

Tutorial

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SAN JOSE STATE UNIVERSITY

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Electrical Engineering Department

# UNIX and CDE Tutorial

IC DESIGN GROUP SAN JOSE STATE UNIVERSITY

# A supplemental guide for using UNIX and the Common Desktop Environment (CDE)

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## Acknowledgements:

## Getting Started With Common Desktop:

### Logging in to your Account:

To log into your account enter your userid into the form shown in Figure 1, press enter and then enter in your password at the prompt.

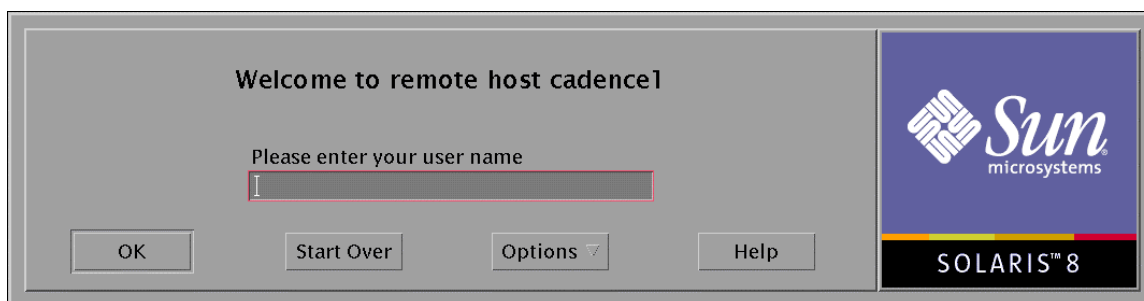


Figure 1: Login Screen for Sun Workstations.

After a few moments, the CDE (Common Desktop Environment) should come up (Figure 2). The CDE is GUI based environment used to start programs, and manage files. Shells (csh is set up for you automatically) can be started as terminals. Terminals are used to enter in UNIX commands.

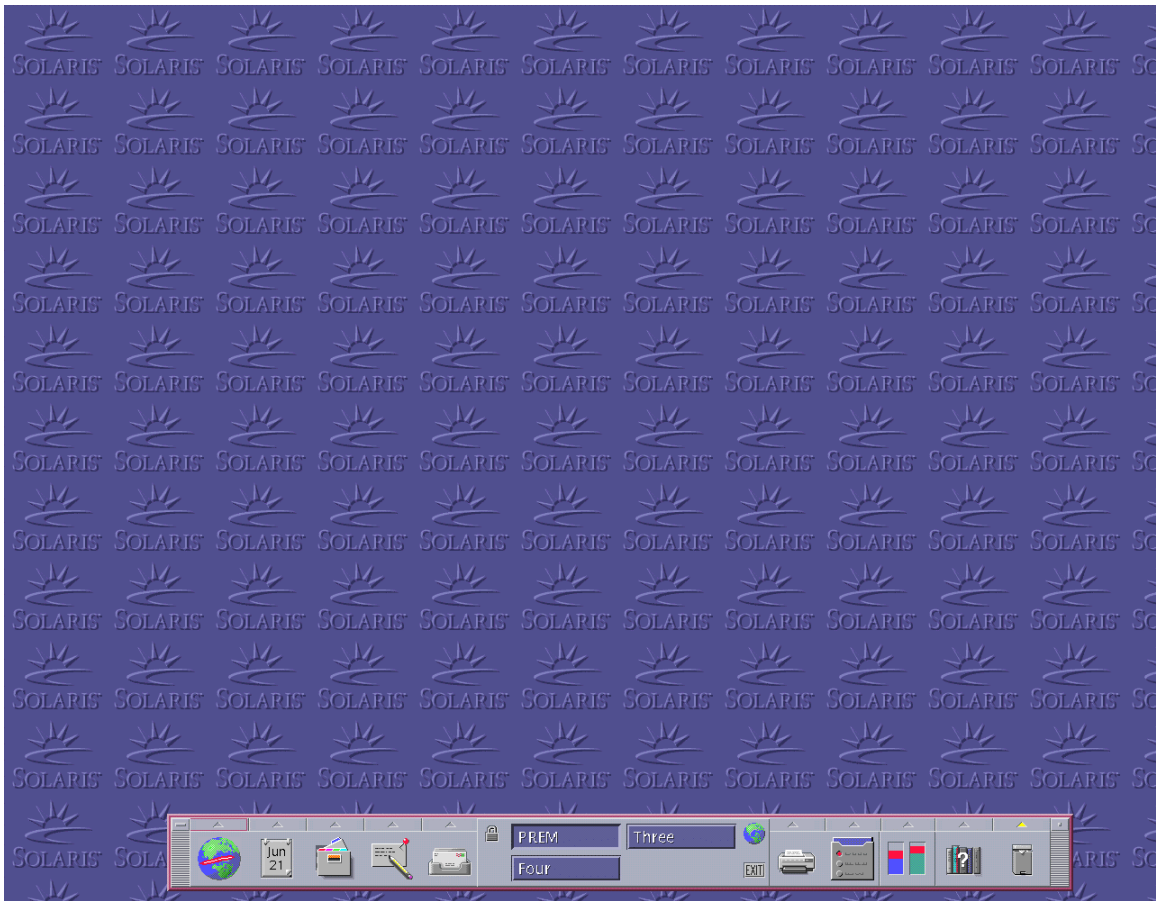


Figure 2: CDE Screen.

## Logging Off:

To log off simply click the left mouse button on the word exit in the bottom center of the CDE screen (Figure 2). A warning should appear like in Figure 3. **Remember to log out! The screen will lock, preventing anyone else from using the workstation. Failure to log out will result in your account being terminated.**

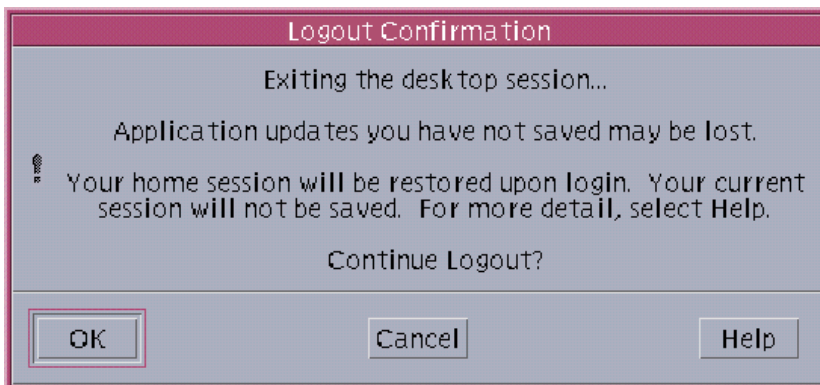


Figure 3: Logging Out.

## Starting a terminal:

To start a terminal right click in the middle of the screen of the CDE. While holding the right mouse button down move, the mouse down until tools is highlighted, and then move the mouse over to tools and highlight terminal. (This should look like Figure 4) Let up the right mouse button and a terminal should start.

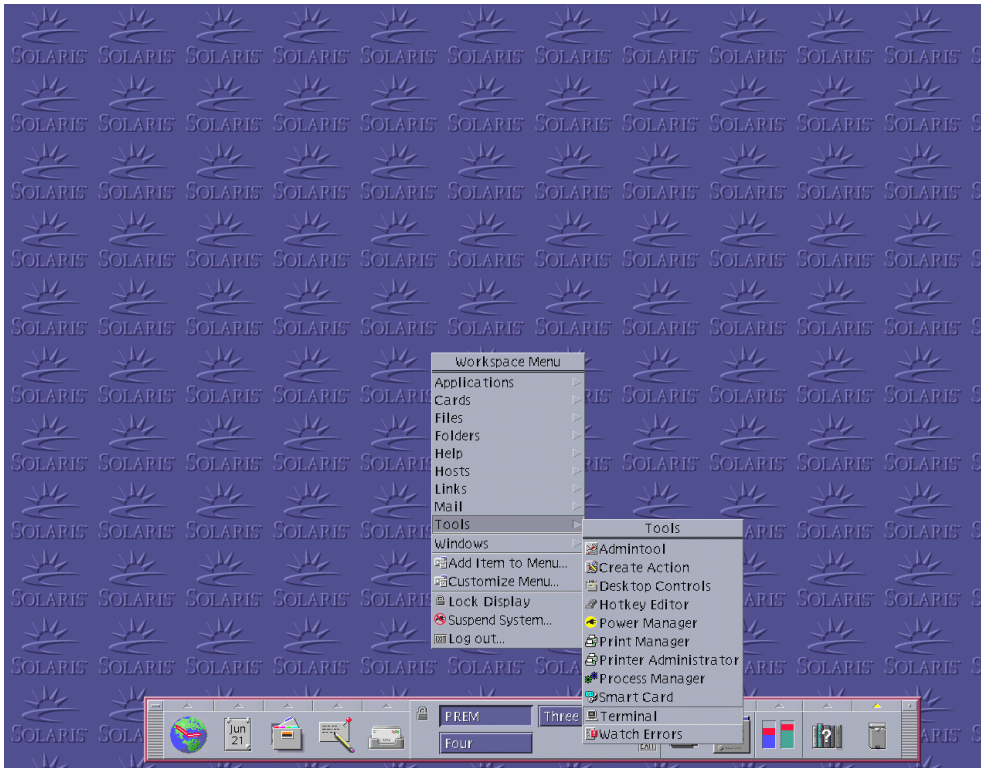


Figure 4.: Starting a Terminal

A terminal should appear like in Figure 5. You may start more than one terminal.

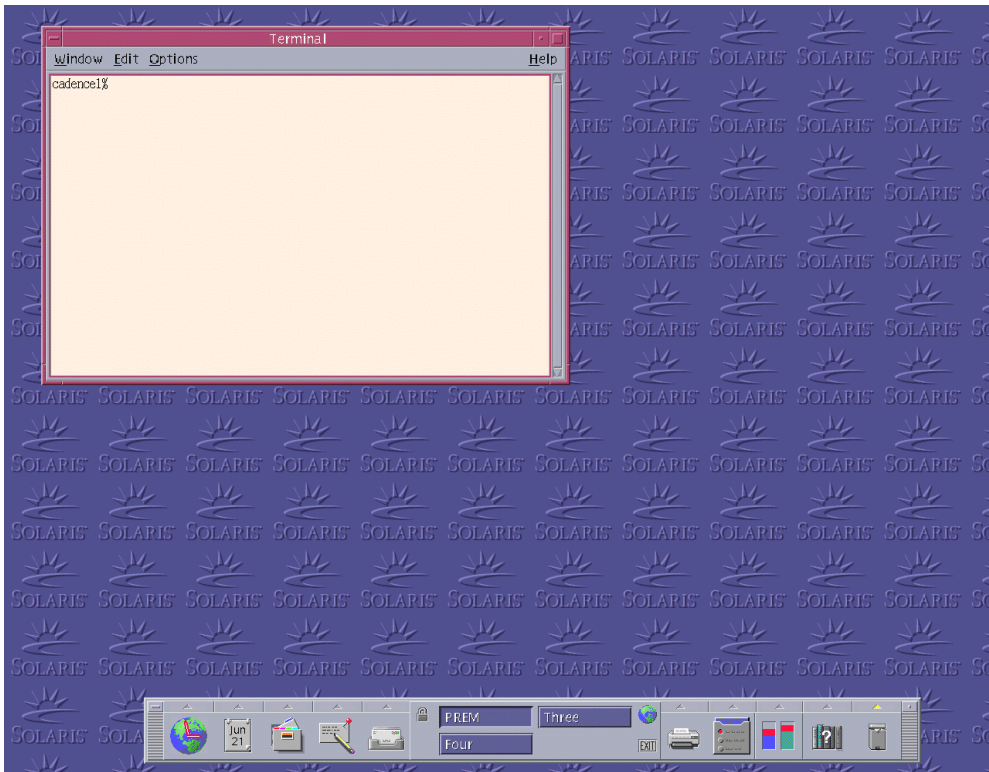


Figure 5: Terminal

## Starting a text editor:

Using the CDE

To start a text editor right click in the middle of the screen of the CDE. While holding the right mouse button down, move the mouse down until the application title is highlighted, and then move the mouse over to applications and highlight text editor. (This should look like Figure 6) Let up the right mouse button and a terminal should start.



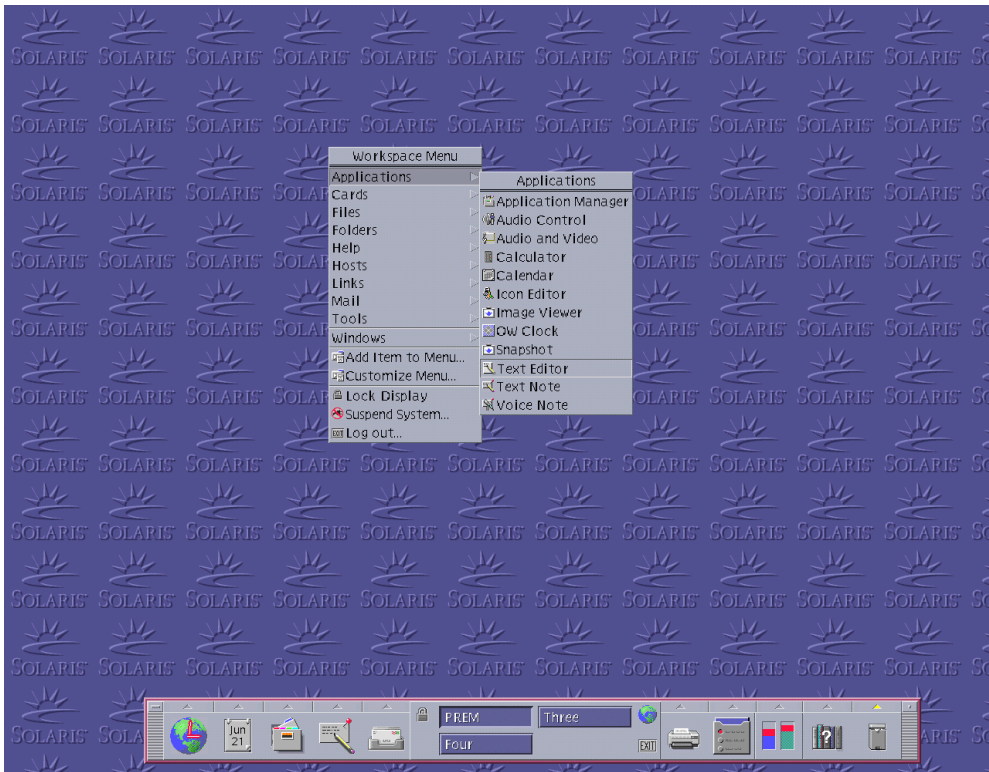


Figure 6: Starting a Text Editor from the CDE.

Using nedit from a terminal

To start a text editor such as nedit or vi from a terminal, first start a terminal and type in the command: nedit & (See Figure 7.) Your CDE should look something like Figure 8.

The & symbol means start the program and let the terminal or shell be used for further commands.

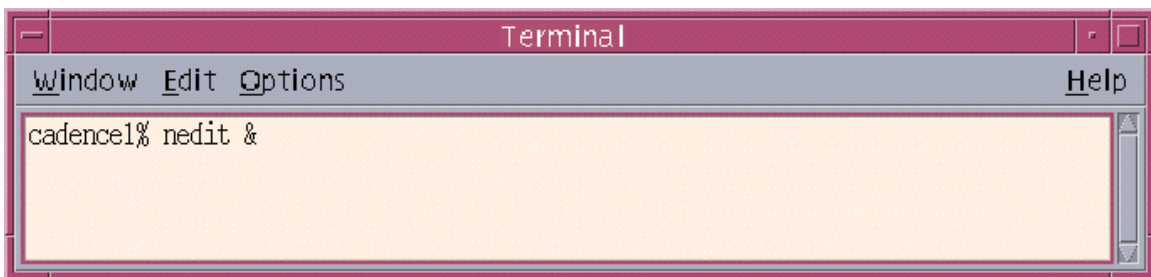


Figure 7: Starting a Text Editor form a Terminal

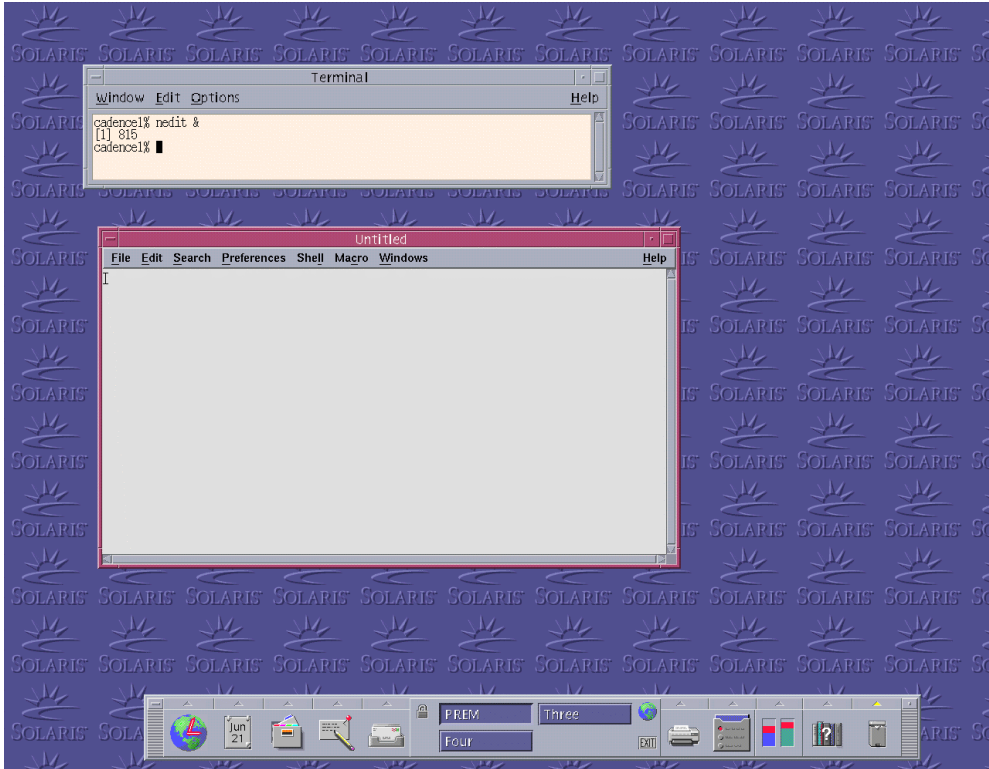


Figure 8: The Text Editor nedit.

## Grabbing an image for insertion into a document:

You will want to save some of your outputs and designs an image that can be imported into a word-processing program. This instruction will show you how to grab an image and save it to a floppy disk for importing into a document or just plain printing.

Start CDS tools and open up the figure or plot you want to save an image of. For example, use the inverter layout as in Figure 9.

You will need to add some text to identify the image as your own. In the layout tool you create a label, in the schematic tool you add notes. In the layout goto Create.. label. Fill out the pop-up like Figure 10. Except change the info to your name!

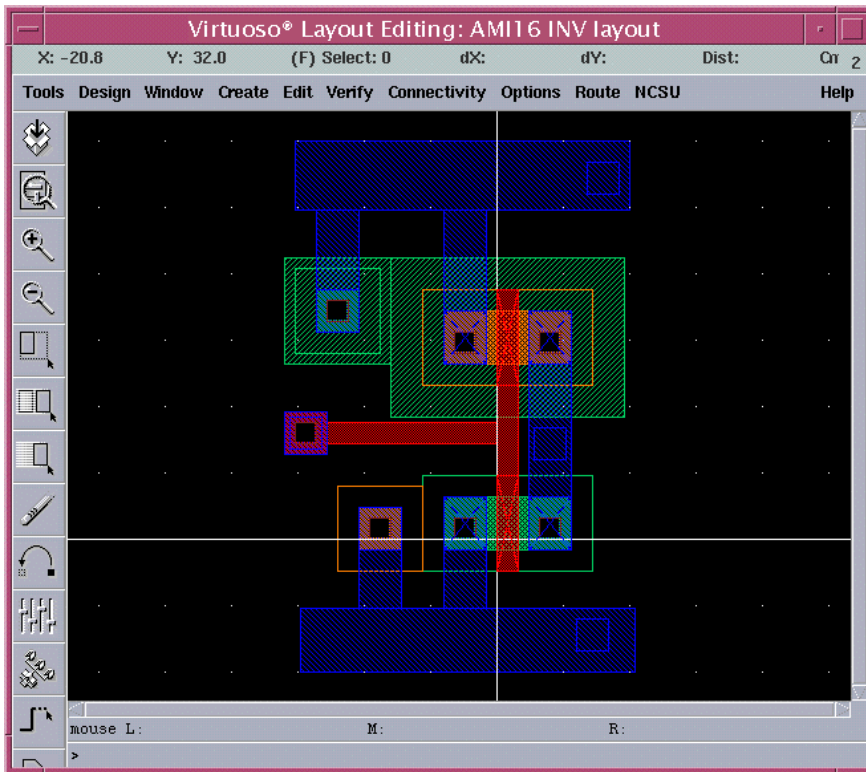


Figure 9: Grabbing the image of your inverter layout.

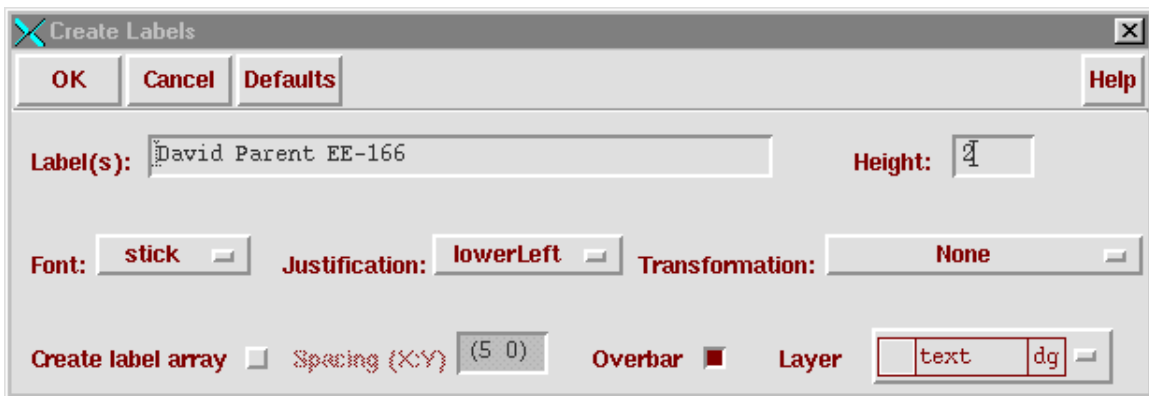


Figure 10: Creating a label.

The software thinks each work is a separate object so click down with the left mouse button to place each word you want displayed, like in Figure 11.

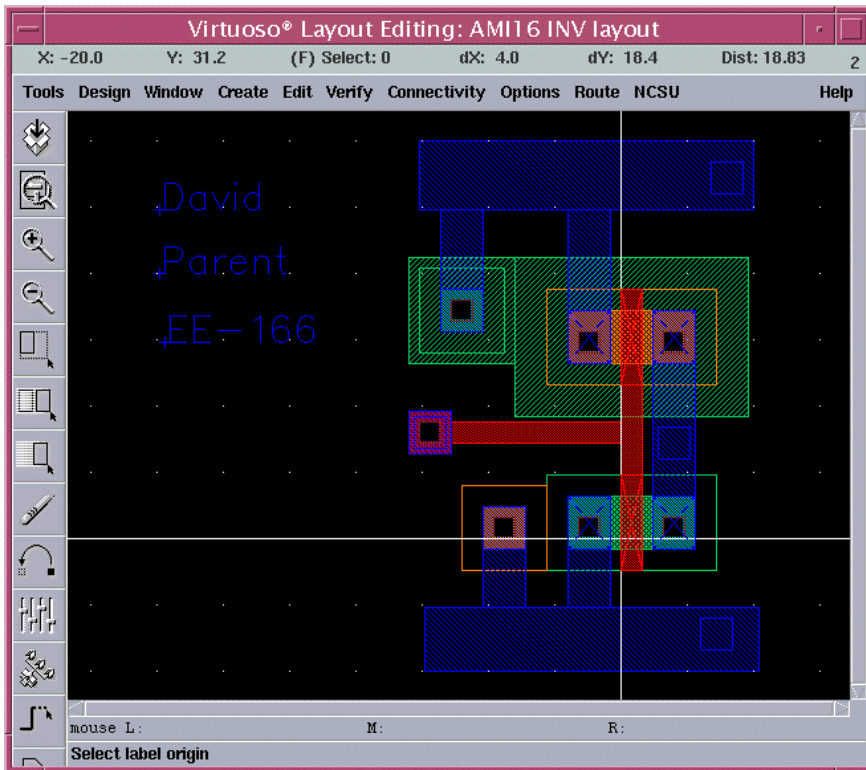


Figure 11: Inverter with text.

You will need to start the image grabber software that comes with the Sun OS.

Right click any where on the screen that is not an application. You should see a pop-up like Figure 12. Highlight Applications and come down to Snapshot like in Figure 13. Left click on Snapshot to start the program. Pop-ups like Figure 14 and Figure 15 should appear on screen.

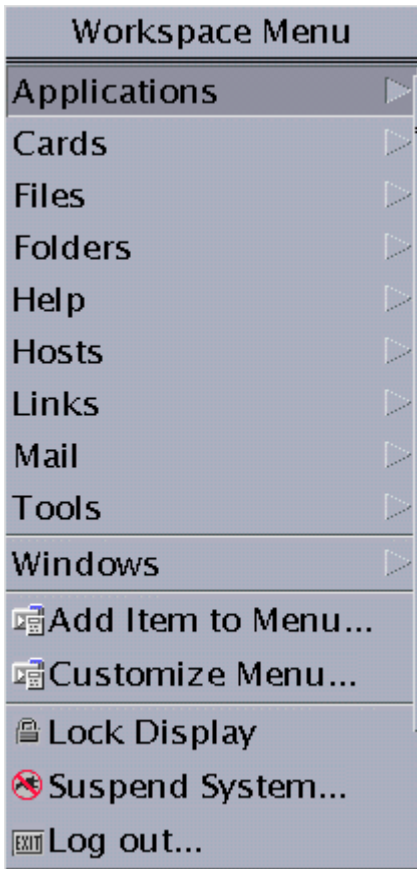


Figure 12: Starting Sun's Snapshot.

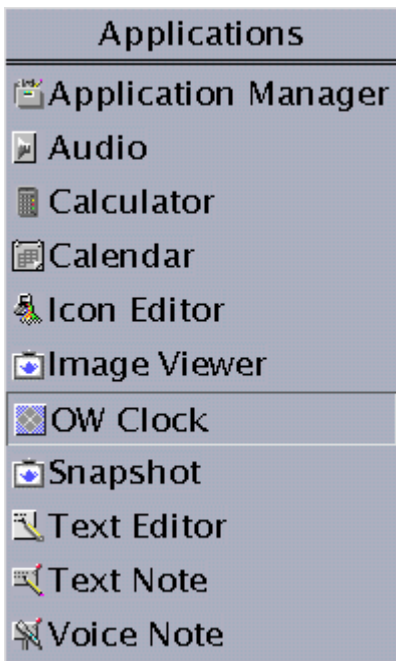


Figure 13: Starting Snapshot continued.

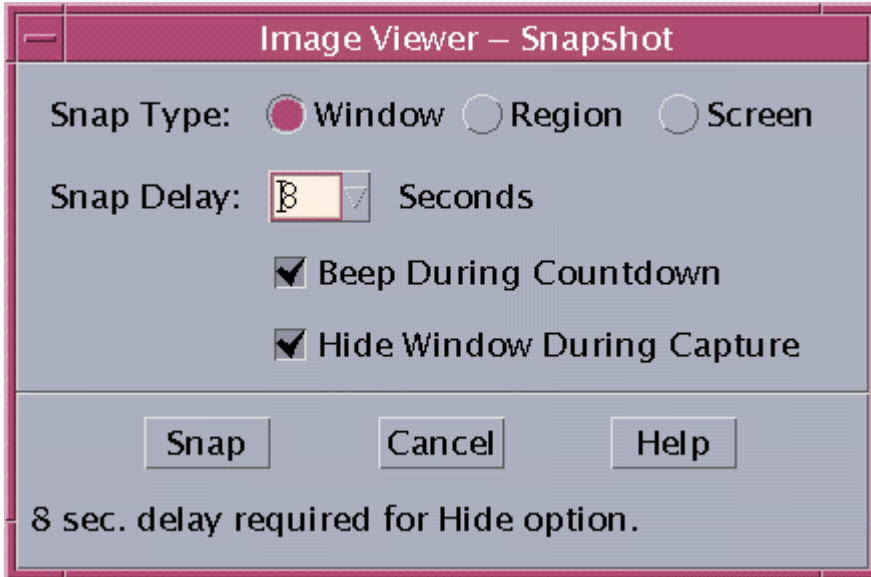


Figure 14: Setting up Snapshot Features.

Fill out the pop-up according to Figure 14.

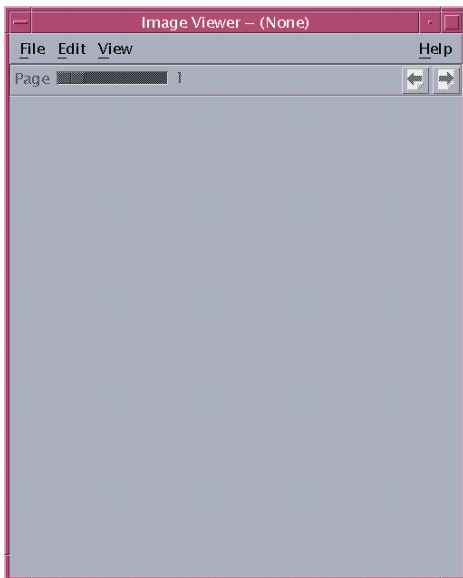


Figure 15: Snap Shot File Manager.

Left click on Snap, and then left click on the inverter image before the beeping ends. After some time the Snapshot file manager should display an image like Figure 16.

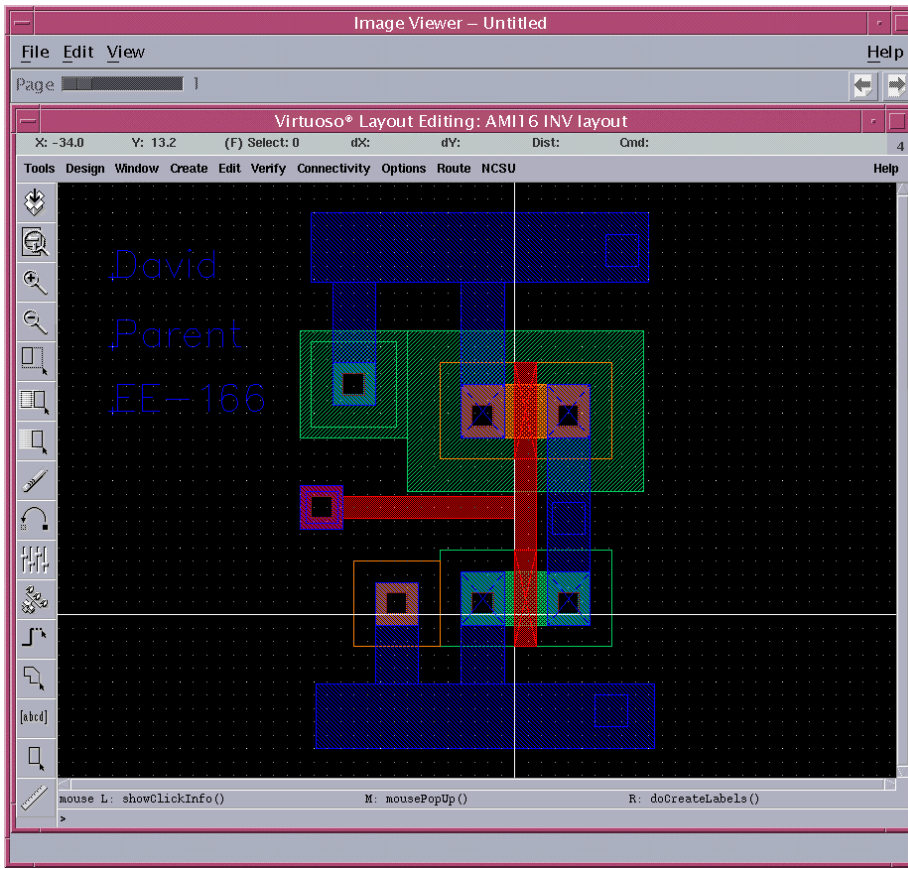


Figure 16: The image of the inverter.

In the Snapshot file manager goto File... Save as. A pop-up like Figure 17 should appear.

Make sure you select TIFF, GIF or JPEG as the image format. Enter in the name of the image file you want to save. Make sure you enter in the .tiff (.gif, or .jpeg) extension like in Figure 17.

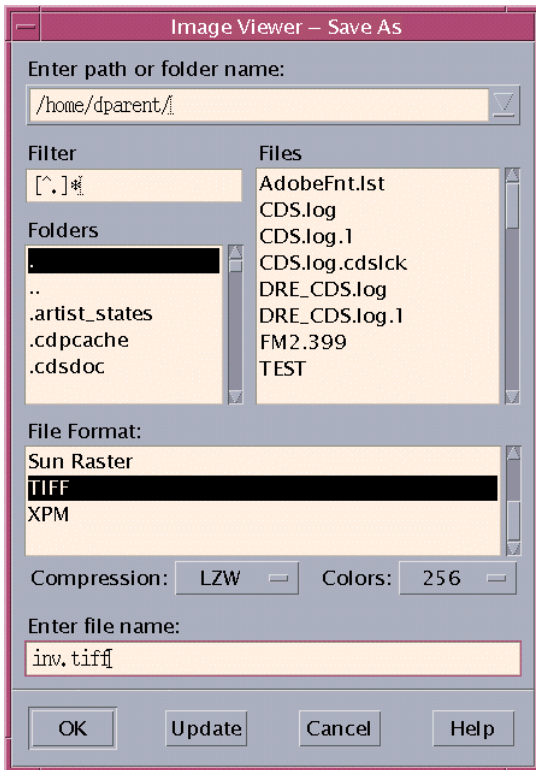


Figure 17: Saving the image.

## Saving a file to Floppy:

Start the file manager by right clicking anywhere on the screen that is not an application. You should see a pop-up like in Figure 12. Goto Files... File Manager to start the file manager. You should get a pop-up like Figure 18.



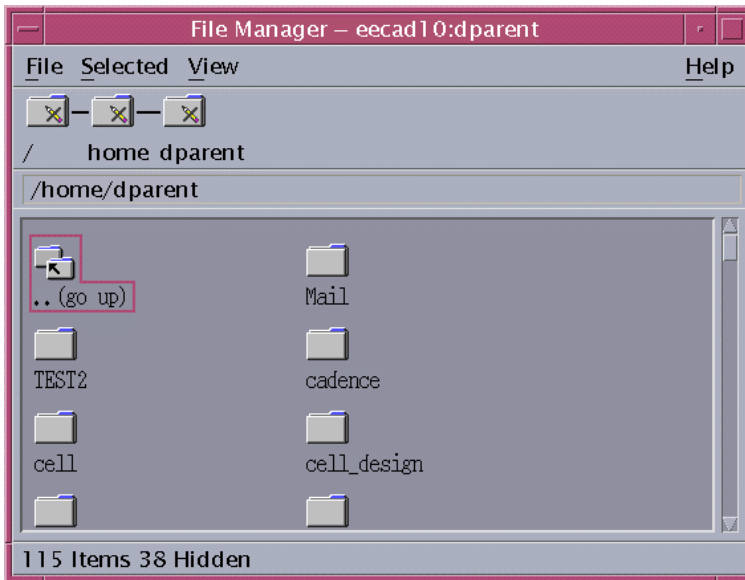


Figure 18: Starting the file manager.

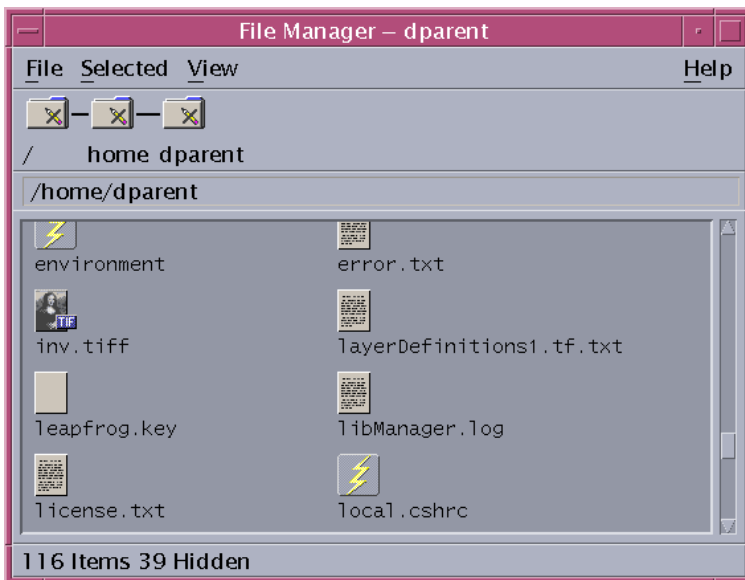


Figure 19: File manager showing TIFF file.

Scroll down until you see your inv.tiff image like in Figure 19.

In the file manager window goto file... open floppy like in Figure 20.

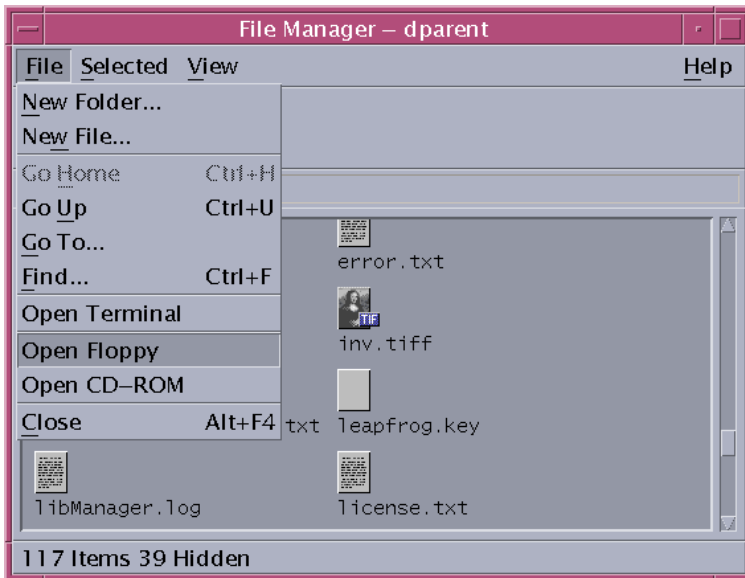


Figure 20: Opening up the floppy drive.

Draw a rectangle around the figures you want to copy and drag and drop them into the floppy window like in Figure 21. Note: Figure 21 is showing more files than you will have if you follow this tutorial.

Now you can print the TIFF image or import it into Power Point or Word, for a professional looking document. You could even start writing Cadence Tutorials yourself!

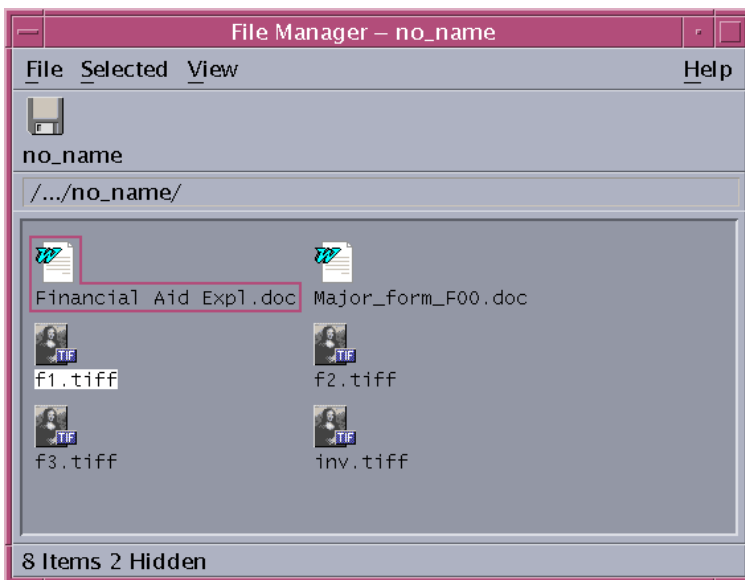


Figure 21: The floppy drive with the inverter images.

# Starting an Internet browser

Using the CDE:

To Start netscape just left click on the picture of the Earth with a clock on the left hand side of the CDE tool bar (Figure 22). A Browser window should appear similar to Figure 23.



Figure 22: CDE Tool Bar.

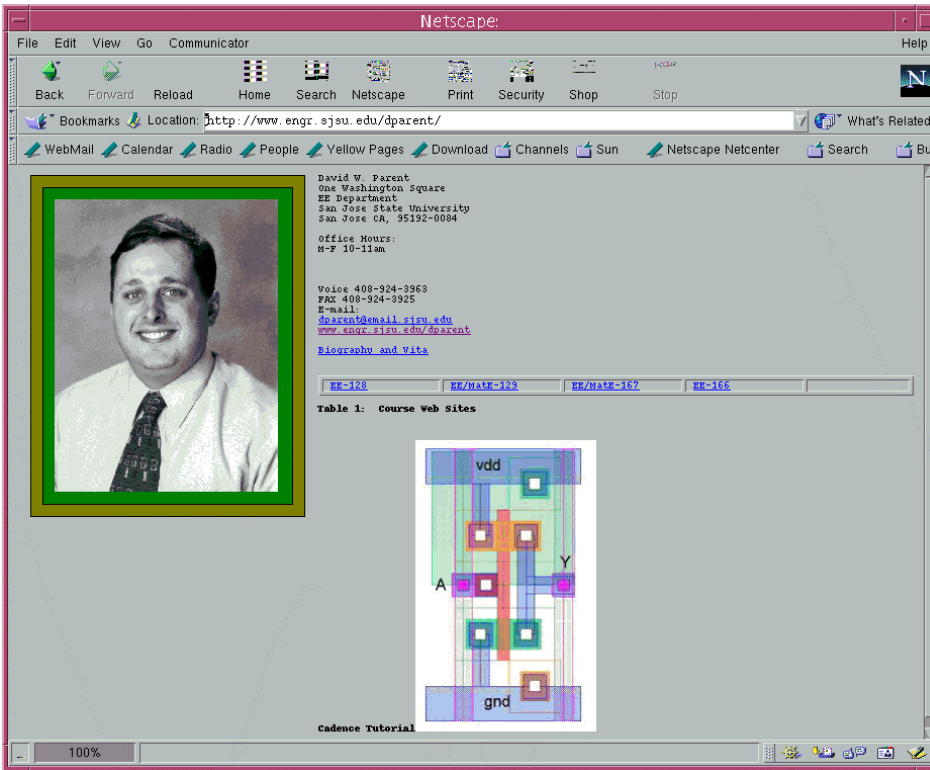


Figure 23: Netscape Browser.

USING a terminal:

Start a terminal and type in: **netscape &** as in Figure 24.



Figure 24: Starting Netscape from a Terminal.

Using an Internet browser to back up or transfer your files:

To send files to a PC, it is usually easier to send them to yourself at an email account, rather than copy them to floppy disk or even use an ftp program. What follows is an example of emailing a file to yourself using an internet email site such as hotmail.

Start a web browser by any method, and log into your email site. In this example, hotmail is used (Figure 25).

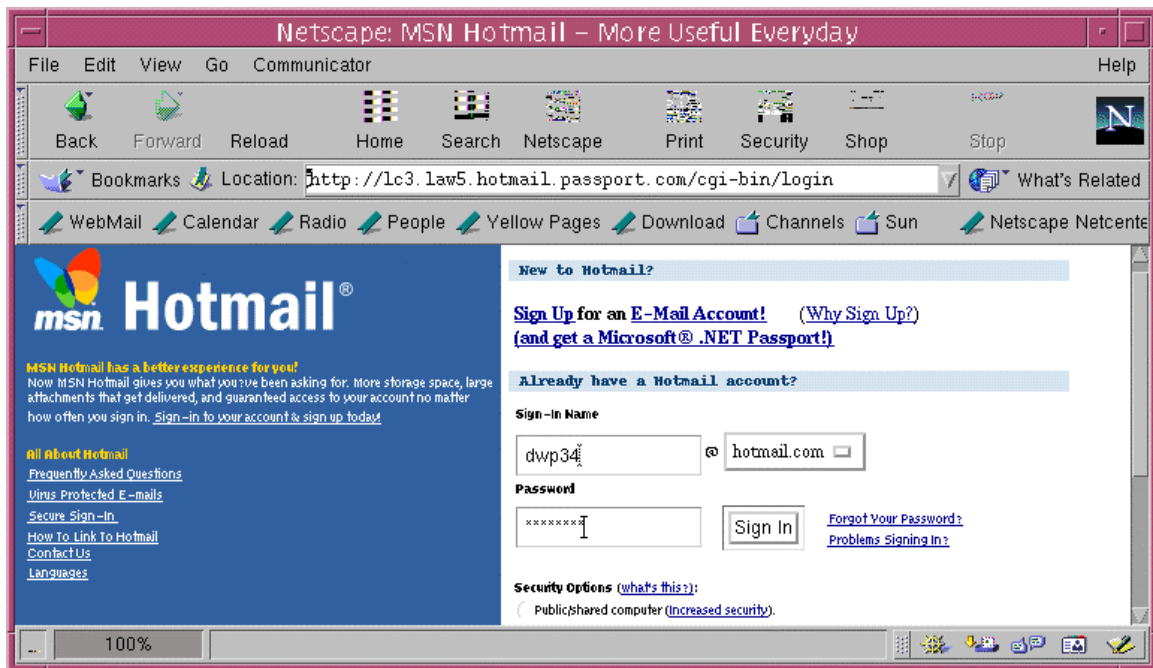


Figure 25: Internet Mail Login Screen.

After logging in, compose a message to your account (Figure 26).

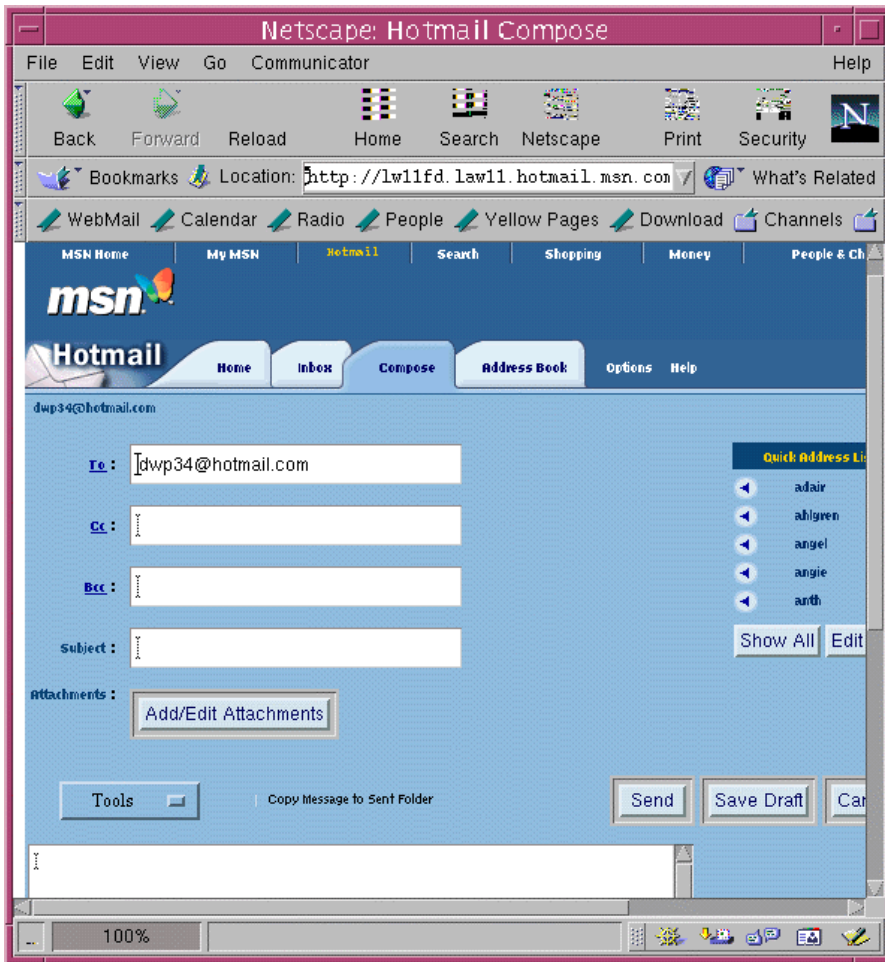


Figure 26: Composing a Message.

Click on Add/Edit attachments (Figure 26) and your screen should change to the add attachments view (Figure 27).

Click on Browse view (Figure 27), and a pop-up like Figure 28 should appear. In this case, the file to be transferred is a VHDL representation of a full adder. Any type of file can be transferred this way.

Select the file you want to send and click OK (Figure 28). The Browser should go back to a view like Figure 29.

Click attach (Figure 29) and the file to be transferred should appear in the right hand side of the viewer (Figure 30).

Click OK once all the files to be transferred are in the right hand side of the viewer (Figure 30). Click Send (like in Figure 26) and the mail message should appear in your inbox (Figure 31).

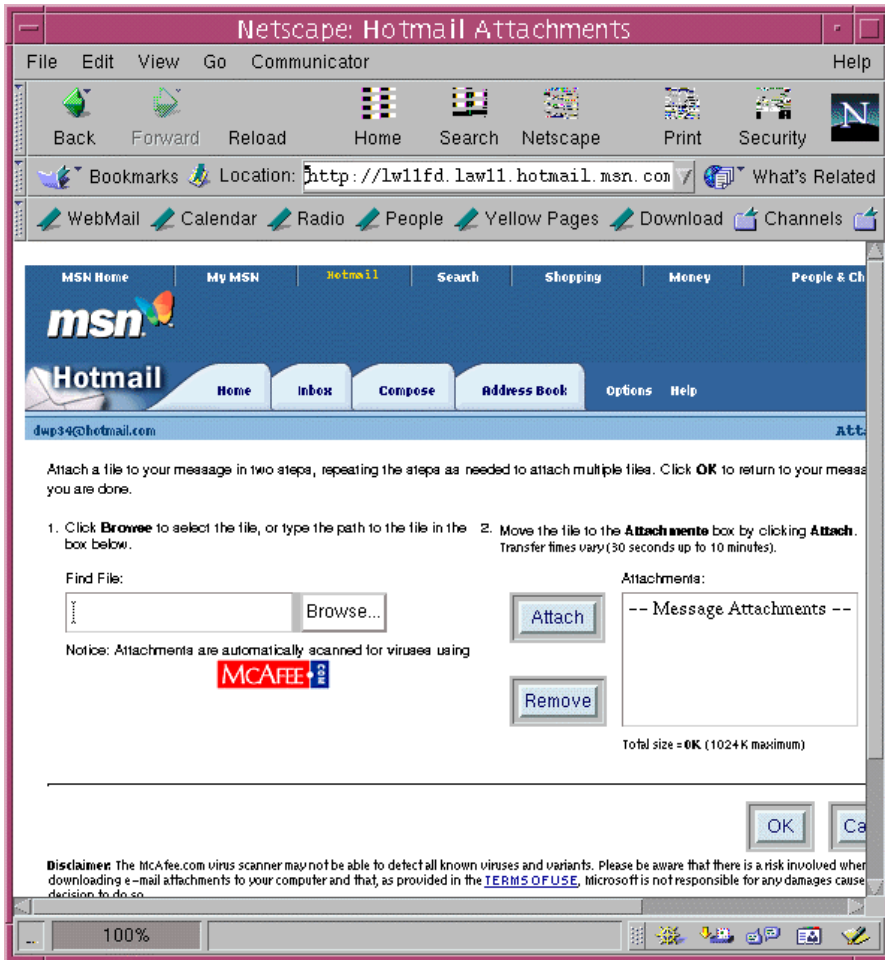


Figure 27: Attaching a File.

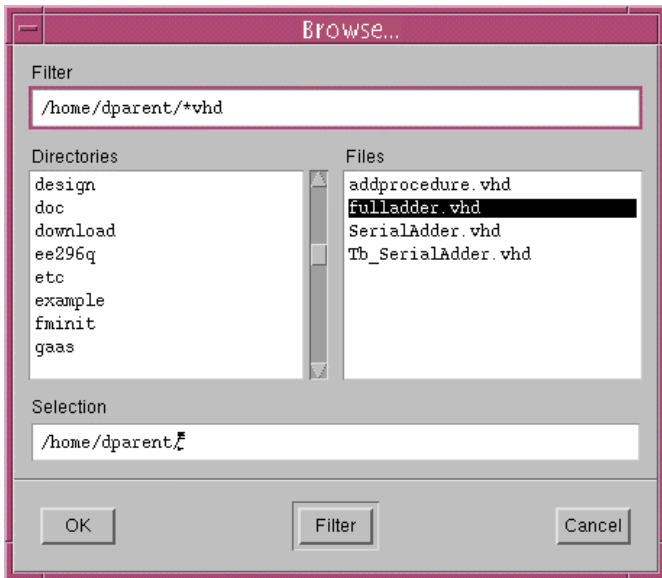


Figure 28: Browsing for a File to Attach.

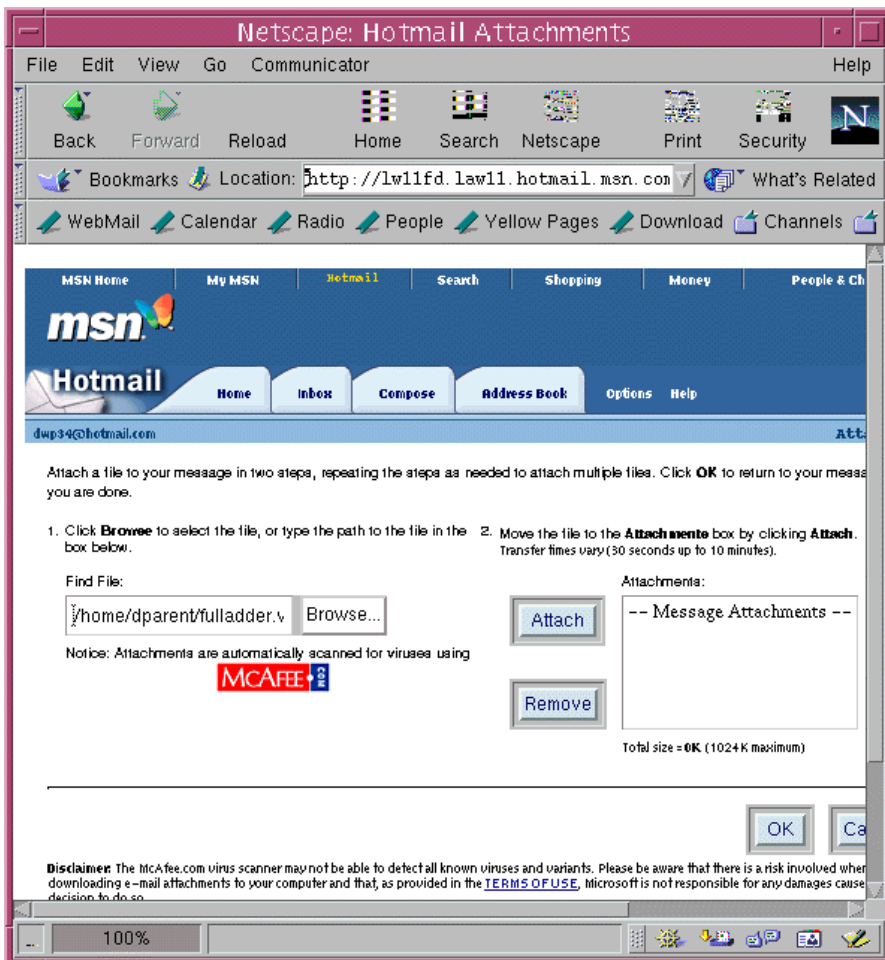


Figure 29: Preparing to Attach a file.

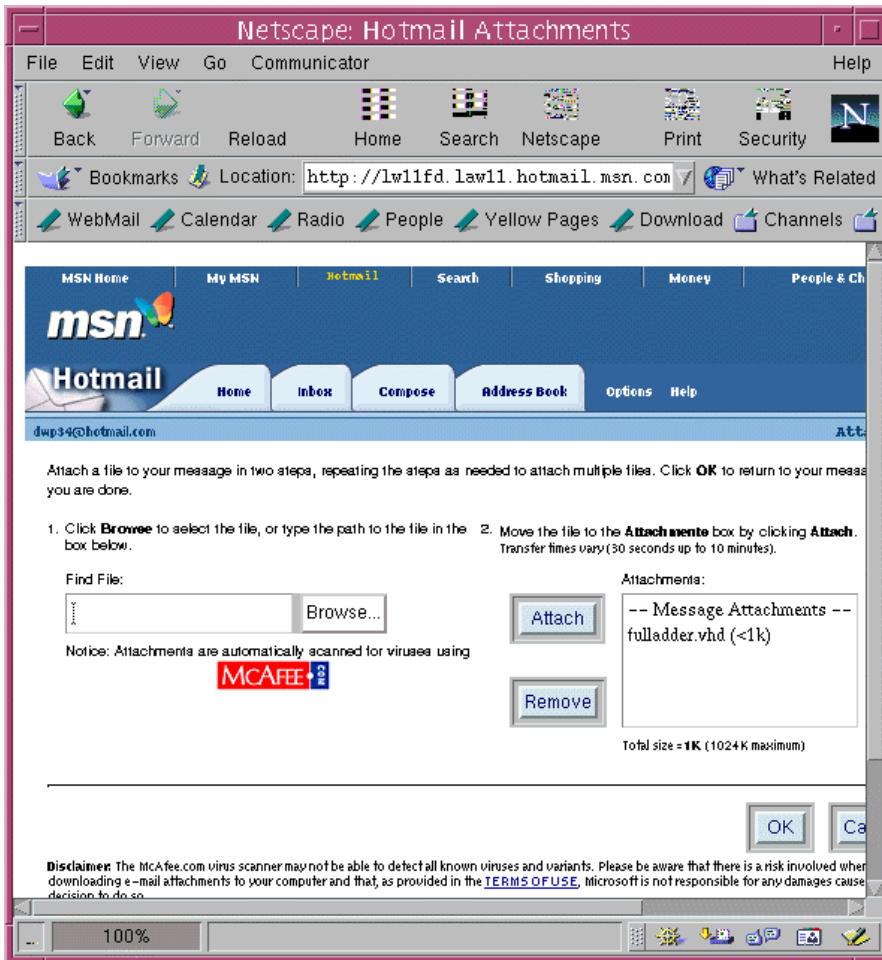


Figure 30: File Attached.

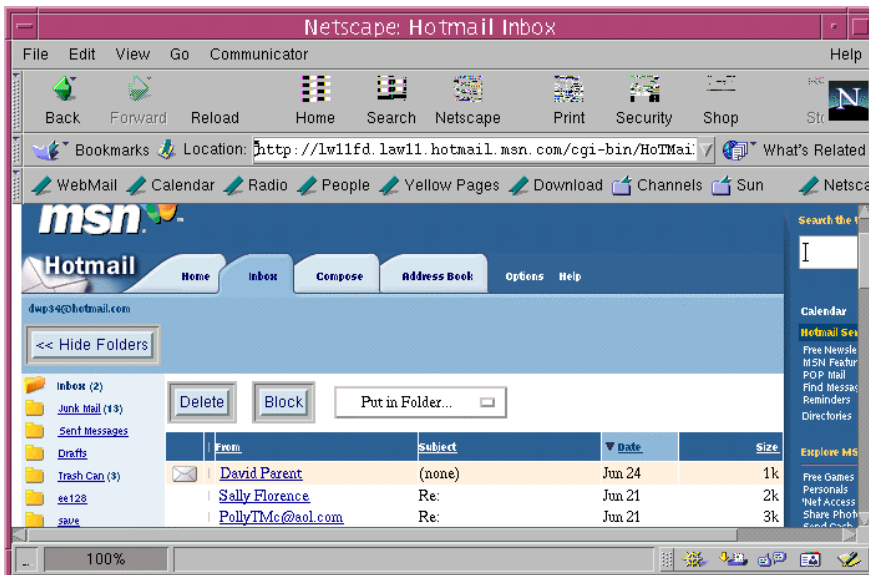


Figure 31: New Message Has Arrived.



## Getting Started with Unix Shell Commands:

### Unix Fundamentals

#### Basic Unix Commands:

What follows is a practical exercise to help you learn the following Unix commands: **passwd**, **pwd**, **ls**, **mkdir**, **touch**, **nedit**, **more**, **copy**, **mv**, **rm**, and **man**. All items that you will enter in on the computer will appear in *bold italics*. Note: The syntax % command means enter the command in italics at the shell prompt.

Command	Function
passwd	changes your passwd on all the UNIX work stations on the network.
pwd	Present Working Directory. This prints to the screen which directory you are in.
ls	lists all the files in the current present working directory.
mkdir	makes a directory
touch	either creates an empty file with an up to date time stamp or changes the date on an existing file
more	a program used to view test files.
nedit	Not really a UNIX command. Use as a text editor.
cp	copies a file or directories from one location or an other.

mv	move a file from one location to another and it can be used to rename a file.
rm	remove files from the system NOTE: UNIX writes over the files that have been removed. <b>There is no Norton utilities to retrieve files that have been deleted.</b>
man	This is the UNIX help command. For help on ls for instance type at a terminal: <i>man ls</i>
df	Displays the disk usage. Use <i>df -bk</i> . To find out how much space is left on the disk drive in kBytes
du	Displays how large a file is. Use: <i>du -sk FILENAME</i> to see how large a file is in KB.
tar	Can be used to back up files to a tape or combine files into one file. To combine all the files in a directory use: <i>tar -xvf DIRECTORYSOURCE FINAL_FILE_NAME.tar</i> To extract all the files from an tar archive: <i>tar -xvf DIRECTORYSOURCE FINAL_FILE_NAME.tar</i>
gzip	Compresses and decompresses files Use: <i>gzip FILENAME</i> to compress. Use: <i>gzip -d FILENAME</i> to decompress. Note: gzip and tar are compatible with Winzip.

## First Mini UNIX Tutorial:

Log in to a UNIX server and start a terminal. Note: The “%” symbol means type the **bold and italicized** text at the command line.

1. The first thing you want to do is change your password from the one you were given. It must be at least six characters long. To do this: enter at the command prompt: **passwd**. Follow the instructions from the computer.

2. % **pwd** This command will tell you the present working directory you are in. You could set your shell to display the current directory you are in at each command prompt, but as you go three or more directories deep the display becomes cumbersome.
3. % **ls** This command list all the files and directories in you current present working directory.
4. % **ls -a** With -a flag you can see all the '.' files such as .profile, .cshrc, and .forward, which are used to customize your Unix environment.
5. % **ls -al** The -l with an a, will give you the last time a file was modified and how large the file is, as well as who owns it( plus some other things).
6. % **mkdir exercise** The mkdir command makes a directory in the directory in which it is invoked.
7. % **ls** You will see the directory exercise has been created.
8. % **cd exercise** The cd command changes to the directory specified.
9. % **pwd** You should see that you are in your exercise directory.
10. % **cd ..** This changes your *pwd* to the next highest directory.
11. % **cd exercise**
12. % **touch test** The touch command creates an empty file, or updates the modification time of a file. (To check the time the file was last created or modified type in **ls -l**)
13. % **edit test** Enter the following in the window: Hello World
14. Save and exit.
15. % **more test** The more command displays the text of a file. If you more an binary file like a.out ( for c programmers) you will see junk.
16. % **ls -al > test2** This piped the standard output of the ls command into a file called test. (Remember: to view it type, more test2.)
17. % **ls -al > test2** This piped the standard output of the ls command into a file called test. (Remember: to view it type, more test2.)
18. % **mv test test1** This moves or renames the file test into test1. If you ls your directory you will see test no longer appears.
19. % **more test1 | grep ll** This pipes the standard output of more test1, into the grep command. The grep command returns only those lines of test1 with the letters ll in them.

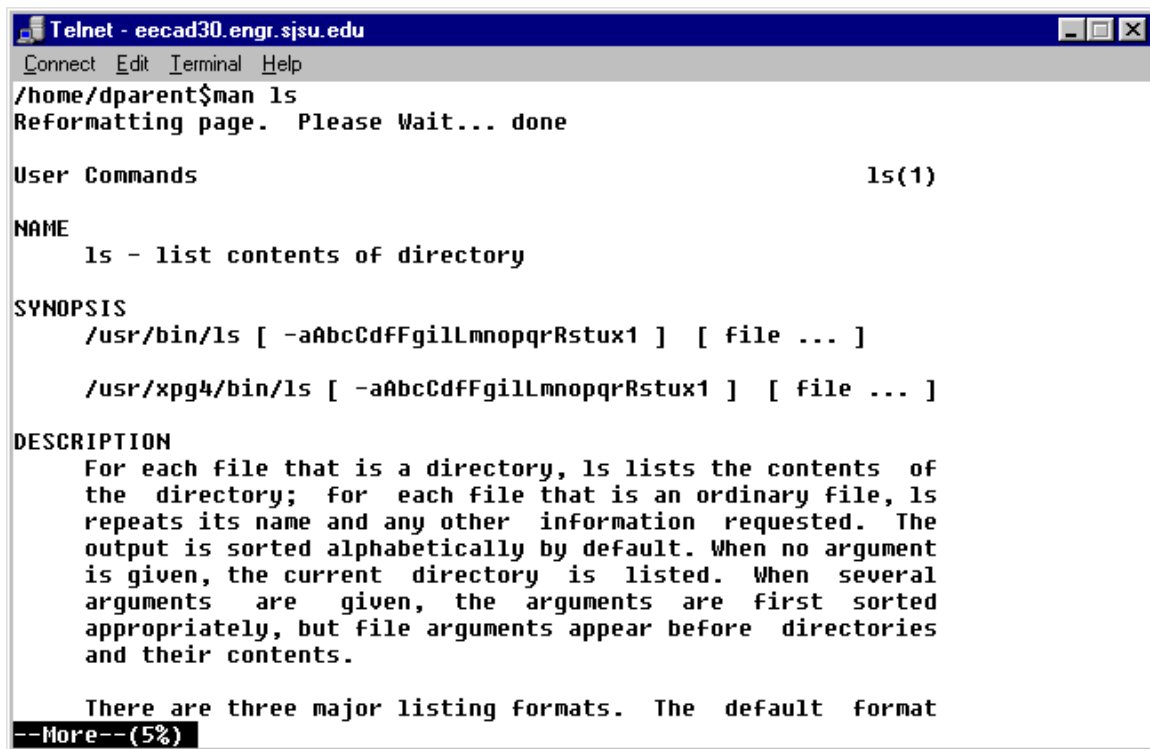
20. % **rm test1**
21. % **rm test2**
22. % **exit** This kills your terminal session.
23. Exit from nedit.

This ends the practical exercise on basic *UNIX*. To get a more detailed descriptions of the each command type *man command*. Note: Command means the particular command you are interested in find more information about.

For example to learn more about the command **ls** type:

```
% man ls
```

You should see the output in Figure 32.



```
Telnet - eecad30.engr.sjsu.edu
Connect Edit Terminal Help
/home/dparent$man ls
Reformatting page. Please Wait... done

User Commands                                ls(1)

NAME
  ls - list contents of directory

SYNOPSIS
  /usr/bin/ls [ -aAbcCdffGgilLmnopqrRstux1 ] [ file ... ]
  /usr/xpg4/bin/ls [ -aAbcCdffGgilLmnopqrRstux1 ] [ file ... ]

DESCRIPTION
  For each file that is a directory, ls lists the contents of
  the directory; for each file that is an ordinary file, ls
  repeats its name and any other information requested. The
  output is sorted alphabetically by default. When no argument
  is given, the current directory is listed. When several
  arguments are given, the arguments are first sorted
  appropriately, but file arguments appear before directories
  and their contents.

  There are three major listing formats. The default format
--More--(5%)
```

Figure 32: Output of *man ls*

## Second Mini UNIX Tutorial:

In this tutorial you will use the UNIX commands `df`, `du`, and `tar`. You will also use the freeware program `gzip`. Note: The “%” symbol means type the ***bold and italicized*** text at the command line.

1. % ***df -sk*** . This will show you how full the file system is.
2. % ***du -sk*** This will show you how large large the current directory is:
3. % ***cd*** This will put you into your home directory
4. % ***mkdir unix*** This will create a directory called `unix`.
5. % ***du -sk unix*** This will show the size of the directory `unix`. An empty directory will come back as 1k large.
6. % ***cd unix*** This changes your `pwd` to `unix`.
7. % ***pwd*** This displays your `pwd`.
8. % ***touch t1 t2 t3 t4 t5*** This creates five empty files.
9. % ***ls*** This list the directory to your terminal.
10. % ***ls t\*> list*** This lists all files that begin with `t`, to a file called `list`.
11. % ***more list*** This shows the context of the file `list`.

The out put of steps 1-11 can be seen in Figure 33.

```
Telnet - cadence1
Connect Edit Terminal Help
cadence1% df -bk .
df: (-bk ) not a block device, directory or mounted resource
Filesystem          kbytes  used  avail capacity  Mounted on
/dev/dsk/c1t0d0s7  10814042 6635143 4070759    62%    /export/home
/dev/dsk/c1t0d0s7  10814042 6635143 4070759    62%    /export/home
cadence1% du -sk
200394 .
cadence1% cd
cadence1% mkdir unix
cadence1% du -sk unix
1      unix
cadence1% cd unix
cadence1% pwd
/home/dparent/unix
cadence1% touch t1 t2 t3 t4 t5
cadence1% ls
t1 t2 t3 t4 t5
cadence1% ls t* >list
cadence1% more list
t1
t2
t3
t4
t5
cadence1% █
```

Figure 33: Commands for Mini Unix Tutorial 2.

Now we will use the tar command and the gzip command to manipulate files: Steps 12 –19 can be seen in Figure 34.

12. % **cd**
13. % **tar -cvf unix.tar unix** This archives the directory called unix into a file called unix.tar. Note: The original directory unix is left unchanged.
14. % **du -sk unix.tar** This will show you the size of the unix.tar file.
15. % **gzip unix.tar** This will compress the file unix.tar into a file named unix.tar.gz. The original unix.tar is replaced with a file that has the \*.gz extension.
16. % **du -sk unix.tar.gz** This shows the size of the compressed file.
17. % **mv unix.tar.gz unix/.** This move the unix.tar.gz file into the unix directory.
18. % **cd unix** This changes your pwd to unix.
19. % **ls** This lists the content of the unix directory to your screen.
20. % **gzip -d unix.tar.gz** This decompresses for unix.tar.gz file.
21. % **tar -xvf unix..tar** This extracts all the files from the unix.tar archive to a directory called unix (which is inside your original unix directory).
22. % **du -sk \*** This shows the size of each file and directory.

The output of lines 20-24 can be seen in Figure 34 and Figure 35.

23. % **cd** This puts you back into your home directory.
24. % **rm -rf unix** This removed the directory and all the files in unix.

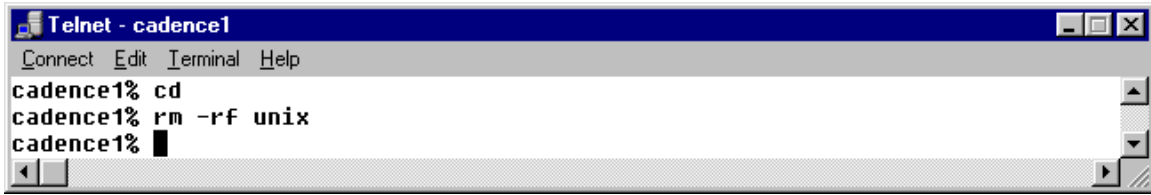
```
Telnet - cadence1
Connect Edit Terminal Help
cadence1%
cadence1%
cadence1%
cadence1%
cadence1%
cadence1%
cadence1% tar -cvf unix.tar unix
a unix/ OK
a unix/t1 OK
a unix/t2 OK
a unix/t3 OK
a unix/t4 OK
a unix/t5 OK
a unix/list 1K
cadence1% du -sk unix.tar
5      unix.tar
cadence1% gzip unix.tar
cadence1% du -sk unix.tar.gz
1      unix.tar.gz
cadence1% mv unix.tar.gz unix/.
cadence1% cd unix
cadence1% ls
list      t2          t4          unix.tar.gz
t1        t3          t5
```

Figure 34: Output for second UNIX Tutorial.

```
Telnet - cadence1
Connect Edit Terminal Help
cadence1% gzip -d unix.tar.gz
cadence1% tar -xvf unix.tar
tar: blocksize = 10
x unix, 0 bytes, 0 tape blocks
x unix/t1, 0 bytes, 0 tape blocks
x unix/t2, 0 bytes, 0 tape blocks
x unix/t3, 0 bytes, 0 tape blocks
x unix/t4, 0 bytes, 0 tape blocks
x unix/t5, 0 bytes, 0 tape blocks
x unix/list, 15 bytes, 1 tape blocks
cadence1% du -sk *
1      list
0      t1
0      t2
0      t3
0      t4
0      t5
2      unix
5      unix.tar
cadence1%
cadence1%
cadence1%
cadence1%
cadence1%
```

Figure 35: Output for second UNIX Tutorial. Continued.



A screenshot of a Telnet terminal window titled "Telnet - cadence1". The window has a menu bar with "Connect", "Edit", "Terminal", and "Help". The terminal content shows three lines of text: "cadence1% cd", "cadence1% rm -rf unix", and "cadence1% █". The window includes standard OS window controls (minimize, maximize, close) and a scrollbar on the right side.

```
Telnet - cadence1
Connect Edit Terminal Help
cadence1% cd
cadence1% rm -rf unix
cadence1% █
```

Figure 36: Removing the tutorial files.

## Remote Access to the Server:

Note: You will need a T1, DSL or cable modem connection. Yes, I have been able to access the tools with a dialup but it is not fast enough. The exception is if you are only doing command line type operations.

### Secure Shell and Secure FTP

Remote access is achieved with secure shell. Secure shell operates like telnet except that information is encrypted. You can download a secure shell program free at:

<http://shark.engr.sjsu.edu/ssh/>

A \$60 version with an X-Windows emulator (The humming bird version is \$150) can be found at:

<http://www.starnet.com/products/downloads.asp>

Download ssh (secure shell) and install it on your PC. The rest of the tutorial will assume you have done this correctly.

### Setting your PC's Display to USE CDS tools

To use Cadence or silvaco tools you have to set the PC's display to 256 or high-16 colors. You will get a error (**can't find 8 bit plane device**) if this is not done. To set your PC's colors right click anywhere there are no icons on your pc screen. A pop-up like Figure 37 should appear. Highlight properties and another pop-up should appear (Figure 38). If you want the best UNIX display then use 256 colors like in Figure 38. If you want a compromise between UNIX and PC choose High Color (16-bit) like in Figure 39. **Note: A DSL or Cable Modem is required to use the cad packages GUI.**



Figure 37: Changing the Properties of your display.

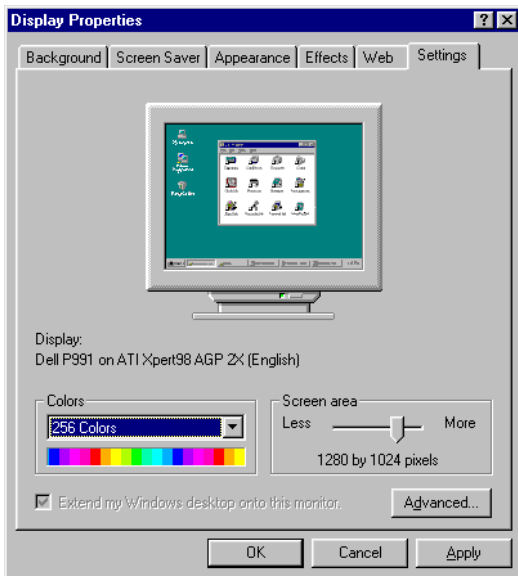


Figure 38: 256 colors (Use for Best Display Using CDS Tools.)

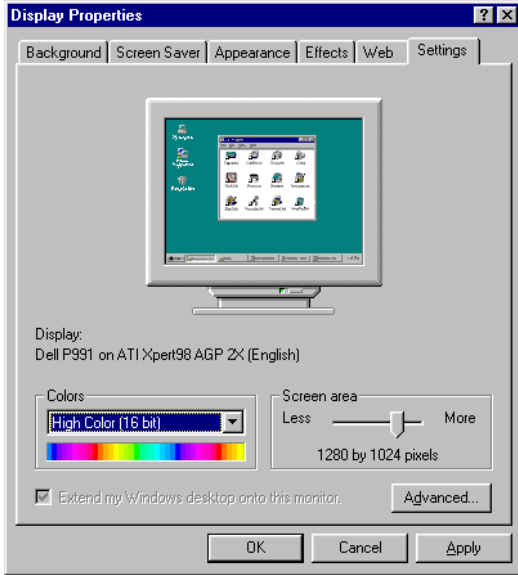


Figure 39: High Color (16 bit) Use as a compromise between UNIX and PC.

## X Windows from a PC Using Hummingbird Exceed (Commercial Software):

Install the software according to the installation wizard. Make sure your display is set to 256 or High Color (16-bit). There are two ways to use the software. Passive mode allows you to open up a terminal directly without the CDE running. This displays better and uses less system resources. The second method is XMDP-Query and this logs you into a server through the CDE. **If you have a router at home you must turn it off for hummingbird to work.**

Secure Shell Login:

To login to a UNIX server using passive mode, open up the directory where you installed Exceed.

Double click on the Xconfig Icon shown in Figure 40. A window should appear like in Figure 41.

Double Click on the communication Icon in Figure 41, and a pop-up like Figure 42 should appear. Set the mode to passive as in Figure 42, and click OK.



Figure 40: Xconfig Utility.

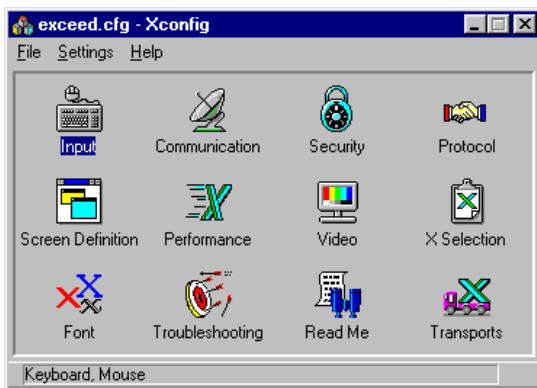


Figure 41: Choosing a Method to Communicate.

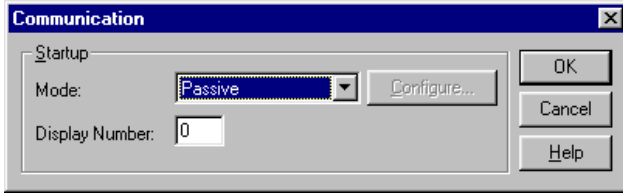


Figure 42: Passive Communication.

To start an X-session: Click on the Exceed Icon in the directory where you installed Exceed (Figure 43).



Figure 43: Starting a Session.

A button like Figure 44 should appear on your task bar.



Figure 44: Pop-up to Start Passive Session.

Start SSH by clicking on the icon as in Figure 45. A window should appear like in Figure 46.



Figure 45: SSH icon.

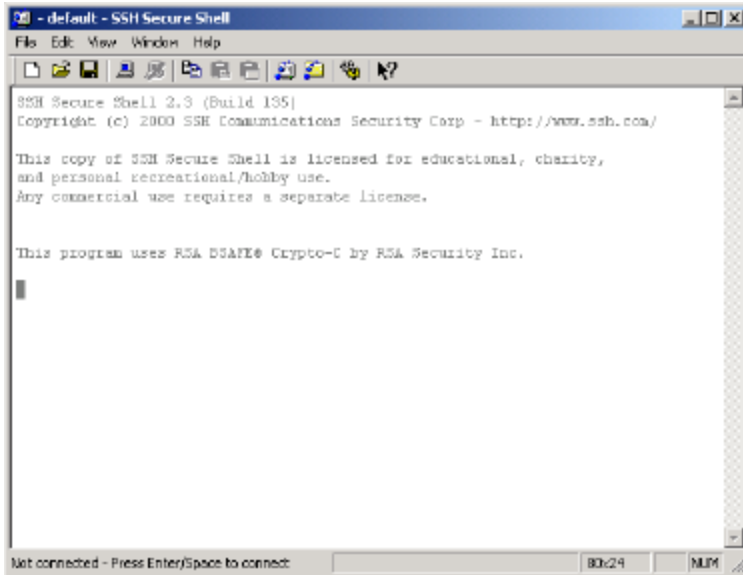


Figure 46: SSH.

You need to turn on X11 tunneling for remote graphics to work. To turn on remote X11 Tunneling:

Go to Edit settings in the secure shell widow. A pop-up like Figure 47 should appear.

Click on tunneling in the settings tree of Figure 48 and click on tunnel X11 connections as in Figure 48.

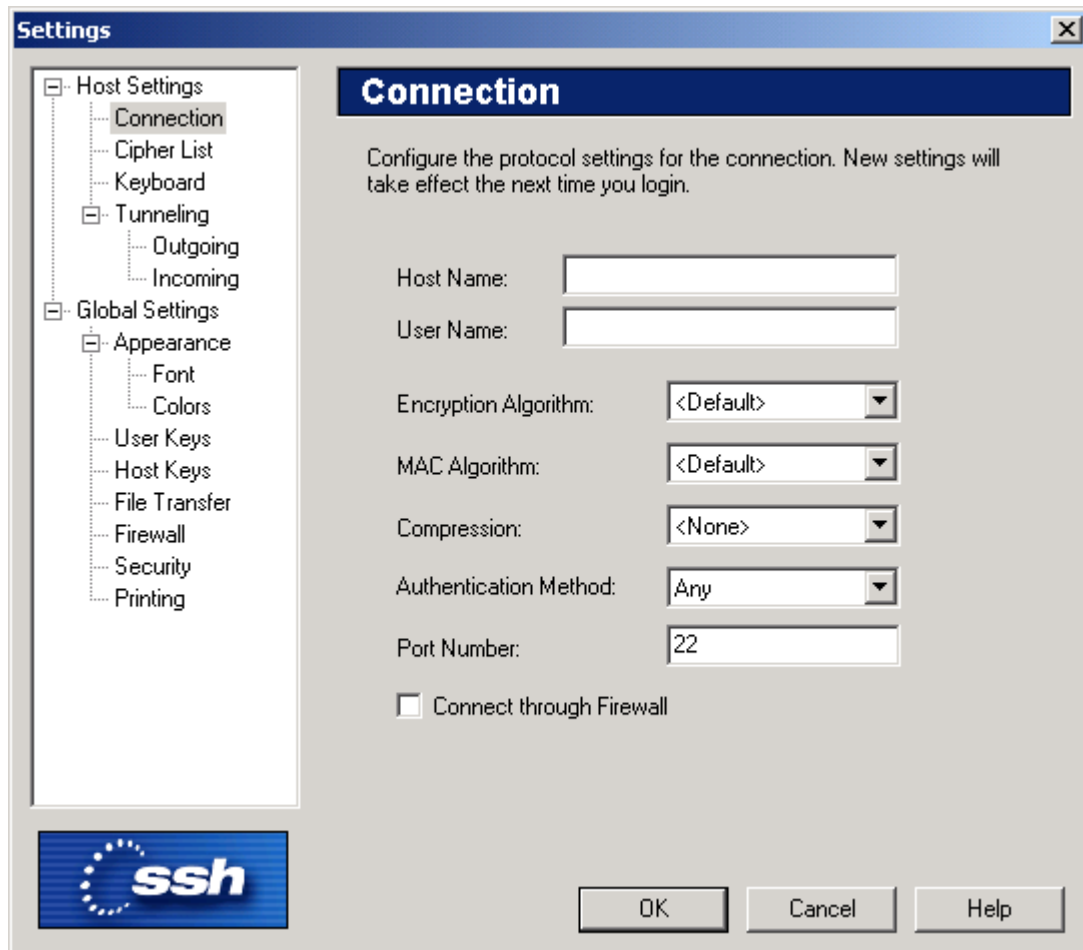


Figure 47: Editing the settings of your secure shell.



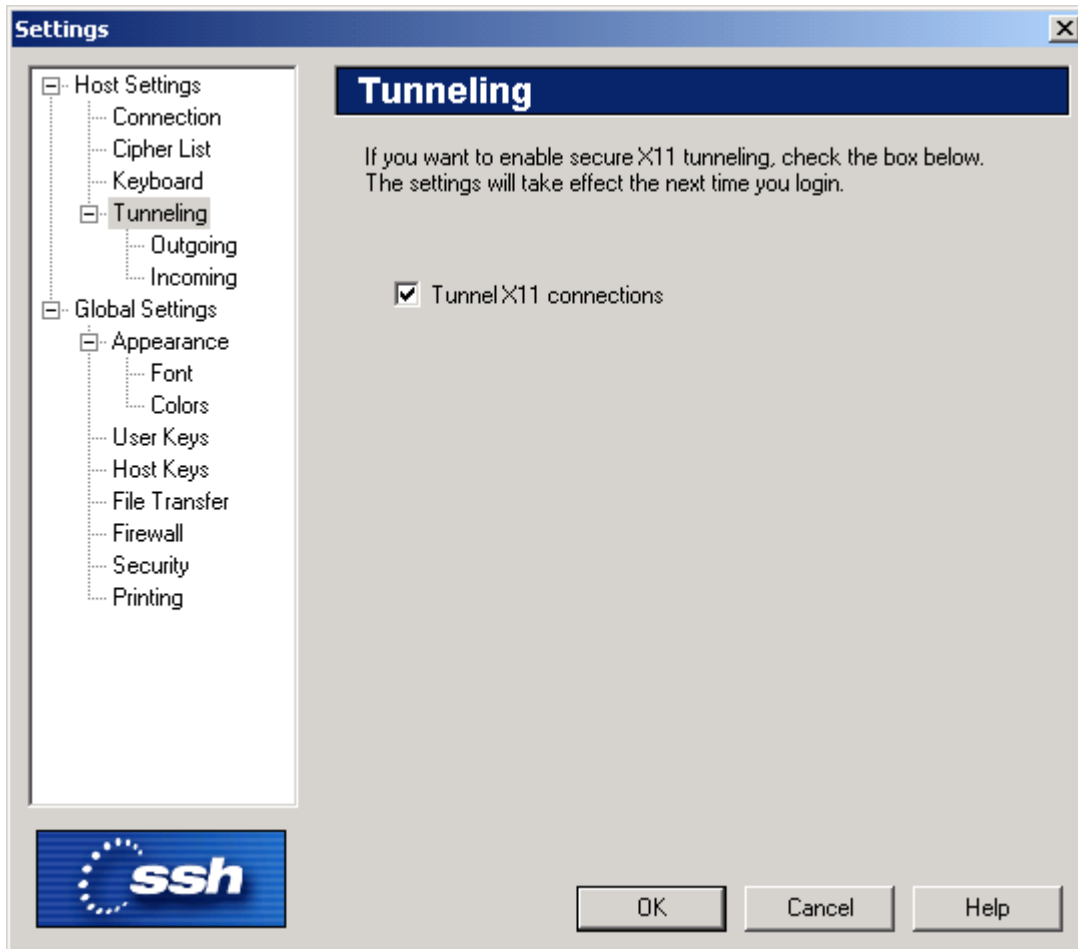


Figure 48: X11 tunneling in ssh.

To connect left click in the SSH window and press return. Fill out the pop-up as in Figure 49 (using your own login name) and click connect. The valid addresses are eecad1.engr.sjsu.edu to eecad50.engr.sjsu.edu. If one machine does not work, try another.

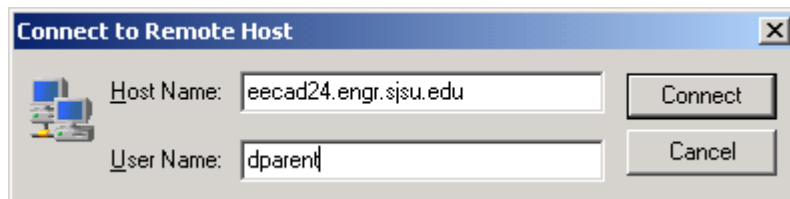


Figure 49: Connecting to a remote host with SSH.

After you click connect a pop-up like Figure 50 will appear. Click yes and then enter your password as in Figure 51 . Your password will look like \*\*\*\*\*.

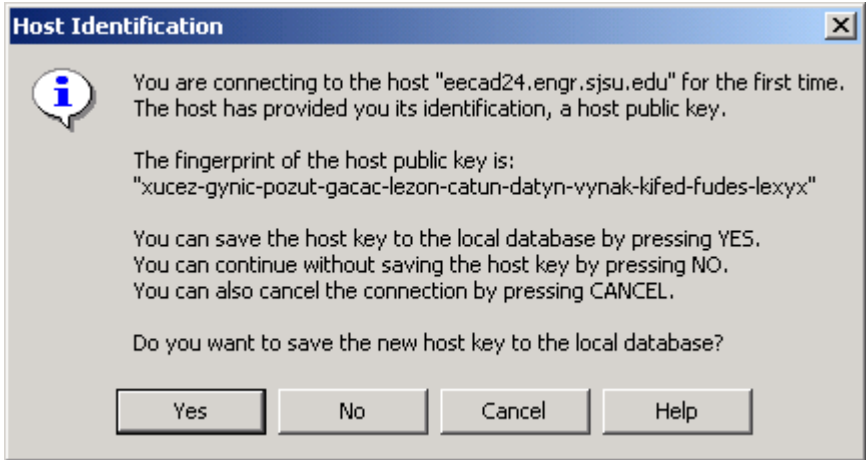


Figure 50: Agreeing to use a host public key.



Figure 51: Entering your password.

If all went well then you should your SSH should accept input from your keyboard and the text should be un-ghosted as in Figure 52.

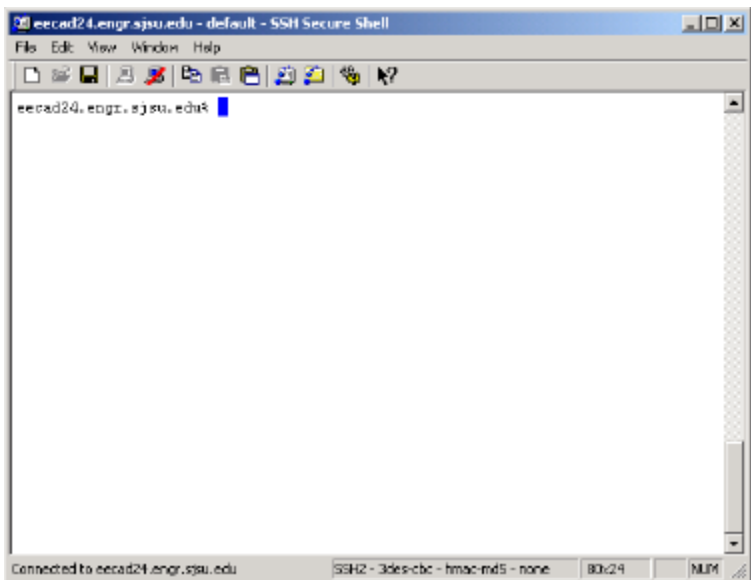


Figure 52: Connected with SSH.

Using a trial version of an X-Windows server:

You can download a trial version of the X-Windows emulator (It works for an hour and then drops you.) at:

<http://www.labtam-inc.com/index.php?act=products&pid=9> The product is X-Thin Pro.

Download and install it according to the instructions.

Go to Start... Programs... XTinPro v6.5 and click on the Xsession icon as in Figure 53.

Click no, when the pop-up asks you if you want to visit the LabTam site.

An Icon like Figure 54 should appear on your tool bar.

Start your SSH and you should be able to access the tools.

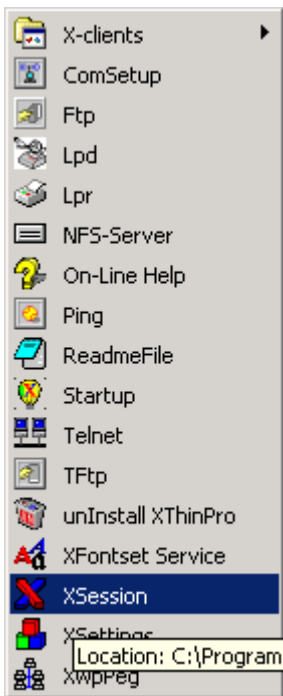


Figure 53: XSession.

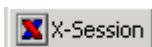


Figure 54: Alternate X-Windows session.