Basic VCS practical

Renesas Design Vietnam Co., Ltd.

HW Design Engineering Division

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Outline

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Exercise Description

The purpose of this practice is guided user how to simulate a HW design in order to watch the result by using VCS.

User can verify the result by reading text in command line mode or by watching waveform in GUI mode.

Note: The design is a simple counter. It has two input signals: clock signal (**`clk`**), reset signal (**`rst_n`**) and one output signal counter value (**`cnt_value`**)

The operation: this counter will increase one value when clock signal (**`clk`**) is **`1`** and reset signal (**`rst_n`**) is **`1`**. Moreover, this counter will reset counter value (**`cnt_value`**) to **`0`** when reset signal (**`rst_n`**) is **`0`** regardless of clock signal.

Data Preparation

Open the terminal

At home directory, make a training directory:

$ mkdir vcs_training

Change to created directory

$ cd vcs_training

Copy "*counter.v*" from DMS location

Documents/1. General Documents/010_ENG/030_Training/EDA Tool Training/Basic Training/VCS Practice/counter.v

Set Local and VCS Environment

Open connection in client machine (this step is used to display GUI later)
(This step must be done when user is in the local machine (user PC))

```
$ xhost +
```

Set VCS environment

```
$ source /common/appl/Env/Synopsys/vcs-mx_vD-2009.12-4
```

```
$ setenv LM_LICENSE_FILE 27000@licedu1
```

Set the path for g++

```
$ setenv PATH  /common/appl/gcc-3.3.6/bin/:$PATH
```

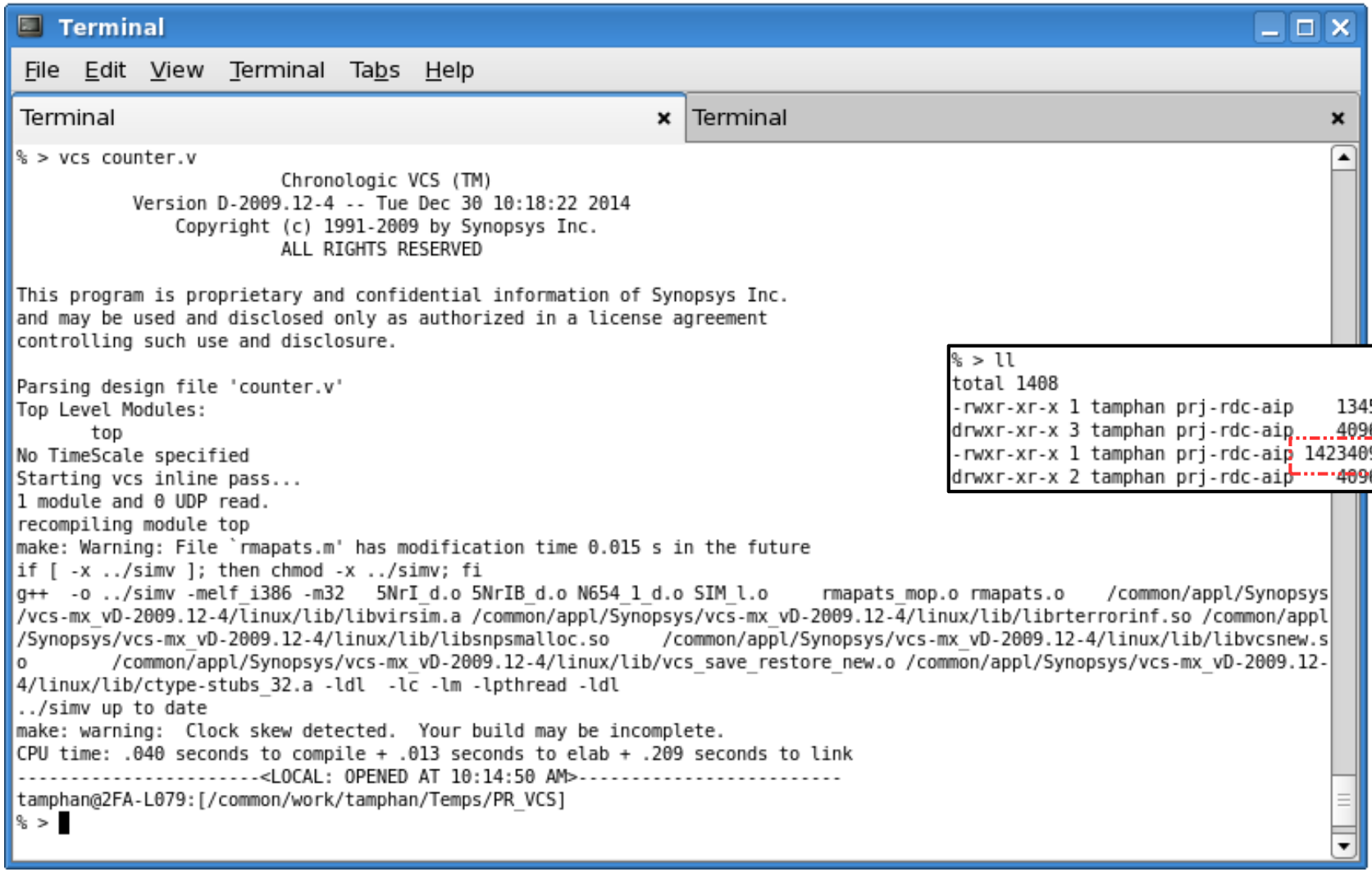
or (depending on your PC compatibility)

```
$ setenv PATH  /common/appl/gcc-3.2.3/bin/:$PATH
```

Exercise 1. Compile and Simulate Design (1/2)

Compile Design

$ vcs counter.v

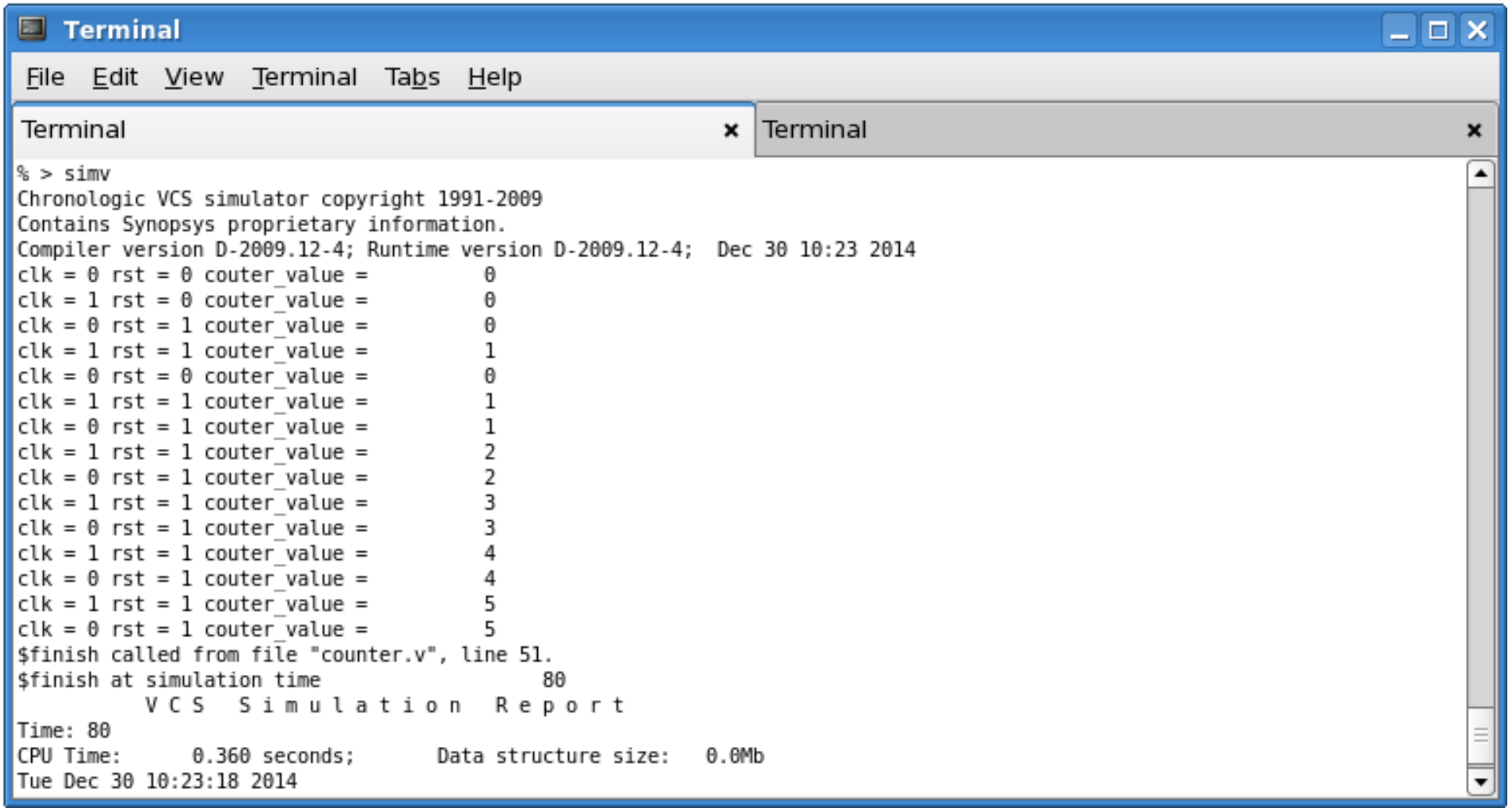


If you compile the source file *successfully*, then you will receive the file **simv**. Please use the command *"ls"* to check the existence of this file.

Exercise 1. Compile and Simulate Design (2/2)

Simulate Design

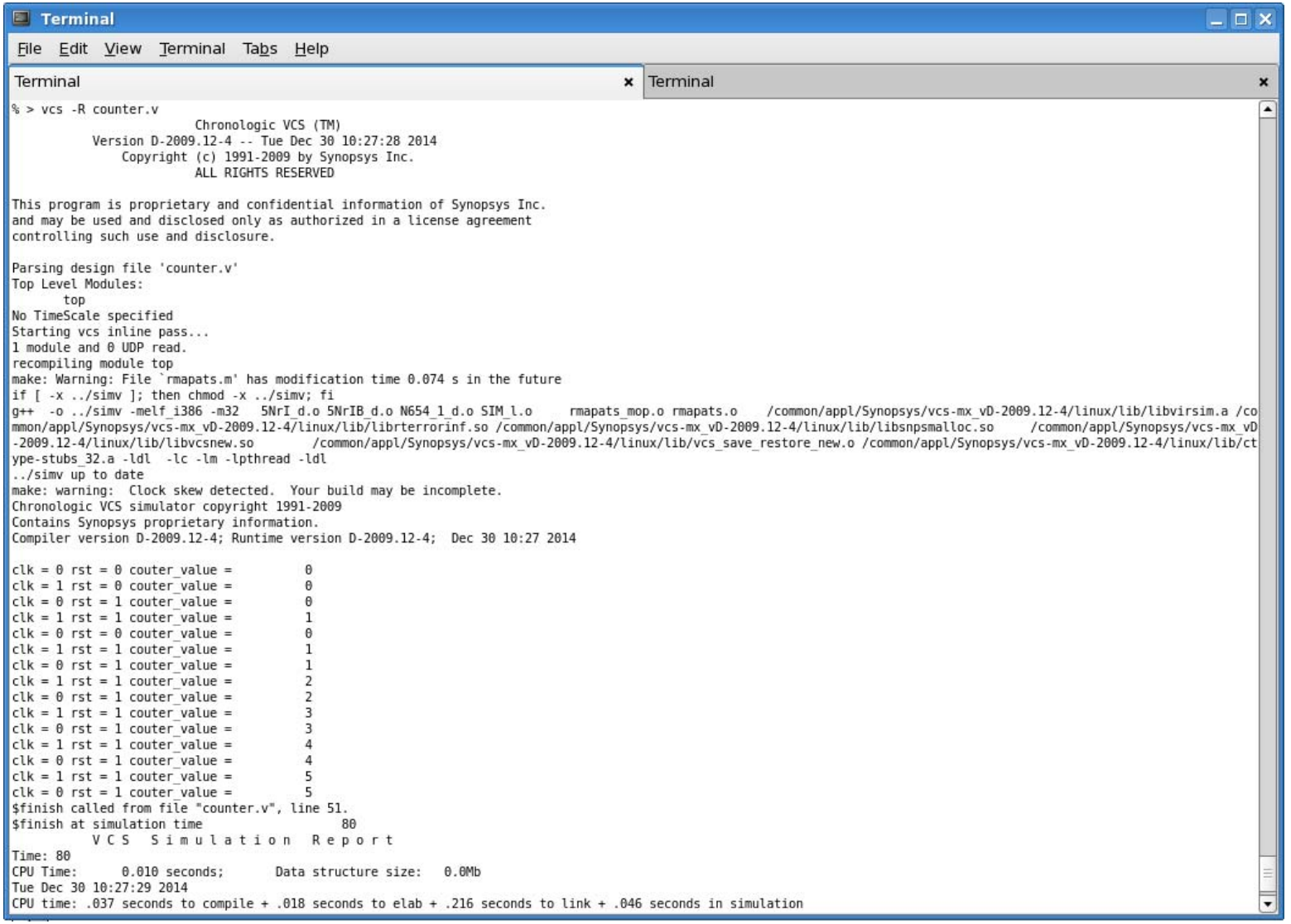
$ simv



Exercise 2. Compile and Simulate with options

Compile and Simulate Design with option -R (with this option user can compile and simulate design with one command)

$ vcs -R counter.v



Exercise 3. Using DVE (1/5)

DVE is the integrated tool in VCS. This tool will help user to watch the waveform of design circuit.

This exercise will help user to watch the waveform of design circuit and explore some features in DVE.

Exercise 3. Using DVE (2/5)

User must open source code

$ vi counter.v

Type following code in the correct location. Please refer to the next picture for more detail:

```
initial begin
   $vcdplusfile ("counter.vpd");
   $vcdpluson  ();
end
```

Save file then run command :

$ vcs -R -debug_pp counter.v

Check created wave file (“counter.vpd”)

$ ls

```
19 endmodule
20
21 module top;
22
23     parameter HALF_CYCLE = 5;
24
25     reg clk;
26     reg rst_n;
27
28     wire[31:0]  cnt_value;
29
30     counter counter01 (.clk(clk),.rst_n(rst_n),.cnt_value(cnt_value));
31
32     always begin
33         #HALF_CYCLE clk = 1'b0;
34         #HALF_CYCLE clk = 1'b1;
35     end
36
37     //-----------------------------------------
38     // Type system task to dump waveform here
39     //-----------------------------------------
40     initial begin
41         $vcdplusfile ("counter.vpd");
42         $vcdpluson  ();
43     end
44
45     //-----------------------------------------
46
47     initial begin
48         # ( 0*HALF_CYCLE)  rst_n = 1'b0;
49         # ( 3*HALF_CYCLE)  rst_n = 1'b1;
50         # ( 2*HALF_CYCLE)  rst_n = 1'b0;
51         # ( 1*HALF_CYCLE)  rst_n = 1'b1;
52         # ( 10*HALF_CYCLE)
53
54         $finish;
55     end
56
57     always @ (clk) begin
58         $strobe ("clk = %d rst = %d couter_value = %d",clk,rst_n,cnt_value);
59     end
60
61 endmodule
```

Exercise 3. Using DVE (3/5)

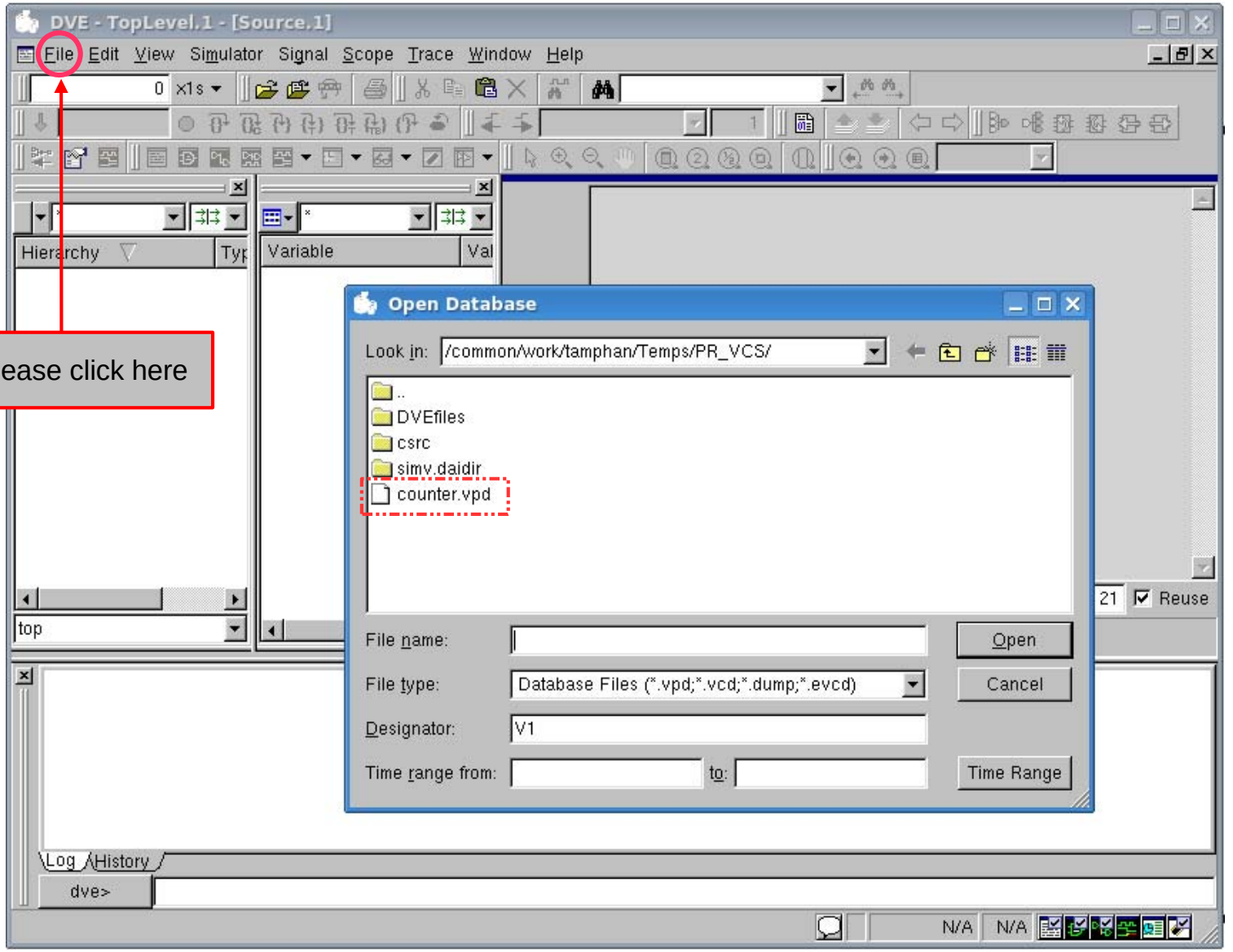
Open DVE:

$ dve

Open wave form file:

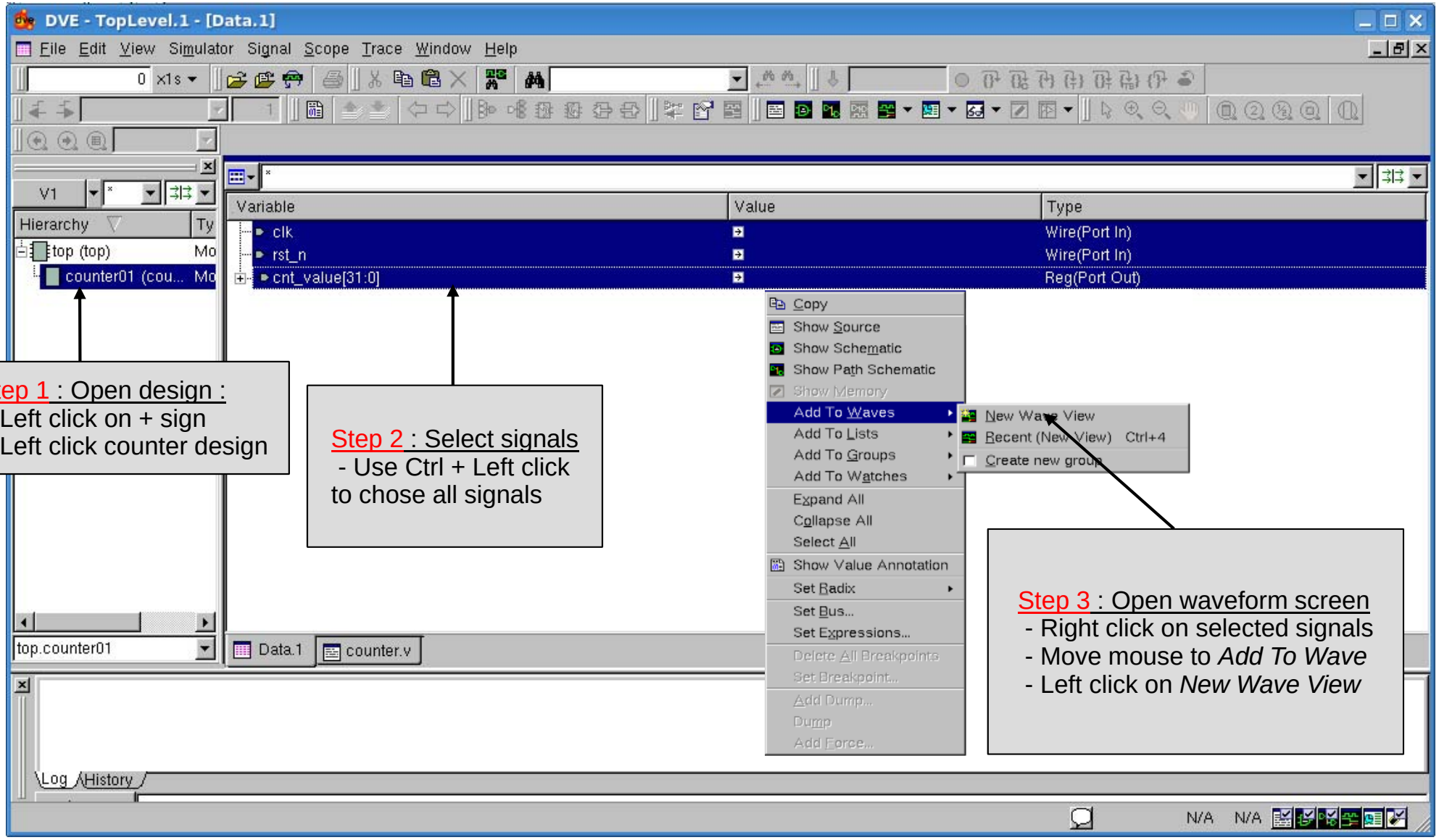
File/Open Database ...

Or using Ctrl + O



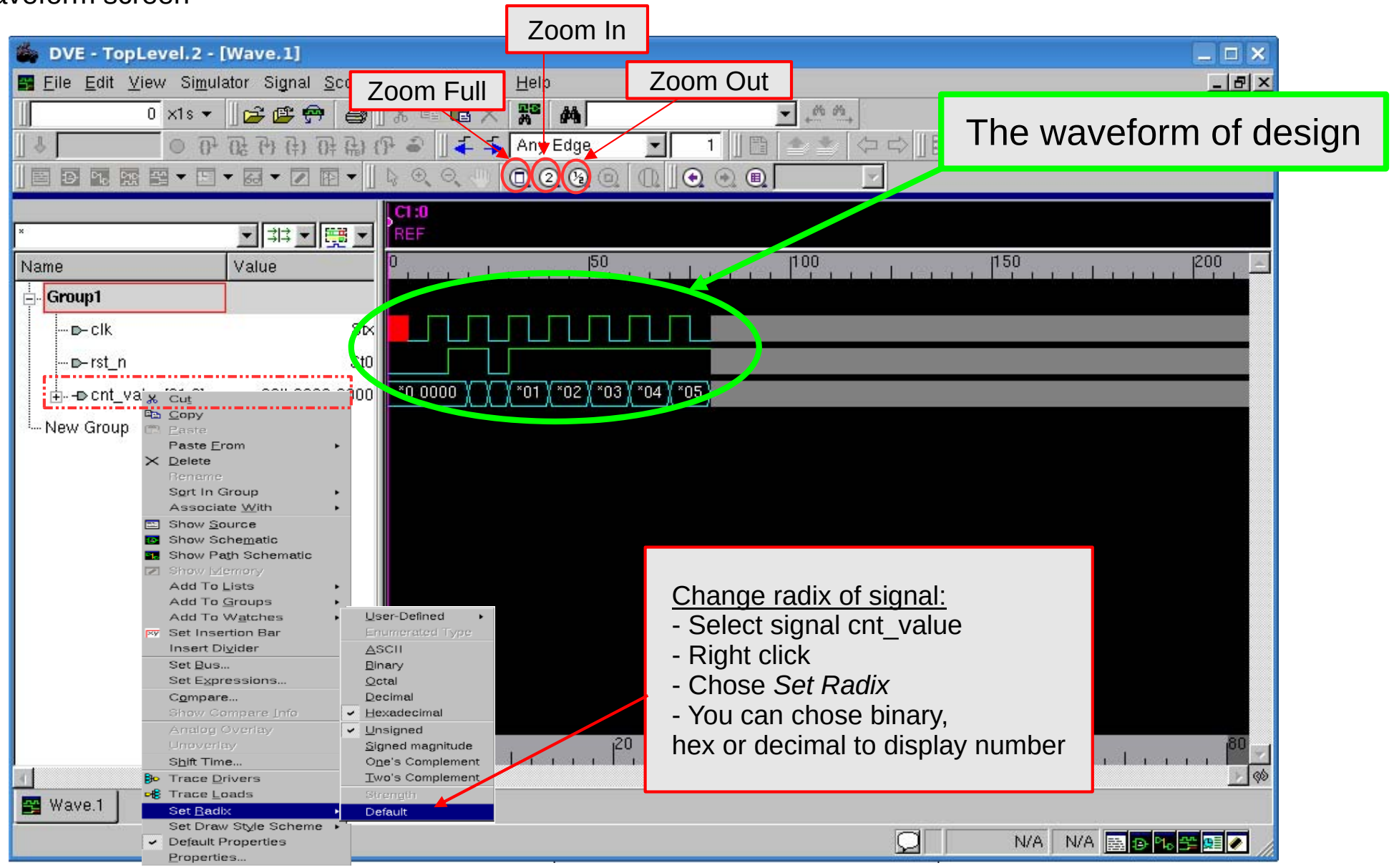
Exercise 3. Using DVE (4/5)

Open wave form screen.



Exercise 3. Using DVE (5/5)

Using waveform screen



Using VCS with LSF (1/2)

Open connection in client machine (this step is used to display GUI later)
(This step must be done when user is in the local machine (user PC))

$ xhost +

Check to see your machine IP
(eth0 inet addr: 172.29.xxx.xx)

$ /sbin/ifconfig

Connect to LSF login server (Password here is Linux machine)

$ ssh lsf-login11

Set LSF environment

$ source /common/lsftool/RBS/dotfiles/lsf_cshrc

Set LSF configuration

$ setenv LSF_PROJECT SV

Set command so result will be returned from server to client machine. (This step must be done when user is in the server)

$ setenv DISPLAY [your machine IP]:0.0

Ex: ***$ setenv DISPLAY 172.29.143.88:0.0***

Using VCS with LSF (2/2)

Set environment for VCS

```
$ source /common/appl/Env/Synopsys/vcs-mx_vD-2009.12-4
```

Run VCS

```
$ bs vcs counter.v
```

or

```
$ bs simv
```

or

```
$ bs vcs -R counter.v
```

or

```
$ bs vcs -R -debug_pp counter.v
```

Run DVE

```
$ bs dve
```

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