

OFFICE OF INFORMATION TECHNOLOGY

Getting Started with X

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READ ME FIRST...

- This handout accompanies the Office of Information Technology Tutorial “Getting Started with the X Window System.” Additional copies are available from the Office of Information Technology, 111 Cummington Street 9 a.m. to 5 p.m. Monday through Friday.
- This tutorial provides the basic information needed to begin using the X Window System and the Motif window manager on an X terminal. The specific information presented here has been tested and is valid for most UNIX computers using the X11R5 version of X Windows and Motif 1.2.
- This tutorial is designed for people who have no experience with the X Window System. However, the following tutorial courses or equivalent knowledge is necessary before attending this tutorial:
 - Getting Started with UNIX (Course 4000) or Getting Started with UNIX, Video Version (Course 4001) or Getting Started with UNIX, Accelerated Version (Course 4005)
 - The ability to use a UNIX text editor (such as Emacs or Vi) to modify files.
- After completing this tutorial you will be able to accomplish the following tasks:

Describe the X Window System

Recognize and describe the parts of an X terminal

Login to an X terminal

Describe and use the Motif user interface

Use the Icon box

Utilize copy and paste commands

Describe and adjust configuration files

Use on-line reference materials

- If you have suggestions or comments on this handout please send electronic mail to **x-tutorial-handout@bu.edu**.
- This tutorial handout is available on the Boston University Web at **<http://web.bu.edu/CC/introx/introx-main.html>**
- Please fill out the tutorial evaluation form before leaving. Thank you for your participation.

NOTES

Conventions

Words which appear in `this font` are used throughout the text to represent computer output and user input.

In the labs **boldface words** should be typed exactly as they appear.

Bold italic words represent descriptive place holders which should be substituted by the appropriate information.

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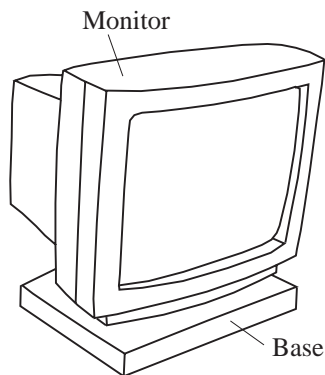
INTRODUCTION

The X Window System is a network-based graphics windowing system. It was developed by the Massachusetts Institute of Technology in 1984 and has been adopted as an industry standard. Today its continuing development is directed by the X Consortium whose members include DEC, HP, SUN, IBM, AT&T and many others. In 1993 the X Consortium broke away from MIT to become its own corporation. The following year in 1994 it merged with a competing organization, the X Industry Association, to form a single group now called the X Consortium.

X allows a single bitmapped monitor to display graphics and data from many different machines simultaneously on a single workstation or X terminal. X terminals are available for general use in the public terminal clusters in the lower level of 111 Cummington Street and the 3rd floor of Mugar Memorial Library. X Terminals consist of several parts, including a monitor, base, keyboard, mouse, and mouse pad. Each part is described and labeled below.

Monitor

The monitor displays images, much like a television's picture tube. The Visual Technologies, Inc. X terminals have brightness and contrast controls on the lower right front of the monitor. You can also tilt and swivel the monitor as you desire.

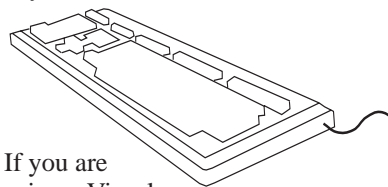



Base

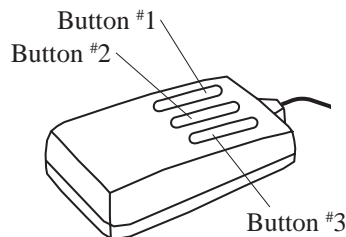
The base usually rests under the monitor. This is the home of the X display's processor. The network connection, power cord, mouse cable, video connector, and keyboard cable are all attached to the back of the base. Moving the base may cause the connections to become loose. We request that you *do not* turn off the X terminals.

Keyboard

The Tektronix keyboard is similar to a standard keyboard. Type as you would normally on any other keyboard. To remove characters from the screen, use the key labeled BACKSPACE. This key is located in the upper right corner of the main keyboard.

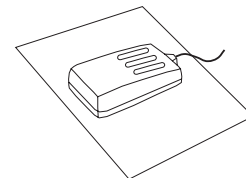


If you are using a Visual Technology X term the backspace key looks like this:  It is also located in the upper right corner of the keyboard.



Mouse Pad

Some mice use a glowing red light on their underside to read the grid printed on the mouse pad. The mouse will only function properly when: it is on the grid pad, the top edge of the pad and mouse are parallel, the pad is horizontal, and the mouse cable is pointing away from you as shown in the diagram.



Mouse

The mouse is the primary method for interacting with the X Window System. There are three buttons on the mouse labeled 1 through 3 as shown here. There are three different mouse movements: pointing, clicking, and dragging. Pointing is moving the on-screen cursor toward a desired object by moving the mouse. Clicking is pressing and releasing a mouse button. Often you'll need to click on an object after pointing to it. Occasionally you'll double or even triple click on an object. Dragging is pressing and holding a mouse button, moving the mouse, and then releasing the button.

INTRODUCTION

The X Window System

A distinct feature of the X Window System, (X for short), is that it uses a network-based architecture rather than the traditional kernel-based architecture used by other window systems. In a kernel-based system, the window system is operating system dependent. The processing necessary for window creation and overhead is the burden of the local machine's central processing unit (CPU).

In common computer terminology, a desktop workstation is considered the client of a larger remote fileserver. However, in the X Window System, the opposite occurs. The local desktop system functions as the server by running a program called the X Server. The applica-

tion programs running on remote systems or on the local system are known as clients. The diagram below shows the relationship between the various X Window System components.

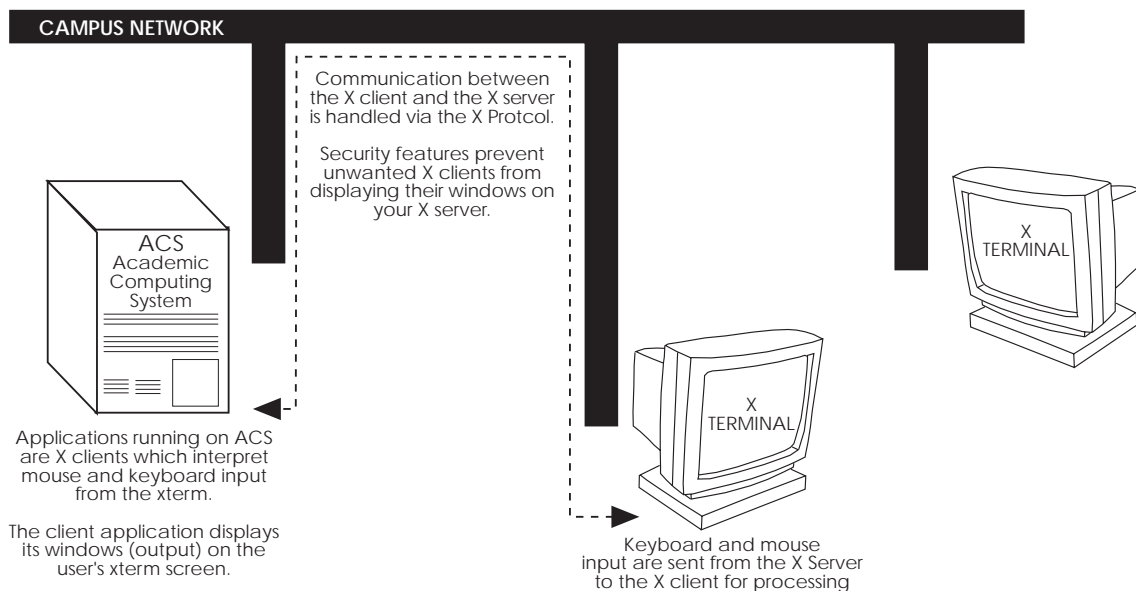
X was developed with customization and flexibility as a primary goal. This often results in additional complexity for the user, as is evident when customizing various resources to an individual's preference.

The mwm (Motif) Window Manager

The window manager controls the look and feel of the X session. X itself provides only the basis upon which any number of different user interfaces (UI's) can be constructed. It provides the capability to create, resize,

rearrange, iconify, and destroy windows. The Open Software Foundation's OSF/Motif first released in 1989 is one of the most prevalent window managers in use today. Motif is an X toolkit of programming libraries which is used to create X applications and the Motif Window Manager (Mwm). There are many window managers available, however, Mwm is commonly used at Boston University.

Visually, Mwm consists of the frame which surrounds each of the X windows, the icon box, and the pop-up menus associated with each of the three mouse buttons. Some of the Mwm resources options are contained in the file `~/ .mwmrc`.



GETTING STARTED

Getting an Account

If you will be using the X Window System on a departmental UNIX computer at Boston University (csa, chem, buphyk, or engc for example) then you will need to contact someone in your department to establish an account on that machine. You may also want to locate your department's X terminals and workstations.

The Academic Computing System (ACS) is available to the entire Boston University community. To establish an account on ACS run the `new` program. To run the `new` program login to an ACS cluster machine (ACS,

ACS2, ...) as **new**. Follow the instructions displayed on the screen. Additional instructions for running `new` are available at Information Technology's main office at 111 Cummington Street.

Finding an X Terminal

To run X and to access ACS, you will need access to an X terminal or a workstation. There are X terminals available in the lower level of 111 Cummington Street and the 3rd floor of Mugar Memorial Library.

Configuration Files

Each new ACS account is created with configuration files required by the X environment.

For additional information on configuration files see the Information Technology hand-out, *Customizing the X Window System*, available at Information Technology's front desk at 111 Cummington Street.

If you have an existing account or a new account on a machine other than ACS you may want to update your configuration files. Configuration files can be retrieved from the host `bu.edu` using anonymous ftp. (See *X Files* on this page for downloading instructions). The configuration files are sometimes called **dot files**. We will describe dot files in detail later.

X FILES

Retrieving X Files

If you already have X configuration files you may want to rename them prior to transferring the new files. Their names are: `.Xresources`, `.xinit`, `.xsession`, `.mwmrc`. Once you have tested

and verified that the new configuration files work properly then you can remove the old files.

The following boldfaced commands illustrate the process of

transferring X configuration files from the `bu.edu` archive to your home directory. Note that the password should contain your login name as well as your current host name.

```
host% ftp bu.edu
Connected to bu.edu.
220 bu.edu FTP server ready.
Name (ftp.bu.edu:tutor1): anonymous
331 Guest login ok, send ident as password.
Password: your_login_name@host_name
230 Guest login ok, access restrictions apply.
ftp> cd examples/X11
250 CWD command successful.
ftp> prompt
Interactive mode off.
ftp> mget .*
200 PORT command successful.
226 Transfer complete.
915 bytes received in 0.4 seconds (2.3 Kbytes/s)
ftp> bye
host% logout
```

A SAMPLE LOGIN SESSION

The Screen Saver

After you have finished your work and logged out of the X terminal it is requested that you do not turn off the equipment. If the person who used the X terminal before you followed Information Technology's request you can expect that the X terminal is turned on and ready for you to use. Most likely, you will see either a blank screen or a large "X" windows logo on the screen. This is the X terminal's screen saver. It is designed to help prevent images from burning into the picture tube during periods of inactivity. Move the mouse to remove the screen saver. If the screen was blank it may require several seconds before an image appears as the monitor warms up.



Using the Host Query Manager

The next window to appear is the host query manager. This may have already been visible if the screen saver was not activated. This window displays the hosts which your X terminal can communicate with at this particular time. The list of available hosts will vary based on several factors, including the system load on each individual machine, and whether a particular machine is "up" and running rather than "down" for maintenance work. Sometimes the list of machines in the host query manager is out of date. This can happen if a machine was not available when the hosts were queried, but has since come up. If a machine you expect to see in the menu is not listed, then left-click on the `Retry HostQuery` button to refresh the list. You can connect to a host by left-clicking on the host name and then left-clicking on the connect button. For example, to connect to ACS, using the mouse point the on-screen arrow to `acs`. Press and release the left mouse button. Notice that the word `acs` becomes highlighted. Finally, point to the button labeled `Connect` and click the left mouse button once.

XDMCP Host Query Manager	
Willing Hosts	Status
<code>csd</code>	alive and well
<code>bumetb</code>	willing to manage
<code>csa</code>	alive and well
<code>cgl</code>	alive and well
<code>acs</code>	alive and well
<code>acs2</code>	alive and well
<code>acs32</code>	willing to manage
<code>acs4</code>	alive and well
<code>engc</code>	alive and well

XDMCP: Sending Query via Direct request to 128.197.152.10

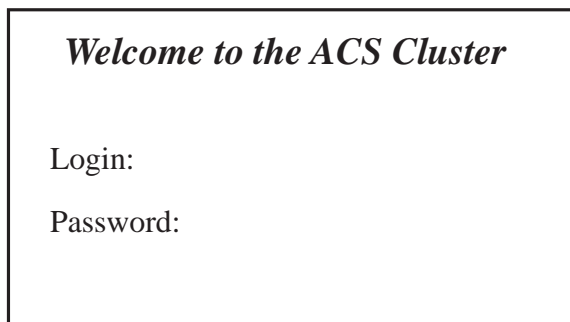
A SAMPLE LOGIN SESSION

LAB 1

The Login Window

The login window is used by the computer to identify who is logging into the system. You should type in your account name and password at the prompts. Press the return key to move from the `login:` prompt to the `password:` prompt. Your password is not echoed to the screen so you will not be able to see what you are typing. If you make a mistake the message `password incorrect` will be displayed. Simply enter your account name and password again. After three unsuccessful login attempts the system will return you to the host query manager. If this happens you should reselect the desired machine and try again. If you make an error you can cancel the login process by typing `Ctrl-c` (hold down the control key while typing the letter c). This will bring you back to the host query manager window. If you have forgotten your account name or password please see the account manager at Information Technology, 111 Cummington Street. Bring your BU identification card for verification.

After having successfully entered your account name and password, the X Window System will start automatically. The X terminal will pause



Logging into a UNIX host from an X Terminal

Remove the screen saver by moving the mouse.

The screen saver is configured to reappear after 10 minutes of inactivity. Nudging the mouse will remove the screen saver.

Left-click on any acs machine (ACS, ACS2, ACS3, ACS4, ACS5) then left-click on the connect button.

If you select a wrong machine cancel the login process by holding down the control key and typing a c (control-c). This will redisplay the Host Query Manager. The control key is sometimes labeled `ctrl`.

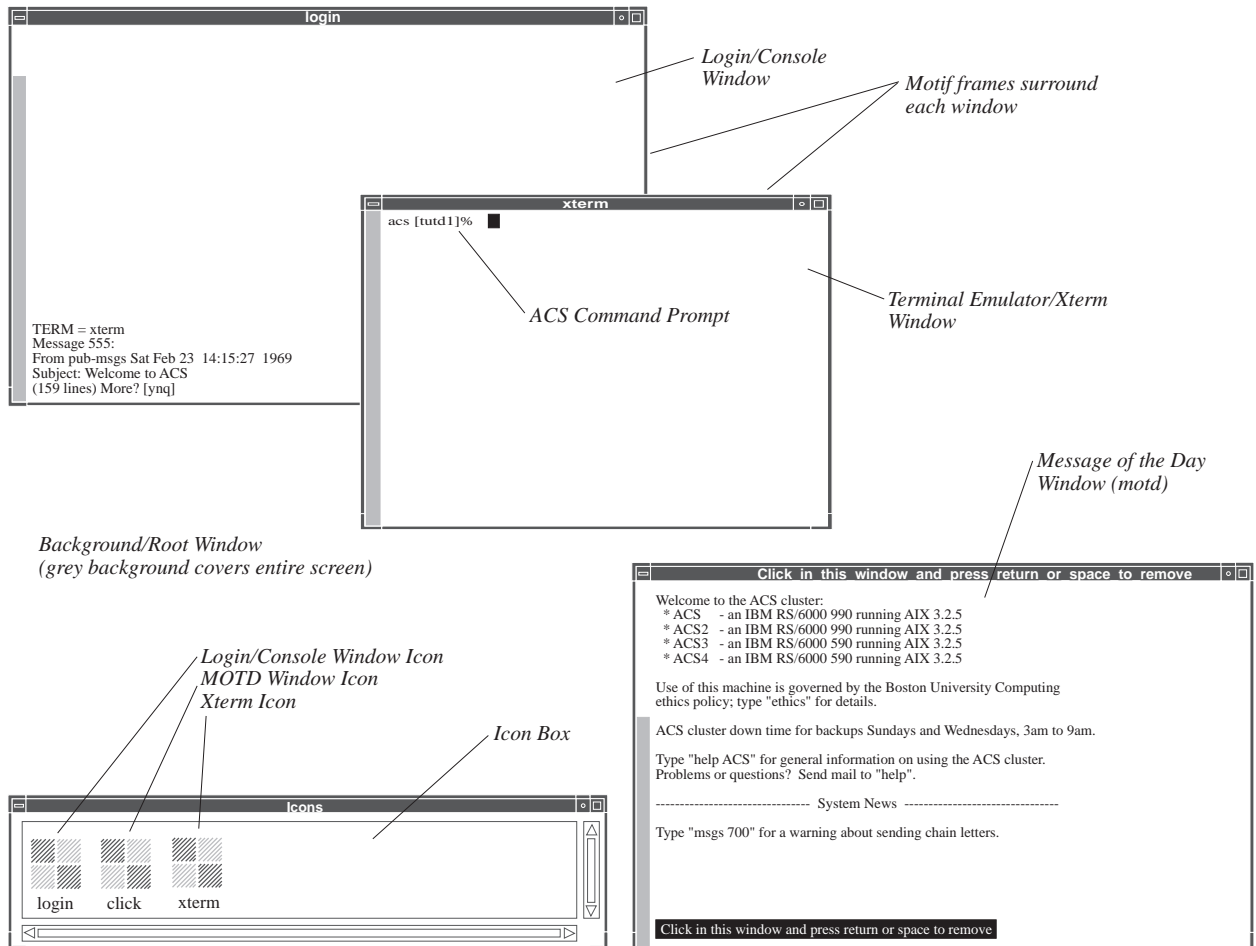
Enter your account name and press return. Now enter your password. The password will not be echoed to the screen. If you make a mistake the message `Incorrect Login or password incorrect` will be displayed. Simply try again by reentering your account name and password.

During the tutorial session please use the account name and password supplied by the instructor.

If you are using a Sun workstation rather than an X Terminal, you should login as described above, and then at the UNIX prompt type `xinit` to start the X Server.

STARTUP APPLICATIONS

After a short pause the hourglass will turn into a pointer arrow and the X Window System will appear on your screen. It should look similar to the picture below.



POINTERS

The on-screen pointer, controlled by the movement of your mouse, can take on different shapes each with its own meaning. Here are the most common pointer icons.



The cursor appears during text input and editing. It is the point of insertion and deletion.



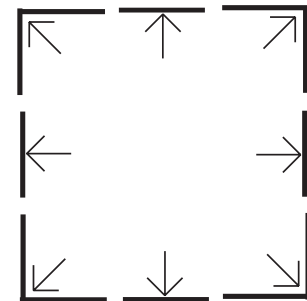
The I-Beam appears when text can be input.



The X appears when pointing at the root window.



The hourglass appears when the system is busy processing. It is a signal for you to wait.



As the on-screen pointer moves over the frame of a Motif window, the following pointers appear. Each indicates the ability to resize the frame in a given direction.

STARTUP APPLICATIONS

Terminal Emulator Window

Often called an xterm window, this is the area where you type commands. This window is configured to appear in the center of your display. The X Window System allows for the simultaneous display of many xterm windows on one single X terminal. If the window prompts you for a terminal type of TERM=vt100 you should enter **xterm** and press return. Usually, the proper terminal type will have already been selected.

Login/Console Window

The login window is partially obstructed from view by the xterm window. The login window is configured to display the msgs program. These messages regularly contain important information about Boston University and the ACS cluster. The login window is simply an xterm window which has the unique property of being the window from which you logout when you have finished working. If you exit this window you will also exit the entire X session. Because of this unique feature we recommend using the login window only for reading messages and logging out at the end of your session.

Message of the Day Window (motd)

This window, also called the motd window, displays announcements from the system managers. It is located in the lower right corner of your display. After reading the message, remove this window by clicking in it and pressing the return key. This window is unique to the ACS cluster. Other machines at Boston University will not display this window.

Background/Root Window

The X Display Server, or simply X, is running if you see a grey background cover the entire screen. This background is also called the root window. The X Display Server manages and responds to mouse clicks and keystrokes. It also tracks which applications are running and where they are located on the screen. X also enforces certain security features which allow only programs which have the correct permissions to display their windows on your X terminal. If you do not see a grey background on your display and the X terminal does not respond to your input, then the X Display Server may not be working. Ask the tutorial presenter for additional assistance.

Icon Box Window

Each application has a corresponding icon which is located in the Icon Box. This window is configured to appear in the lower left corner of the screen.

LAB 2

Reading Messages

Move the arrow into the login window and left-click. This activates the window allowing text to be entered.

After you have finished reading the messages type the letter **q** to quit. You will see a UNIX prompt ending in a percent (%) sign.

Although the login window will accept UNIX commands, we suggest that you use this window for logging out only. Inadvertently executing the exit command in this window quits your entire X session. Do this only

Reading Message of the Day

Point to the border of the motd window with the arrow and left-click. This will activate the window allowing you to read the message of the day.

When you have finished, press the space bar to exit this window.

If you would like to read the motd again you can type **more /etc/motd** at the UNIX prompt in any xterm window.

MOTIF USER INTERFACE

LAB 3

The Window Manager

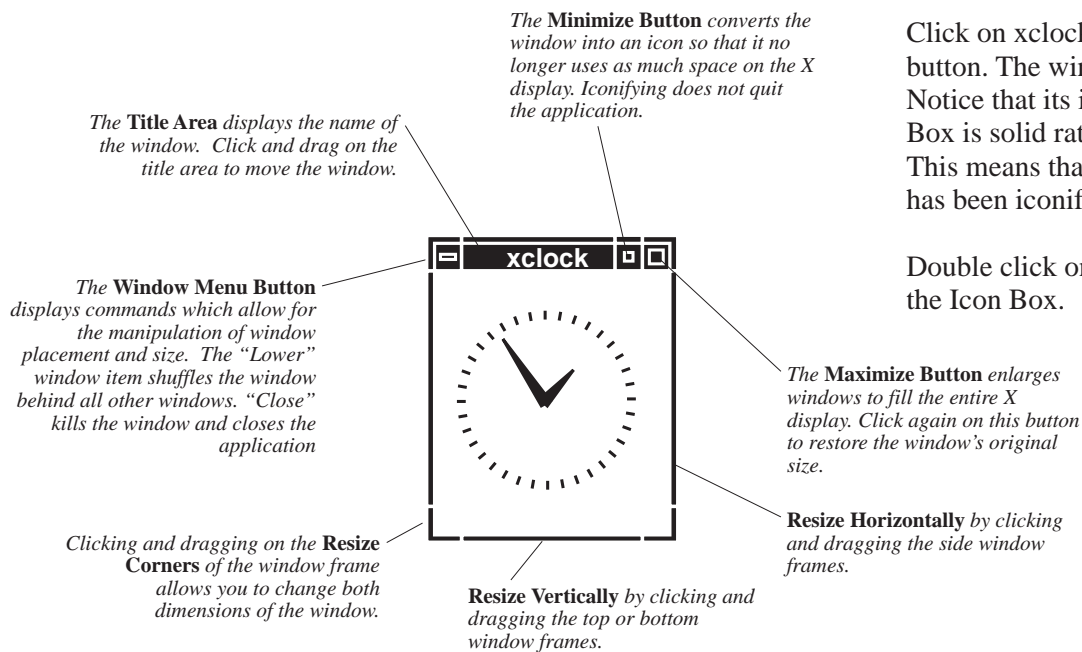
The window manager is an application that works with the X Window system to provide a more intuitive interface with the operating system. This often involves the use of menus, window management, and manipulation tools. There are several window managers available. The most commonly used window manager at Boston University is Motif (mwm).

Visually, mwm consists of the following items: a frame which surrounds the X window, the icon box, the menus associated with the mouse, the content of pop-up menus, and the actions triggered by the three mouse buttons. The various options for mwm are specified in a dot file called `.mwmrc` which should be located in your home directory. ACS accounts access a system default `.mwmrc` file rather than local copies in individual accounts.

Window Frames

Each application that runs under mwm has a similar frame surrounding its window. Only a single frame/window can be active. The active window has a solid title area while the inactive windows will have faint (non-solid) title areas. By default Mwm uses “keyboard input focus.” This means that an active window will receive keyboard input until a different window is explicitly selected (by pointing and clicking with the mouse). A second type of input focus, called Pointer, can be used by modifying your `.mwmrc` file.

The Mwm frame and its functions are labeled and described below. Xclock is used as an example.



Sizing & Moving Windows

Type `xclock &` at the ACS prompt in an xterm window to start xclock.

Move the pointer to the right side of the xclock window frame. Click and hold the left mouse button then move the mouse about one inch to the right. Notice how the window outline follows the pointer. Release the mouse button when you finish adjusting the window size.

Move the pointer to the lower right corner of the xclock window and repeat the same steps. Notice that you are able to resize the window in two directions.

Move the pointer to the title bar of xclock. Click and hold the left mouse button and drag the window to the bottom of your display. Release the mouse button when you have finished moving the window.

Maximizing & Minimizing

Click on xclock's minimize button. The window will vanish. Notice that its icon in the Icon Box is solid rather than shaded. This means that the application has been iconified.

Double click on xclock's icon in the Icon Box.

THE ROOT WINDOW

The shaded grey background on the screen is called the root window. All application windows are displayed on top of this window. Since the root window is always displayed, although sometimes almost entirely hidden by an application's window, it is always accessible. Three pop-up menus, associated with the three mouse buttons, are accessed by clicking the button while pointing to the root window. The contents of the menus can be configured and defined in the .mwmrc file. The standard ACS defined menus are described below.

Left Button Root Menu



New Window starts a new xterm window. **Shuffle Up** moves the bottom-most window in a stack to the top level. **Shuffle Down** moves the active window to the bottom of a stack. **Refresh** redraws the screen image. **Restart** will kill mwm, read the .mwmrc file and restart the window manager. This does not end the X session or log you out of the system.

Root Menu
New Window
Shuffle Up
Shuffle Down
Refresh
Restart

Right Button Hosts Menu



The hosts menu allows you to connect to the hosts specified in the system .mwmrc file. On ACS, the Boston University Library is the only host to which you can connect by this method.

Hosts Menu
Library

Middle Button Utilities Menu



FrameMaker is a document preparation system for papers and reports. **IslandDraw** is used for creating drawings consisting of basic geometric shapes. **IslandPaint** is used for creating freehand drawings. **IslandWrite** is a word processing and page layout program with features similar to Microsoft Word and Word Perfect. **Mathematica** is a system for performing numerical, symbolic, and graphical calculations. **SAS** is a package used for statistical analysis. **Wingz** is a spreadsheet application similar to Microsoft Excel. **xcalc** is a simple calculator. Read **man xcalc** for more information. Information Technology has additional information available for all of these X applications.

Utilities Menu
FrameMaker
IslandDraw
IslandPaint
IslandWrite
Mathematica
SAS
Wingz
xcalc

LAB 4

Using the Menus

Move the pointer to any part of the root window. Hold down the middle mouse button to bring up a list of applications from the Utilities Menu. Select the application "xcalc" from the menu and release the mouse button. This may take a few moments before you will see the application appear on your screen.

When the application window appears, hold down the left button when the pointer is on the root window. This pops up the root menu. Select the "Shuffle Down" menu item and notice how the calculator application nearly disappears behind the login window. Choose "Shuffle Up" to see the calculator again.

Now close the calculator by clicking and holding the calculator window's menu button (the button directly to the left of the word calculator). Select "Close" from the menu that appears.

COPYING/PASTING TEXT

The X Window System has the ability to copy and paste text between windows. This is useful because it gives you the capability to duplicate a large quantity of text without retyping. Any text that is displayed on your screen can be copied and pasted using X.

Xterm windows support four different methods for copying text. Each method is described below. Other X applications may have different methods for copying and pasting. See the application's documentation for details.

Copying a Word

A single word can be copied by placing the i-beam over the word and double-clicking the left mouse button. Double-clicking means click the button twice in rapid succession.

Copying a Line

An entire line of text can be copied by placing the i-beam on the line and triple-clicking the left mouse button. Triple-clicking means click the button three times in rapid succession.

Copying a Section of Text

A section of text can be copied by dragging the i-beam over the desired section. Do this by

- moving the i-beam just before the start of the section
- pressing and holding the left mouse button
- moving the i-beam just after the end of the section
- releasing the mouse button

Copying Another Section of Text

A section of text can also be copied by using the left and right mouse buttons to specify the desired section. Do this by

- moving the i-beam just before the start of the section
- clicking the left mouse button once
- moving the i-beam just after the end of the section
- clicking the right mouse button once

Pasting

Pasting is always performed by clicking the middle mouse button. The pasted text will always appear at the location of the cursor.

LAB 5

Copying & Pasting

Practice copying and pasting text from one window to another using all four methods.

Start two xedit windows by typing

xedit & and press return then type **xedit &** again and press return.

Type a sentence into one of the xedit windows.

Use the four copying methods to move text from the first xedit window to the second.

Note: Xedit is not recommended for general use beyond the scope of this exercise.

FONTS

Customizing the Xterm Window

Font, font size, background and foreground color, and window size and location can all be defined using various flags when executing the xterm command. For example, the command below generates an xterm window by specifying various attributes. The command should be typed on a single line but to fit the page appears on three lines below:

```
xterm -iconic -fn lucidasanstypewriter-24
      -bg black -fg white -g 30x20+50+100
      -title bigXterm -name bigXterm
```

Each of the flags are described below. For more type `man xterm`.

- iconic** Causes the xterm to appear initially as an icon rather than an open window
- fn** Font used to display text appearing in the window
- bg** Color of window background
- fg** Color of text displayed in window
- g** Geometry coordinates for window size and location, in the example above, 30 characters wide by 20 lines positioned 50 pixels from the left of the screen and 100 pixels from the top of the screen.
- title** Name displayed under window's icon
- name** Name displayed in window's title bar

There are utility programs useful for selecting among the large number of fonts available on ACS. To see a list of fonts, type:

```
xlsfonts | less
```

at the ACS prompt. To select a specific font using menus type:

```
xfontsel &
```

at the ACS command prompt.

Font Spacing

Only fixed width fonts (non-proportionally spaced) are usable within xterm windows. The two fixed width fonts available on ACS are:

```
courier
lucidasanstypewriter
```

Previewing Fonts

You can preview fonts using xfd. At the ACS command prompt type:

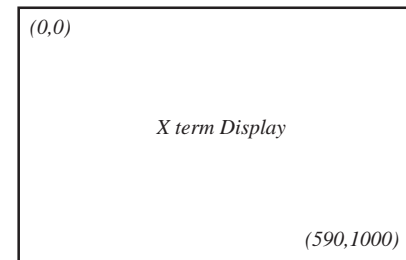
```
xfd -fn <name of desired font>
```

If the font you specified doesn't exist, you'll see the following error message xfd: No match. If the font does exist then a table will appear showing all the characters available in that particular font.

LAB 6

Create xterm windows by specifying the various attributes described on this page.

X Display Coordinates



Use this diagram to help determine placement of X windows using the -g (geometry) flag. The coordinate numbers shown, (0,0) and (590,1000) indicate number of pixels from the upper left corner of the display.

Color Selection Tool (*xcmmap*)

xcmmap can be used to find the hexadecimal values of colors available on ACS. This can be useful if one tries to change the color definitions for an application, in which case the exact color values are required. Simply type *xcmmap* and the color palette will be displayed. The palette consists of small rectangles painted in different colors. Move the mouse over the rectangle with the color whose values you desire then press the left mouse button. At the bottom of the palette window you'll see the RGB (Red-Green-Blue) values for the selected color.

Interactive Image Display Tool (*xv*)

xv can be used to view, capture, or manipulate pictures. To view a picture type *xv* followed by the name of that picture. The graphic will appear shortly; if you click the right mouse button within the picture, a window will come up with all the available operations one can perform on the picture. It's called the "XV Controls" window. Clicking the right button again makes it disappear. Using the menu, you may save the picture in a different format, crop its contents, add text, cut and paste, etc.

CUSTOMIZING X

Customizing the Mouse and Keyboard

The `xset` command can be used to set various mouse and keyboard attributes. For example, the command below sets acceleration to 2 and threshold to 4:

```
xset m 2 4
```

The first command below turns on the key click while the second command turns it off:

```
xset c 1
xset c 0
```

Type `man xset` for additional details. The `xset` command can be entered at the UNIX prompt or incorporated into the `.xsession` file.

Changing the background (`xsetroot`)

Using this command you can set the background of the screen to a specific color or graphic (whether it's tiled or single-entity). When changing the color of the background, these are the available options:

- solid *color* Fill the root window with the specified color
- fg *color* Set the foreground to the specified color
- bg *color* Set the background to the specified color
- mod *x y* Make a grid on the root window with vertical lines every *x* pixels and horizontal lines every *y* pixels (*x* and *y* are integers between 1 and 16)
- gray Set the root window color to gray

Changing the Menus Associated with the Mouse Buttons

As explained on page 9, *The Root Window*, there are menus associated with each mouse button. Each menu is activated when the corresponding mouse button is clicked while the mouse pointer is on the root window. We wouldn't suggest changing the Root menu but customizing the Hosts and Utilities menus can save a lot of time otherwise spent on launching frequently used applications.

LAB 8

Change the mouse acceleration and threshold settings.

Turn on the keyboard click, verify that it works, then turn it off.

CONFIGURATION FILES

The configuration files used by your UNIX account are called dot files. Their names all begin with a period (.). The table below lists the files, their names, and briefly describes their functions.

File name	Function	Referenced by
.login	executed at login	UNIX
.cshrc	configures the UNIX environment	UNIX
.Xresources	configures default options for all X applications	X Server
.xsession	executed at X start-up on X terminals	X Server
.xinitrc	executed at X start-up on workstations	X Server
.mwmrc	configures the Motif Window Manager	Window Manager

Configuration files are accessed from top to bottom as shown above. The primary configuration files are located in your home directory (on ACS, system-wide dot files are used). By default, dot files are not listed with other files you may create. To see your dot files use the **ls -a** command. This command lists all your files as well as those beginning with a period.

UNIX Initialization Files

The .cshrc and .login files are read when you login to the system. These files are necessary whether or not you are running X. The .cshrc file defines the search path used when you execute a command. The location of the X applications, /usr/bin/X11, must be included in this path to allow the system to locate the X programs. Type **echo \$PATH** to see your current path settings. The .login file defines your terminal type. When using an X Terminal this should always be set to xterm.

X Initialization Files

The files .xsession and .xinitrc are almost identical to one another. The .xsession file is read when X starts on an X terminal while .xinitrc is used only when X is running on a workstation. These files contain a list of applications which are started automatically. These files include mwm, xterm, and the login window which were discussed in a previous section of this tutorial. These files also contain instructions for X to load the file .Xresources. This file is discussed in the handout "Customizing the X Window System."

X Application Resource File

The file .Xresources is a tool for customizing X applications. This file is sometimes called .Xdefaults. It contains a list of applications and their local configuration options. This file dictates the location of windows on the screen, whether or not they have scroll bars, the color of the window, etc. This file is accessed by a program called xrdb (X Resource Database Manager) when the X server starts. Xrdb makes these customizing options available to all applications, regardless of which host you are using to run the applications.

MORE HELP

Troubleshooting

Make sure that your terminal type is set to `xterm` during the login procedure. Verify your terminal type by using the command `echo $TERM` at the ACS command prompt. To change the terminal type to `xterm` use the command `setenv TERM xterm` at the ACS command prompt.

Don't forget to type `Control-d`, `exit`, or `logout` to kill an `xterm`. Typing these commands in the console `xterm` will kill the entire X session. Do this only after your work has been saved and you are ready to leave the X terminal.

If you see the message, "Command not found" when trying to start an X application, make sure you have `/usr/MIT/bin` in your `PATH`. For accounts on machines other than ACS the path should be `/usr/bin/X11`.

If you can't type in a window, click once with the left mouse button inside that window. It should now be active and able to respond to your input.

Where to Go From Here

There are many resources and tools available to help you learn more about the X Window System.

Information Technology offers a series of two-hour tutorials for learning the X Window System. See the tutorial schedule available at the front desk of the Information Technology office on the first floor of 111 Cummington Street.

Consultants are available at both X terminal clusters to answer questions. Their phone number is 353-2784.

There is a second handout available titled *Customizing the X Window System*. See the Information Technology front desk for a copy.

LAB 9

Type `help` at the ACS prompt. This will start the `xhelp` application. It uses a Web browser interface to display local help files created by the Office of Information Technology.

Type `xman &` at the ACS prompt. `Xman` is an X interface to the `man` program and the manual pages that are available on ACS. These pages describe some of the resources available on ACS and how they can be used.

RECENT DEVELOPMENTS

1993 — Common Desktop Environment (CDE)

CDE is a Motif-based industry standard desktop interface and application programming interface (API). It provides a single graphical user interface (GUI) for a common look and feel across many platforms and vendors. In 1993 Sun, IBM, HP, and Novell established this new comprehensive open standard. SUN and IBM have already implemented CDE for their respective operating systems.

References

CDE Primer, *The X Journal*, January-February 1995, p.38-41

1994 — X Consortium Merger

The X Consortium and the X Industry Association merged under a single entity, the X Consortium. The new organization is now responsible for guiding the development and marketing of the X Window System.

References

<http://www.x.org/consortium/intro.html>

1996 — Broadway Project

The X Consortium's project to provide universal access to interactive applications on the Web. This includes the ability to invoke remote applications via the Web with displays (audio and graphics) directed to X windows or imbedded in Web browsers. Broadway replaces X11 after its release in late 1996, however, Broadway is backwards compatible allowing existing applications to function in the new environment.

References

<http://www.x.org/consortium/broadway.html>

X Flies into the Future, *The X Journal*, May 1996, p.30-36

X: Back to the Future, *The X Journal*, May 1996, p.38-43

REFERENCES

The definitive guide to the X Window System and the Motif window manager is *X Window System User's Guide OSF/Motif Edition* by Valerie Quercia and Tim O'Reilly. This book is on reserve at the Science and Engineering library and may be checked out for 24 hours with proper BU identification. This book is also available at the Help Desk in the lower level of 111 Cummington Street, and at Mugar Library on the 4th floor. It may be used while in the cluster area. The book can be purchased for \$26.95 at the Information Technology front desk.