Personal Iris

OWNER'S GUIDE

VERSION 1.0

Silicon Graphics

007-9000-010

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Version 1.0

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Notice:
This equipment generates, uses, and may emit radio frequency energy. If you do not install it according to the instructions in this manual, it may interfere with radio communications. The equipment has been tested, and complies with the limits for a class A computing device pursuant to Subpart J of Part 15 of FCC rules. These rules are designed to provide reasonable protection against such interference when you run the equipment in a commercial setting. If you operate this equipment in a residential area, you are responsible for correcting any interference that the equipment causes.

Personal IRIS Owner's Guide
Version 1.0
Document Number: 007-9000-010

Silicon Graphics, Inc.
Mountain View, CA.

To the Reader

Welcome to your Personal IRIS workstation!

The Personal IRIS gives you the power to create 3D, full color designs, and set them in motion. This manual is designed to help you learn to use, manage, and troubleshoot your Personal IRIS. Even if you've never used any kind of computer before, this book gives you all the information you need to get the most out of your IRIS.

The first chapter, "Getting Started", shows you how to set up, start up, and shut down your IRIS, and also shows you how to run an interactive, 3D demonstration program. Finally, it explains how to master the IRIS as quickly as possible given your own computer background.

This book does not show you how to use any particular application program that runs on the Personal IRIS. See the documentation that came with the application for this information.

Contents

To the Reader i
Contents iii

1. Getting Started 1-1

Unpacking and Setting Up the IRIS 1-2
About the Software Tapes 1-3
Selecting a Site 1-3
Putting the Pieces Together 1-4
Starting Up the IRIS 1-9
Trying It Out 1-12
Shutting Down the IRIS 1-17
Where to Go from Here 1-18

2. Learning About the IRIS 2-1

Logging In as *tutor* 2-2
Using the Mouse and Cursor 2-3
Using Max, the IRIS Window Manager 2-5
Using Windows and Icons 2-5
Making Windows Active 2-6
Manipulating Windows 2-7
Moving Windows and Icons 2-8
Using Pop-Up Menus 2-9
The Window Menu 2-11
The Icon Menu 2-13
The Max (Background) Menu 2-14

Using Rollover Menus 2-14
Using the Max Toolchests 2-15
Using *wsh* 2-16
Using the Scroll Bar 2-16
The *wsh* Menu 2-18
Using IRIX 2-19
Understanding the Structure of IRIX 2-19
Pathnames 2-20
Current Working Directory 2-20
Changing Directories 2-22
Using Directories and Files 2-23
Making New Directories 2-24
Understanding the Contents of a Directory 2-24
Copying Files 2-25
Looking at the Contents of a File 2-28
Renaming (Moving) Files 2-31
Removing Files 2-31
Removing Directories 2-32
Summary of Basic Commands and Terms 2-33
Learning the *vi* Text Editor 2-35
Editing a Sample File 2-35
Starting *vi* 2-35
Moving the Text Cursor 2-36
The *vi* Modes 2-37
Inserting Text 2-37
Deleting Text 2-38
Saving Your Edits 2-39
Exiting *vi* 2-40
Creating a New File 2-40
Summary of *vi* Commands 2-42
Logging Out 2-43

3. Using the Power of the IRIS 3-1

The Basics 3-2
Logging In and Logging Out 3-2
Starting and Stopping IRIX Shells 3-3
Summary of IRIX Commands 3-5
Running Applications 3-5
Understanding File Ownership 3-6
About Permissions 3-6
Changing Permissions 3-9
Backing Up and Restoring Your Information 3-11
Using Tapes and Tape Drives 3-12
Backing Up Your Information 3-14
Restoring Information 3-15
Using the Network 3-17
Accessing Other Workstations 3-18
Logging In to Other Workstations 3-18
Transferring Information Between Workstations 3-19
Using Electronic Mail 3-20
Composing and Sending Mail 3-21
Reading, Deleting, and Replying to Mail 3-24
Summary of Mail Commands 3-26
Using the NFS Option 3-27

4. Managing the IRIS 4-1

Choosing a System Manager 4-2
Setting Up a New IRIS 4-4
Starting System Setup 4-5
Setting the Time and Date 4-6
Adding Yourself As a User 4-6
Giving Passwords to Privileged Accounts 4-8
Naming Your IRIS 4-9

Adding the IRIS to a Network 4-9
Before You Begin... 4-10
Attaching IRIS to the Network 4-11
Turning on Standard Network Capabilities 4-11
Setting Up Electronic Mail 4-13
Overview of *sysadm* 4-14
Managing Users and Groups 4-16
Adding Users or Groups 4-18
Adding Users 4-18
Changing Defaults for New Users 4-21
Adding Groups 4-22
Changing Users and Groups 4-22
Changing User Accounts 4-23
Changing the Name of a Group 4-24
Deleting Users and Groups 4-25
Deleting User Accounts 4-25
Deleting Groups 4-26
Managing File Systems and Disks 4-27
Backing Up and Restoring Data 4-28
Selecting Your Backup Tape 4-29
Using Basic Backup/Restore Commands 4-30
Monitoring Disk Use 4-31
Changing Permissions and File Ownership 4-32
Adding New Software 4-33
Expanding Your IRIS 4-37
Adding Silicon Graphics Peripherals and Upgrades 4-38
Adding Other Peripherals 4-39
Adding an ASCII Terminal 4-39
Connecting the Terminal to the IRIS 4-39
Finding the Terminal Model Name 4-40
Configuring the Software 4-41
Adding a Modem 4-43
Connecting the Modem to the IRIS 4-44
Configuring Software for a Dial-In Modem 4-44

Adding a Dumb Serial Printer 4-46
Connecting the Printer to the IRIS 4-46
Configuring the Software 4-46

5. Caring for the IRIS 5-1

Preventative Medicine 5-1
Hardware Dos and Don'ts 5-2
Software Dos and Don'ts 5-4
If It's Not Working Properly... 5-5
Physical Inspection Checklist (Troubleshooting) 5-6
Running Diagnostic Tests 5-7
Removing the Electronics Module 5-11
Packaging the Electronics Module 5-15
Recovering from a System Crash 5-17
Service and Support Information 5-20

A. Using the Ports A-1

Using the Serial Ports A-1
Modem Cables A-3
Null Modem Cables A-3
Cables That Work in IRIS Ports A-5

Glossary G-1

Index I-1

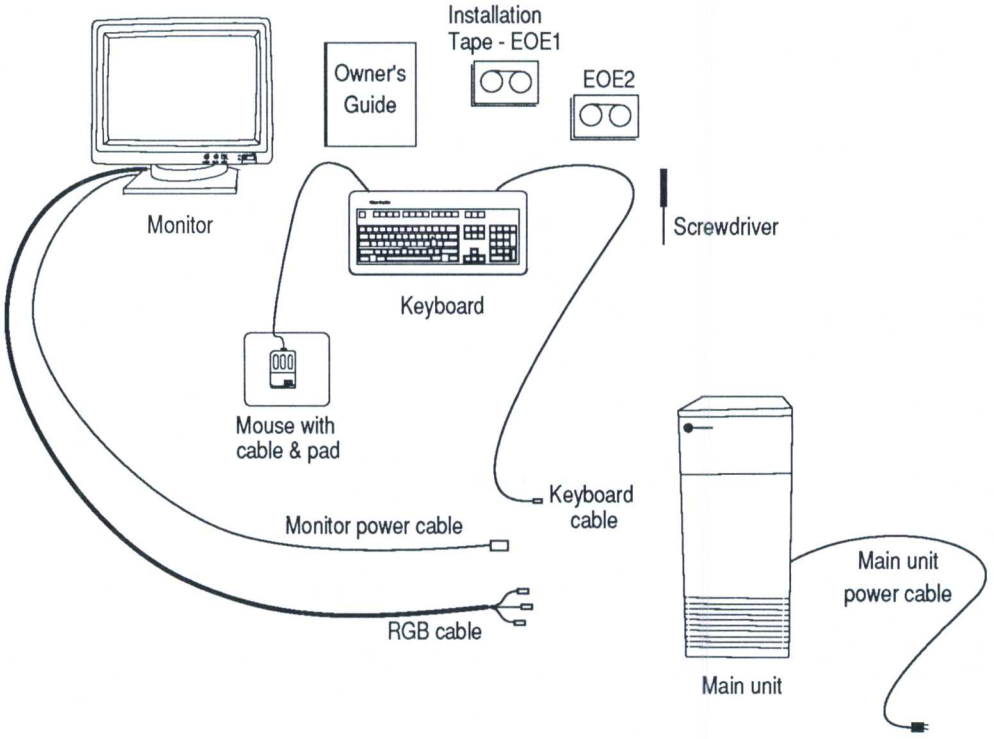
1. Getting Started

This chapter shows you how to set up your Personal IRIS and run an interactive, 3D demonstration program — all in under 20 minutes. It also explains how to use this book to become productive on the IRIS as quickly as possible.

If someone else set up your workstation for you, skip ahead to the next section, "Starting Up the IRIS", on page 1-9.

Unpacking and Setting Up the IRIS

Your Personal IRIS arrived in three separate boxes — one contains the monitor, another contains the main unit, cables, a screwdriver, and the mouse and mouse pad, and the third contains the main unit power cable, software tapes, the keyboard, and manuals. Unpack all three boxes, and make sure you have all of the parts shown below.



If you ordered additional options, set them aside for now. You can install them after you set up the workstation.

About the Software Tapes

You received at least two tapes with your system — one is labeled "EOE1 - Installation Tape", and the other is labeled "EOE2". These tapes contain a copy of the information that is already on the IRIS. EOE1 also contains a software installation tool that you use to take care of the IRIS.

Do not, under any circumstances, use these tapes to store your own information. Store the tapes in a safe place so you can find them in case of a system failure.

Selecting a Site

The Personal IRIS is designed to fit easily into your office. Its fan is quiet, and the main unit is small enough to fit under your desk. Find a convenient spot using these suggestions:

- Place the main unit and the monitor within six feet of each other; you will connect them with cables that are ten feet long.
- Place the main unit within eight feet of a standard, three-prong (grounded) electrical outlet.
- Do not place the main unit within a small, enclosed area such as a closet. It is important not to block the vents in the front or the back.

For detailed hardware maintenance and troubleshooting information, see Chapter 5, "Caring for the Personal IRIS".

Putting the Pieces Together

Ports look like small, black outlets, while **RGB posts** are short metal cylinders.

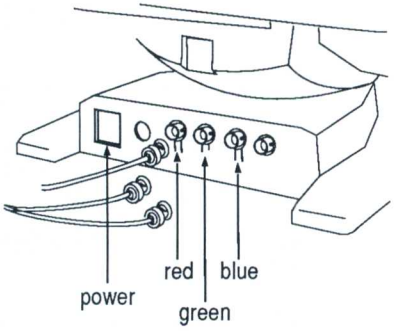
Putting the IRIS together involves connecting cables to outlets (ports and RGB posts) on the main unit, the monitor, and the keyboard.

Place the monitor and the main unit near the spots you have selected, then follow these steps:

1. **Connect the cables to the monitor.**

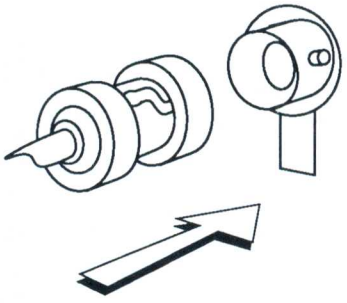
- ❑ Face the back of the monitor so you can access the outlets.
- ❑ Locate the RGB and monitor power cables.

  The monitor power cable is thin and grey; the RGB (Red, Green, Blue) cable is thick and grey, with red, green, and blue segments at either end.



- ❑ Plug the female end of the monitor power cable into the monitor power outlet.
- ❑ Connect the red, green, and blue segments of the RGB cable to the posts labeled **red**, **green**, and **blue** on the monitor.

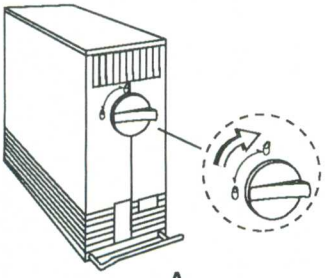
  Fit each connector over the corresponding RGB post on the monitor, being careful to line up the small metal tabs on each post with the notches in the connector. Simultaneously press and twist the connector clockwise to lock it into place.



- ❑ Make sure the white switches below the RGB posts are pressed in (so they are in the 75-ohm position). If they are not pressed in, the colors your monitor displays will not be correct.

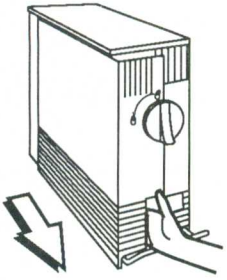
2. Remove the plastic side panel of the main unit.

Some of the outlets are inside the main unit, so you need to remove the plastic side panel to access them.

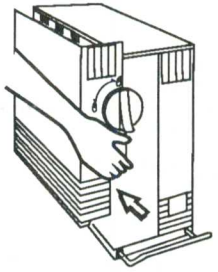


A

- ❑ Face the back of the main unit so the locking dial is in front of you.
- ❑ Turn the locking dial clockwise so it points to the open padlock. (A)
- ❑ Grab the panel at the rectangular opening at the bottom of the panel, then pull the panel toward you. (B) This releases the side panel, so you can lift it away from the main unit. (C)



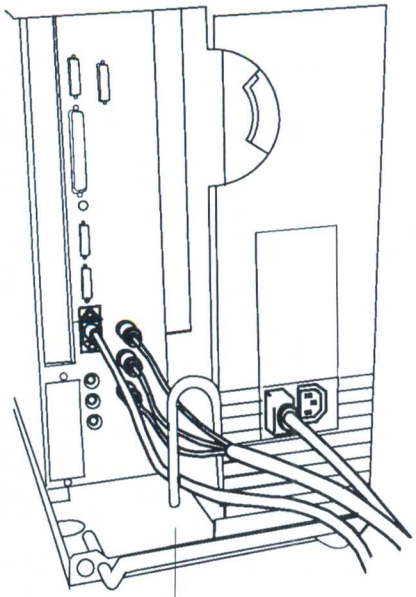
B



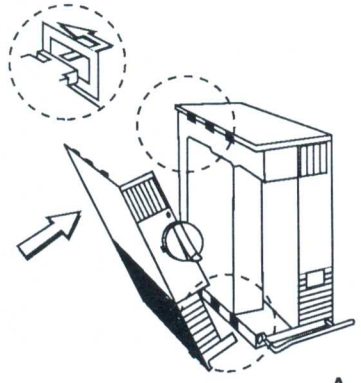
C

You see a number of outlets to which you will connect the keyboard and RGB cables.

3. Connect all cables to the main unit.

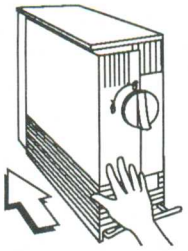


- ❑ Connect the red, green, and blue segments of the RGB cable to the posts labeled **red**, **green**, and **blue** on the main unit, just as you did for the monitor. It's easiest to connect first the blue, then green, then red segments.
- ❑ Locate the keyboard cable; it is white and has connectors on either end.
- ❑ Plug either end of the keyboard cable into the port labeled **keyboard** on the main unit, then screw it into place with the screwdriver provided.
- ❑ Route the RGB and keyboard cables through the U-shaped bracket at the bottom of the main unit.
- ❑ Plug the male end of the monitor power cable into the port on the main unit, which is to the right of all the other ports.



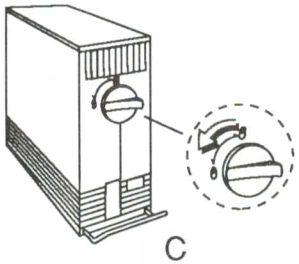
4. Replace the plastic side panel.

- ❑ Face the back of the main unit.
- ❑ Make sure the arrow on the locking dial is pointing to the open padlock.
- ❑ Line up the tabs on the bottom of the panel with the holes on the bottom edge of the main unit. Push the tabs through the holes. (A)



B

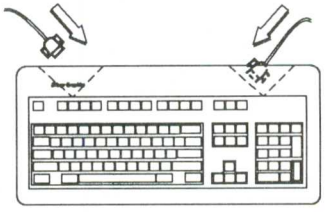
- ❑ Line up the same tab and hole arrangement on the top of the panel and the top edge of the main unit.
- ❑ Push the panel firmly toward the front of the main unit, so the tabs seat in the holes. (B)
- ❑ Turn the locking dial counterclockwise so it points to the closed padlock. (C)

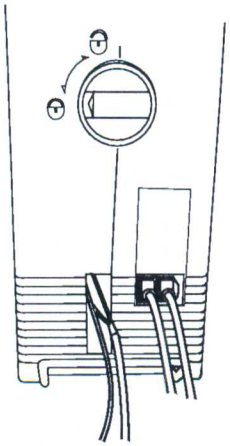


C

5. Connect the mouse and the keyboard.

- ❑ Plug the connector on the mouse cable into one of the two ports that are on the underside of the keyboard, then screw it into place. (Left-handed people usually prefer to use the left port, while right-handed people prefer the right port.)





- ❑ Plug the keyboard cable into the other port on the keyboard, then screw it into place.

6. Connect the main unit power cable.

- ❑ Plug the female end of the power cable into the port that is on the back of the main unit (next to the monitor power cable).
- ❑ Plug the male end of the power cable into a standard, three-prong (grounded) power outlet.

Important Note: Do not use an adaptor to plug the workstation into a two-prong (ungrounded) outlet. This could damage the workstation, and could build up a static charge in the metal parts of the workstation.

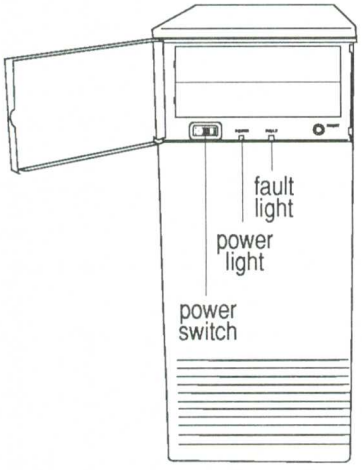
Your Personal IRIS is completely set up. Before you install any options or attach the IRIS to a network, start it up to make sure everything is working as it should. Then see "Shutting Down the IRIS" on page 1-17 to shut it down before installing other hardware.

Starting Up the IRIS

Make sure all cable connections are solid, then position the IRIS in the spot you chose. If the IRIS is already started up (if you see pictures on the screen) skip ahead to the next section, "Trying It Out".

Important Note: When the IRIS is turned on, do not move the main unit. It contains a hard disk that may be damaged if you move it while it is running.

To start up the IRIS, follow these steps:



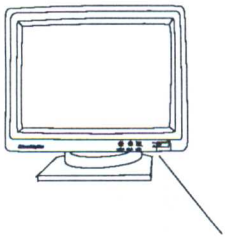
1. Turn on the main unit.

- ❑ Open the door on the front of the main unit.
- ❑ Turn on the power switch.

  You see the green power light and yellow fault light come on; after a few moments, the yellow light turns off.

  If the yellow light remains turned on for more than one or two minutes, something may be wrong with the workstation. Try turning the power off and on again. If the yellow light still remains on, see Chapter 5, "Caring for the IRIS".

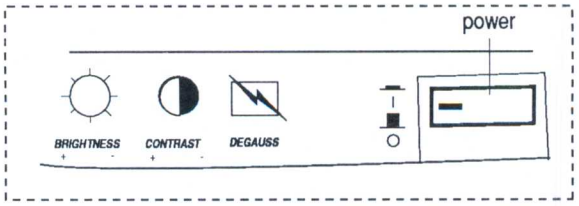
- ❑ Close the door.



2. Turn on and adjust the monitor.

- Press the power switch on the front of the monitor. You will see the green light on the switch turn on.

  You should see the Silicon Graphics logo in the upper left corner of the screen.



- If the picture is too dark or bright, adjust the contrast and brightness using the two control dials to the left of the power switch.

3. When you see the login prompt, log in to the system.

The system takes about 30 seconds more to start up. While it's starting, you see some messages:

```
Starting up the system...

(To perform system maintenance instead, press <Esc>.)
```

Then you see the login prompt:

```
IRIS console login:
```

Log in as *tutor* by typing:

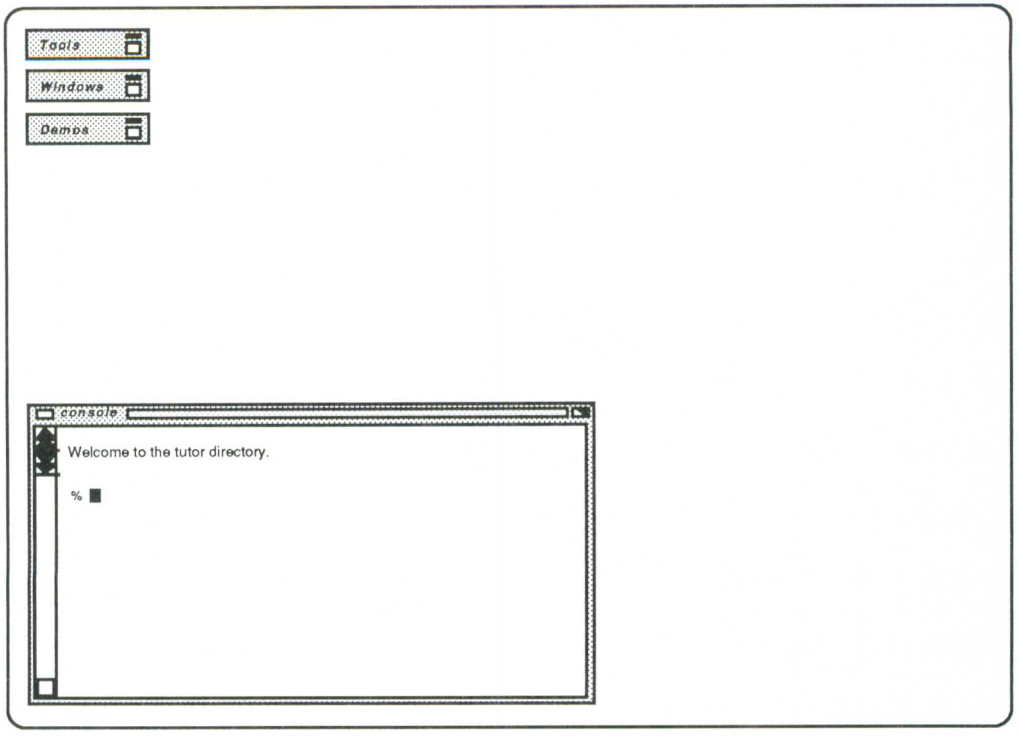
```
tutor
```

Then press <enter>.

The cursor turns into an hourglass, then you see this message:

Welcome to the Personal IRIS

Then your screen looks something like this:



This means the system is ready to go.

Important Note: If you get an error message at any point during startup, see Chapter 5, "Caring for the IRIS".

Now that your system is up and running, you have several options:

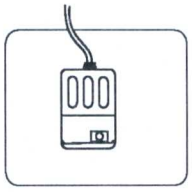
- To run an interactive, 3D demonstration program, go on to the next section, "Trying it Out".
- To install options such as a disk drive, go on to page 1-17, "Shutting Down the IRIS", then follow the instructions that came with the options.
- To learn how to use the system, go on to Chapter 2, "Learning About the IRIS".
- To set up user accounts or add peripherals, see Chapter 4, "Managing the IRIS".

Trying It Out

Before you learn some basics about the Personal IRIS, have some fun with the demonstration programs that you can access through the *Demos* toolchest.

The IRIS has an optical mouse. If the mouse is not on top of the mouse pad, the IRIS will not notice when you move the mouse.

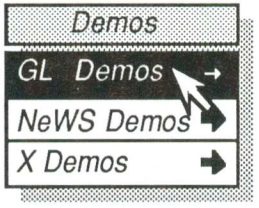
You communicate with the IRIS through the mouse. Make sure the mouse is positioned on the mouse pad, and your fingers are over (but not pressing down) the three mouse keys. Make sure the mouse and the pad are oriented like this:



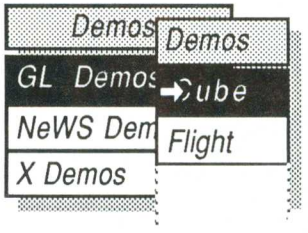
Move the mouse around the mouse pad, and note that the cursor (small red arrow on the screen) echoes the movements of the mouse. Chapter 2 explains the mouse and all its buttons in detail; for now, use the right hand mouse button to run a demo by following these steps:

1. Move the mouse so the cursor is over the rectangular icon (toolchest) called *Demos*.

2. Press and hold down the right hand mouse button. You see this menu:



3. Move the cursor so the first item, "GL Demos", is highlighted (so its background is black, and the letters are white), then slowly slide the cursor to the right. You see another menu:



(This is called a rollover menu; you learn more about it in Chapter 2.)

4. Move the cursor so the first item, "Cube", is highlighted, then release the right hand mouse button. You see a red square (a resize box):

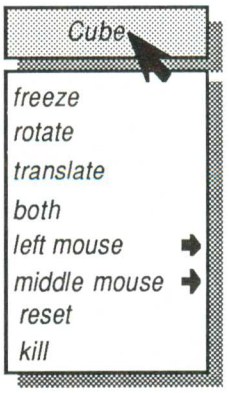
5. To make this box large enough to hold the demo program, sweep it out by following these steps:

- Move the mouse so the box is in the center of the screen.
- Press and hold down any mouse button.
- Keep pressing down the button, and move the mouse diagonally so the box stretches.

  If you do not continue pressing the mouse button, you may start the demo in a very small window. If this happens, position your cursor over the window, and use the right hand mouse button to select "resize" from the pop-up menu that you see.

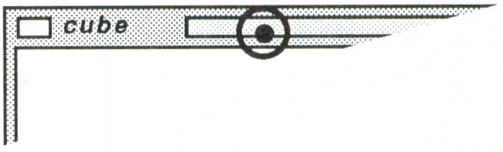
- When you like the size of the box, release the mouse button. You see the demo program appear in its own window.

6. To make the cube spin and move toward you and away from you, select items from *Cube*'s menu. Position your cursor over the cube, then press and hold the right hand mouse button to see this menu:



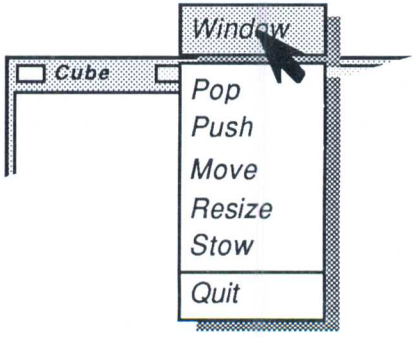
This program will run forever if you let it. To stop the program and make its window disappear, follow these steps:

1. Move the cursor so it's over *Cube*'s title bar.



The cursor turns into a bulls-eye.

2. Press and hold down the right hand mouse button. You see this menu:



3. Move the cursor so "Quit" is highlighted, then release the mouse button. The window disappears.

You have successfully run a demo program! Feel free to run some more that you find in the *Demos* toolchest. Note that the colors in certain demos may look incorrect if your IRIS has less bitplanes (less color capacity) than the demos require.

Important Note: Two programs that may be in the *Demos* toolchest, Flight and Arena, use the entire screen. To stop these programs, press the <Esc> key while they are on the screen.

You have already seen a little of the IRIS's powerful windowing system, 4Sight. Chapter 2 shows you how to use the mouse and all the pop-up menus that let you get the most out of 4Sight.

Shutting Down the IRIS

While the IRIS is running it keeps several important files open. You could shut down the system just by turning off the power switch on the main unit, but you will lose valuable data that way. The best way to shut down the system is to first close those files, then turn off the power. You use the *halt* command to close the files.

To safely shut down the system, follow these steps:

1. Position your cursor over the black part of the console window, which is in the lower left corner of the screen.

2. Become the system manager by typing:

   ```
   su
   ```

   Then press <enter>. If you are asked for a password that you do not know, ask your system manager to shut down the system for you.

3. When you see the # prompt, start the shutdown by typing:

   ```
   halt
   ```

   Then press <enter>. After a few moments, you see this message:

   ```
   Okay to power off the system now.

       Press any key to restart.
   ```

   This tells you it is safe to turn off your system.

4. Turn off the power switch behind the door on the front of the main unit.

5. Turn off the power switch on the front of the monitor.

Your IRIS is now shut down. After it has been shut down for one minute, you can safely move the main unit. To start it back up, turn on the power switches on first the main unit, then the monitor as described on page 1-9, "Starting Up the IRIS".

Where to Go from Here

This book teaches you the skills you need to get the most out of your IRIS. Specifically, it shows you how to:

- work with windows using the mouse and pop-up menus
- use IRIX commands to manage your information
- edit text using *vi*, the visual text editor
- work in a networked environment using electronic mail and TCP/IP
- manage and expand your system
- maintain and troubleshoot your hardware and software

Everyone who uses the IRIS needs to understand how to use windows, IRIX commands, *vi*, and, if the IRIS is part of a network, the networking tools; only those users who are responsible for the upkeep of the IRIS need to use the information in Chapters 4 and 5 to manage and troubleshoot the IRIS.

Chapter 2, "Learning About the IRIS", is an interactive tutorial that introduces you to windows, IRIX, and *vi*, and explains some basics about managing your information. It guides you through this material step by step, and tells you where you can find more detailed information.

Chapter 3, "Using the Power of the IRIS", summarizes key information you learned in Chapter 2, and expands on the basic knowledge you gained from the tutorial to show you how to take advantage of all the features the IRIS offers. Specifically, it explains how to manage your files, back up your information, and use the network and electronic mail.

Chapter 4, "Managing the IRIS", explains system security, multi-user systems, and networking. It shows you how to set up the software on a new workstation, and gives you all the information you need to manage these functions, and to expand the capabilities of your IRIS.

Chapter 5, "Caring for the IRIS", shows you how to maintain the hardware and software, and tells you what to do if your IRIS has any problems.

If you are unfamiliar with IRIX (or any form of the UNIX operating system) and the *vi* text editor, start with Chapter 2. If you already know about IRIX and *vi*, go on to Chapter 4 to set up user accounts for everyone who will use this Personal IRIS.

2. Learning About the IRIS

Every time you start up your Personal IRIS, you enter the world of visual computing. This chapter introduces the fundamentals of using the IRIS — working with windows, using IRIX commands to manage your information, and using *vi*, the basic text editor. When you finish this tutorial you will have all the skills you need to use the full power of the IRIS.

To use this tutorial, your IRIS must be set up and started up; see Chapter 1, "Getting Started", if this is not the case.

Logging In as *tutor*

After you start up the IRIS, it displays this prompt:

```
IRIS console login:
```

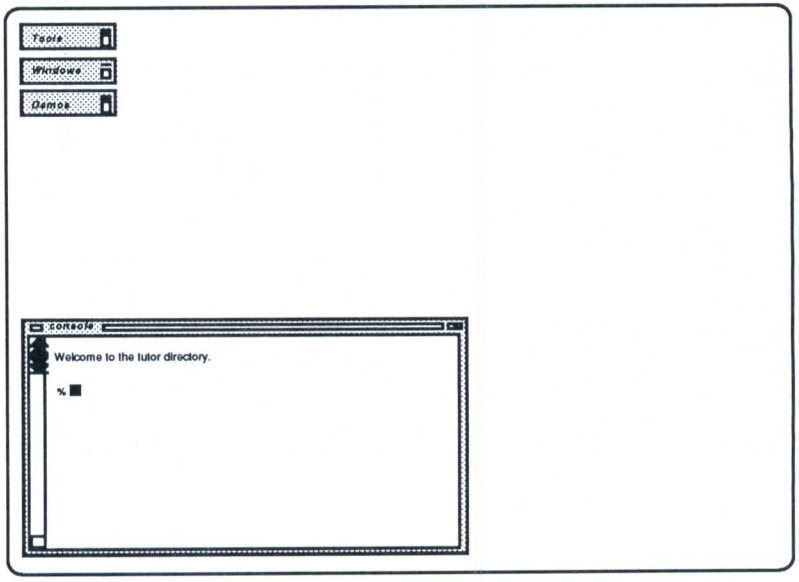
This means it is ready for you to log in. For now, log in as *tutor* by typing:

```
tutor
```

Then press <enter>. The screen blanks for a moment, then displays this message:

Welcome to the Personal IRIS

After a few moments, a black window appears in the lower left hand corner of the screen, and three small boxes (icons) appear in the upper left hand corner. The screen looks like this:



The black window is the console window, a text window through which you communicate with IRIX. Inside the console window you see a welcome message, and a percent sign (%). This is the system prompt; you learn more about it later in the tutorial.

The console window is special because the IRIS sends messages to the console window by default. Later in this tutorial you learn how to create additional text windows like this one that can also accept IRIX commands.

You are now logged in to the special account for people who want to use the tutorial. After you finish the tutorial, see Chapter 4, "Managing the IRIS", to learn how to set up your own account.

If at any point you want to take a break and log out, see page 2-43, "Logging Out".

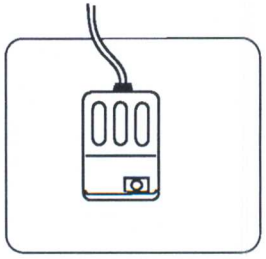
Using the Mouse and Cursor

When you log in, the system starts Max, the IRIS windowing system. Max lets you use many windows on the screen at once. These windows can contain either graphics or text, and can communicate with IRIX, just like the console window.

You manipulate windows through the mouse and cursor.

The IRIS has an optical mouse. If the mouse is not on top of the mouse pad, the IRIS will not notice when you move the mouse.

Make sure the mouse is positioned on the mouse pad, and your fingers are over (but not pressing down) the mouse buttons. Make sure the mouse and the pad are oriented like this:



Move the mouse around the mouse pad, and note that the cursor (small red arrow on the screen) echoes the movements of the mouse.

There are two basic actions you perform with the mouse — moving the mouse to move the cursor on the screen, and pressing the mouse buttons. You combine these actions to use pop-up menus to act on icons and windows.

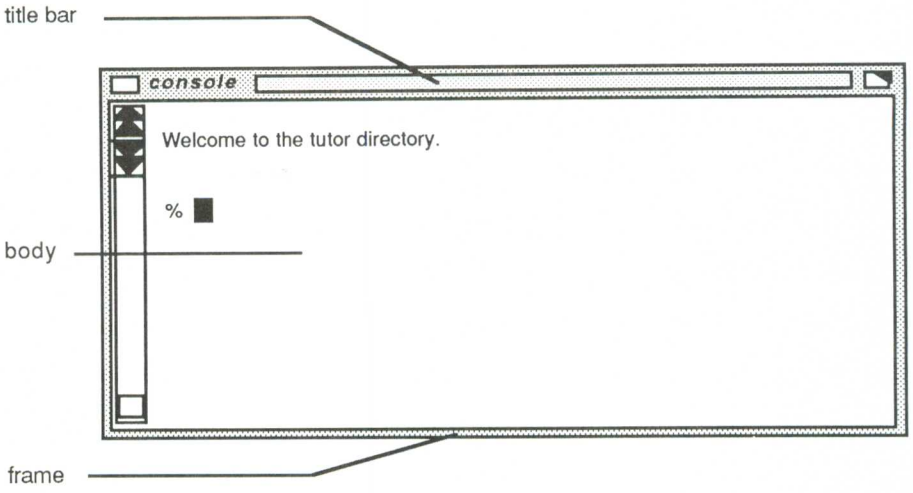
You use the right hand mouse button to request pop-up menus, and use the other two buttons for shortcuts. At first the three buttons may seem confusing, but you'll soon feel comfortable with the mouse and can take advantage of the extra shortcuts that the three buttons provide.

Using Max, the IRIS Window Manager

The window manager lets you move windows around like pieces of paper on a desktop, stack them up, change their size, stow them as icons, and make them disappear when you are done using them. You can also scroll through them to review their contents.

Using Windows and Icons

A window has two main parts: its *body*, the main portion of the window, and its *frame*, the border around the body. The top portion of the window frame that contains the window's title is called the *title bar*.



Making Windows Active

The most important thing to remember when you work with windows is that you can communicate with only one window at a time. That one window is called the *active* window. When a window is active, it accepts input from the keyboard and mouse; in other words, it recognizes when you are typing something or pressing a mouse button.

You make a window active by positioning the cursor over the body of the window. Experiment with making the console window active and inactive.

1. Position the cursor over the body of the window (not the title bar or the frame); notice that the title bar highlights. This means the window is active.

   Press <enter> a few times; you see more system prompts. This confirms that the window is active.

2. Move the cursor out of the window, so it's over the blue background; press <enter> a few times. Nothing happens because the window is no longer active.

3. Move the cursor over the title bar or frame of the window, so the cursor turns into a bulls-eye; press <enter> a few times. Again, nothing happens because the cursor must be over the body of the window to make the window active.

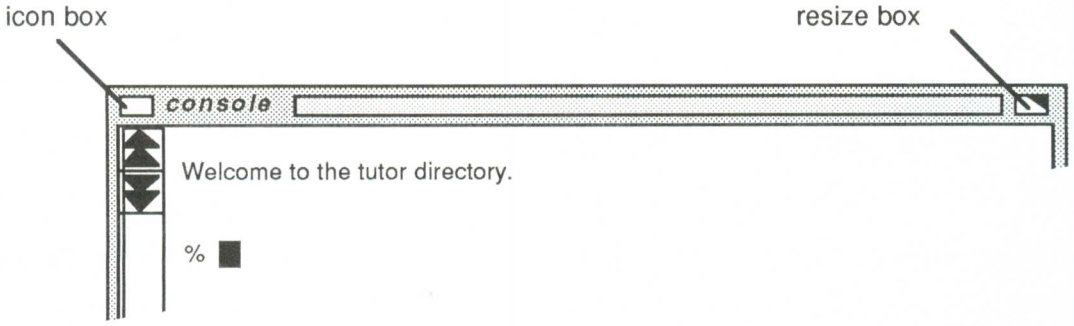
There is also a way to make the window active while the cursor is not in the window. Position the cursor over the body of the window, press and hold down the <Ctrl> key, then move the cursor out of the window.

The title bar is still highlighted; as long as you keep pressing the <Ctrl> key, this window remains active.

Manipulating Windows

The title bar also contains two small white boxes, one in each corner. The box on the left is the icon box. Press the left mouse button when the mouse cursor is over this box and the window turns into an icon. The box on the right side of the title bar is the resize box. Press and hold the left mouse button over this box to change the size of the window.

This figure shows the location of the icon and resize boxes.



Try using the icon box on the console window by positioning the cursor over the box, then pressing and releasing the left mouse button. It shrinks to a small grey square with the window's title written on it. Notice that when the mouse cursor is over the icon the cursor becomes a red 'X'. Open the window again by putting the mouse cursor over the icon and pressing the left mouse button.

Now move the mouse cursor over the resize box. Press and hold down the left mouse button. A red outline of the window appears. While still holding down the left mouse button, move the mouse so that the outline is half the size of the console window, and then release the mouse button. The window reshapes itself to fit inside the outline (but the text in the window stays the same size).

You can't make the console window larger than its original size using the resize box. This is because some windows (especially text windows) have maximum sizes. Some other windows don't have any size constraints, and you can make them as large as the entire screen.

Moving Windows and Icons

Often you may want to organize your screen space by moving windows and icons around. To move a window, follow these steps:

1. Move the mouse cursor to anywhere on the window frame except the icon or resize boxes.

2. Press and hold down the middle mouse button. A red outline of the window appears.

3. While holding down the middle mouse button, move the mouse to where you want to place the window. The red window outline shows you where the window will go.

4. Let go of the mouse button. The window moves to where the outline was when you let go.

Try moving the console to a couple of different places on the screen. Note that you can move part of it off the screen if you want.

To move an icon, follow the same procedure. You can press the middle mouse button when the mouse cursor is anywhere inside the icon.

Using Pop-Up Menus

There is one other way to interact with the window manager; you can select items from a variety of *pop-up menus*. Pressing the right hand mouse button gives you the menu associated with whatever is under the mouse cursor. (If you just pressed the button and see a menu, move the cursor off of the menu so no items are highlighted, then release the button.)

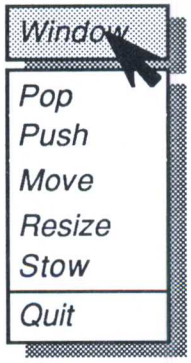
The frame of every window has the same menu associated with it (the *Window menu*). Similarly, every icon has the same menu (the *Icon menu*). The body of a window may have its own unique menu for manipulating the program running in it; for instance, the body of the console window has a menu entitled "wsh". This is because the console window is a special version of *wsh*, the windowing IRIX shell. You learn more about *wsh* later in this chapter.

To use the console window's Window menu, follow these steps:

1. Move the mouse cursor over any part of the window frame, except the icon and resize boxes.

2. Press and hold down the right mouse button.

   You see this menu:



   This menu appears when you press the right mouse button while the cursor is located in the frame of any window.

3. Holding down the right button, move the cursor down the menu.

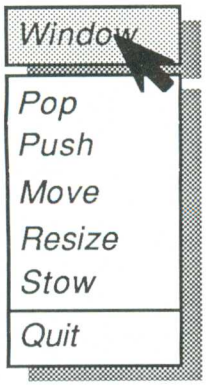
   As you move the cursor, each item it touches is highlighted. **Do not release the button this time.** If you release the mouse button while an item is highlighted, Max carries out the action. This is called *selecting* the item.

4. Move the cursor outside the menu. None of the menu items are highlighted. Nothing happens when you release the mouse button.

5. While the cursor is outside the menu, release the right button.

   The menu disappears and nothing else changes.

Max uses three pop-up menus for controlling windows and icons. These three menus and the items they contain are described below.

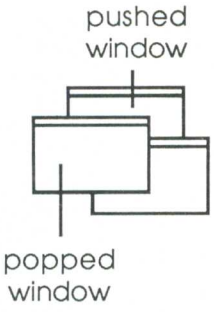


The Window Menu

The Window menu appears when you press the right mouse button on any window frame. Some windows allow you to access this menu from the body of the window as well; others use their own menus within the body of the window (the console window, for example). The Window menu contains these items:

Pop Put the window in front of any other windows. You can also pop a window by pressing the left mouse button when the cursor is over the window frame (but not over the icon or resize boxes).

Push Put the window behind any windows it overlaps.



Move Move the window anywhere on the screen. When you select this item, a red outline appears around the window. Without pressing any buttons or keyboard keys, move the outline with the mouse. When the outline is where you want to place the window, press any mouse button or keyboard key. The window moves to where you put the red outline on the screen.

You can also move windows by positioning your cursor over the frame, pressing the middle mouse button, and dragging the red outline to a new position.

Resize Change the window's shape and position. When you select this item, a small red box appears next to the cursor. Move the point of the mouse cursor to where you want one corner of the window to be. Press and hold down any mouse button. While holding down the mouse button, move the cursor in any direction. You see the red outline of a box. One corner is anchored at the spot you selected. The opposite corner follows the mouse cursor as you move it. When you have made the outline the size and shape you want, let go of the mouse button. The window is drawn inside it, and erased from its old location.

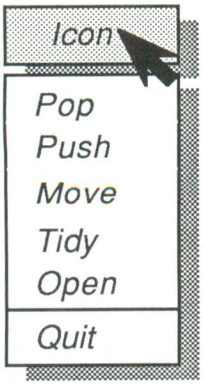
You could also resize the window by positioning the cursor over the resize box, pressing and holding the left mouse button, and stretching the box to a new size.

Stow Make the window an icon.

Quit Delete a window, terminating the program running in it.

The Icon Menu

The Icon menu appears when you press the right mouse button on any icon. It contains these items:



Pop Put the icon in front of any other windows/icons.

Push Put the icon behind anything it overlaps.

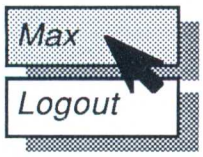
Move Move the icon anywhere on the screen. When you select this item, you see a red outline appear around the icon. Without pressing any buttons or keyboard keys, move the outline with the mouse. When you are ready, press any mouse button or keyboard key. The icon moves to where you put the red outline.

Tidy Moves the icon to the lower left corner of the screen. If you tidy several icons, they line up neatly along the lower border of the screen.

Open Make the icon a window. You can also open an icon by pressing the left mouse button while the mouse cursor is over it.

Quit Delete an icon, terminating the program or shell running in it.

The Max (Background) Menu

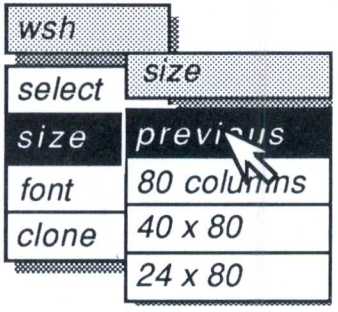


If you press the right mouse button over the background, you see the Max menu. If has only one item, "Logout". You should use this menu only when you are completely done with your session on the IRIS. See the section entitled "Logging Out" at the end of this chapter for instructions on using this menu.

Using Rollover Menus

You will come across another kind of menu item on some menus. Move the mouse over the body of the console window. Now, press and hold down the right mouse button. You see the *wsh* menu. Notice that two of the items, "size" and "font", have arrows pointing off the right side of the menu.

While holding down the right mouse button, move the cursor over the "size" item so it is highlighted, then slide the mouse cursor slowly to the right. Another menu, titled "size", pops up on top of the first one. It looks like this:



This is called a *rollover menu*. You select items from a rollover menu just like you would from any other menu. (You learn what the items in this menu do in the next few pages.)

Using the Max Toolchests

In Chapter 1 you used one of the three small boxes in the upper left corner of the screen to run a demonstration program. These boxes are called *toolchests*. Toolchests are essentially menus that contain useful Max functions and programs. You select items from a toolchest as you do from any other menu, with the right hand mouse button. If you don't like the location of the toolchests on your screen, you can move them individually using the middle mouse button (the same way you move an icon).

Toolchests let you create new windows. Earlier you read about *wsh* windows; now you can create one using the toolchest. Follow these steps:

1. Move the mouse cursor over the *Tools* Toolchest.

2. Press and hold down the right hand mouse button. The *Tools* menu appears.

3. Select the first item, "Shell", from the menu.

   A large red outline of a window appears, and follows the cursor.

4. When you have positioned the outline where you want the window to be, press any mouse button.

You have just created a *wsh* window, a window that contains an IRIX shell. For the rest of this tutorial, work in this window rather than the console window.

Using *wsh*

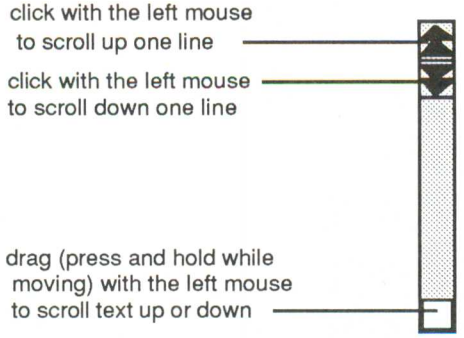
wsh is an IRIX shell that runs in a window. From a *wsh* window, you can execute IRIX commands, edit files, and run programs.

You should use a *wsh* window when you do your work rather than the console window for these reasons:

- The *wsh* window is 40 lines long, and the console window is only 24 lines long. Screen editors like *vi* generally work better in full size *wsh* windows.
- The console window receives messages from the system and prints them out on the screen. This can sometimes get in the way if you are editing files or executing commands.
- If you don't use the console window, you always have that window free in case you need it for something special.

Using the Scroll Bar

wsh windows contain a scroll bar. You can use the scroll bar to view lines you typed that are no longer visible on the screen. The figure on the next page shows the parts of the scroll bar.



Use the left mouse button to click on the two arrow-shaped controls in the upper left corner of the window. These scroll text up or down one line each time you click on them.

You can also use the left mouse to move the square white slider at the bottom left of the window. Click the left mouse button in the middle of the scroll bar. The square slider jumps underneath the mouse cursor (and the text in the window jumps as well).

Now, position the cursor over the slider, hold down the left mouse button, and slide the cursor up and down within the scroll bar border. The text in the window slides up and down too.

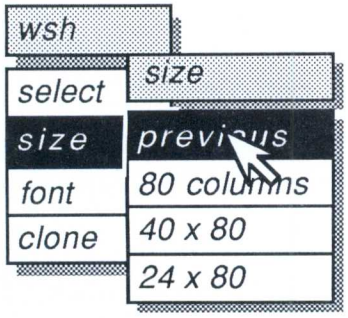
To get to the end of the text, slide the square white slider to the very bottom of the scroll bar.

The *wsh* Menu

Each *wsh* window also has its own menu, which you see when you press the right mouse button over the body of the *wsh* window. The *wsh* menu contains the following items:

select — Put the *wsh* window in front of any windows overlapping it. This item is the same as "Pop" on the Window menu.

size — Change the size of the *wsh* window. This is a rollover menu; you can choose the following sizes:



previous — Set the window to whatever size it was before it was last resized.

80 columns — Set the width of the window to 80 columns; don't change the height.

40 x 80 — Set the window to 40 lines of 80 columns. This is the default size.

24 x 80 — Set the window to 24 lines of 80 columns.

font — Change the size and shape of the font used in the *wsh* window. This is a rollover menu; you can choose from a variety of fonts and point sizes.

clone — Make a new *wsh* window with the same size, shape, font, etc. as the current window.

Using IRIX

Whenever you start up the IRIS, you start up the IRIX operating system. An operating system performs two basic functions:

- It stores your information in some logical structure.
- It translates your commands for the computer hardware.

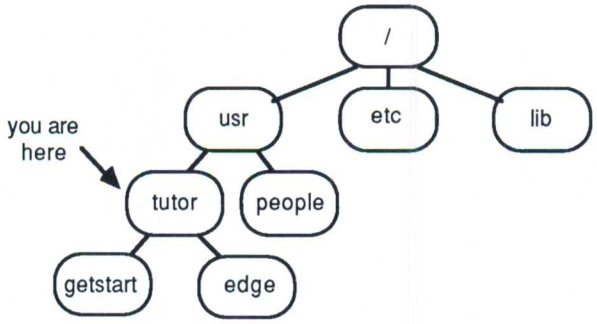
This section explains how IRIX is structured, and teaches you the basic IRIX commands you use to manipulate files and directories.

Understanding the Structure of IRIX

IRIX lets you store your information in two different types of containers: *files* and *directories*. Files contain information such as text or programs, while directories contain files and other directories.

Like many operating systems, IRIX organizes files and directories in a hierarchy. At the top of the hierarchy is the *root* directory, which is written as a slash (/). This directory contains files and other directories; these directories in turn contain other files and directories, and so on. This hierarchy is called a *file system*.

When you logged in as *tutor*, IRIX placed you in a certain location in the file system; in this case, it placed you in a directory that is also called *tutor*.



IRIX places you in the same directory every time you log in; this directory is called your *home directory*. Usually your home directory has the same name as your login account, which is true for *tutor*. The idea of location is very important for understanding the structure of IRIX.

Pathnames

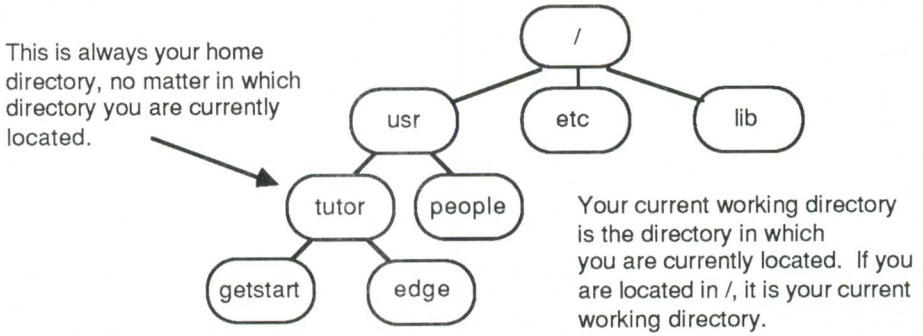
A pathname is the list of directories that leads you from the *root* directory, through other directories, to a particular directory or file. In the diagram above, the path that you follow to get to the *tutor* directory is */usr/tutor*. The leading slash (/) stands for the *root* directory, while the other slash separates the *usr* and *tutor* directories from each other.

Current Working Directory

When you use IRIX, you are always located in one of the directories in its file system. Your location at a given time is called your *current working directory*. You just learned that IRIX automatically places you in your home directory when you log in; this means that

when you log in, your home directory is also your current working directory. So, your current working directory right now is */usr/tutor*.

The difference between your home and current working directories is that your home directory never changes, while your current working directory changes each time you move to a new directory (change locations) in the file system.



You don't usually refer to files and directories using their full pathnames. Instead, you can refer to them in terms relative to your current working directory. For example, if you are in */usr/tutor*, you can refer to the directory */usr/tutor/getstart* simply as *getstart*.

Whenever you type a file or directory name that does not begin with slash (/), the IRIS assumes that it is located in your current working directory. If you do precede a name with a slash, the system looks in the *root* directory for the name.

To find out in which directory you are located, you need to issue an IRIX command. Remember, to erase

characters, press <Back Space>, and to cancel a command and start over, press <Ctrl-U>.

The command *pwd* stands for print working directory, or, loosely translated, "where am I?" At the system prompt (%), type:

```
pwd
```

Don't forget to press <enter>. You logged in as *tutor*, and you are still in your home directory, so the IRIS responds with this:

```
/usr/tutor
```

Changing Directories

The *tutor* directory contains other directories that you use to do different tutorials. To look at, or *list* the contents of *tutor*, you use the *ls* command. Type:

```
ls
```

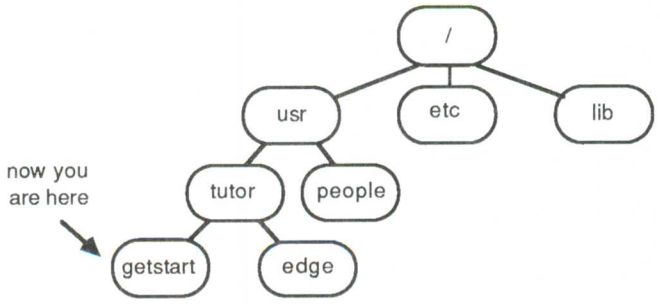
The system shows you this:

```
edge                getstart
```

This listing means that *tutor* contains two items: *edge* and *getstart*. *edge* is a directory set up for another tutorial; *getstart* is set up for people who use this tutorial. You must be located in *getstart* to use this tutorial, so you need to change directories. The IRIX command for this is *cd*. Type:

```
cd getstart
```

Now you are in *getstart*, and it is your current working directory.



To see the full pathname of your current working directory, type:

```
pwd
```

To see the contents of this directory, type:

```
ls
```

You see these two file names:

```
runme      textfile
```

You use these sample files in the next section to learn how to use directories and files.

Using Directories and Files

The IRIX file system is very flexible. Within your home directory you can create a hierarchy of files and directories that suits your organizational needs.

Making New Directories

As you create more and more files, you'll find it convenient to organize them into directories. Make sure you are located in the *getstart* directory. Type:

```
pwd
```

Use the *mkdir* command to make a directory here called *sub*. Type:

```
mkdir sub
```

Use *ls* to look for your new directory. Type:

```
ls
```

You see these names:

```
runme      sub     textfile
```

Understanding the Contents of a Directory

At this point the *getstart* directory contains three items, and you may not remember what each different name means. If, for example, you had named the new directory *text*, you may not remember whether it is a directory or a file the next time you log in.

IRIX can give you a more informative listing about the contents of your directory when you use an option with the *ls* command. Many commands have options that expand the functions that they perform. You usually specify an option with a hyphen (-) and one or more characters. Try the **F** option now by typing:

```
ls -F
```

You see this list:

```
runme*      sub/    textfile
```

When you use the **F** option with *ls*, IRIX:

- puts an asterisk next to all programs, such as *runme*
- puts a trailing slash (/) after all directories, such as *sub*
- does not add any characters to plain text files, such as *textfile*

Start fresh by putting some files into the new directory. First, move into the *sub* directory so it is convenient to work with new files. To move into *sub*, type:

```
cd sub
```

Note that you could also move into *sub* using its full pathname:

```
cd  /usr/tutor/getstart/sub
```

Copying Files

Use *pwd* to make sure your current directory is *sub*, then see what it contains. Type:

```
pwd
ls
```

There are no files or directories in *sub*. You can create directories in *sub* using *mkdir;* you can create files here using a text editor such as *vi* (you learn how to do

this later in this tutorial), or by copying them from another directory with the *cp* command.

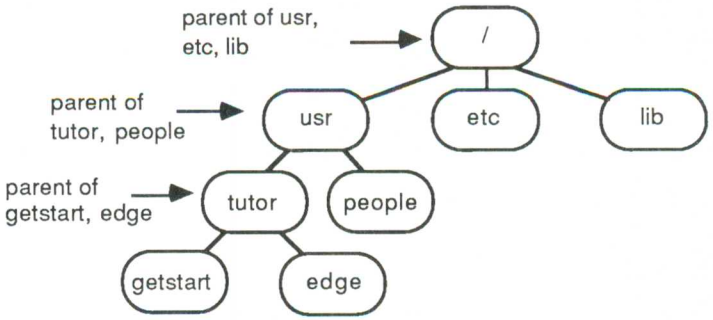
To use *cp*, you must give IRIX two pieces of information: the pathname of the file you want to copy, and the pathname of the new file. The pathnames can be either full pathnames (from / on down) or pathnames relative to the current working directory. In the next few minutes, you'll copy one of your files from *getstart* into *sub*.

First, change directories so you are in *getstart*. Type:

```
cd /usr/tutor/getstart
```

There is also an easier way to do this. Two periods (..) are always equivalent to the name of the *parent* of your current working directory. The parent of your current working directory is the directory that contains your current working directory.

For example, if you are located in */usr/tutor/getstart*, the parent (..) is */usr/tutor*. If your current working directory is */usr/tutor*, the parent is */usr*. So, you could have typed `cd ..` to move from */usr/tutor/getstart/sub* to */usr/tutor/getstart*. Don't type this now, or you'll move into */usr/tutor* since you are now in */usr/tutor/getstart*.



To check where you are now, type:

```
pwd
```

You see this:

```
/usr/tutor/getstart
```

To look at the contents of *getstart*, type:

```
ls -F
```

You see this:

```
runme*      sub/    textfile
```

Copy *textfile* into *sub*. The command below means "copy *textfile* from my current working directory into the directory *sub*, and call it *textfile*." Type:

```
cp textfile sub/textfile
```

To make sure textfile was copied, move into *sub* and list its contents. Type:

```
cd sub
ls
```

Now copy *runme* from *getstart* into *sub*. This time use two periods (..) to specify *getstart* rather than typing the full pathname. The command below means "copy *runme* from the parent directory into my current working directory, and call it *runme*." Type:

```
cp ../runme runme
```

Now check the contents of *sub*. Type:

```
ls
```

You see this:

```
runme              textfile
```

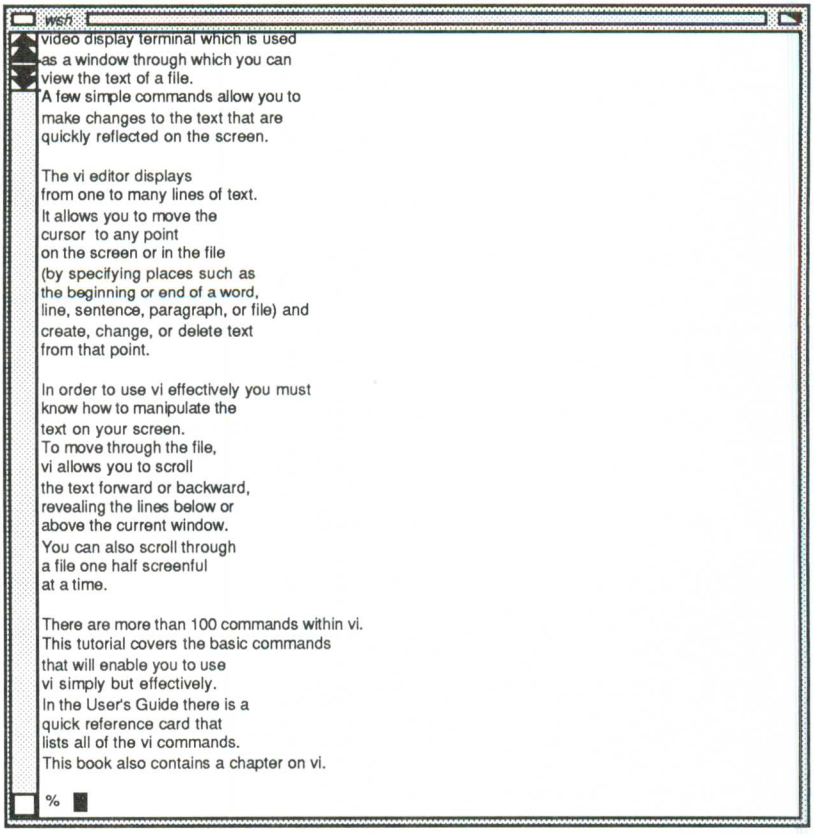
Looking at the Contents of a File

If you want to look at the contents of a text file without using an editor, you can use either *cat* or *more*. *cat* displays the contents of a text file in a window. If the file has more lines than the window can display all at once, some text scrolls off the top of the window, and *cat* displays only the final lines of the file. You can then use the scroll bars to see the portion of the file that you missed.

Display *textfile* by typing:

```
cat textfile
```

Your window looks like this:

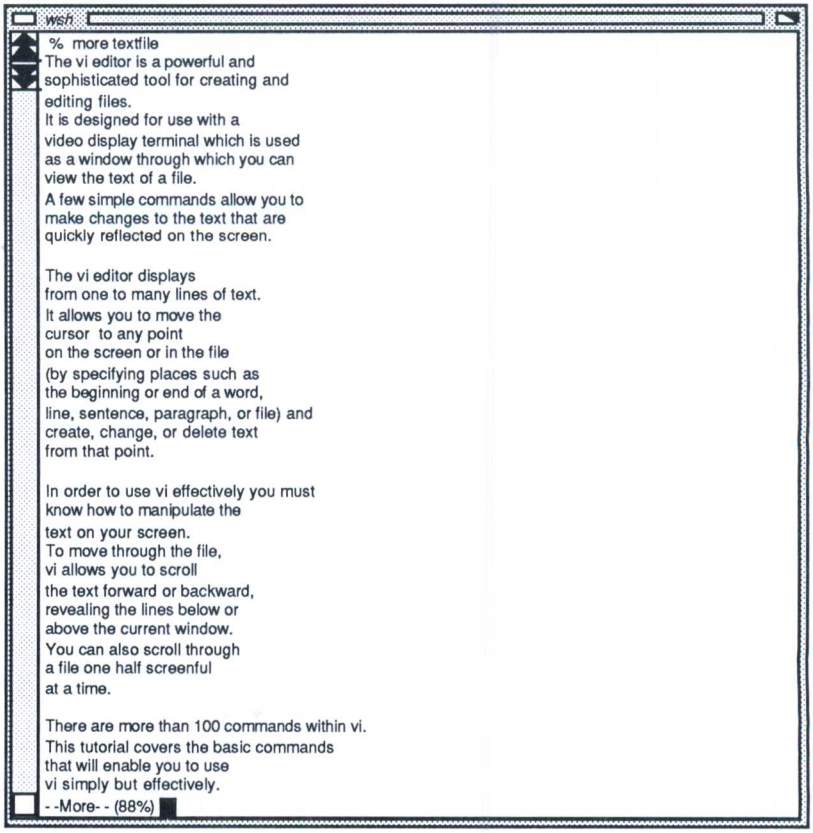


The *more* command also displays text files; however, if the whole file doesn't fit in the window, *more* displays only the first lines. It also displays a message at the bottom of the window indicating what percentage of the file it is displaying. To see more of the file, either press <enter> to see one more line, or press the spacebar to see the next screenful.

Try the *more* command with *textfile*. Type:

```
more textfile
```

Your window looks like this:



Press <enter> to see one more line; press the spacebar to see the next screenful.

Note that if you use *cat* or *more* on a file that contains a program (such as *runme*), you see strange characters. This is because programs are stored as binary files, not

ASCII files, and they contain some non-printable characters.

Renaming (Moving) Files

The *mv* (move) command changes the pathname of a file; this renames the file. You could rename a file using commands you already know by copying the file and then removing the original. An easier way is to type *mv*, followed by the name of the file you want to rename, followed by the new name.

Change the name of *textfile* to *oldfile* by typing:

```
mv textfile oldfile
```

To make sure *textfile* was renamed, type:

```
ls
```

You see that *textfile* is no longer there, and *oldfile* has appeared in its place. Since you don't want to be confused about the contents of this file, change it back to *textfile*, then list the directory. Type:

```
mv oldfile textfile
ls
```

Removing Files

To remove (delete) files from a directory, use the *rm* command. Be careful when you remove a file, because you can recover it only from the last backup tape that you made. (Chapter 3, "Using the Power of the IRIS", shows you how to back up and restore files.)

Remove *textfile* from the *sub* directory. (You still have a copy of it in *getstart*.) First make sure you are in */usr/tutor/getstart/sub* by typing:

```
pwd
```

If the pathname you see doesn't match *sub*'s full pathname, use *cd* to move into *sub* by typing:

```
cd  /usr/tutor/getstart/sub
```

To remove *textfile*, type:

```
rm  textfile
```

To make sure *textfile* is gone, type:

```
ls
```

Removing Directories

To remove a directory from its parent directory, use the *rmdir* command. You can remove a directory only when it is empty (when it contains no files or directories). *sub* contains the file *runme*, so before you can remove *sub* from *getstart*, you must remove *runme* from *sub*. Type:

```
rm  runme
```

Use *ls* to make sure *sub* is empty. Type:

```
ls
```

Now move up to *getstart* by typing:

```
cd  ..
```

Remove *sub* by typing:

```
rmdir sub
```

To make sure *sub* is really gone, type:

```
ls
```

Your *getstart* directory should look like this:

```
runme       textfile
```

Summary of Basic Commands and Terms

The section on using IRIX introduced you to the fundamental commands and terms. This section summarizes the commands and their functions, and the terms and their definitions.

Command	Function
login *user-name*	log in to the system
pwd	print current working directory
cd *directory*	change current working directory
ls	list contents of directory
cat *textfile*	display contents of *textfile*
more *textfile*	display contents of *textfile* (one window at a time)
cp *file1 file2*	copy *file1* and name the copy *file2*
rm *file*	remove a file
mv *oldname newname*	move (rename) a file
mkdir *directory*	make a directory
rmdir *directory*	remove a directory
logout	log out of the system

Term	Definition
file	container in which you store information such as text or programs
directory	container in which you store files and other directories
file system	hierarchy of directories and files; the top of the hierarchy is the *root* (/) directory
pathname	list of directories that leads you from the *root* (/) directory to a specific file or directory in the file system
home directory	directory in which IRIX places you each time you log in; it is tied to your login account
current working directory	directory in which you are currently located
parent directory	relative term that refers to a directory that holds another directory; if directory A holds directory B, A is the parent directory of B

Learning the *vi* Text Editor

This section teaches you how to use the IRIX text editor, *vi*. You use *vi* to create and edit files so you can use electronic mail (described in Chapter 3) and can effectively manage your system (see Chapter 4).

First, make sure you are in the *getstart* directory by typing:

```
cd /usr/tutor/getstart
```

Editing a Sample File

The *getstart* directory contains a file called *textfile* that you will be editing. Make your own copy of this file so the next person who uses this tutorial can still work with the original *textfile*. Use *cp* to copy *textfile*, and name the copy *myfile*. Type:

```
cp textfile myfile
```

Make sure *myfile* is there. Type:

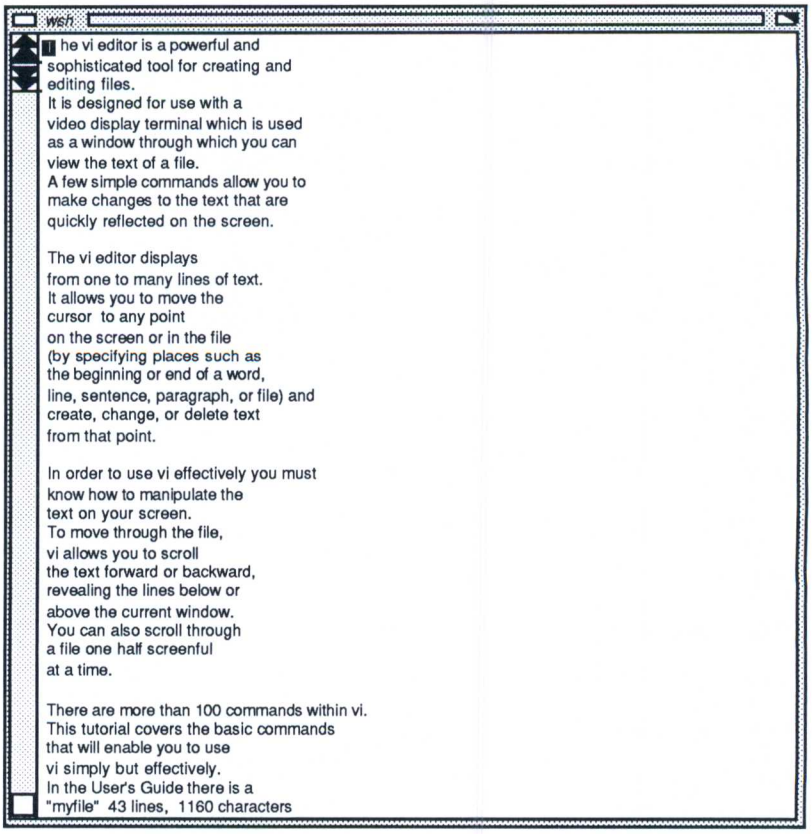
```
ls
```

Starting *vi*

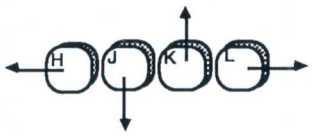
To edit *myfile*, position the cursor over the *wsh* window, then type:

```
vi myfile
```

This starts the *vi* editor. Your window looks like this:



Moving the Text Cursor



The small green box at the top of the window is the *text cursor*. The text cursor (*cursor* for short) points to the place in the file where you can type in (insert) text. The arrow keys on your keyboard move the cursor around in the file. You can also use the *h,j,k,* and *l* keys to move the cursor.

The *vi* Modes

vi has two modes: *command mode* and *text insert mode*. When *vi* is in command mode, it interprets every character you type as a command. When it is in text insert mode, it inserts every character you type into the body of the text.

When you start up *vi*, it is always in command mode; if you type something now, *vi* thinks it's a command. *vi* considers cursor movements to be commands, so you can move the cursor around only when you are in command mode.

Inserting Text

The first command you need is *i*. When you type *i*, you start text insert mode, and *vi* inserts any new text before the cursor position.

Position your cursor at the beginning of the first paragraph, press `i`, then type:

```
This is a test.
```

Press <Back Space> to correct or erase characters on a line (<Back Space> does not move the cursor to the previous line).

After you type this sentence, press <enter>, then press the <Esc> key to return to command mode. When you press <Esc> just once, you get no feedback telling you that you are in command mode. If you are not sure which mode you are in, press <Esc> twice and you'll hear a beep — this assures you that you are in

command mode where you can move the cursor again.

You can also insert text using the *a* command. This also starts insert mode, but it inserts any new text after the cursor position.

Move the cursor so it's over the "s" in the word "is" that you just added, press **a**, press the spacebar, then type:

```
only
```

The resulting sentence should look like this:

```
This is only a test.
```

If you had used *i* instead, the sentence would read:

```
This i onlys a test.
```

Edit this file as you like, and practice moving between the two modes.

Deleting Text

There are two basic commands for deleting text — *x* and *dd*. *x* deletes the character that is within the cursor box. You use *x* whenever you're in command mode, and the system executes it immediately — you don't need to press <Esc> or <enter>. Try deleting some of your text with the *x* command. Press <Esc> to make sure you're in command mode, move the cursor over the character you want to delete, then press **x**.

dd deletes the entire line of text in which the cursor is located. Like *x*, you use *dd* in command mode. Move the cursor to a line you want to delete, then press `dd` (you don't need to press <enter> or <Esc>).

Saving Your Edits

None of the text in the window is saved in the file *myfile* until you tell *vi* to save it. When you're done editing the file, follow these steps:

1. Press <Esc> to enter command mode.

2. Press the colon key (:); a colon appears at the bottom of the window.

3. Press `w` to write (save) the file.

4. Press <enter> to complete the command.

After you save a file, you are back in command mode. You can continue to edit the file by moving the cursor around and using the commands you just learned. Any time you want to save your changes, press <Esc> and tell *vi* to save the file by typing:

```
:w
```

Don't forget to press <enter>. Note that each time you save *myfile* in this way you overwrite (delete) the previous version.

Exiting *vi*

To exit *vi*, press <Esc>, then type:

```
:q
```

If you get a message that says you can't exit *vi*, it means you haven't saved your edits with the *:w* command. To save your edits and exit *vi* all at once, press <Esc>, then type:

```
:wq
```

If you ever want to exit *vi* without saving the edits you made, press <Esc>, then type:

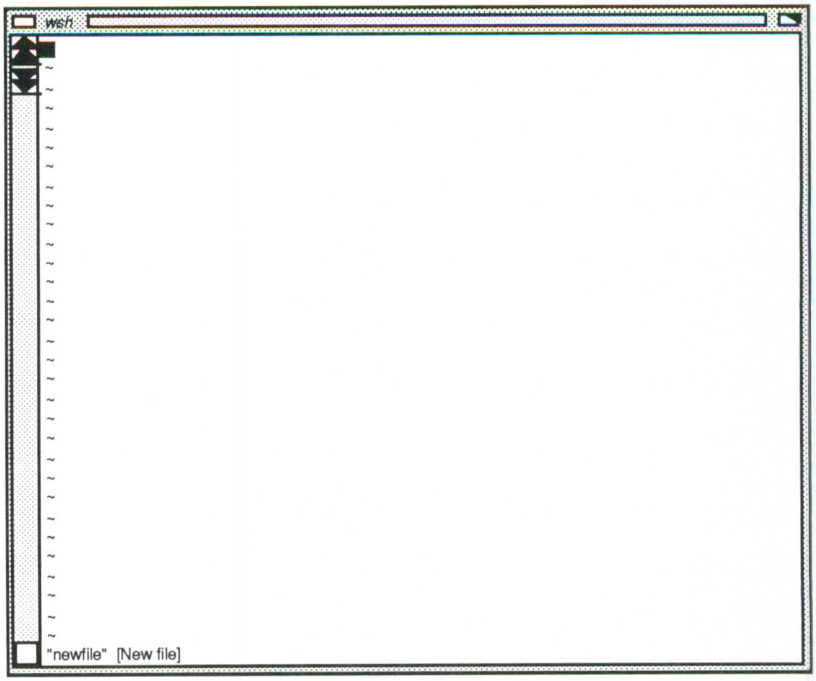
```
:q!
```

Creating a New File

To create a new file with *vi*, you need only decide what you want to name the file. Say you decided to create a file called *newfile*. To do this, type:

```
vi newfile
```

Your window looks like this:



Press `i` to start insert mode, then start typing whatever text you want the file to contain.

Summary of *vi* Commands

This table summarizes the *vi* commands you learned in this chapter.

Command	Function
→ or **l**	move the cursor one character to the right
← or **h**	move the cursor one character to the left
↓ or **j**	move the cursor down one line
↑ or **k**	move the cursor up one line
i*text*	start text insert mode; insert text before cursor
a*text*	start text insert mode; insert text after cursor
<Esc>	enter command mode
x	delete this character
dd	delete this line
:w	save the edits
:q	exit from *vi*
:wq	save the edits and exit from *vi*
:q!	exit from *vi* without saving the edits

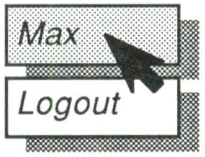
Logging Out

When you are ready to log out, follow these steps:

1. Position your cursor over the blue background (so it's not over any windows).

2. Press and hold down the right hand mouse button.

   You see the Max (Background) menu.



3. Select "Logout" from the menu.

4. Select "Yes, really!" from the confirmation menu.

You are now logged out, and the IRIS is displaying the `IRIS console login` prompt.

3. Using the Power of the IRIS

This chapter shows you how to use the basic utilities that the Personal IRIS provides. Before you use the information in this chapter, you need your own login account.

If you are the person who will take care of the IRIS, see Chapter 4, "Managing the IRIS", to perform the initial setup of the IRIS, which includes adding a login account for yourself and anyone else who will use the IRIS.

The Basics

This section summarizes the key material that you learned in Chapter 2, "Learning About the IRIS".

Logging In and Logging Out

The IRIS is ready for someone to log in when it displays this message:

```
IRIS Console Login:
```

The IRIS displays this message at two different times: right after you start up the IRIS as described in Chapter 1, and right after someone else logs out.

To log in to the IRIS, follow these steps:

1. Make sure you see this message:

   ```
   IRIS console login:
   ```

2. Type your login name, then press the <enter> key. If you have no password, IRIS displays this message:

   Welcome to the Personal Iris

   Then you see the console window and the three toolchest icons.

3. If you have a password, you see this message:

   ```
   Password:
   ```

Type your password, then press the <enter> key; the IRIS displays the welcome message, then you see the console window and the three toolchest icons.

To type commands, your cursor must be positioned inside the console window or a *wsh* window.

To log out of the IRIS, follow these steps:

1. Position your cursor over the blue background (so it's not over any windows).
2. Press and hold down the right hand mouse button.

   You see the Max (Background) menu.
3. Select "Logout" from the menu.
4. Select "Yes, really!" from the confirmation menu.

You are now logged out, and the IRIS is displaying the `console login` prompt.

Starting and Stopping IRIX Shells

The console window is an IRIX shell. To start additional shells, follow these steps:

1. Move the cursor over the *Tools* toolchest.
2. Press and hold down the right hand mouse button.
3. Select the first item,"Shell", from the menu.

A large red outline appears, and when you move the cursor, the outline moves with it.

4. Position the outline where you want the window to appear, then press and release any mouse button.

5. Position your cursor within this new window if you want to type commands in it.

To stop an IRIX shell and make its window disappear, follow these steps:

1. Move the cursor into the title bar of the window that you want to delete.

2. Press and hold down the right hand mouse button.

3. Select "Quit".

   The window disappears.

Summary of IRIX Commands

This table shows the basic IRIX commands and their functions. See Chapter 2 for several examples of how to use them.

Command	Function
login *user-name*	log in to the system
pwd	print current working directory
cd *directory*	change current working directory
ls	list contents of directory
cat *textfile*	display contents of *textfile*
more *textfile*	display contents of *textfile* (one window at a time)
cp *file1 file2*	copy *file1* and name the copy *file2*
rm *file*	remove a file
mv *oldname newname*	move (rename) a file
mkdir *directory*	make a directory
rmdir *directory*	remove a directory
logout	log out of the system

Running Applications

Refer to the documentation that came with your specific application to learn how to run it. In general, you can run an application by following these steps:

1. Position your cursor over a window that is running a shell.

2. Type the name of the application at the system prompt (%), then press <enter>.

   If a full window that contains your application appears, you are done.

If a resize box appears, sweep out the window (see Chapter 2).

Understanding File Ownership

As you learned in Chapter 2, the IRIS gives each user a unique location in the file system in which to do work and store files and directories. This is called your *home directory*; you own this directory, and, whenever you create a file anywhere in the file system, you own the file.

Owning a directory or file means you have full access to it (you can read it, change it, and copy it), and you can decide whether or not other users can have access to the file or directory. This way you can share an IRIS with several people, and still maintain private information. Specifying who can or cannot access information is called *granting permissions*.

About Permissions

The manager of this IRIS has full permissions on everything in the file system, including your information. This gives the manager the ability to back up the entire file system, and change permissions on certain files or directories if you need to access them.

The only files and directories whose permissions you can control are those that you create (and therefore

own). For example, if you have a directory that contains personal information, you grant permissions to no one; if a directory contains a project that several people are working on, you grant permissions to everyone.

You can grant three types of permissions:

- *read* lets other users view and copy the directory or file.
- *write* lets other users change the directory or file.
- *execute* lets other users run application files and go into (*cd* to) directories.

You can grant permissions to either all members of your group, or to everyone who uses the system.

To find out what the permissions are on a certain file, you use the **l** (el) option with the *ls* command. For example, to find the permissions for a directory you created named *dir1*, type:

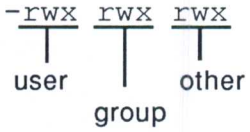
```
ls -l dir1
```

You see a listing that looks like this:

```
drwxr-xr-x      owner group size   date   dir1
```

The beginning of this line (`drwxr-xr-x`) shows the permissions. The leading `d` means it's a directory; it's not important for now. The diagram below shows that this listing consists of three groups of three letters; each group of letters establishes the permissions for you (the *user* who owns the file), the *group* to which this user

belongs, and *other* (everyone else who uses the system).



The three letters within each group have these meanings:

r the file or directory can be read

w the file or directory can be written (changed)

x the file can be executed (for files that are application programs); the directory can be entered

So, in the example of *dir1* whose permissions are `drwxr-xr-x`, you have read, write, and execute permission, but your group and all other users have only read and execute permissions; this means only you can change the contents of this directory.

Changing Permissions

To change permissions on a file or directory, you use the *chmod* command. *chmod* needs four pieces of information:

- whether you are changing permissions for yourself, the group, or other
- whether you are granting permissions or taking them away
- what type of permission (read, write, execute) you are granting or taking away
- which file or directory's permissions you are changing

The *chmod* command has this form:

`chmod` *who add/subtract permission_type file*

The variables have these meanings:

who	**u** for user, **g** for group, or **o** for other
add/subtract	+ for add, - for subtract permissions
permission_type	**r** for read, **w** for write, **x** for execute
file	name of file or directory

For example, say you have a directory called *dir1* that has these permissions:

```
drwxr-xr-x
```

Again, this means that you have read, write, and execute permission, but that your group and all other users have only read and execute permissions.

To change this so your group also has write permissions, you would type:

```
chmod g+w dir1
```

Now when you type `ls -l`, the permissions look like this:

```
drwxrwxr-x
```

To change the permissions so no one else has any permissions for this directory, you would type:

```
chmod go-rwx dir1
```

Now when you type `ls -l`, the permissions look like this:

```
drwx------
```

Backing Up and Restoring Your Information

The most important task you perform on your IRIS is making frequent, regular backup copies of your files and directories. The manager of the IRIS is responsible for backing up all information on the IRIS on a regular basis (such as once a week); however, you run the risk of losing a full week's work if you rely on only this backup. The best way to protect your data is to copy all your files and directories to a tape every one or two days.

Important Note: If you are the manager for this IRIS, you are also responsible for making weekly backups of every user's data. See Chapter 4, "Managing the IRIS".

The tape drive is an option on the IRIS. If you do not have a tape drive, you can back up your IRIS using the tape drive of another Personal IRIS which is part of your network.

Always use two backup tapes between which you alternate the daily backup. When you start a backup, the system copies this new information over the old, which effectively deletes the old information. If you use yesterday's backup tape to perform today's backup, you run the risk of having a system failure when the tape contains some combination of new and old information.

To make and maintain good backups, you use three basic commands:

Backup *full_pathname*	copies information from your disk to a tape
Restore *full_pathname*	copies information from a tape to your disk
List_tape	shows you what information the tape contains

You find instructions for using these commands in the sections below.

Using Tapes and Tape Drives

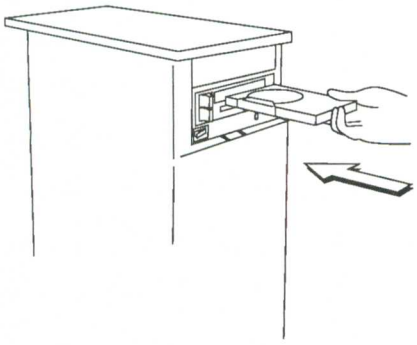
The tape drive on the IRIS can copy your information only to high density tapes. If you try to copy information to a low density tape, you see error messages, and the copy does not work.

Important Note: Do not do your backups on the Installation Tape (EOE1) that came with your IRIS. It contains installation tools that you need should your system ever have a serious software failure.

Silicon Graphics, Inc. recommends using the DC600XTD data cartridge by 3M Magnetic Media Division. The tape has these specifications:

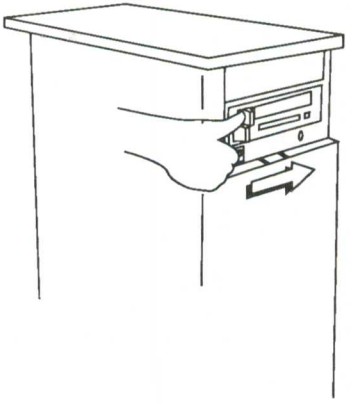
600 ft. long
extra track density
12,500 ftpi
550 oersted tape

If you use a tape other than this 3M model, make sure it meets or exceeds all these specifications. If it does not, your backups will not work.



To insert the tape in the tape drive, follow these steps:

1. Hold the tape so the label is up, and the larger tape reel is nearest to the tape drive.
2. Insert the tape.
3. Lock the tape in place by pushing the lever on the left side of the tape drive to the right.



Backing Up Your Information

To back up everything in your home directory, follow these steps:

1. Insert a blank tape, or the tape that does not contain your most recent backup, into your tape drive, or the drive of another Personal IRIS on your network.

2. Use the *Backup* command and the full pathname of your home directory to make the backup; in this example, your home directory is */usr/people/bill*.

   To back up your home directory using your own tape drive, type:

   ```
   Backup  /usr/people/bill
   ```

   To back up your home directory using the tape drive of a system named *viking*, you use the -h option. Type:

   ```
   Backup -h viking /usr/people/bill
   ```

   You see this message:

   ```
   Backup started.  Please wait...
   ```

   Then you see the names of the files that *Backup* is copying to the tape.

   If you do not see the file names, and see an error message instead, you may not be using a high density tape. Check your tape against the specifications listed above.

When all files are copied to the tape, you see this message:

```
Backup complete.
```

3. Remove the tape, label it with today's date and the name of the directory you backed up, and store it in a safe spot.

Restoring Information

If the system fails, or if you delete files accidentally, you can retrieve whole blocks of files or individual files from your backup tape using the *Restore* command.

Important Note: Always use the full pathname of your home directory when you restore your information.

To restore your entire home directory, follow these steps:

1. Insert your most recent backup tape into your tape drive, or the drive of another Personal IRIS on your network.

2. Use *Restore* with the full pathname of your home directory to restore everything in this directory; in this example, your home directory is */usr/people/bill*.

   To restore your home directory using your own tape drive, type:

   ```
   Restore  /usr/people/bill
   ```

To restore your home directory using the tape drive of a system named *viking*, type:

```
Restore -h viking /usr/people/bill
```

You see this message:

```
Restore started.  Please wait...
```

Then you see the names of the files that *Restore* is copying to your disk. When all files are restored, you see this message:

```
Restore complete.
```

3. Remove the tape and store it in a safe spot.

To restore only a few specific files from the tape, you first look at what the tape contains, then restore the files using their full pathnames.

For example, suppose your home directory is */usr/people/bill*, and you want to restore the file */usr/people/bill/dir1/file1*. You would follow these steps:

1. Insert your most recent backup tape into your tape drive.

2. Use *List_tape* to look at the contents of the tape to make sure that you have the correct pathname for *file1*. Type:

```
List_tape
```

3. Restore the file by typing:

```
Restore /usr/people/dir1/file1
```

You see this message:

```
Restore started.  Please wait...
```

Then you see the name of the file that *Restore* is copying back on to your disk. When the file is restored, you see this message:

```
Restore complete.
```

4. Remove the tape and store it in a safe spot.

Using the Network

If your IRIS is part of a network, you gain several convenient, powerful utilities:

- You can access the information on other workstations without physically moving between workstations.
- You can copy information back and forth between workstations electronically rather than first copying information from one workstation onto a tape, placing the tape in a second workstation, then copying that information to the second workstation's disk.
- You can use electronic mail, a mechanism that lets you send messages to anyone else who uses your network.

- If you have the NFS option, you can access files and directories on other workstations as if they were on your workstation.

Accessing Other Workstations

There are two different ways to share information across a network. You can either log in to another person's workstation and do your work there, or you can copy files from another person's workstation to your workstation and work on them there.

You use two commands to do this: *rlogin* and *rcp*.

Important Note: Depending on how much network security your Network Administrator has established, you may not be able to log in to or transfer files from or to certain workstations. If you need access to a workstation that you currently cannot access, see your Network Administrator.

Logging In to Other Workstations

You use the *rlogin* (remote login) command to log in to other workstations. The examples below assume that you want to log in to another workstation named *viking*.

To log in to a workstation named *viking*, type:

```
rlogin viking
```

If *viking* asks for a password, type it, then press <enter>.

If you do not have an account on *viking* (if *viking* doesn't recognize you as a user), you can log in as a *guest* by typing:

```
rlogin viking -l guest
```

Transferring Information Between Workstations

You use the *rcp* (remote copy) command to copy information from one workstation to another. Use the **-v** option (verbose) to see the files as they are copied.

The *rcp* command has this form:

rcp **-v** *src_host:filename dest_host:filename*

Where *src_host* is the workstation that has the file that you want to transfer, and *dest_host* is the workstation to which you are transferring the file.

In the examples below, your IRIS is named *bud*, and the other workstation is named *viking*.

To copy the file *file1* from *bud* to the */tmp* directory on *viking*, type:

```
rcp -v bud:file1 viking:/tmp
```

If you do not have an account on *viking*, do the copy as *guest* by typing:

```
rcp -v bud:file1 guest@viking:/tmp
```

To copy the file */tmp/file2* from *viking* to the */tmp* directory on *bud*, type:

```
rcp -v viking:/tmp/file2 bud:/tmp
```

If you do not have an account on *viking*, do the copy as *guest* by typing:

```
rcp -v guest@viking:/tmp/file2 bud:/tmp
```

Using Electronic Mail

Before you can use the electronic mail system, make sure the system manager for this IRIS has set it up. If you are the system manager, see Chapter 4, "Managing the IRIS", to set up the mail system.

Electronic mail is a very useful and powerful communication tool. You can send a message to one or several people, and they in turn can read, delete, or reply to the message.

Composing and Sending Mail

There are two different ways to compose a mail message:

- start the mail utility, compose your message within it, then send your message
- use *vi* to create a file that contains your message or other information, start the mail utility, then send the file

If you do not know how to use *vi*, see Chapter 2.

Use the first method if you are sending quick, short notes.

Use the second method if your message is lengthy and requires a lot of thought or careful wording, or if your message is an existing text file, such as an outline for a proposal. One advantage to this method is that you can save the file in case you need it in the future.

To compose a quick, short message and send it to someone whose login account is *bill*, follow these steps:

1. Start the mail utility by typing:

   ```
   Mail bill
   ```

   After you press <enter>, the cursor moves to the next line, and you do not see a system prompt.

2. Type your message, pressing <enter> after each line:

   ```
   This is my first mail message <enter>
   ```

3. When the message is complete, press <enter> so the cursor is on a blank line, then press <Ctrl-D> to send the message.

   When you see the system prompt, your message has been sent.

To send a text file to *bill*, follow these steps:

1. Start the mail utility by typing:

   ```
   Mail bill
   ```

   After you press <enter>, the cursor moves to the next line, and you do not see a system prompt.

2. Tell the mail utility to read in the text file, for example, the file called */usr/people/ed/file1*, by typing:

   ```
   ~r /usr/people/ed/file1 <enter>
   ```

3. After you press <enter>, press <Ctrl-D> to send the message.

   When you see the system prompt, your message has been sent.

There are a few more useful mail options that work like **~r**. The example below uses three more options:

- **~t** (to) sends the message to the names that follow it
- **~c** (cc) sends copies to the names that follow it
- **~s** (subject) prepends a subject line to the message

For a user named *bill* to send the file *proposal.out* to *paul, mary,* and *jack*, send copies to *boss1* and *boss2*, prepend a subject line, and finish it off by asking for their comments, he would have a mail session that goes like this:

```
% Mail paul  <enter>
~t mary jack   <enter>
~c boss1 boss2   <enter>
~s Proposal outline.   <enter>
~r proposal.out   <enter>
Please let me know what you think.   <enter>
<Ctrl-D>
EOT
%
```

When everyone receives the message, it looks like this:

```
Message #
Date: Fri Aug 12 10:27
From: bill
Message-Id: <89333999>
To: paul, mary, jack
Cc: boss1, boss2
Subject: Proposal outline.

text of proposal.out

Please let me know what you think.
```

One more useful option is **~v**, which starts the *vi* text editor within the mail session. This gives you the advantage of using a text editor during the session, but your text is not saved as a file — when you send the message, the text is not saved anywhere on your workstation. When you exit from *vi*, you are still using mail; you do not see the system prompt.

Reading, Deleting, and Replying to Mail

You know that mail has arrived for you when you press <enter> at the prompt, and you see this message:

```
You have mail.
```

At this point, you generally follow these steps:

1. Type **Mail** to see the numbered list of mail messages.

2. Type the number that precedes the first message to see the full message.

3. After reading the message, type either **d** to delete it or **r** to reply to it. Note that when you reply to a message, it is automatically deleted.

4. If there are more messages, type **n** to see the next one.

5. To review the list of messages (to show headers) that remain, type **h**.

6. To create and send a mail message to *user* while you're using mail, type **m** *user*.

7. When you are done working with mail, type **q** to quit. Then you see the system prompt.

The next page shows a mail session where *jack* received *bill*'s message, plus another message from *mary*.

```
% <enter>
You have mail.
% Mail
Mail version 5.2 6/21/85.  Type ? for help.
"/usr/mail/jack": 2 messages 2 new
>N 1 bill  Fri Aug 12 10:27  13/24 "Proposal outline."
>N 2 mary  Fri Aug 12 10:35  14/24 "Proposal meeting time."
& 1
Message 1:
Date: Fri Aug 12 10:27
From: bill
Message-Id: <89333999>
To: paul, mary, jack
Cc: boss1, boss2
Subject: Proposal outline.
```

text of proposal.out

```
Please let me know what you think.

& r
To: bill
Subject: Re: Proposal outline

Bill -    <enter>
<enter>
I think it looks great.  We can go over it  <enter>
at tomorrow's meeting.    <enter>
<enter>
Jack
<Ctrl-D>
EOT
& n
Message 2:
Date: Fri Aug 12 10:35
From: mary
Message-Id: <89333999>
To: paul, bill, jack
Cc: boss1, boss2
Subject: Proposal meeting time.

Tomorrow's meeting is at 9:30 in
conference room C.

Mary

& d
& q
%
```

During this session, *jack* read and replied to *bill*'s message, read and deleted *mary*'s message, then stopped using mail.

Summary of Mail Commands

When you compose and send mail, use these commands:

Mail *user user...*	Start mail that will go to *user*(s).
~t *user user...*	Send the message to *user*(s).
~c *user user...*	Send copies to *user*(s).
~s *subject*	Show the *subject* (a brief summary of the contents of the message) at the beginning of the message.
~r *filename*	Read in the contents of *filename*.
~v	Start the *vi* editor. When you exit from *vi*, you are still using mail.
<Ctrl-D>	Send the message.

When you receive messages, use these commands:

Mail	Start mail, and show the numbered list of mail messages.
number	Show message *number*.
d	Delete the message.
r	Reply to the message; your reply goes to only the person who sent the message.
ra	Reply to the message; your reply goes to the original sender, and all people to whom the original sender sent copies.
m *user*	Create a message for *user*.
q	Stop using (quit) mail.

There are a few more Mail options that you can see by typing **?** while you are using Mail.

Using the NFS Option

The NFS (Network File System) option lets you use another workstation's files, directories, and application programs just as if they were on your own workstation.

Check with the manager of this IRIS to see whether NFS is installed and set up on this IRIS. If you are the manager and you have the NFS option, see the *NFS User's Guide* to install and set up NFS.

4. Managing the IRIS

The Personal IRIS is different from a Personal Computer in two very important and useful ways. First, it understands that more than one person may be using it, and that each person may want to organize files differently. Second, it communicates with other computers through sophisticated networks very quickly and efficiently.

To take advantage of these two unique and powerful capabilities, you need to spend a few minutes telling the IRIS exactly how you want to use them.

This chapter shows you how to:

- choose a person to manage the IRIS
- set up a new IRIS
- manage users, groups, and file systems
- manage the system as part of a network
- install system software
- install and configure optional peripherals, such as terminals

Choosing a System Manager

In an environment where several people are using the IRIS, it's important to assign one person to manage the administrative parts of using a workstation such as maintaining login accounts, making weekly backups of the system, setting up network communications, and adding peripherals.

This person will use the *root* account, which has special permissions so he or she can access every file and directory on the workstation. Needless to say, you should select a responsible colleague. If you currently have a System or Network Administrator in your environment, it's possible that this person would be interested in managing your IRIS as well.

Once you select the person (or persons), they will use the *sysadm* tool that this chapter describes to create a

password for the *root* and other privileged accounts, and to manage the system. The manager will also use the basic utilities described in Chapter 3 to control permissions on file and directories, and to make full backups of the system.

Important Note: The system manager also must have a personal login account. The manager should use the *root* account only when performing administrative tasks that require *root* permissions.

If you are the only person who uses the system, or if system security is not important to you, there is no need to create a manager password for the *root* account. Any user on the system will be able to manage users and networking, which is often very convenient.

You can use the *root* account either by logging in as *root*, or, if you are already logged in under your personal account, just type **su**.

Throughout this chapter, items that you should type are printed in **bold courier** font; information that the IRIS displays is printed in `plain courier` font.

Setting Up a New IRIS

A new IRIS needs four pieces of information:

- the correct time zone, time, and date
- the login accounts of the users who will be using it
- passwords for the privileged accounts
- the name you want this IRIS to go by

If your system will be part of a network, before you begin setting up the system you need to ask your Network Administrator (or whoever controls the network) a few questions:

- Does your network run the Yellow Pages (YP) networking option?

  If it does run YP, only the Network Administrator can set up the IRIS to work with YP. The *sysadm* tool does not work on systems that run YP. Do not try to set up this system yourself.

- Does the Network Administrator want to control passwords for the privileged accounts?
- Is the name you chose for your IRIS already taken?
- What are the current login names, user IDs, and group IDs on the network for the users that you are going to add to your IRIS?

Before you actually attach your IRIS to the network, you will need to get additional information from your

Network Administrator. See page 4-9,"Adding the IRIS to a Network".

Starting System Setup

At this point you do not have a password for the *root* account. Log out if you are currently logged in, then log in as *root*. Type:

```
root
```

Then press <enter>. When you see the system prompt (#), move the cursor over the console window, then start the setup by typing:

```
sysadm setup
```

Then press <enter>. You see this message:

```
Running subcommand 'setup' from menu 'syssetup',
SYSTEM SETUP

          Setup Procedure
Setup establishes this machine as yours and can make sure that no one else
uses it without your permission.

The first step is to set the timezone, date, and time of the system clock.
```

Now you are ready to set the time zone, date, and time.

Setting the Time and Date

To set the time zone, date, and time, follow this sequence:

The system accepts default values when you press <enter>.

```
Current time and time zone is:  04:59 EDT
Change the time zone?  [y, n, q, ?]  n
Current date and time:  Tue. 08/28/87  05:00
Change the date and time:  [y, n, q, ?]  y
Month    default 08      (1-12):  <enter>
Day        default 28      (1-31):  <enter>
Year        default 87      (70-99):  <enter>
Hour        default 05      (0-23):  <enter>
Minute     default 00      (0-59):  04
Date and time will be set to:08/28/87 05:04. OK? [y, n, q]  y
The date and time are now changed.
```

Adding Yourself As a User

The next step in this procedure is to identify yourself, or the primary user of this IRIS, to the IRIS. User accounts are explained in detail in the next section, "Managing Users and Groups".

To add yourself as a user, follow this sequence:

```
Enter user's full name  [?, q]:  John Q. Public
Enter user's login ID  [?, q]:  jqp
```

You then see this message:

```
Would you like a YP type entry
(default 'n')  [y,n,?,q] :
```

Always answer no (type **n**). *sysadm* does not support YP entries. If your network runs YP, do not continue setting up your system. Type **q**, and see your Network Administrator.

The system then prompts for a user ID number. Use the user and group information the Network Administrator gave you; or, if this IRIS is not part of a network, simply accept the default values by pressing <enter> in response to each question.

The system accepts default values when you press <enter>.

```
Enter user's ID number  (default 100)  [?, q]:  <enter>
Enter group ID number or group name.
(default 20) [?, q]:  <enter>
Enter user's login (home) directory name.
(default '/usr/people/jqp') [?, q]:  <enter>
Enter shell type.
(default 'bin/csh')  [?, q]  <enter>

This is the information for the new login:
User's name:        John Q. Public
login ID:           jqp
user ID:            100
group ID:           20
home directory:     /usr/people/jqp
shell               /bin/csh
```

After the system displays the information for the new login, it asks this question:

```
Do you want to install, edit, or skip this entry [i,e,s,q]?
```

If all the information is correct, type **i**. If some of the information is not correct, type **e**. If you decide not to add yourself after all, type **q** to add no users and exit from the add user sequence.

If you type **i**, you see this question:

```
Do you want to give the user a password? [y,n]
```

If you want a password for your account, type **y**, then enter a password that has at least six characters, one of which is a number.

If you don't want a password, type **n**.

Finally, you see this question:

```
Do you want to add another login? [y,n,q]
```

To stop adding users and finish setting up the system, type **n** or **q**.

Giving Passwords to Privileged Accounts

It is very important to assign passwords to the privileged accounts. If they do not have passwords, anyone who knows the name of a privileged account could log in and conceivably destroy all system software and user information.

The 12 privileged accounts are *root, sys, adm, bin, diag, uucp, nuucp, lp, daemon, setup, powerdown,* and *sysadm.*

To assign passwords to one or more of these accounts, follow this sequence:

```
Do you want to give passwords to administrative logins?  [y, n, /, q]  y

(Typing "y" causes the system to prompt you about each administrative login.)

Do you want to give passwords to system logins? [y, n, ?, q]  y
Do you want to give the 'root' login a password?  [y, n, ?, q]  y
New password:
Re-enter new password:
The following system logins still do not have passwords:
    adm
    .
    .
    .
```

Naming Your IRIS

If there is more than one workstation on your network, you must give your IRIS a unique name. The name cannot contain any uppercase letters. To name your workstation, follow this sequence:

```
This machine is currently called "IRIS".
Do you want to change it?  [y, n, ?, q]  y
What name do you want to give it?  [q]  mysystem
#
```

When you see the system prompt (#), you have finished setting up your system. You and other users of the IRIS may now log in to the new accounts.

Adding the IRIS to a Network

The IRIS communicates with other computers over a network. A network is a group of computers and other devices (such as printers and file servers) that can all share and transfer information. The IRIS uses the DARPA Internet Protocol Suite, commonly known as TCP/IP, to communicate over the network.

This section shows you how to add IRIS to an existing TCP/IP network, and start up the standard networking capability and the mail system.

This section does not describe how to manage or set up NFS or the Yellow Pages; see the *NFS User's Guide* which came with the NFS software option for this detailed information.

Before You Begin...

Before you can add the IRIS to an existing network, you need to:

- name your IRIS
- speak with your Network Administrator

Computers on a network are called hosts. Each computer (host) has a unique name, which is its hostname.

If you did not name your IRIS yet, log in as *root*, type **`sysadm nodename`**, then follow the sequence shown in "Naming Your IRIS" on page 4-9.

Your Network Administrator will provide some information, hardware, and services that let you add your IRIS to the network. First, ask the Network Administrator for three items:

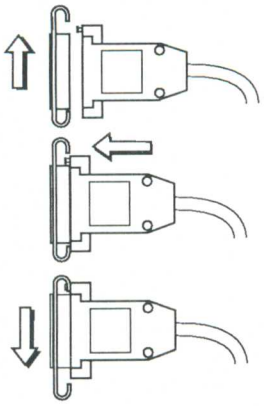
- the physical ethernet cable that connects your IRIS to the network
- the Internet address of your IRIS (a unique number that identifies your IRIS on the network)
- the hostname and Internet address of the master workstation on the network

Then, ask the Network Administrator to add your hostname and Internet address to the master workstation.

Attaching IRIS to the Network

To attach the ethernet cable to your IRIS, follow these steps:

1. Get a cable (drop line) from your system administrator that reaches the back of your IRIS.



2. Remove the plastic side panel of the main unit (see Chapter 1).

3. Attach the cable to the port labeled **Ethernet**.

- ❑ Make sure the sliding bracket is pushed all the way up.
- ❑ Plug the cable into the port.
- ❑ Slide down the bracket to hold it into place.

Important Note: Do not plug this cable into the port labeled **Genlock.**

4. Replace the plastic side panel (see Chapter 1).

Turning on Standard Network Capabilities

To turn on TCP/IP, the standard network capability, you need to first make sure the master workstation on the network recognizes your IRIS, then make your IRIS recognize the master. You do this by editing some files.

In the steps below, the master workstation is called *master*, and its Internet address is 192.20.10.1; your new IRIS is called *mysystem*, and its Internet address is

192.20.10.2. (You get the actual names and addresses from your Network Administrator.)

To turn on TCP/IP, follow these steps:

1. Confirm that your Network Administrator added your IRIS to the master workstation's */etc/hosts* file.

2. Log in to your IRIS (*mysystem*) as *root*.

3. Edit *mysystem's* */etc/hosts* file. The file currently looks like this:

```
#
# This network number,'192.0.2.1' is the officially blessed
   test network
#It should be changed immediately to your own network number.
192.0.2.1  IRIS
```

   Remove the line that reads "192.0.2.1 IRIS", then add *mysystem*'s name and Internet address, and *master*'s name and Internet address, so */etc/hosts* looks like this:

```
#
# This network number,'192.0.2.1' is the officially blessed
   test network
#It should be changed immediately to your own network number.
192.20.10.2       mysystem
192.20.10.1       master
```

4. Restart the system by typing:

   reboot

5. When you see `mysystem console login`, log in as *root*.

6. Copy the */etc/hosts* file from the other system (*master*) to your IRIS (*mysystem*). Type:

   ```
   rcp -v guest@master:/etc/hosts /etc/hosts
   ```

   If you have a problem copying this over, make sure your ethernet cable is securely fastened to the port labeled **Ethernet**. If you still have problems, make sure the other system (*master*) is working properly.

7. To make sure this worked properly, try logging in to another system on the network (not *master*). Type:

   rlogin *other_system* **-l guest**

   You should see a welcome message. Log out by typing:

   ```
   logout
   ```

   If this doesn't work, see your Network Administrator.

Your IRIS is now a member of the network. See "Using the Network" in Chapter 3 to learn how to log in to other computers and transfer files.

Setting Up Electronic Mail

If your network is large and sophisticated, you will not be able to start up the mail system yourself; see your Network Administrator. If you have a small network that consists of only Personal IRIS workstations, you can set up the mail system using the instructions below.

To start up electronic mail, you need to add the name of your IRIS to the file */usr/lib/sendmail.cf*. Follow these steps:

1. In */usr/lib/sendmail.cf*, find this line:

   ```
   # direct connect smtp hosts
   ```

   Below this line are names of other workstations that use electronic mail; all the names have "CS" prepended to them.

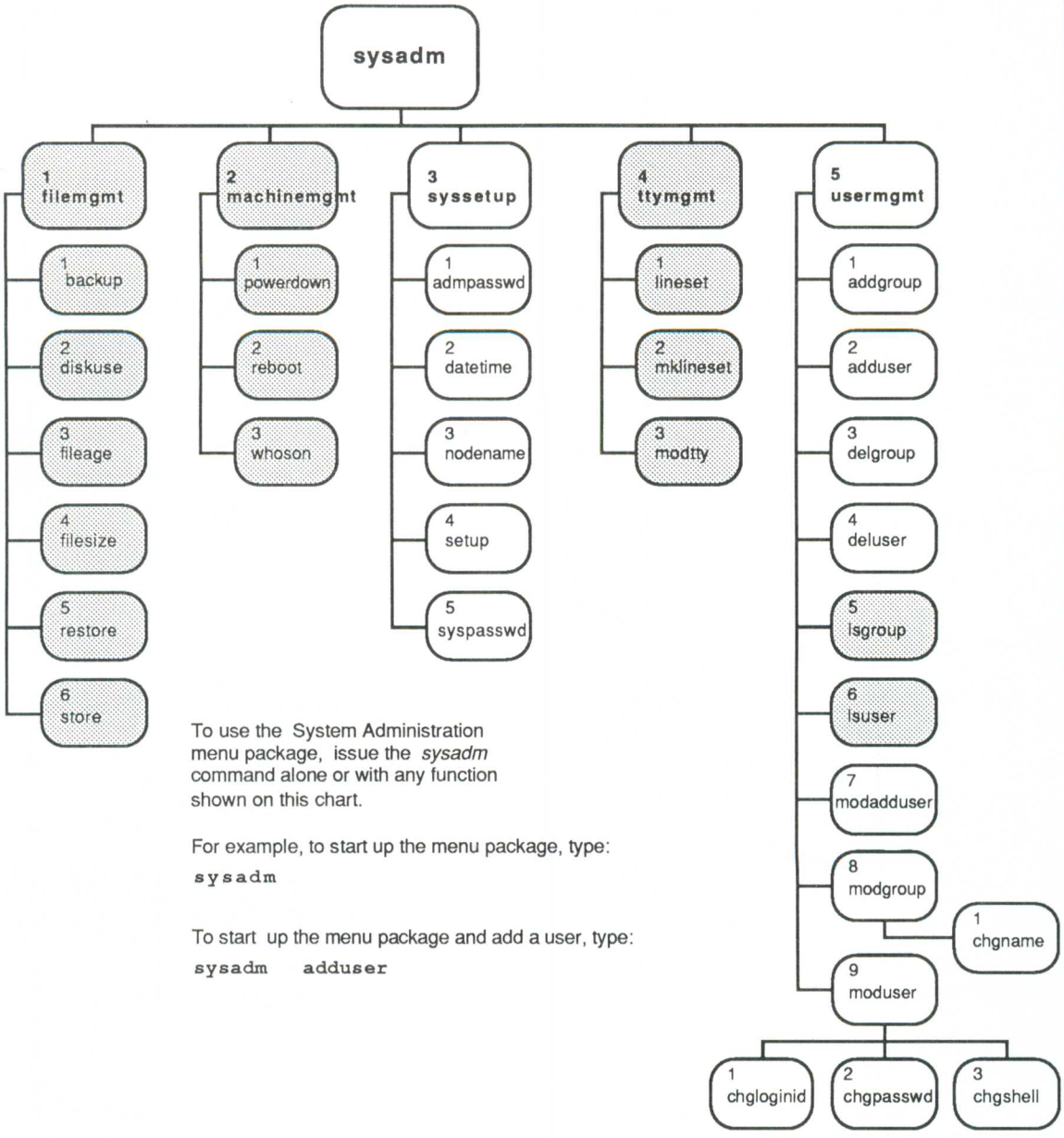
2. Add your IRIS's name directly below this line, and prepend "CS" to it. For example, if your IRIS is called *mysystem*, the lines would look like this:

   ```
   # Direct connect smpt hosts
   CSmysystem
   ```

See Chapter 3 to learn how to use electronic mail.

Overview of *sysadm*

You used one part of the *sysadm* tool to set up the IRIS. *sysadm* is a menu-driven package that you use to set up the system, and to manage users and groups. The figure on the next page shows the structure of the entire tool. The menus that are shaded grey are not supported.



To use the System Administration menu package, issue the *sysadm* command alone or with any function shown on this chart.

For example, to start up the menu package, type:

```
sysadm
```

To start up the menu package and add a user, type:

```
sysadm    adduser
```

Managing Users and Groups

The most important step in customizing your IRIS is specifying who will use it. Every person who uses the IRIS will have their own account (their own identity). The IRIS's ability to distinguish between users gives many advantages:

Chapters 2 and 3 provide detailed explanations of these concepts.

- The IRIS gives each user a unique location in the file system in which to do work and store files and directories. This is called the user's home directory.

- Whenever a user creates a file, the user owns the file. This means the user can decide whether or not other users can have access to the file. This way you can share an IRIS with several people, and still maintain private information. Specifying who can or cannot access information is called granting permissions.

- You can set up groups of users that share files and directories. For example, if you are working on a project and want two colleagues to be able to change your files if necessary, you can set up a group that consists of the three of you. Whenever anyone in the group creates a file, that person owns it, but any member of the group can access it; however, people who are not it the group cannot.

- The IRIS tracks the activity of every user. When someone touches a file or directory, the IRIS records the information and displays it when you use the *ls -l* command. This is very important information when you are sharing files with a group of people, and want to track who is working on different files.

Whether other people will use the IRIS directly or over the network, you must add an account for each person for two reasons:

- When you log in to IRIS, you type the account name so IRIS knows who you are, and which files and directories are yours.

- The IRIS uses the account name to label new files and directories that you create so you and everyone else knows to whom they belong.

An account always consists of a login name, and sometimes has an associated password. A login name is a combination of letters that each person chooses that uniquely identifies the person to the IRIS. You type this name at the `IRIS console login` prompt. Usually people choose short names, such as their first or last name, or their initials. Generally, everyone who uses the same IRIS knows to whom each login name belongs.

The password is any combination of letters that only the user who owns the account knows. When you log in, the IRIS first asks for your login name, then, if you have a password, it asks for it.

Adding Users or Groups

If your system will be part of a network, before you add users or groups you need to ask the Network Administrator for a few pieces of information:

- the current login names, user IDs, and group IDs on the network for the users and groups that you are going to add; use the same ones for the IRIS
- whether the network uses a YP (Yellow Pages) database to track the users

  If it does run YP, only the Network Administrator can add user accounts that work with YP. The *sysadm* tool does not work on systems that run YP. Do not try to add accounts yourself.

If your system is not part of a network, ask the users what login name or group name they would like to use.

Adding Users

You use the *adduser* menu to add new users or login accounts to the IRIS. *adduser* assigns these default values:

The shell is an IRIX interpreter. All the commands you learn in this book work with the default shell, the C-shell.

group ID	20
home directory	*/usr/people/*loginID
user ID	next available number
shell	*/usr/csh* (C-shell)

You can change these defaults during the *adduser* sequence; or, if you are adding several users for whom you will change some defaults (for example, if you want all user accounts in */usr/staff* rather than */usr/people*) you can change the default group ID and parent directory that *adduser* assigns. See "Changing Defaults for New Users", below.

To add a user account, follow these steps:

1. Log in as *root*.
2. Type:

```
sysadm adduser
```

3. Follow this sequence:

```
Running subcommand 'adduser' from menu 'usermgmt',
USER MANAGEMENT

Anytime you want to quit, type "q".
If you are not sure how to answer any prompt, type "?" for help,
or see the Owner/Operator manual.

If a default appears in the question, press <return> for the default.

Enter user's full name  [?, q]:  John Q. Public
Enter user's login ID  [?, q]:  jqp
```

You then see this message:

```
Would you like a YP type entry
(default 'n')  [y,n,?,q] :
```

Always answer no (type **n**). *sysadm* does not support YP entries. If your network runs YP, do not try to add a user. Type **q**, and see your Network Administrator.

The system then prompts for a user ID number. Use the user and group information the Network Administrator gave you; or, if this IRIS is not part of a network, simply accept the default values by pressing <enter> in response to each question.

The system accepts default values when you press <enter>.

```
Enter user's ID number  (default 100)  [?, q]:  <enter>
Enter group ID number or group name.
(default 20) [?, q]:  <enter>
Enter user's login (home) directory name.
(default '/usr/people/jqp') [?, q]:  <enter>
Enter shell type.
(default 'bin/csh')  [?, q]  <enter>

This is the information for the new login:
User's name:        John Q. Public
login ID:           jqp
user ID:            100
group ID:           20
home directory:     /usr/people/jqp
shell               /bin/csh
```

After the system displays the information for the new login, it asks this question:

```
Do you want to install, edit, or skip this entry [i,e,s,q]?
```

If all the information is correct, type **i**. If some of the information is not correct, type **e**. If you decide not to add a user after all, type **q** to add no users and exit from the add user sequence.

If you type **i**, you see this question:

```
Do you want to give the user a password? [y,n]
```

If you want a password for the account, type **y**, then enter a password that has at least six characters, one of which is a number.

If you don't want a password, type **n**.

Finally, you see this question:

```
Do you want to add another login? [y,n,q]
```

To add another user and return to the first question, type **y**. Otherwise, type **n** or **q**, and you see the system prompt (#).

Changing Defaults for New Users

To change the default group ID or parent directory that *adduser* assigns to new users, follow these steps:

1. Log in as *root*.
2. Type:

   sysadm modadduser

3. Follow this sequence:

```
Running subcommand 'modadduser' from menu 'usermgmt'
USER MANAGEMENT

Anytime you want to quit, type "q".
If you are not sure how to answer any prompt, type"?" for help,
or see the Owner/Operator manual.

Current defaults for adduser:
group ID          20     (other)
parent directory  /usr/people
Do you want to change the default group ID?  [y, n, ?, q]  y
Enter group ID number or group name  [?, q]  100
Do you want to change the default parent directory?  [y, n, ?, q]  n

These will  be the new defaults:
group ID:                          100
parent directory:                /usr/people
Do you want to keep these values?  [y, n, q]  y
Defaults installed.
#
```

Adding Groups

To add a new group, follow these steps:

1. Log in as *root*.
2. Type:

   sysadm addgroup

3. Follow this sequence:

The system accepts default values when you press <enter>.

```
Running subcommand 'addgroup' from menu 'usermgmt',
USER MANAGEMENT

Anytime you want to quit, type "q".
If you are not sure how to answer any prompt, type "?" for help,
or see the Owner/Operator manual.

If a default appears in the question, press <enter> for the default.

Enter group  name  [?, q]:  num1
Enter group ID number (default 20)  [?, q]:  <enter>
This is the information for the new group:
Group name:        num1
group ID:          20
Do you want to install, edit or skip this entry  [i, e, s, q]?  i
Group installed

Do you want to add another group?  [y, n, q]  n
#
```

Changing Users and Groups

Once you have created users and groups, you can change some, but not all, information about them.

Changing User Accounts

For existing user accounts, you can change:

- the login ID
- the password for the account
- the login shell

To change one or more of these items, follow these steps:

1. Log in as *root*.
2. Type:

   sysadm moduser

   You see this menu:

```
Running subcommand 'moduser' from menu 'usermgmt'
MODIFY USER'S LOGIN

1 chgloginid        change a user's login ID
2 chpasswd          change a user's password
3 chgshell          change a user's login shell

Enter a number, a name, the initial part of a name, or
? or <number>? for HELP,  q to QUIT:
```

3. To change the login name, select 1. The system prompts you for the new login name. After you enter it, you return to the above menu.

   To change the user's password, select 2. The system prompts you for a new password. After you enter it, you return to the above menu.

To change the login shell, select 3. Then follow this sequence:

```
Running subcommand 'chgshell' from menu 'moduser',
MODIFY USER'S LOGIN

Enter user's login ID  [?, q]:  jqp
The current shell is /bin/csh
Enter new shell command  [q]:  /bin/sh

Do you want to change the login shell of another login? [y, n, q]  q

#
```

You have the choice of either the C-shell (*/bin/csh*) or the Bourne shell (*/bin/sh*). All the commands you learned in Chapter 2 work with the C-shell.

Changing the Name of a Group

To change the name of a group, follow these steps:

1. Log in as *root*.
2. Type:

   sysadm chgname

3. Follow this sequence:

```
Running subcommand 'chgname' from menu 'modgroup',
MODIFY GROUP ATTRIBUTES

Anytime you want to quit, type "q".
If you are not sure how to answer any prompt, type "?" for help.

Which group name do you wish to change  [q]:  oldname
Group name:  oldname
Group ID:       000

Enter new group name  [?, q]:  newname
Do you want to change the name of the group 'oldname'
to 'newname'?  [y, n, ?, q]  y

The name of the group 'oldname' has been changed to 'newname'.
Do you want to change the name of another group?  [y, n, q]  n
#
```

Deleting Users and Groups

You can also use *sysadm* to delete users and groups when they are no longer necessary.

Deleting User Accounts

When someone no longer uses the IRIS, it is a good idea to delete that person's account. When you delete an account, you take away the person's ability to log in to and use the IRIS, and you delete the files and directories that the person owns.

Important Note: If there are files in the person's home directory, make sure other people are not using those files. Make a backup tape of the directory, or copy the files to another directory.

To delete an account and all associated files and directories, follow these steps:

1. Log in as *root*.
2. Type:

```
sysadm deluser
```

3. Follow this sequence:

```
Running subcommand 'deluser' from menu 'usermgmt',
USER MANAGEMENT

This function COMPLETELY REMOVES THE USER, their mail file,
home directory
and all files below their home directory from the machine.
Once this is done, there is no way guaranteed to get them all
back.
BE SURE THIS IS WHAT YOU WANT TO DO!

Enter login ID you wish to remove  [q]:  jqp
'jqp' belongs to 'John Q. Public'
whose home directory is /usr/people/jqp
Do you want to remove login ID  'jqp'?  [y, n, ?, q]  y

/usr/people/jqp and all files under it have been removed.

jqp has been completely removed.
Enter login ID you wish to remove  [q]:  q

#
```

Deleting Groups

When you use *sysadm* to delete a group, you delete only the group number or name. You are not deleting the user accounts that belong to the group. See "Deleting Users", above, to delete all users that belong to a certain group.

To delete a group, follow these steps:

1. Log in as *root*.
2. Type:

   sysadm delgroup

3. Follow this sequence:

```
Running subcommand 'delgroup' from menu 'usermgmt'
USER MANAGEMENT

Which group name do you wish to delete?  [q]  num1
Do you want to delete group name 'num1', group ID 20? [y, n, ?, q]  y
num1 has been deleted
Do you want to delete any other group?  [y, n, q]  q
#
```

Managing File Systems and Disks

As manager of this IRIS, you are responsible for making sure that users can access the files and directories they need, and that the system and user data remains intact. You create and access data using the IRIX operating system, which eventually stores that data on a physical hard disk. If something goes wrong with the disk, you may lose all of the user data, and may even lose the system software that IRIX needs to work.

Managing the file system is not difficult or time consuming, but it is a critical function. Basically, you need to perform four tasks:

- backing up data (copying data from your disk to a tape) and restoring it when necessary
- monitoring the file system to make sure the disk doesn't get too full
- changing permissions and ownership for files and directories when users need to access them
- recovering the file system if its information becomes corrupted

The rest of this section explains how to backup and restore data, monitor disk use, and change permissions and file ownership. If the file system becomes corrupted so you cannot access any data, or so the system does not start, you need to use the information in Chapter 5, "Caring for the IRIS", to recover the system.

Backing Up and Restoring Data

The first step towards ensuring the safety of system and user data is to develop a backup strategy. You should back up the entire disk at least once a week. (Individual users may want to back up their own files more frequently.)

Important Note: Always make a new backup after you work on user accounts, add peripherals, or install new software. Otherwise, in the event of a system failure, this system information will be lost.

Make sure all users agree to and are aware of the set time for the weekly backup. Try to schedule it for a time when the system is not usually being used, such as early on Monday morning or late Friday afternoon.

Always use two backup tapes between which you alternate the weekly backup. When you start a backup, the system copies this new information over the old, which effectively deletes the old information. If you use last week's backup tape to perform this week's backup, you run the risk of having a system failure when the tape contains some combination of new and old information.

Finally, the tape drive is an option on the IRIS. If you do not have a tape drive, you can back up your IRIS using the tape drive of another Personal IRIS which is part of your network.

Selecting Your Backup Tape

The tape drive on the IRIS can copy your information only to high density tapes. If you try to copy information to a low density tape, you see error messages, and the copy does not work.

Important Note: Do not use the Installation Tape (EOE1) that came with your IRIS for your backups. It contains installation tools that you need should your system ever have a serious software failure.

Silicon Graphics, Inc. recommends using the DC600XTD data cartridge by 3M Magnetic Media Division. The tape has these specifications:

600 ft. long
extra track density
12,500 ftpi
550 oersted tape

If you use a tape other than this 3M model, make sure it meets or exceeds all these specifications. If it does not, your backups will not work.

Using Basic Backup/Restore Commands

You use the same commands to back up and restore files as other users do. However, the *root* permissions allow you to back up *all* files on the disk — not just those that belong to a particular user.

To make and maintain good backups, you use three basic commands:

Backup [**-h** *remote_host*] [*full_pathname*]	copies information from your disk to a tape
Restore [**-h** *remote_host*] [*full_pathname*]	copies information from a tape to your disk
List_tape [**-h** *remote_host*] [*full_pathname*]	shows you what information the tape contains

To back up the entire file system (the entire disk) using the tape drive on your Personal IRIS, type:

```
Backup /
```

Then, to restore the entire file system, type:

```
Restore /
```

To view the contents of a tape, type:

```
List_tape
```

To do any of these tasks using the tape drive of another Personal IRIS on the network (for example, backing up on an IRIS called *viking*), type:

```
Backup -h viking /
```

For more examples of using these commands, see Chapter 3, "Using the Power of the IRIS".

Important Note: Always use full pathnames when you make a backup tape. If you use *Backup* or *Restore* without specifying a pathname, you will backup or restore whatever is in your current directory. While this may be convenient, you run into trouble if you use *Backup* while in one directory, then do a *Restore* while you are in a different directory. You end up with files in the wrong location in the file system.

Monitoring Disk Use

It is important to make sure your disk does not have too much information on it. If the disk becomes too full, you and other users will no longer be able to issue IRIX commands to access your files, directories, or applications.

You use the *df* command to check what percentage of disk space the file system is using. Type:

```
df
```

You see a listing similar to this one:

```
Filesystem   Type kbytes    use   avail   %use    Mounted on
/dev/root    efs  15479    15919 15039   51%     /
/dev/usr     efs  243013 129709 356318  27%     /usr
```

Check the column entitled `%use`. If this number is above 90%, delete old or unnecessary files, or archive some files to tape using the *Backup* command.

Changing Permissions and File Ownership

As the manager of the Personal IRIS, you can change permissions and ownership of all files and directories so users can access the information they need. Use this privilege only to change files and directories created and owned by users of the Personal IRIS. Never change permissions or ownership of any files or directories that came with the system; IRIX expects the system files to be in a certain state in order to work properly.

The section entitled "Understanding File Ownership" in Chapter 3 describes permissions, why you may want to change them, and how to use the *chmod* command to do so.

In addition to changing permissions, you can also assign a new owner or group to a file or directory. Whenever a certain user creates a file (or directory), that user owns it. When you type `ls -l` this user's name and group appear next to the file.

There are some cases where you want to change either the owner, the group, or both. For example, if one user

is working on a project for which there are several files, and that project is reassigned to another user, it's a good idea to make this user the new owner of those files.

To change the owner you use the *chown* command; to change the group you use *chgrp*. These commands have this form:

chown *user file_or_directory*
chgrp *group file_or_directory*

For example, say you typed **ls -l** and saw this listing:

```
drwxr-xr-x        bill    20      512  Aug 11  8:27     dir1
```

This tells you that *bill*, whose group number is *20*, owns *dir1*. You want to change ownership so that *paul*, whose group number is *40*, owns *dir1*. To do this, you would type:

```
chown paul dir1
chgrp 40 dir1
```

Now if you type **ls -l**, you see this listing:

```
drwxr-xr-x        paul    40      512  Aug 11  8:27     dir1
```

Adding New Software

You may receive software for your IRIS from two different sources: Silicon Graphics, Inc., the company that makes the IRIS, or another company that writes application software that runs on the IRIS.

This section shows you how to install most software that you receive from Silicon Graphics, Inc.; if you receive installation instructions with the software, use those instructions instead.

To install software that came from another company, see the installation instructions that came with that software.

You can install software from Silicon Graphics, Inc. by placing the tape in either your own IRIS's tape drive (the local drive), or into the drive of any other Silicon Graphics, Inc. workstation that is on the same network (a remote drive). It will take you approximately 20 minutes per tape to install the software.

If you are going to use a remote drive, you need to know the name of the workstation to which it belongs.

To install the software, follow these steps:

1. Shut down the system by typing:

```
su
halt
```

2. After a few moments, you see this message:

```
Okay to power off the system now.
      Press any key to restart.
```

   Press any key.

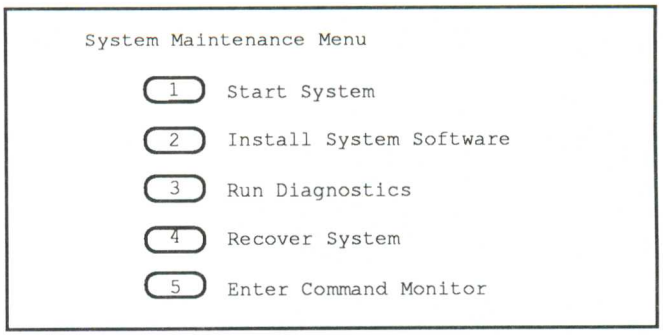
3. You see this message:

```
Starting up the system...

To perform system maintenance instead, press <Esc>.
```

Press <Esc>.

4. You see this menu:



Select 2, Install System Software, by typing:

2

5. You see this message:

```
Insert the installation tape, then press <enter>:
```

Insert the tape, then press <enter>.

If you are installing from a remote drive, you see this message:

```
Enter the name of the machine with the tape drive:
```

Make sure the installation tape is in the remote workstation's tape drive, type in its name, then press <enter>.

6. You see some messages.

   After a few moments, you see this menu:

```
Ready to install software.

        Choose an item, then press <enter>:

        1. Install software automatically
        2. Use manual installation features
        3. Help
        4. Quit

Install>
```

   Type `1`, then press <enter>.

7. The software is completely installed when you see this message:

```
Is there more software to install?
```

   If you do not have any more tapes to install, type `n`, then go on to step 8.

   If you have more software (another tape), remove the first tape, then type `y`. Then you see this message:

```
Insert the next tape, then press <enter>.
```

   Insert the tape, then press <enter>. Then go back to step 6 and follow those instructions. Repeat steps 6 and 7 for all tapes.

8. After the software is completely installed, you see this message:

```
Please wait ...
Ready to restart the system.  Restart?
```

Type **y** to restart the system, then press <enter>.

You see some messages, then the IRIS restarts. The system is ready to go when you see the `console login` prompt.

Expanding Your IRIS

After you work with the IRIS for a while, you may want to expand its capabilities. You can expand your IRIS in two ways:

- add performance upgrades, such as RAM (memory), a floating point chip, or extra graphics cards
- add hardware peripherals, such as disk or tape drives, printers, or terminals

You can either order specialized upgrades and hardware peripherals directly from Silicon Graphics, Inc., or you can buy hardware peripherals that the IRIS supports from other vendors.

Adding Silicon Graphics Peripherals and Upgrades

Silicon Graphics, Inc. offers a number of hardware peripherals and performance upgrades. To order peripherals or upgrades, contact your sales representative. When you receive your order, you may have the choice of either installing the items yourself, or having a Field Engineer do it for you.

Important Note: Only a field engineer can install some of the upgrades, such as the Graphics Upgrade and Floating Point chip.

This is a list of the basic upgrades and peripherals that are available. Contact your sales representative for the most complete list.

Options from Silicon Graphics, Inc.	
Graphics upgrade	1/4" tape drive
Memory (RAM) upgrade	Dials and buttons box
Floating point upgrade	Digitizer tablet
380Mb disk (344Mb formatted)	Extra 19" color monitor
Set of high density tapes	ASCII terminal

Each peripheral and upgrade that you can install is shipped with installation instructions.

Adding Other Peripherals

The IRIS supports several types of printers, terminals and modems. Each section below:

- shows you how to attach the peripheral to the IRIS
- explains how to configure the software that lets the IRIS communicate with the peripheral

Adding an ASCII Terminal

Adding a terminal is a three-step process. First you need to connect the terminal to the IRIS using a null modem cable, then you need to find the model name that the IRIS uses to describe your terminal, then configure the software to let the IRIS communicate with the terminal.

The serial ports on the IRIS have 9 pins, and are male. See Appendix A for more information.

Connecting the Terminal to the IRIS

To connect the terminal to the IRIS using a null modem cable, follow these steps:

1. Connect the cable to the terminal.

   Follow the instructions that came with the terminal to connect one end of the cable to the correct port on the terminal.

2. Remove the plastic side panel of the main unit (see Chapter 1).

3. Connect the other end (the female, 9-pin end) of the cable to either the port labeled **Serial Port 1** or **Serial Port 2**.

4. Replace the plastic side panel (see Chapter 1).

Your terminal is now completely connected to the IRIS. Go on to the next section to configure the software.

Finding the Terminal Model Name

The IRIS supports a number of different terminals. The directory */usr/lib/terminfo* contains descriptions of and model names for various terminal types. Check the documentation that came with your terminal to find its model name, and to find whether it can emulate a vt100. If it can emulate a vt100, set it up to do so using the instructions that came with the terminal.

Before you can configure the software, you need to find the model name that the IRIS uses for your particular terminal. Here is a list of the most common types:

IRIS Name	Description
vt52	Model vt52 from Digital Equipment Corp (DEC)
vt100	Model vt100 from DEC, or any terminal that can emulate a vt100.
vt220	Model vt220 from DEC, or any terminal that can emulate a vt220.
wyse50	Model 50 from Wyse Computer.

If your terminal is listed here, skip ahead to the next section, "Configuring the Software".

If your terminal is not listed above, find the model name for your terminal by following these steps:

1. Log in as *root*.

2. Change directories to */usr/lib/terminfo*, then issue the *fgrep* (find string) command with a string you suspect could make up part of the terminal's abbreviation. Type:

   ```
   cd /usr/lib/terminfo

   ls -R | fgrep string
   ```

   If this fails, examine the subdirectories of */usr/lib/terminfo*, which contain all the terminal entries, to find your model name.

When you find the model name, you have the information you need to configure the software.

Configuring the Software

To configure the software, you need to edit two files: */etc/ttytype* and */etc/inittab*. Follow these steps:

1. Log in as *root*.

2. Edit */etc/ttytype*. This file tells the IRIS to which port your terminal is connected. */etc/ttytype* looks like this:

```
iris-ansi      console
iris-ansi      systty
?v50am ttyd1
?v50am ttyd2
```

The lines that begin with a question mark (?) contain a model name (`v50am`) and a serial port name (`ttyd1, ttyd2`). `ttyd1` is another name for serial port 1; `ttyd2` is another name for serial port 2.

If you connected your terminal to serial port 1, edit the line that contains `ttyd1` by replacing `?v50am` with the model name of your terminal. If you connected your terminal to serial port 2, edit the line that contains `ttyd2` in the same way.

3. Edit */etc/inittab* to enable the port to which the terminal is connected. You will edit one of these two lines from */etc/inittab*:

```
t1:234:respawn:/etc/getty-s console ttyd1 co_9600 none LDISC1

t2:x:respawn:/etc/getty ttyd2 co_9600 none LDISC1
```

If your terminal is attached to serial port 1, edit the line that begins with `t1` (the first line above) by replacing `234` with a `2`. The line should now look like this:

```
t1:2:respawn:/etc/getty -s console ttyd1 co_9600 none LDISC1
```

If your terminal is attached to serial port 2, edit the line that begins with `t2` by replacing the `x` with a `2`.

4. Edit */etc/inittab* so the baud rate is set properly. In the lines above, `co_9600` sets the terminal to 9600 baud. If this is not the correct rate, edit the line by replacing `9600` with the correct rate (either 4800, 2400, or 1200).

5. Inform the system of the changes. Type:

```
telinit q
```

Turn on the terminal and try it out. Press <enter> a few times until you see the login prompt, then log in as usual.

If you do not see the prompt after pressing <enter> several times, press <break> to try different baud rates. If this doesn't work, check the cable connections and make sure the power is turned on.

Adding a Modem

This section shows you how to connect a modem to the IRIS, and how to configure the software for a dial-in modem.

You will connect the modem to serial port 1 or 2. Both ports support *data carrier detect* and *data terminal ready*. The serial ports on the IRIS have 9 pins, and are male. See Appendix A for more information on the IRIS port signals.

Connecting the Modem to the IRIS

To connect the modem to the IRIS using a modem cable, follow these steps:

1. Connect the cable to the modem.

   Follow the instructions that came with the modem to connect one end of the cable to the correct port on the modem.

2. Remove the plastic side panel of the main unit (see Chapter 1).

3. Connect the other end (the 9-pin, male end) of the cable to either the port labeled **Serial Port 1** or **Serial Port 2**.

4. Replace the plastic side panel (see Chapter 1).

Your modem is now completely connected to the IRIS. Go on to the next section to configure the software.

Configuring Software for a Dial-In Modem

To configure the software so you can use your modem to access the IRIS from another location, follow these steps:

1. Log in as *root*.

2. Edit the file */etc/inittab* so no one will be able to log in to the port to which you attached your modem, and so the system recognizes it as a modem (as opposed to a terminal).

You will edit one of these two lines from */etc/inittab*:

```
t1:234:respawn:/etc/getty-s console ttyd1 co_9600 none LDISC1

t2:x:respawn:/etc/getty ttyd2 co_9600 none LDISC1
```

If you connected your modem to serial port 1, you edit the line that begins with `t1`. If you connected your modem to serial port 2, you edit the line that begins with `t2`. Edit it in three places:

- Change `ttyd1` to `ttym1` (or `ttyd2` to `ttym2`).
- Make sure there is only a `2` between the first pair of colons (::).
- Change `co` to `du`, and make sure the baud rate is correct.

For example, if you connected a modem that runs at 1200 baud to serial port 2, find this line:

```
t2:x:respawn:/etc/getty ttyd2 co_9600 none LDISC1
```

Change it so it looks like this:

```
t2:2:respawn:/etc/getty ttym2 du_1200 none LDISC1
```

3. Inform the system of the changes. Type:

```
telinit q
```

Try to dial in to the IRIS through this modem. If the login prompt is garbled or does not appear, press the <break> key on your keyboard and try again. If it still does not work, check all cable connections.

Adding a Dumb Serial Printer

Adding a printer is a two-step process. First you need to connect the printer to the IRIS using a null modem cable, then you need to configure the software to let the IRIS communicate with the printer.

Connecting the Printer to the IRIS

To connect the printer to the IRIS using a null modem cable, follow these steps:

1. Connect the cable to the printer.

   Follow the instructions that came with the printer to connect one end of the cable to the correct port on the printer.

2. Remove the plastic side panel of the main unit (see Chapter 1).

3. Connect the other end of the cable to either **serial port 1** or **serial port 2**

4. Replace the plastic side panel (see Chapter 1).

Your printer is now completely connected to the IRIS. Go on to the next section to configure the software.

Configuring the Software

To configure the printer software, follow these steps:

1. Log in as *root*.

2. To prevent the IRIS from sending a login prompt to the printer, you need to edit one of these two lines from */etc/inittab*:

```
t1:234:respawn:/etc/getty-s console ttyd1 co_9600 none LDISC1

t2:x:respawn:/etc/getty ttyd2 co_9600 none LDISC1
```

   If you connected your printer to serial port 1, you edit the line that begins with `t1`. If you connected your printer to serial port 2, you edit the line that begins with `t2`. Edit the line so there is only an `x` between the first two colons (::).

   If you connected your printer to serial port 1, the line should look like this:

```
t1:x:respawn:/etc/getty -s console ttyd1 co_9600 none LDISC1
```

3. Turn off the printer scheduler using *lpshut*. Type:

   `/usr/lib/lpshut`

4. To ensure that the printer uses the correct baud rate, edit */etc/rc2.d/S60lp*. At the end of this file, add these lines:

   `sleep 100000000 < /dev/ttyd`*`port_number`*
   `sleep 2`
   `stty` *`baud_rate`* `ixon ixoff -ixany </dev/ttyd`*`port_number`*

   Where *baud_rate* is the baud that your printer uses (for example, 4800 or 9600; see the documentation that came with your printer for this information), and *port_number* is either 1 or 2, depending on the port to which you connected the printer.

5. Introduce the printer to the system using the *lpadmin* command. You need to select a printer name, then specify to which port the printer is connected (*ttyd1* for port 1, and *ttyd2* for port 2), and that it is a dumb printer.

   The printer name that you select must:

   - be no longer than ten characters
   - consist of only alphanumeric characters and underscores
   - be unique from other printers that are on your network

   Introduce the printer by typing:

   /usr/lib/lpadmin **-p***printer* **-vttyd***port_number* **-mdumb**

6. Start the scheduler with the *lpsched* command. Type:

   /usr/lib/lpsched

7. Allow the printer to accept print requests with the accept command. Type:

   /usr/lib/accept *printer*

8. Enable the printer with the enable command. Type:

   enable *printer*

9. If you want this to be the default printer to which all your print requests go, type:

   /usr/lib/lpadmin **-d***printer*

The printer is completely configured. To test it, send a simple text file to the printer by typing:

`lp` *filename*

To check that it reached the printer, check the queue by typing:

```
lpstat -t
```

If the printer or queue does not seem to work properly now or in the future, you can reinstall the printer. To do this, type:

```
/usr/spool/lp/etc/util/preset
```

Important Note: This removes all printers that you have installed.

Then repeat all the steps in "Configuring the Software", above.

5. Caring for the IRIS

This chapter gives you some guidelines for keeping your IRIS in good running order, and shows you how to work with it if something goes wrong.

Preventative Medicine

This section contains some basic guidelines that you should follow to keep your hardware (the physical machine) and the software that runs on the hardware healthy.

Hardware Dos and Don'ts

To keep your machine in good running order, try to remember these guidelines.

Do not...

- enclose the main unit in a small, poorly ventilated area (such as a closet), or crowd other large objects around it.
- run the main unit with either side panel off; this alters the air flow.
- run the main unit while any of its sheet metal parts are not in place (e.g., when the metal cover is not on the electronics module). This exposes the circuit boards and could severly damage them.
- connect cables or add other hardware components while the main unit is turned on.
- power down the main unit frequently. Leave it running over nights and weekends if possible.
- move the main unit while it is running, or within one minute of powering it down. It has a hard disk inside it that may be damaged.
- lay the main unit on its side.
- use an adaptor to plug the main unit into a 2-prong (ungrounded) outlet.
- place liquids, food, or heavy objects on the main unit or keyboard.

- dangle the mouse by its cable, or throw the mouse at co-workers.

Do...

- plug in all cables completely, and tighten their screws for a firm connection.
- degauss the monitor every few days. Do this by pressing the degauss button on the front of the monitor.
- keep your mouse pad clean for accurate mouse tracking.
- plug the main unit into a power surge protection strip (if possible).
- clean the tape drive heads every 100 hours; clean them more often if you use the drive heavily.

Software Dos and Don'ts

When your system is up and running, try to follow these guidelines.

Do not ...

- turn off power to a workstation that is currently started up and running software. Follow the shutdown procedure that is described in Chapter 1.
- use the *root* account unless you are performing administrative tasks.
- run too many demos at the same time.

Do...

- make regular backups (weekly for the whole system, nightly for individual users) of all user information.
- use *df* to monitor disk usage.

If It's Not Working Properly...

The behavior of a system that is not working correctly falls into three broad categories:

operational You are able to log in to the system, but it doesn't respond as usual. For example, the picture looks strange or the windows don't respond to input from the mouse or keyboard.

marginal You are not able to fully start up the system, (i.e., get to the `console login` prompt), but you can reach the System Maintenance Menu.

faulty You cannot reach the System Maintenance Menu, and the yellow fault light is turned on.

If the behavior of the IRIS is operational or marginal, first do a physical inspection (use the physical inspection checklist on the next page). If all connections seem solid, try to restart the system. If the problem still exists, run the diagnostic tests from the System Maintenance Menu.

If the IRIS is faulty, turn the power to the main unit off and on. It this does not help, contact your maintenance organization.

Physical Inspection Checklist (Troubleshooting)

Check every item that is on this list.

- Make sure the monitor and main unit power switches are turned on.
- Make sure the mouse is on the mouse pad.

Before you continue, shut down the IRIS and turn off the power.

- Check all of these cable connections:
  - ❑ RGB cable (grey with red, green, and blue segments) should be connected to the monitor at one end, and the three posts labeled red, green, and blue on the main unit at the other end.

    Also make sure that the white switches below the RGB posts are pressed in (are in the 75-ohm position).
  - ❑ Monitor power cable (grey) should be connected to the monitor at one end and the main unit at the other end.
  - ❑ Keyboard cable (white) should be connected to the keyboard at one end and the main unit at the other end.
  - ❑ Mouse cable should be connected to the keyboard.

- Main unit power cable (black) should be connected to the main unit at one end, and plugged into a 3-prong (grounded) outlet at the other end.

- Ethernet cable should be plugged into the port labeled **Ethernet** (not **Genlock**), and secured with the slip lock.

- If you have any front-loading options such as a disk or tape drive, push them in firmly to make sure they are seated properly. Or, remove the drive and reseat it.

Start up your IRIS and see if the problem is resolved. If the IRIS still is not behaving normally, run the diagnostic tests.

Running Diagnostic Tests

If you checked all the connections (described above), powered down and restarted the main unit, and the IRIS still isn't working properly, you need to run the diagnostic tests. These tests check the critical hardware and let you know whether you need to replace the electronics module or another piece of hardware.

The complete set of tests takes about 30 minutes to run. The testing stops if the system finds any errors, and reports the problem.

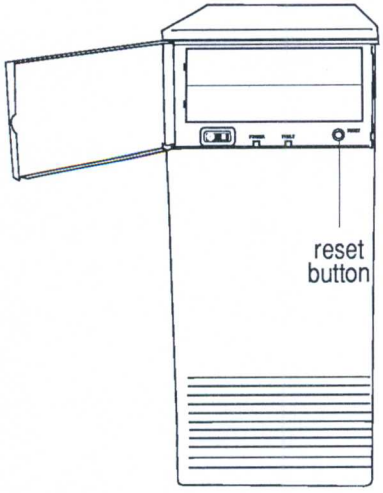
To run the diagnostic tests, follow these steps:

1. Shut down the system.

   If the IRIS is running and you can still type into a window, type:

   ```
   su
   halt
   ```

   If the IRIS is in a sorry state and you cannot communicate with it using the mouse or keyboard, press the **RESET** button located behind the front door. Then skip ahead to step 3.



2. After a few moments, you see this message:

   ```
   Okay to power off the system now.
        Press any key to restart.
   ```

   Press any key.

3. You see this message:

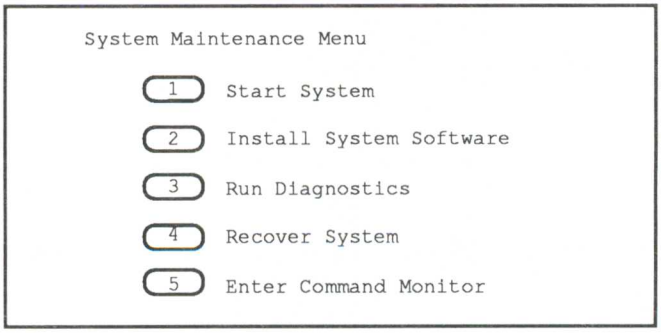
   ```
   Starting up the system...

   To perform system maintenance instead, press <Esc>.
   ```

   Press <Esc>.

If you cannot reach this menu, your system is faulty. Contact your maintenance organization.

4. You see this menu:



Start diagnostics by typing:

```
3
```

If you do not see this message, you cannot run the diagnostics. You probably have a faulty disk. Contact your maintenance organization.

5. You see a message similar to this:

```
Version 4D1-3.1 IDE 4D20 field
Fri Jul 22 13:10:44 PDT 1988 SGI
+
```

The character on the last line (next to the cursor) alternates between a plus (+) and an asterisk (*) to indicate that the tests are running. Also, the yellow fault light on the front of the main unit flashes throughout the diagnostics.

Included in the diagnostics is a series of graphics tests. During these tests, the screen will go blank and display various images. You know that the system is still running the diagnostics because the yellow fault light continues flashing.

6. During this time, watch for messages.

   If the IRIS hardware is completely healthy, after about 10-30 minutes you see this message:

```
Diagnostic tests completed with no failures detected.

Press <Enter> to continue.
```

   Press <enter> to return to the System Maintenance Menu, where you can restart the system by selecting 1. If problems persist, or if you still cannot restart the IRIS, you may have a software problem. See the section below entitled "Recovering from a System Crash".

   If the diagnostics find a problem, you see a message like this:

```
ERROR:  Failure detected in the Electronics Module (CPU)
```

   This means the electronics module must be repaired. (The item in parentheses specifies which part of the module is faulty — it could be the CPU, graphics, bitplane expansion, Z-buffer, or FPU). Record this information.

   You may also see other messages that report faulty peripherals.

If your electronics module needs to be repaired, call your company's maintenance organization. You have two options:

- Have a field engineer come to fix the module at your place of business.
- Remove the module yourself and ship it to the manufacturer for repair.

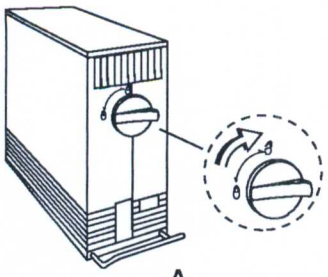
If the maintenance organization recommends removing it and sending it in, use the next section to learn how to remove and package the module.

Removing the Electronics Module

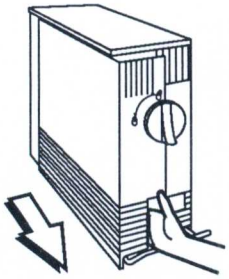
This procedure shows you how to remove the Electronics Module.

Important Note: The electronics module is extremely sensitive to static electricity. To avoid damaging it further, ground yourself throughout this procedure by frequently touching the metal parts of the main unit.

1. **Shut down the system and unplug the main unit.**



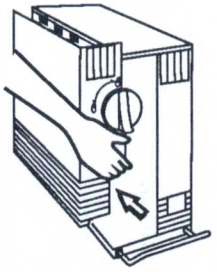
A



B

2. Remove the plastic side panel of the main unit.

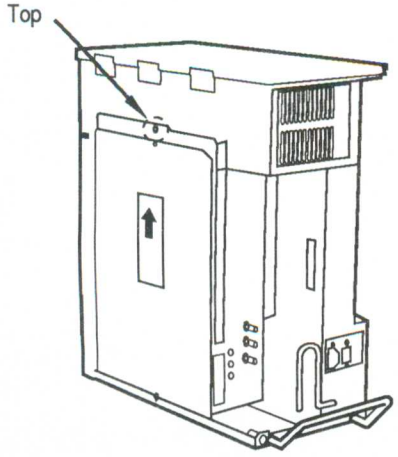
- ❑ Face the back of the main unit so the locking dial is in front of you.
- ❑ Turn the locking dial clockwise so it points to the open padlock. (A)
- ❑ Grab the panel at the rectangular opening at the bottom of the panel, then pull the panel toward you. (B) This releases the side panel, so you can lift it away from the main unit.(C)



C

3. Disconnect the side cables.

- ❑ Disconnect the keyboard cable by unscrewing it and pulling it out.
- ❑ Disconnect the RGB cable by pressing each connector, twisting it counterclockwise, and pulling it off.
- ❑ Disconnect all other cables that are attached to the electronics module.



4. Loosen the electronics module.

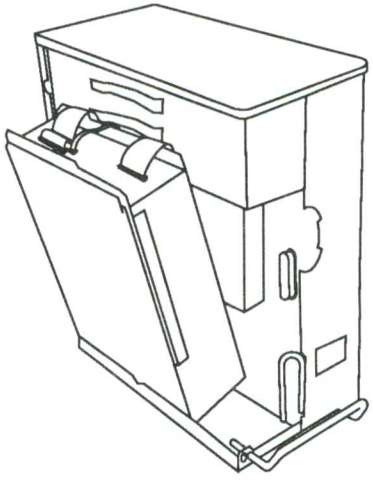
❑ Face the electronics module.

You see two screws located on the electronics module metal cover, and one screw that is above the cover.

❑ Use the screwdriver to remove the top screw (the one above the electronics module metal cover). Put the screw in a safe place.

5. Disconnect the top cables.

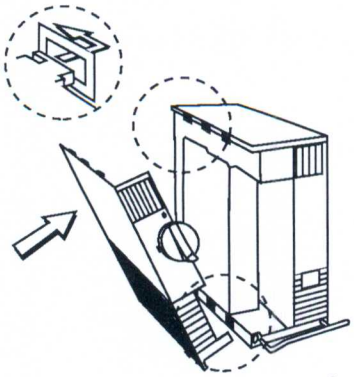
❑ Tilt the electronics module towards you, so you can see the cables.



❑ Disconnect the double cable on the lefthand side by grasping the two plastic loops and pulling them upwards.

- ❑ Disconnect the small cable to the right of the double cable by grasping it by the black connector, and pulling it upwards.
- ❑ Disconnect the wide cable on the righthand side by grasping the white tab and pulling it upwards.

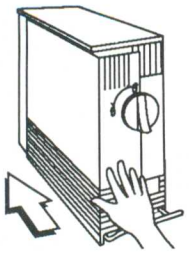
6. Completely remove the electronics module.



A

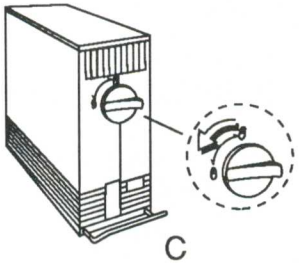
7. Replace the plastic side panel.

- ❑ Face the back of the main unit.
- ❑ Make sure the arrow on the locking dial is pointing to the open padlock.
- ❑ Line up the tabs on the bottom of the panel with the holes on the bottom edge of the main unit. Push the tabs through the holes. (A)
- ❑ Line up the same tab and hole arrangement on the top of the panel and the top edge of the main unit.



B

- ❑ Push the panel firmly toward the front of the main unit, so the tabs seat in the holes. (B)
- ❑ Turn the locking dial counterclockwise so it points to the closed padlock. (C)



C

Your replacement electronics module comes with instructions on how to install it.

Packaging the Electronics Module

If you receive your new electronics module before you return the damaged one, package the damaged module in the packing material in which the new one arrived.

If you must return the damaged module before you receive a new one, follow these packaging guidelines:

- Find a sturdy cardboard box that is at least one inch larger than the electronics module on every side.

- Wrap the electronics module several times in a bubble bag if possible. Otherwise, use styrofoam packing peanuts or, as a last resort, newspaper, to cushion the electronics module within the box.

Important Note: If you use packing peanuts, first wrap the module in a plastic bag. The module could be damaged further if the peanuts enter the module through any opening.

Make sure the electronics module does not move around in the box.

- Seal the box securely.

- Send the package to your maintenance organization via a reliable overnight carrier for the fastest, safest service. Silicon Graphics, Inc. recommends insuring the package for the replacement value of the electronics module.

Recovering from a System Crash

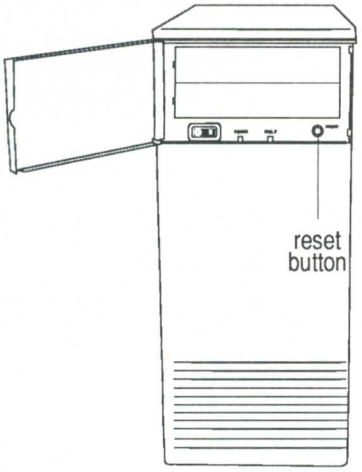
If the problem is in software, you need to use the Installation Tape (EOE1) that came with your IRIS and your most recent full backup tape to recover your system. To recover from a crash, follow these steps:

1. Shut down the system.

   If the IRIS is running and you can still type into a window, type:

   ```
   su
   halt
   ```

   If the IRIS is in a sorry state and you cannot communicate with it using the mouse or keyboard, press the **RESET** button located behind the front door. Then skip ahead to step 3.



2. After a few moments, you see this message:

   ```
   Okay to power off the system now.
       Press any key to restart.
   ```

   Press any key.

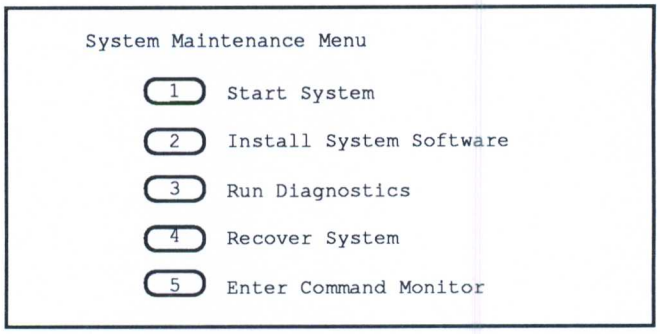
3. You see this message:

   ```
   Starting up the system...

   To perform system maintenance instead, press <Esc>.
   ```

   Press <Esc>.

4. You see this menu:



Select 4, Recover System, by typing:

4

5. You see this message:

```
Insert the installation tape, then press <enter>:
```

Insert the Installation Tape (EOE1) that came with your Personal IRIS (**not** your own backup tape), then press <enter>.

You hear the tape drive reading the tape. At this point, the system takes approximately 15 minutes to copy the information from the tape that it needs. During this time, you see messages like these:

```
Copying installation program to disk.
.....................................
.....................................
.....................................
10000 bytes copied
.
.
```

You may also see a WARNING: message, after which the system pauses; this is normal.

6. When everything is copied to disk, you see this message:

```
*******************************************************
                    CRASH RECOVERY
*******************************************************

Insert the Backup tape in the drive, then press <enter>:
```

   Remove the Installation Tape, insert your most recent full backup tape, then press <enter>. If you are recovering using a tape drive on another Personal IRIS, the system will ask for its name.

7. Then you see this message:

```
Erase old filesystems and make new ones (y,n) ? [n]
```

   If you answer no to this question, the system tries to salvage as many files as possible, then it uses your backup tape to replace the files it could not salvage. Usually you should answer no, especially if your backup tape is not very recent.

   If you answer yes, the system erases the disk and copies everything from your backup tape to the disk. The system will lose any information that you created between now and when you made your backup tape.

   Answer by typing either **y** or **n**.

8. You see this message:

```
Starting recovery from tape.
```

After 2-3 minutes the names of the files that the system is copying to its disk start scrolling by. When the recovery is complete, you see this message:

```
Recovery complete, restarting system.
```

Then the system restarts. When you see the `console login` prompt, the IRIS is ready to go.

Service and Support Information

When you purchased your IRIS you may have purchased a support program from either Silicon Graphics,Inc., or a vendor who supplies you software. Whenever you encounter any problems that you cannot solve using the methods in this chapter, contact the organization from which you purchased the support program.

If you did not purchase a support program, contact your sales representative.

A. Using the Ports

This appendix describes how to use the two RS-232 ports that are standard on the Personal IRIS, and provides a list of FCC certified cables that you can purchase to work in the various ports of the IRIS.

Using the Serial Ports

There are two RS-232 serial ports on the IRIS, each with a 9-pin connector. Most peripherals have ports that require a 25-pin connector. For this reason, most cables you use will have a 9-pin connector on one end and a 25-pin connector on the other end.

Two kinds of cables plug into IRIS ports; modem and null modem cables. Regardless of what type of cable you use, make sure you always use shielded cables. See the last section of this appendix for the specifications for RS-232 cables that the FCC has certified.

Use a modem cable to install a modem and other simple devices, and a null modem cable to install devices such as terminals and printers.

The table below shows the standard pin signal abbreviations.

Signal Abbreviations	
Transmit Data	TD
Receive Data	RD
Request to Send	RTS
Clear to Send	CTS
Signal Ground	GND
Data Carrier Detect	DCD
Data Terminal Ready	DTR

For information on using the optional serial ports, see *Using the 6-port RS-232 Option.*

Modem Cables

A modem cable has a pin-to-pin correspondence. It connects pin 1 on the 9-pin end to pin 1 on the 25-pin end.

Use a modem cable to install modems. The pin definitions for a modem cable are shown below:

9-pin end	25-pin end	Signal
2	2	TD
3	3	RD
4	4	RTS
7	7	GND
8	8	DCD
9	20	DTR

Null Modem Cables

Where modem cables have a pin-to-pin correspondence, pins are crossed on a null modem cable. For example, pin 2 sends its information to pin 3. Use null modem cables to install terminals and printers.

When one device sends and the other receives, a 3-wire null modem cable is the minimal connection. Use a 3-wire null modem cable to install terminals. The table below shows an example of the pin signals for a 3-wire terminal cable.

9-pin end	25-pin end	Signal
2	3	TD
3	2	RD
7	7	GND

A null modem cable always has wires 2 and 3 crossed and may have other wires crossed. This table lists the pin definitions for an example of a typical null modem cable.

9-pin end	Wire	Signal
2	3	TD
3	2	RD
4	5	RTS, CTS
5	4	CTS, RTS
7	7	GND
9	6,8	DTR, DSR, DCD
8	20	DCD, DTR

Printers often have different cable specifications. See your printer manual for specific pin definitions.

See the peripheral installation manuals for information on how to configure software.

Cables That Work in IRIS Ports

The cables in the table on the next page meet FCC Class A requirements when you use them with the Personal IRIS and a certified Class A peripheral device. The column entitled "INMAC cable" contains part numbers for the cable as they appear in the catalogue published by INMAC, a computer peripheral supplier.

You can contact INMAC at this address:

INMAC
Corporate Office
2465 Augustine Drive
P.O. Box 58031
Santa Clara, CA 95052-8031

Port	Description		INMAC cable
Serial 1 and 2	Construction:	9-conductor, straight through with full shield attached 360 to solid metal D shield	
	Computer end:	9-pin, D-sub, male	
	Peripheral end:	9-pin, D-sub, male, 10'	374-2
	Peripheral end:	9-pin, D-sub, female, 10'	374-1
Parallel Printer	Construction:	Centronics 25-line interface with full shield attached 360 to solid metal D shell; IBM PC compatible	
	Computer end:	25-pin, D-sub, male	
	Peripheral end:	37-pin, Centronics, male, 8'	740-0, 741-0
	Peripheral end:	25-pin, D-sub, male, 10'	406-2
	Peripheral end:	25-pin, D-sub, female, 10'	406-1
Ethernet	Construction:	shielded with full shield attached 360 to solid metal D shell	
	Computer end:	15-pin, D-sub, male with integral latch	
	Peripheral end:	15-pin, D-sub, female with integral latch; 16.5'	1063-1
Genlock	Construction:	15-conductor, straight through with full shield attached 360 to solid metal D shield.	
	Computer end:	15-pin, D-sub, male	
	Peripheral end:	15-pin, D-sub, male (375-2 modified)	23606
SCSI	Construction	Double shielded, shield attached full 360 to metal shell	
	Computer end:	50-pin male	
	Peripheral end:	50-pin male, 4'	789
	Extension cable:	4'	790-1
	Extension cable:	8'	790-2

Glossary

4Sight Windowing system that controls all windows, pop-up menus, and icons.

account Information that uniquely identifies each user. The account consists of a login name (the name the user types each time the user wants to start using the IRIS), sometimes a password, and a unique location in the file system that the user owns.

active window The only window that recognizes input (activity) from the keyboard and mouse.

Background (Max) menu The menu that you see when you press the right-hand mouse button while the cursor is outside of all windows. You use this menu to log out.

back up When you back up your IRIS, you are copying a certain set of files and directories from your disk to a tape.

body The part of the window that contains text or graphics.

brightness The knob on the front of the monitor that controls the intensity of the image that the monitor displays.

connectors Hardware at the end of a cable that allows you to fasten the cable to an outlet (ports, RGB posts, or 3-prong electrical outlets).

console window The one window that appears each time you log in. You cannot remove this window; IRIX uses it to report the status of the IRIS.

contrast The knob on the front of the monitor that controls the difference between light and dark images.

current working directory The directory within the file system in which you are currently located.

cursor The screen cursor is a small red arrow that echoes the movements of the mouse. The text cursor is the bright square within a text file that identifies the place in the file where you can insert text.

degauss The button on the front of the monitor that you press to de-magnify the monitor.

diagnostics A series of tests that check all hardware components of the IRIS.

directory A container in the file system in which you store other directories and files.

disk use The percentage of space on your disk that contains information.

drive (disk and tape) Hardware that communicates with the main unit through a SCSI (Small Computer System Interface) port.

electronic mail A program that lets you send and receive messages over a network.

electronics module The part of the main unit that contains the CPU and graphics boards, the memory (RAM), and all the outlets.

file system A hierarchy of directories and files. The top of the hierarchy is the *root* (/) directory.

file container in which you store information such as text, programs, or images you created using an application.

frame The part of a window that surrounds the body, and contains the stow and resize boxes. The top of the frame is called the title bar.

highlight A menu item is highlighted when the background of the item is black, and the lettering is white. If you release a mouse button while an item is highlighted, the IRIS carries out the action to which the item corresponds; this is called selecting the item.

home directory The directory into which IRIX places you each time you log in. It is tied to your account, and you own it.

Icon menu The menu that you see when you press the right-hand mouse button while the cursor is over an icon.

icon box The small square in the upper left-hand corner of every window. If you press the left-hand mouse button while the cursor is over this square, the window turns into an icon (a small, grey square).

Installation Tape The 1/4-inch cartridge tape that came with your system that is labeled "EOE1- Installation Tape". This tape contains a software installation tool that you use to take care of your Personal IRIS.

IRIX The operating system that runs on the IRIS. It lets you store your information in a hierarchy, and gives you a convenient way to communicate with the IRIS hardware. It is based on the UNIX System V operating system.

locking dial The large knob on the back of the main unit that you turn to unlock and lock the plastic side panels.

log in Sign on or start a session on the IRIS.

log out Sign off or end a session on the IRIS.

main unit power cable The black cord that connects the main unit to a 3-prong (grounded) power outlet.

main unit The rectangular, plastic box that contains the electronics module, disk and tape drives, fan, and power supply, to which you connect the monitor, keyboard, and all other hardware options. All computations are performed by the main unit.

monitor power cable The grey cord that connects the monitor to the main unit.

mouse pad The rectangular, metallic surface that reads the movements of the optical mouse.

mouse (optical) A hardware device that you use to communicate with windows and icons. You move the mouse to move the arrow-shaped cursor on the screen, and you press its buttons to request actions. The mouse must always be on the mouse pad in order for the IRIS to interpret its movements.

option An extra piece of hardware that you can add to the basic IRIS system, such as a second disk drive. Both peripherals and upgrades are considered options.

outlets Openings in the hardware to which you attach connectors to make an electrical connection.

ownership Every file and directory in the file system belongs to a certain user. That user can decide what other users can access the file. When a user creates a file or directory, the user automatically owns it. Only the owner or the system manager can change who owns the file.

padlock icons Symbols on the back of the main unit, near the locking dial. When the arrow on the locking dial points to the open padlock, the plastic side panels are unlocked, so you can remove them. When the arrow points to the closed padlock, the plastic side panels are locked into place.

parent directory A relative term that refers to a directory that holds another directory. If directory A holds directory B, then A is the parent directory of B.

password Any combination of letters, plus one number, that only you know. Each time you log in, you first type your account name, then you type your password.

pathname The list of directories that leads you from the *root* (/) directory to a specific file or directory in the file system.

peripheral A hardware device that adds new functionality to the basic IRIS, such as a disk drive.

permissions Information attached to every file and directory that determines which users can access the file or directory, and to what degree.

plastic side panel Large, L-shaped plastic coverings that fit over each side of the main unit.

pop-up menu A list of actions that the IRIS can carry out on various objects on the screen. You see a pop-up menu when you press and hold down the right-hand mouse button; you see different pop-up menus depending on the location of your cursor when you press the button.

port An outlet to which you attach cable connectors.

power down Turn off the power switches on the front of the monitor and the main unit.

prompt The character (such as % or #) that tells you IRIX is ready to accept a command.

resize box The small square in the upper right-hand corner of every window. If you press and hold the left-hand mouse button while the cursor is over this square, you can stretch the window to a new size. This term also refers to the red box you see after you select "resize" from the Window menu.

restore When you restore files to your IRIS, you are copying a certain set of files and directories from a tape to your disk.

RGB cable The grey cable with red, green, and blue segments at both ends that you use to connect the monitor to the main unit.

RGB posts Short metal cylinders on the monitor and the main unit to which you connect the RGB cable.

rollover menu A pop-up menu that contains another pop-up menu. You access the second menu by sliding the cursor to the right.

root account A privileged login account that the system manager uses. The person who uses this account can access every file and directory in the file system, including those files that contain information about every user.

root (/) directory The directory at the top of the file system hierarchy.

scroll bar The left-hand portion of every window that you can use to view information that is no longer displayed in the window.

scrolling Moving information that is currently displayed in a window up or down to view information that was displayed earlier or later in the window.

select To select an item from a pop-up menu, you release a mouse button while an item is highlighted, and the IRIS carries out the action to which the item corresponds. To select a window (pop it to the front and make it active), position your cursor over the title bar, then press and release the left-hand mouse button.

shut down Safely close all files, log out, and bring the IRIS to a state where you can safely power it down. You use the *halt* command to do this.

stow Make a window into an icon using the stow box.

superuser Another name for the system manager, or anyone who is using the *root* account.

system manager The person who uses the *root* account to perform the administrative tasks associated with using a workstation.

system All the hardware and software that makes up the IRIS.

TCP/IP The standard networking software that the IRIS uses to communicate over the network. Its formal name is the DARPA Internet Protocol Suite.

title bar The top of the frame of every window.

toolchests Icons in the upper left-hand corner of the screen that contain menus.

tutor The account that you use when you want to use the tutorial; also the name of the home directory for the tutor account.

U-shaped bracket Metal hook in the main unit through which you route all cables.

upgrade Hardware that you add to the basic IRIS that increases its performance, such as additional memory (RAM) or more graphics boards.

vi The standard IRIX text editor.

Window menu The menu that you see when you press the right-hand mouse button while the cursor is in the title bar of a window.

window A portion of the screen that contains either text or graphics.

wsh menu The menu that you see when you press the right-hand mouse button while the cursor is in the body of a window.

Index

A

accessing
    files and directories, 3-6/3-8
    other workstations, 3-18/3-19
account
    privileged, 4-8
    root, 4-2/4-3
    user, 4-16/4-17, 4-19, 4-23/4-24
account name, 4-16/4-17
active windows, 2-6/2-7
adding
    ASCII terminal, 4-39/4-43, A-1/A-5
    groups, 4-22
    IRIS to network, 4-9/4-13
    modem, 4-43/4-45, A-1/A-3
    new software, 4-33/4-37
    peripherals, 4-37/4-49
    printer, 4-46/4-49, A-1/A-5
    upgrades, 4-37/4-38
    users, 4-6/4-8, 4-18/4-21
address, Internet, 4-10
applications
    adding, 4-33/4-37
    using, 3-5/3-6
ASCII terminal, adding, 4-39/4-43
assigning passwords, 4-8

B

Background menu
    see Max menu
backing up files, 3-11/3-15, 4-28/4-31
    see also recovering from system crash
    see also restoring files
Backup command, 4-30
    see also backing up files
binary files, 2-31
button
    mouse, 2-4
    reset, 5-17

C

cable specifications, A-3/A-6
caring for
    see maintaining
changing
    directories, 2-22/2-23
    font, 2-18
    group name, 4-24/4-25
    permissions, 3-9/3-10, 4-32/4-33
    text, 2-35/2-42
    user accounts, 4-23/4-24
    window size, 2-7/2-8, 2-12, 2-18
checking
    cable connections, 5-6/5-7
    current working directory, 2-22
    disk space, 4-31/4-32
    electronics module, 5-7/5-11
    hardware, 5-7/5-11
    switch positions, 5-6/5-7
    see also troubleshooting
command mode, 2-37/2-38
command summary
    IRIX, 2-33/2-34
    mail, 3-26/3-27
    vi text editor, 2-40
commands
    Icon menu, 2-13
    IRIX, 2-1, 2-16, 2-19/2-34
    Max menu, 2-14
    Window menu, 2-11/2-12
    wsh menu, 2-18
connecting the system
    see setting up
console window, 2-3
    see also Window menu, *wsh* menu

copying files, 2-25/2-28
creating
backup copies, 3-11/3-17, 4-28/4-31
electronic mail messages, 3-21/3-22
new directories, 2-24
new files, 2-40
new windows, 2-15/2-1
current working directory
checking, 2-22
description, 2-20/2-22, 2-34
listing full pathname, 2-22/2-23
see also directories
cursor
moving, 2-3/2-4
text, 2-36
see also mouse
customizing your IRIS, 4-16/4-26
see also IRIS workstation

D

DARPA Internet Protocol Suite
see TCP/IP network
defaults, changing, 4-21
deleting
directories, 2-32/2-33
electronic mail messages, 3-24/3-26
files, 2-31/2-32
groups, 4-26/4-27
text, 2-38/2-39
users, 4-25/4-26
demonstration programs, 1-12/1-16
Demos toolchest
see demonstration programs, toolchests
diagnostics tests, running, 5-7/5-11
dial-in modem, 4-44/4-45
disk space, checking, 4-31/4-32
displaying
see listing
directories
changing, 2-22/2-23
creating new, 2-24
current working, 2-20/2-22, 2-34
deleting, 2-32/2-33
description, 2-19/2-22, 2-34
home, 2-20, 2-34, 4-16
listing contents, 2-22/2-25
owning, 3-6/3-8
parent, 2-26, 2-34
print working, 2-22
root, 2-19
tutor, 2-19
usr, 2-20
using pathnames, 2-20
see also permissions
dumb serial printer, 4-46/4-49

E

editing text, 2-35/2-42
editor
see *vi* text editor
electronic mail
setting up, 4-13/4-14
using, 3-20/3-28
see also electronic mail messages
electronic mail messages
command summary, 3-26
creating, 3-20/3-21
deleting, 3-24/3-26
sending, 3-21/3-23
reading, 3-24
replying to, 3-24/3-26
electronics module
checking, 5-7/5-11
packing, 5-15/5-16
removing, 5-11/5-15
Ethernet cable, attaching, 4-11, 5-7

execute permission, 3-7
see also permissions
exiting
see stopping

F

file system, 2-19/2-34
see also IRIX operating system
files
backing up, 3-11/3-15, 4-28/4-31
binary, 2-31
copying, 2-25/2-28
creating new, 2-40/2-41
deleting, 2-31/2-32
description, 2-19/2-34
listing contents, 2-28/2-31
locating, 2-19/2-23
moving, 2-31
owning, 3-6/3-8, 4-32/4-33
renaming, 2-31
restoring, 3-11, 3-15/3-17
sharing, 3-6/3-11
transferring, 3-19/3-20
finding files
see locating, files

G

getting product support, 5-20
granting permissions
see permissions
groups
adding, 4-22
changing name, 4-24/4-25
deleting, 4-26/4-27
description, 3-6/3-8
see also permissions
guidelines, maintenance, 5-1/5-3

H

halt command, 1-17
hardware
maintaining, 5-2/5-3
problems, 5-5/5-11
hardware peripherals
see peripherals
help, getting, 5-20
hierarchy, file system, 2-19/2-34
see also directories, files
home directory, 2-20, 2-34, 4-16
hostname, 4-10
hosts, 4-10

I

icons
changing to windows, 2-13
deleting, 2-13
description, 2-2
moving, 2-8/2-9, 2-13
see also Icon menu
Icon box, 2-7/2-8
Icon menu, 2-9, 2-13
inserting
tape in tape drive, 3-13
text, 2-37/2-38
insert mode, 2-37/2-38
Installation Tape, 1-3, 3-12, 4-29, 5-16
installing new software, 4-33/4-37
see also peripherals
Internet address, 4-10
IRIS options
mail, 3-26/3-27
Network File System (NFS), 3-27/3-28, 4-19
tape drive, 3-11, 4-29
Yellow Pages (YP) networking, 4-4/4-5, 4-9

IRIS workstation
accessing other, 3-18
adding groups, 4-22
adding peripherals, 4-39/4-49
adding to network, 4-9/4-13
adding users, 4-6/4-8, 4-18/4-21
backing up files, 3-11/3-15, 4-28/4-31
changing group name, 4-24/4-25
changing user accounts, 4-23/4-24
checking disk space, 4-31/4-32
components, 1-2
deleting groups, 4-26/4-27
deleting user accounts, 4-25/4-26
description, 4-11
installing new software, 4-33/4-37
learning, 2-1/2-43
logging in, 2-2/2-3
logging in to other, 3-18/3-19
maintaining, 5-1/5-20
manager, 1-17, 3-6
managing, 4-2/4-3
naming, 4-9/4-10
options, 1-12
preventive maintenance, 5-1/5-4
recovering from system crash, 5-16/5-20
restoring files, 3-11, 3-15/3-17, 4-30/4-31
selecting system manager, 4-2/4-3
service and support, 5-20
setting time and date, 4-6
setting up, 1-2/1-8, 4-4/4-15
setting up electronic mail, 4-13/4-14
setting up new workstation, 4-4/4-15
starting, 1-9/1-11, 2-2/2-3, 2-33, 3-2/3-3
stopping, 1-17/1-18, 2-43, 3-3
transferring files between, 3-19/3-20
troubleshooting, 5-6/5-11
unpacking, 1-2
using ports, A-1/A-6
using with network, 3-17/3-20
see also peripherals
IRIX operating system
commands, 2-1, 2-16, 2-19/2-34
command summary, 2-33/2-34, 3-5
directories, 2-19
files, 2-19
logging in, 2-2/2-3, 3-2/3-3
logging out, 2-43, 3-3
managing files and disks, 4-27/4-32
shell, 2-15/2-16
see also *wsh*
using applications, 3-5/3-6
IRIX text editor, 2-35/2-42

L

learning IRIS, 2-1/2-43
see also IRIS workstation
listing
backup tape contents, 4-30
directory contents, 2-22/2-25
file contents, 2-28/2-31
full pathname, 2-23
text files, 2-28/2-31
List_tape command, 3-12, 3-16, 4-30/4-31
local tape drive, 4-34
locating files, 2-19/2-23
logging in to
IRIS, 2-2/2-3, 3-2/3-3
other workstations, 3-18/3-19
logging out of IRIS, 2-43, 3-3
login name, 4-17

M

mail
see electronic mail
maintenance
preventive, 5-1/5-4
tape, 1-3, 3-12, 5-16

maintaining
hardware, 5-1/5-3
software, 5-4
making
see creating
managing
file systems and disks, 4-27/4-33
users and groups, 4-16/4-26
master workstation, 4-10
Max toolchests
see toolchests
Max menu, 2-14
Max window manager, 2-3, 2-5/2-18
memory (RAM) upgrade, 4-37/4-38
menus
Icon, 2-9, 2-13
Max, 2-14
rollover, 2-14/2-15, 2-18
selecting items from, 2-10
size, 2-14
System Maintenance, 5-5/5-11
Window, 2-9/2-12
wsh, 2-14, 2-18
modem
adding, 4-43/4-45
cable, A-1/A-3
signal abbreviations, A-2
modes, text editing, 2-37/2-38
Mouse
buttons, 2-4
using, 1-12/1-13, 2-3/2-4
moving
cursor, 2-3/2-4
files, 2-31
icons, 2-8/2-9, 2-13
text cursor, 2-36
windows, 2-8/2-9, 2-11/2-12

N

name
account, 4-17
group, 4-22, 4-24/4-25
login, 4-17
terminal model, 4-40/4-41
naming your IRIS, 4-9/4-10
network
adding groups, 4-22
adding IRIS to, 4-9/4-13
adding users, 4-6/4-8, 4-18/4-21
description, 4-9
file system option, 3-27/3-28
security, 3-18
TCP/IP, 4-9
null modem cable, A-2/A-3

O

operating system
see IRIX operating system
options
see IRIS options
organizing files, 2-23/2-34
owning
directories, 3-6/3-8
files, 3-6/3-8
see also permissions

P

packing electronics module, 5-15/5-16
parent directory, 2-26, 2-34
passwords
about, 4-17
assigning, 4-8
pathname, 2-19/2-20

performance upgrades
see upgrades
peripherals
adding ASCII terminal, 4-39/4-43, A-1/A-5
adding modem, 4-43/4-45, A-1/A-3
adding printer, 4-46/4-49, A-1/A-5
permissions
assigning passwords, 4-8, 4-17
changing, 3-9/3-10, 4-32/4-33
description, 3-6/3-8
execute, 3-7
read, 3-7
write, 3-7
pin signals
modem cable, A-3
null modem cable, A-4
ports, using, A-1/A-6
printer, 4-46/4-49
privileged accounts, 4-8
problems, IRIS workstation
see troubleshooting
product support, 5-20
protecting files
see backing up

R

read permission, 3-7
see also permissions
reading electronic mail, 3-24
recovering from system crash, 5-6/5-20
remote tape drive, 4-34
removing electronics module, 5-11/5-15
see also deleting
renaming files, 2-31
replying to electronic mail, 3-24/3-26
resize box, 1-14, 2-7/2-8
resizing windows, 2-7/2-8, 2-12
Restore command, 4-30
see also restoring files
restoring files
description, 3-11
entire file system, 4-30/4-31
home directory, 3-15/3-16
specific files, 3-16/3-17
see also backing up files
see also recovering from system crash
rollover menu, 1-13
root
account, 4-2/4-3
directory, 2-19
running applications
see using applications

S

saving text edits, 2-39
scroll bar, 2-16/2-17
scrolling text, 2-16/2-17
security, network, 3-18
selecting
a system manager, 4-2/4-3
menu items, 2-10
sending electronic mail, 3-21/3-23
see also electronic mail messages
serial
ports, A-1/A-3
printer, 4-46/4-49
setting up software on a new IRIS , 4-4/4-15
see also changing, IRIS workstation
setting up the hardware 1-2/1-8
sharing files, 3-6/3-10
sizing windows, 2-7/2-8, 2-12, 2-18
software
adding new, 4-33/4-37
maintaining, 5-4
problems, 5-17/5-20
see also peripherals
software tapes, 1-2/1-3

starting
IRIS, 1-9/1-11, 2-2/2-3, 3-2/3-3
IRIX shells, 3-3/3-4
mail utility, 3-21/3-23
system setup, 4-5
vi text editor, 2-35/2-36
stopping
IRIS program, 1-17/1-18, 2-43, 3-3
IRIX shells, 3-4
vi text editor, 2-40
summary
IRIX commands, 2-33/2-34
mail commands, 3-26/3-27
vi commands, 2-42
super graphics upgrade, 4-37/4-38
sysadm tool, 4-14/4-15
system crash, recovering from, 5-16/5-20
System Maintenance menu, 5-5/5-11
system manager, 1-17, 3-6, 4-2/4-3, 4-27/4-33
system prompt, 2-3

T

tape
drive, 3-12/3-13, 4-29, 4-34
specifications, 3-13, 4-29/4-30
see also Installation Tape
TCP/IP network
description, 4-9
turning on, 4-11/4-13
using, 3-17/3-28
terminal
see ASCII terminal, peripherals
terminal model name, 4-40/4-41
text
deleting, 2-38/2-39
editing, 2-35/2-42
inserting, 2-37/2-38
listing, 2-28/2-31
moving text cursor, 2-36
saving edits, 2-39
scrolling, 2-16/2-17
text cursor, 2-36
text editor
see *vi* text editor
textfiles
see text
text insert mode, 2-37/2-38
title bar, 2-5
toolchests
demonstration, 1-12/1-16
sysadm tool, 4-14/4-15
tools, 2-15/2-16
using, 2-15/2-16
tracking user activity, 4-16/4-26
transferring files, 3-19/3-20
troubleshooting
hardware problems, 5-5/5-11
inspection checklist, 5-6/5-7
running diagnostic tests, 5-7/5-11
software problems, 5-17/5-20
trying demonstration programs, 1-12/1-16
tutorial, 2-1/2-43

U

unpacking the IRIS, 1-2
upgrades, adding, 4-37/4-38
users
adding, 4-6/4-8, 4-18/4-21
changing, 2-23/2-24
changing defaults for new, 4-21
deleting, 4-25/4-26
using
applications, 3-5/3-6
IRIX commands, 2-19/2-34
mouse, 1-12/1-13
vi, 2-16, 2-35/2-43

V

vi text editor
command summary, 2-42
starting, 2-35/2-36
stopping, 2-40
using, 2-16, 2-35/2-43

W

windows
changing to icons, 2-12
console, 2-3
creating new, 2-15/2-16
deleting, 2-12
enlarging, 1-14
4Sight, 1-16
making active, 2-6/2-7
moving, 2-8/2-9, 2-11/2-12
sizing, 2-7/2-8, 2-12, 2-18
wsh, 2-16/2-18
see also menus
window manager, Max, 2-5/2-18
Window menu, 2-9/2-12
working directory
see current working directory
workstation, master, 4-10
workstations
see IRIS workstation
write permission, 3-7
see also permissions
wsh menu, 2-14, 2-18
wsh window, 2-16/2-18
see also *wsh* menu

Y

Yellow Pages (YP) networking option, 4-4/4-5