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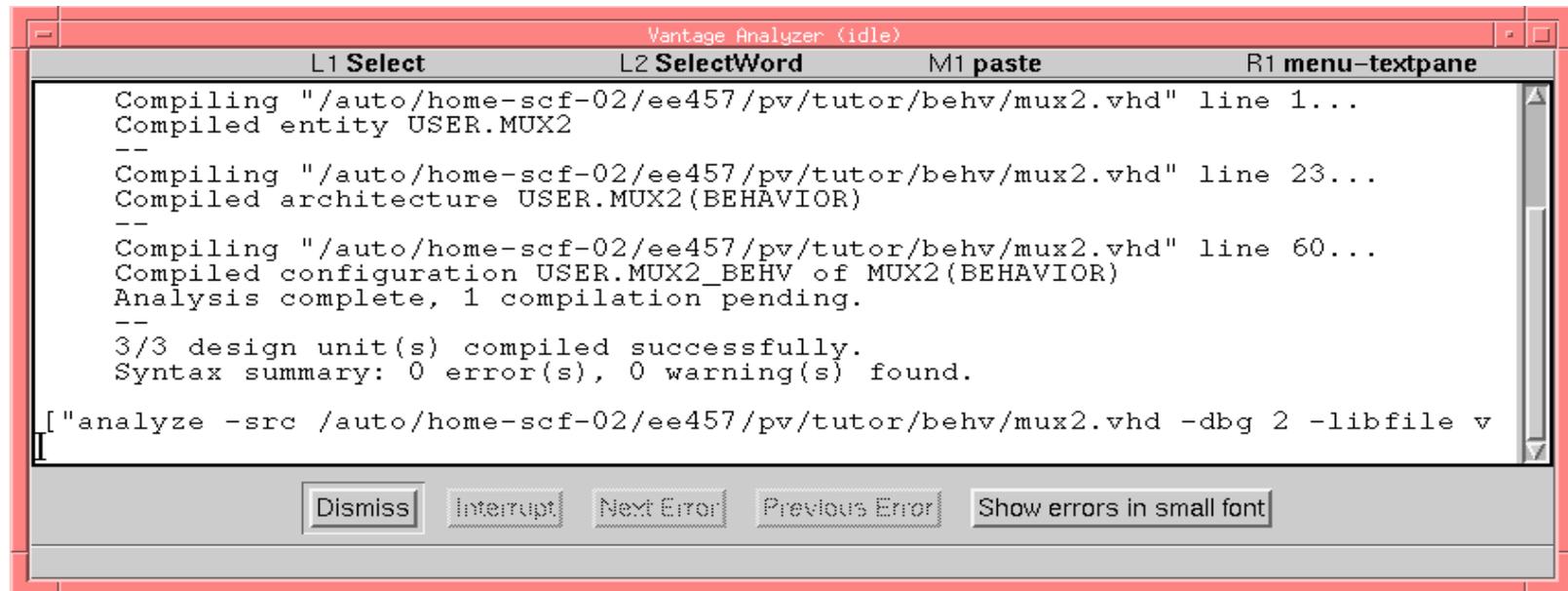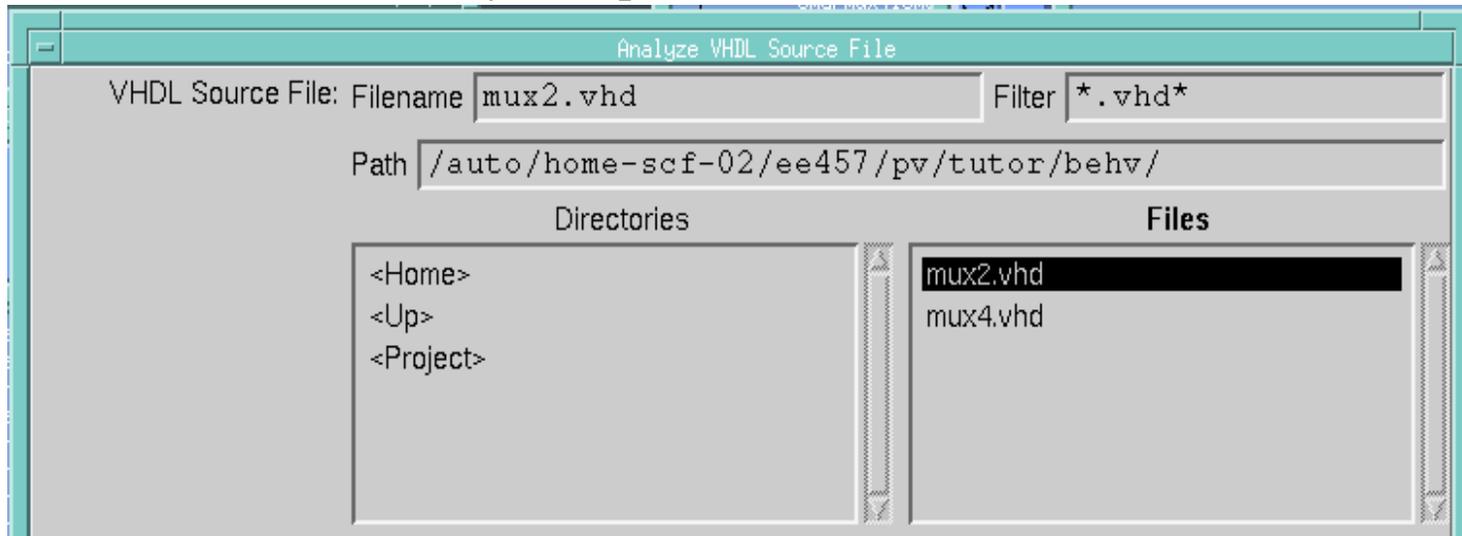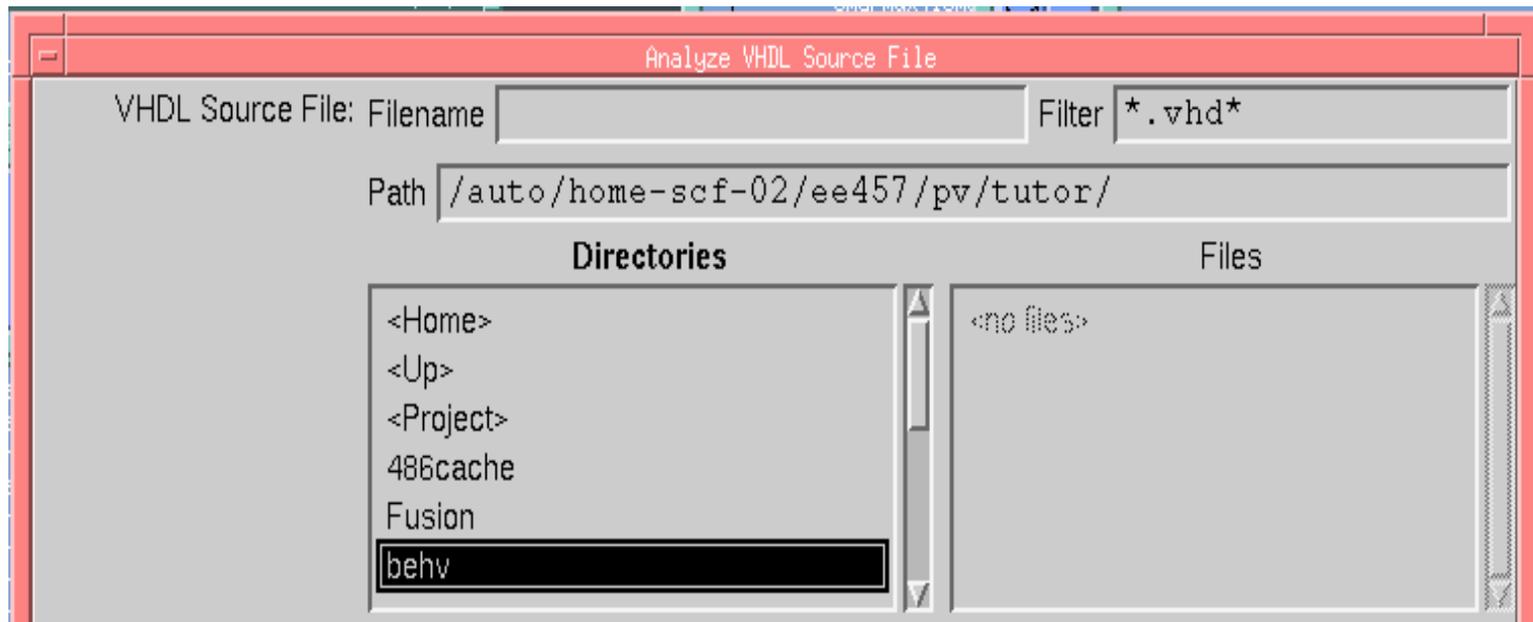# Select the mux2.vhd file. Analyze it (press the OK button). Dismiss the Analyzer message window

Analyze VHDL Source File

VHDL Source File: Filename `mux2.vhd`          Filter `*.vhd*`

Path `/auto/home-scf-02/ee457/pv/tutor/behv/`

**Directories**                              **Files**

<Home>                                       mux2.vhd
<Up>                                         mux4.vhd
<Project>

Vantage Analyzer (idle)

| L1 **Select** | L2 **SelectWord** | M1 **paste** | R1 **menu−textpane** |

```
Compiling "/auto/home-scf-02/ee457/pv/tutor/behv/mux2.vhd" line 1...
Compiled entity USER.MUX2
--
Compiling "/auto/home-scf-02/ee457/pv/tutor/behv/mux2.vhd" line 23...
Compiled architecture USER.MUX2(BEHAVIOR)
--
Compiling "/auto/home-scf-02/ee457/pv/tutor/behv/mux2.vhd" line 60...
Compiled configuration USER.MUX2_BEHV of MUX2(BEHAVIOR)
Analysis complete, 1 compilation pending.
--
3/3 design unit(s) compiled successfully.
Syntax summary: 0 error(s), 0 warning(s) found.

["analyze -src /auto/home-scf-02/ee457/pv/tutor/behv/mux2.vhd -dbg 2 -libfile v
```

Dismiss   Interrupt   Next Error   Previous Error   Show errors in small font
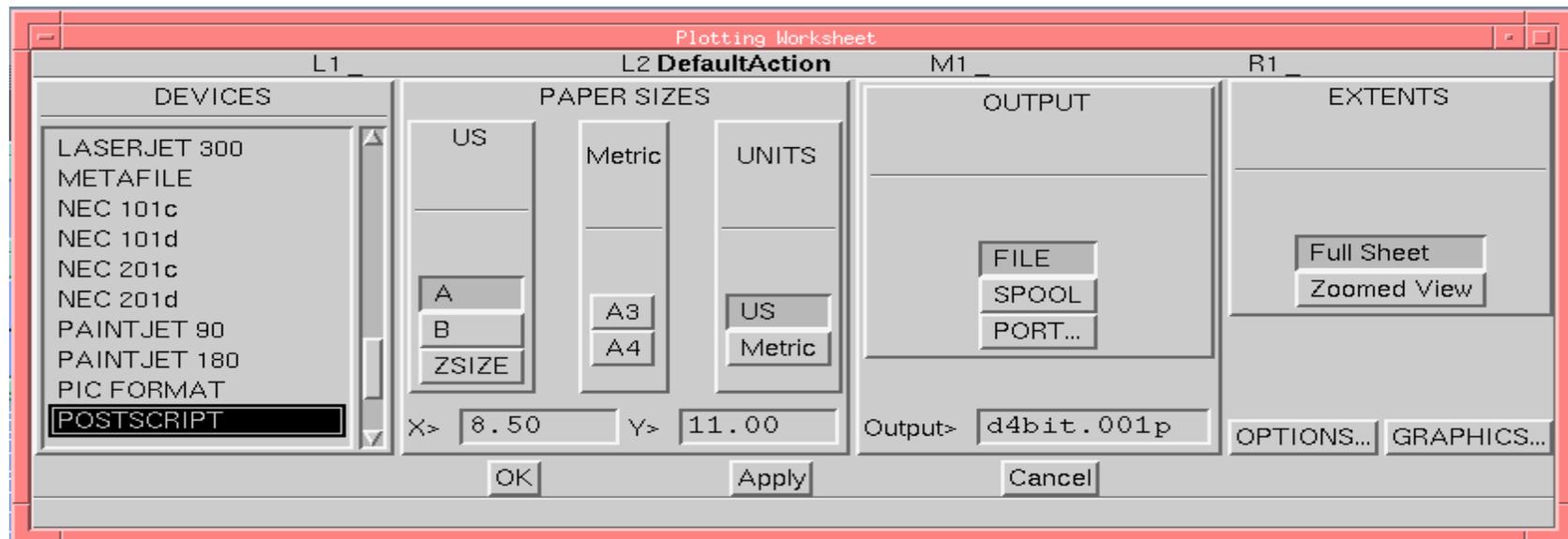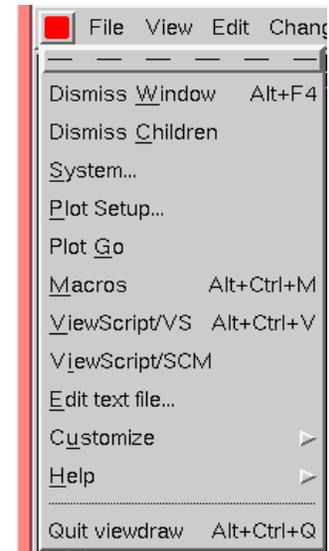
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# III. Analyze a VHDL file

Invoke VHDL analyzer. Click on the VhdlAnlz icon in the cockpit.

In the Analyze VHDL dialog box, double click on behv to make the
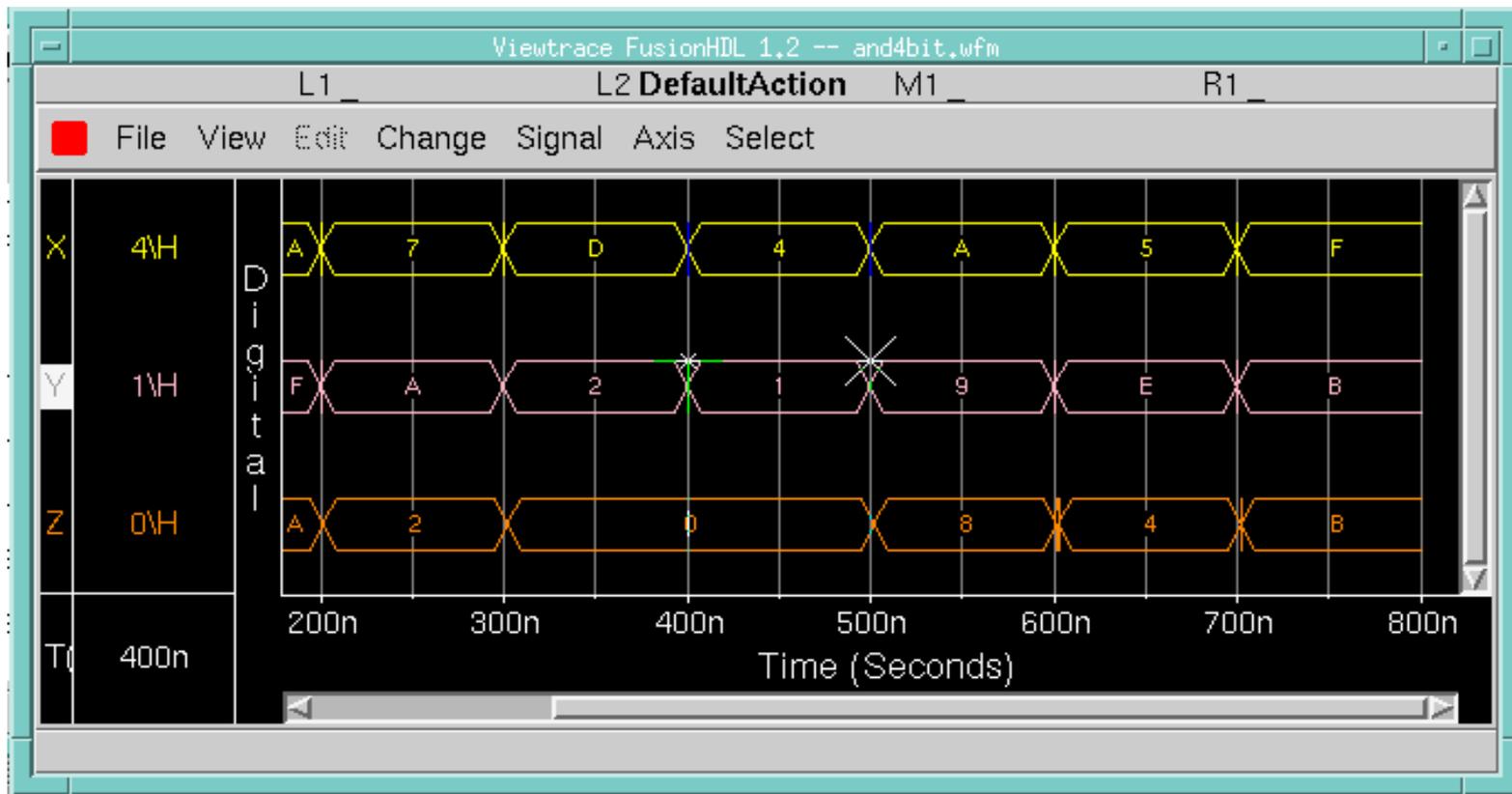vhdl files in behv subdirectory visible.



Analyze VHDL Source File

VHDL Source File: Filename [                    ]    Filter [`*.vhd*`]

Path [`/auto/home-scf-02/ee457/pv/tutor/`]

**Directories**                                      **Files**

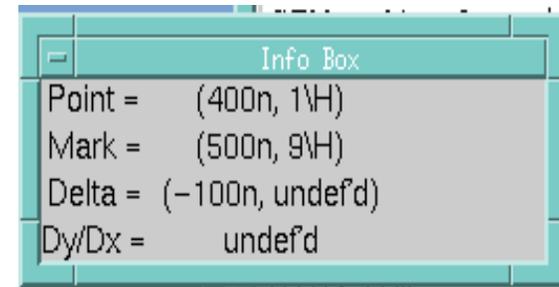| Directories | Files |
|---|---|
| <Home> | <no files> |
| <Up> | |
| <Project> | |
| 486cache | |
| Fusion | |
| behv | |

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# Plotting of schematics and waveforms:

From the RED SQUARE menu, plotting can be accomplished, through the Plot Setup and Plot Go menu items. You can plot the Full Sheet or the Zoomed View. You can create a post-script file and print it later using the lpr command. The default name for schematic plots is schematic_name.nnnp where nnn is the sheet number. The default name for the waveform plots is the project_name.plt. You may like to choose a more specific name for the waveform plot such as mux2_wave.plt in the Plot Setup dialog box.

File  View  Edit  Chang
Dismiss Window      Alt+F4
Dismiss Children
System...
Plot Setup...
Plot Go
Macros              Alt+Ctrl+M
ViewScript/VS    Alt+Ctrl+V
ViewScript/SCM
Edit text file...
Customize             ▶
Help                  ▶
Quit viewdraw    Alt+Ctrl+Q

Plotting Worksheet

L1 _          L2 **DefaultAction**          M1 _                    R1 _

DEVICES          PAPER SIZES          OUTPUT          EXTENTS

LASERJET 300
METAFILE
NEC 101c
NEC 101d
NEC 201c
NEC 201d
PAINTJET 90
PAINTJET 180
PIC FORMAT
POSTSCRIPT

US          Metric          UNITS

A
B
ZSIZE

A3
A4

US
Metric

FILE
SPOOL
PORT...

Full Sheet
Zoomed View

X> 8.50          Y> 11.00          Output> d4bit.001p

OPTIONS...  GRAPHICS...

OK          Apply          Cancel

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# ViewTrace operations:

You can zoom in and out, add or delete signal(s), make time measurements using the two cursors, "point" and the "mark", and save the file in .gen or .bad format. You can plot file in full or in zoomed-in fashion.
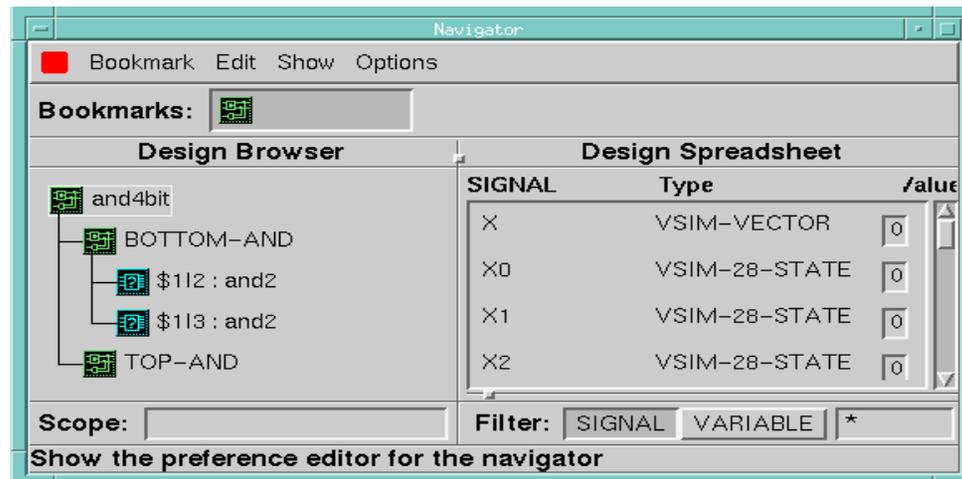
| Info Box | |
|---|---|
| Point = | (400n, 1\H) |
| Mark = | (500n, 9\H) |
| Delta = | (-100n, undef'd) |
| Dy/Dx = | undef'd |

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The display commands are also useful.

The simulation (time advancement) commands
are obviously important.

| | |
|---|---|
| sim 400ns | \| simulate another 400ns |
| cycle 4 | \| apply four clock cyles |
| run | \| run until exhausting the |
| | \| longest pattern |
| restart | \| reset time to 0.0 |
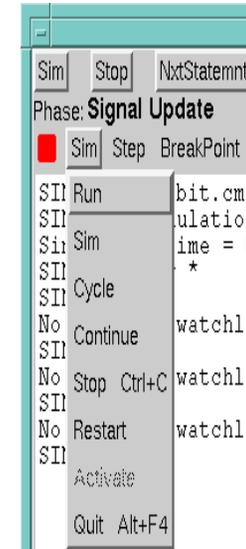
The Navigator window shows hierarchy.

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# ViewSim Commands:

Notice the two sets of menus at the top of the ViewSim (Fusion HDL) window.
The upper menu items are for VHDL debugging utilities whereas the lower ones are
for applying the usual simulation commands such as setting up of a clock, setting up of a
pattern, etc. Rather than using the lower line of menu commands, it is preferable to learn
the common commands for simulation and write them in the form of a command file.
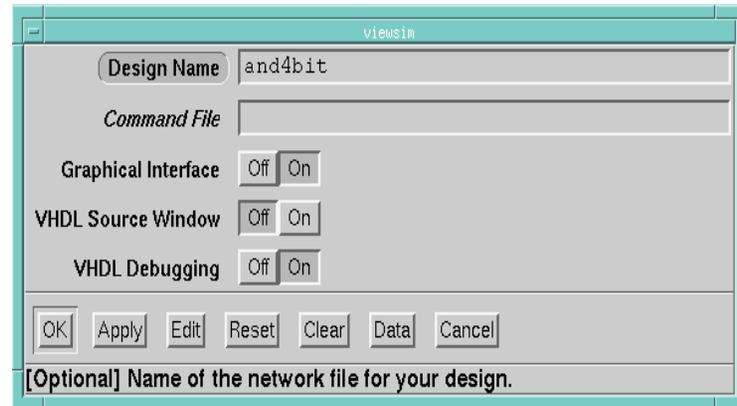
Use the red square menu item **Help on Commands,** to learn commands.
The most commonly used commands are the setup commands.

```
stepsize 50ns                                  | stepsize command
pat A_INPUT  0 1 1 0 0 1                        | pattern command
pat ~RESET  0 0 0 1
wfm ~RESET @0=0 @1237=1                         | to come out of reset at 123.7ns
v DATA D[7:0]                                   | vector command
radix hex DATA                                  | radix command
pat DATA 4A\h 07\h                              | notice the back-slashes
clock my_clock  0 0 1                           | clock command
wave my_design.wfm A_INPUT ~RESET DATA my_clock
                                               | setting up waveform (trace)
watch A_INPUT DATA                              | watch command
logfile my_design.log                          | logfile command
loadm cache_mem (64:128) F7\h                   | load memory
```

s_mnuset

Wave...
Vector...
Wfm...
Pat...
Clock...
Stepsize...
Radix...
BrkPnt...

Watch...
Trace...
Defaults ▻
Report ▻
Delay ▻
Print
LogFile...

Vantage Libraries...
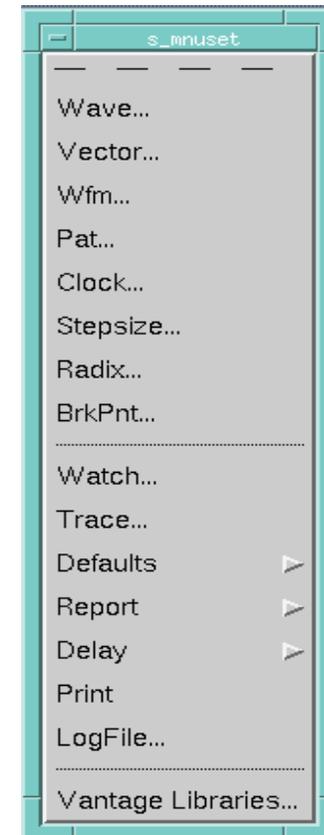
# Simulating your design using ViewSim:

Invoke ViewSim tool. Set Graphical Interface and VHDL debugging to On. Though you are not working with VHDL files, the debugging capabilities allow you to look through the hierarchy, and hence we turn it On.

```
                              viewsim

   Design Name  and4bit

   Command File

   Graphical Interface   Off | On

   VHDL Source Window    Off | On

   VHDL Debugging        Off | On

   OK  Apply  Edit  Reset  Clear  Data  Cancel

   [Optional] Name of the network file for your design.
```

```
                           FusionHDL1.2.1

 Sim   Stop   NxtStatemnt   StpOver   BrkAtLine   Value   Source   Monitor   Navigator...   Analyzer...   Net...
 Phase: Signal Update        Time: 0.0ns + 0              Context Stack:
      Sim  Step  BreakPoint  Display  Set  Trace  Setup  Delete  Open  Misc

 FusionHDL - V1.2.1; Powerview 6.0 (041896)
 c Copyright 1985,1996 by Viewlogic Systems, Inc.

 [I] VANTAGE_VSS environment variable found; adding to WDIR.
 Typical delays in use.
 All delays scaled by 1.
 Total of 4 digital modules were processed.
 SIM>cmd/and4bit.cmd
 SIM>
```

# Creating a vsm Netlist file:

Invoke the vsm tool to create a netlist file for your design (entered as a schematic). Choose the "long" format.
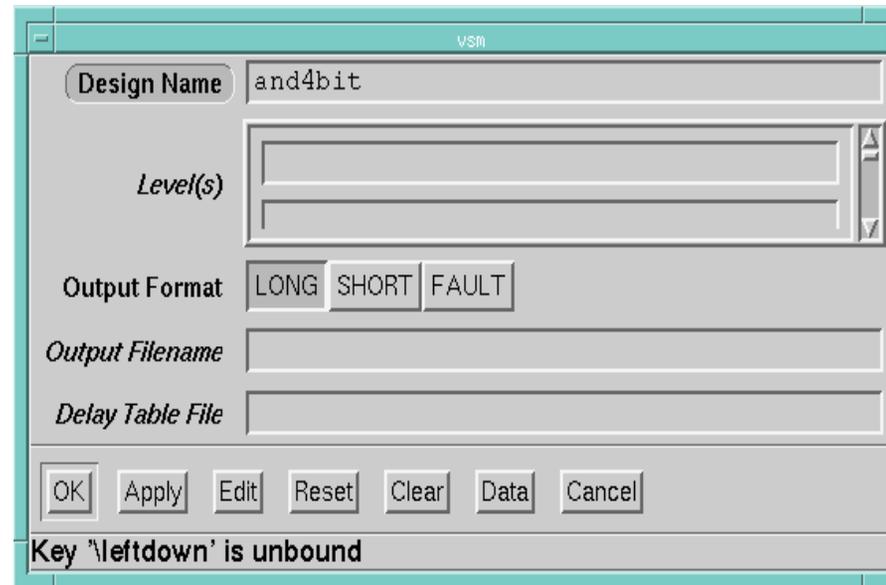


Don't forget this step. The very first time, even if you forget this step, since the simulator (ViewSim) will not simulate your design without a .vsm file, you will necessarily go through this step. However, during debugging of your design, it is quite possible that you fix your design in ViewDraw, save the schematic, and may forget to produce a new .vsm file. If you simulate at that time, you will be simulating the "old" .vsm file which does not reflect the revisions you carried out in the schematic.

1. Please notice the difference between a dangling end of a net (a SQUARE dot) and a connection between two nets at right angle (a solder dot which is CIRCULAR).

2. Fast Draw mode allows fast addition of nets and components, and moving of items.

3. The operation of each mouse button is displayed on the top of the window all the time.

4. The pop up menu is a collection of frequently used commands.

5. From the RED SQUARE menu, you will be able to Dismiss Window, do Plot Setup, and perform plotting (Plot Go), get help (ViewDoc, Help on Commands, ...), and Quit.

6. While it is not necessary to add input (in.1) and output (out.1) pins to the primary inputs and primary outputs, it is desirable to do so. If the inputs or outputs of a VHDL component (a component symbol, whose behavior is described through an underlying VHDL file) form the primary inputs or primary outputs and were not connected to pins, the tool (drc) (drc = design rule checker) generates several warnings.

7. Note that connectivity is maintained through labels across sheets and between a symbol and its underlying schematic. A symbol and its underlying schematic bear the same names.

| | | |
|---|---|---|
| View => Full | F10 | full |
| View => Zoom | z | zoom |
| View => In | F7 | in |
| View => Out | F8 | out |
| View => Pan | F6 | pan |
| View => Refresh | F5 | refresh |
| View => Context | | con |
| | | |
| Change => Attr => Dialog => All) | Ctrl-A | cat |
| Change => Attr => Visibility | | |
| Change => Text => String | | string |
| Change => Text => Size | | size |
| | | |
| | | |
| File => Level => Push (schematic \| symbol \| sheet) psch \| psym \| psheet | | |
| File => Level => Pop | | pop |
| File => Write | w | write |
| File => Writeto | W | writeto |

To use a " Command line command, " tap on the space bar and type-in the command in the command window.

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Practice the following commands in viewdraw:

| Menu command | Key binding | Command line command |
|---|---|---|
| Add => Comp | i | comp |
| Add => Net | n | net |
| Add => Bus | b | bus |
| Add => Label | l | label |
| Add => Text | t | text |
| Add => Graphic => (Box \| Line \| Arc \| Pin) | B \| L \| A \| p | box \| line \| arc \| pin |

; Note: Pin can be added if you are editing a symbol.

| Menu command | Key binding | Command line command |
|---|---|---|
| Edit => Copy | c | copy |
| Edit => Delete | d | delete |
| Edit => Move | m | move |
| Edit => Buffer => Copy | | bcopy |
| Edit => Buffer => Cut | | bcut |
| Edit = > Buffer => Paste | | bpaste |
| Edit => undo | u | undo |
| Edit => xform => (Reflect \| Rotate \| Scale) | | xform |

# Schematic entry using ViewDraw:

Using the left mouse button, double-click on the Viewdraw icon to open the ViewDraw File open Dialog box.
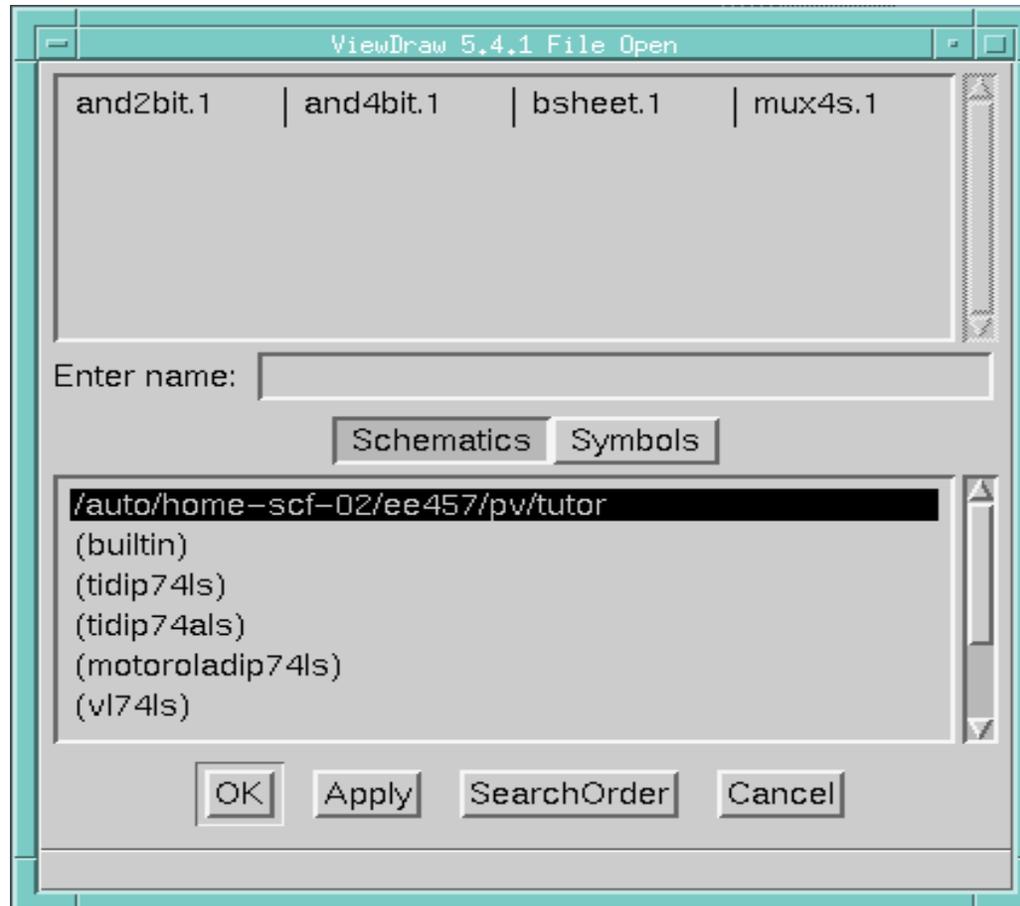


You could open an existing schematic (or symbol) for editing or crate a new schematic (or symbol).

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Using Help => ViewDoc, you can invoke the on-line documentation of powerview.
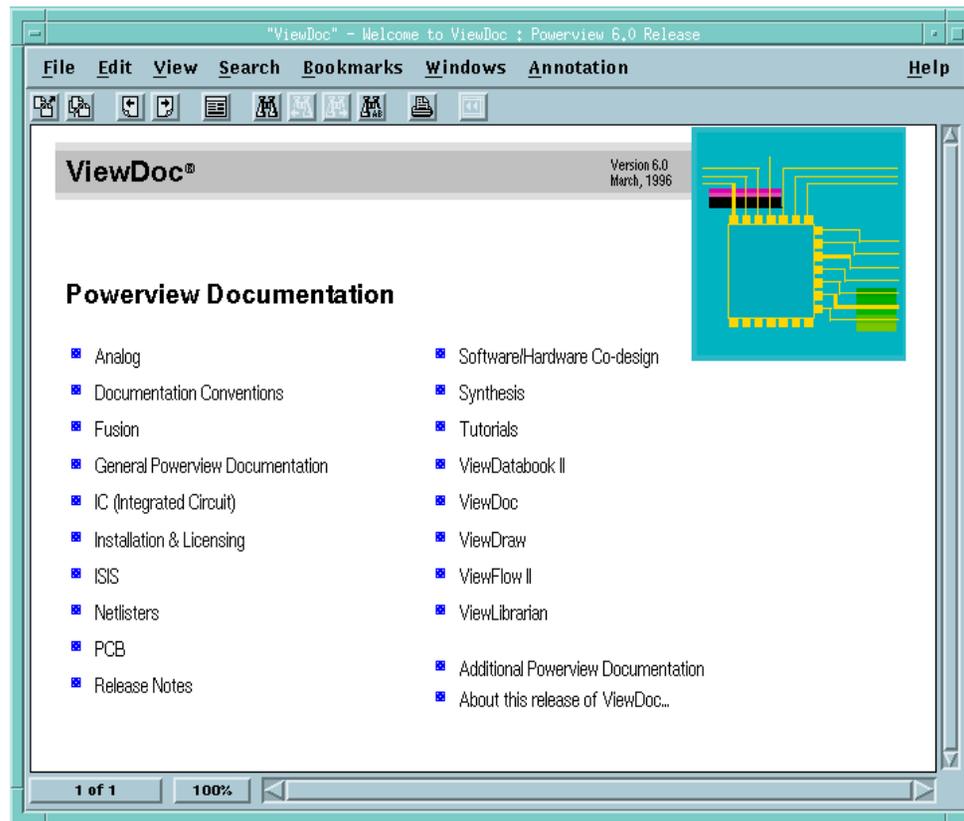


If you are not able to invoke the on-line documentation window, then your DISPLAY variable is not set properly before the xrdb command in the ~eeview/powerview.setup is executed. Refer to ~eeview/README.pv.setup for further details.

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# II.    Enter a schematic, simulate, and analyze (all students)

**Cockpit**:  Invoke the tool using the command "**powerview &**" from the pv directory.

Locate Viewdraw, vsm, Viewsim, and Viewtrace tool icons. Check to see if the current project is set to tutor (or whatever you wanted to work in) otherwise change the current project. Notice items under the **RED SQUARE** menu, particularly **Help** and **Quit powerview**.  If you are not able to invoke the tool, check your path, DISPLAY variable, etc.

4
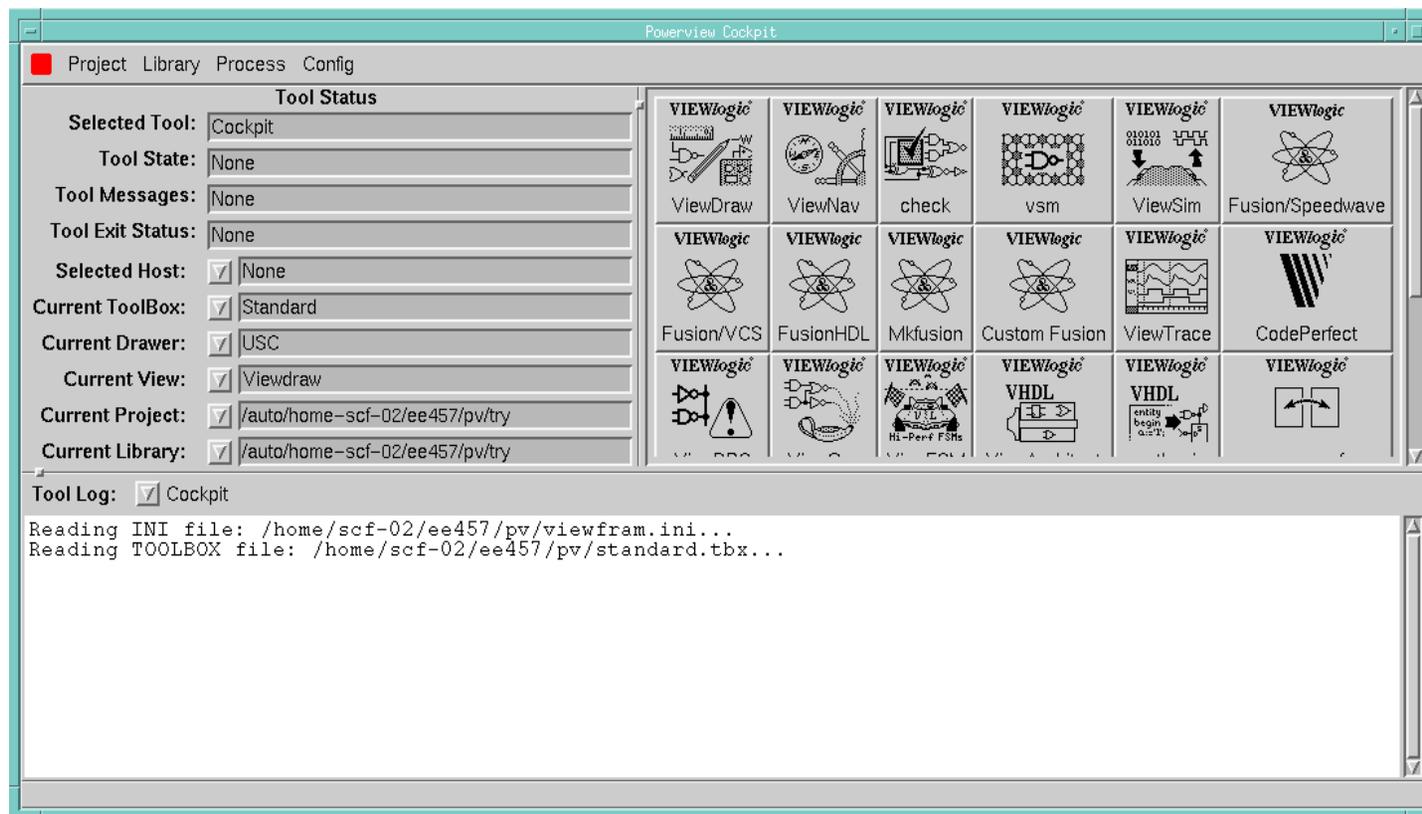
To setup your account, do the following only once. For detailed discussion on setting up of your account, please read the file ~eeview/README.pv.setup.

1.a. Perform **~eeview/pv.setup** to create pv directory and append a few lines in your .login file. These lines **source ~eeview/powerview.setup** every time you login. The powerview.setup sets up path and other environmental variables (WDIR, etc.). After the first time of doing pv.setup, please logout and login again (or source .login) to cause execution of the new lines added to your .login.

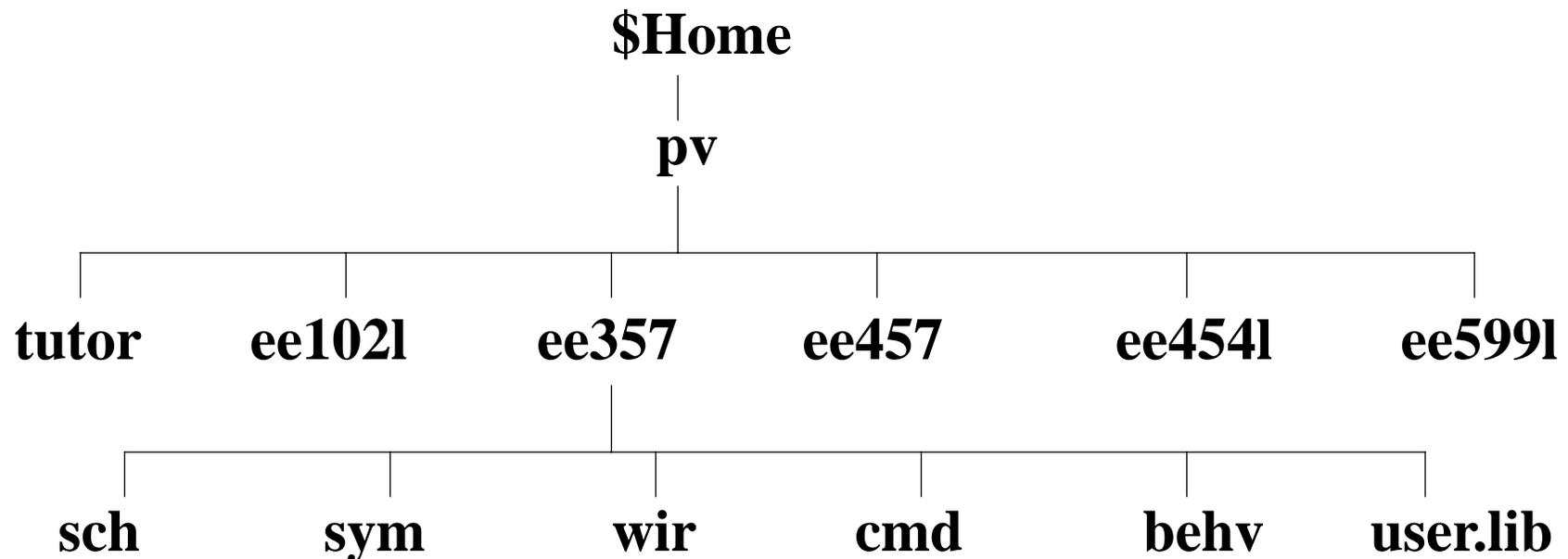1.b. Change directory to pv and do one or more of the following as appropriate to you. These create project directories under pv.

**All first-time users:** **~eeview/tutor_pv.setup**
**EE102L students:** **~eeview/ee102l_pv.setup**
**EE357 students:** **~eeview/ee357_pv.setup**
**EE457 students:** **~eeview/ee457_pv.setup**
**EE454L students:** **~eeview/ee454l_pv.setup**
**EE599L students:** **~eeview/ee599l_pv.setup**

# I.   Set up your account for Powerview (all students)

At USC Powerview runs on the scf (student computing facility) SUN machines under the Solaris operating system.

Directory structure in user (student) account

**$Home**
|
**pv**

**tutor**   **ee102l**   **ee357**   **ee457**   **ee454l**   **ee599l**

ee357:
**sch**   **sym**   **wir**   **cmd**   **behv**   **user.lib**

Please **do NOT** alter the directory structure that has been setup for you.

This lecture introduces five items: (Currently only the first three items are included here)

**I.  Set up your account for Powerview (all students)**

**II.  Enter a schematic, simulate, and analyze (all students)**

**III.  Analyze a VHDL file  and simulate a design
    with VHDL components (EE599L)**

**IV.  Simulate a design with Smartmodel components (EE454L)**

**V.  Simulate/debug a stand-alone VHDL design (EE599L)**

Additional information may be found in                    ~eeview/README.pv.setup and
                                                         ~eeview/README.pv.tutor

9/12/97

# Introduction
# to
# **Power*view***

## Instructor: Gandhi Puvvada

## University of Southern California