

Verilog Lab 1

Prof. Shih-Chieh Chang



Outline

- Workstation setting: MobaXterm
- Project



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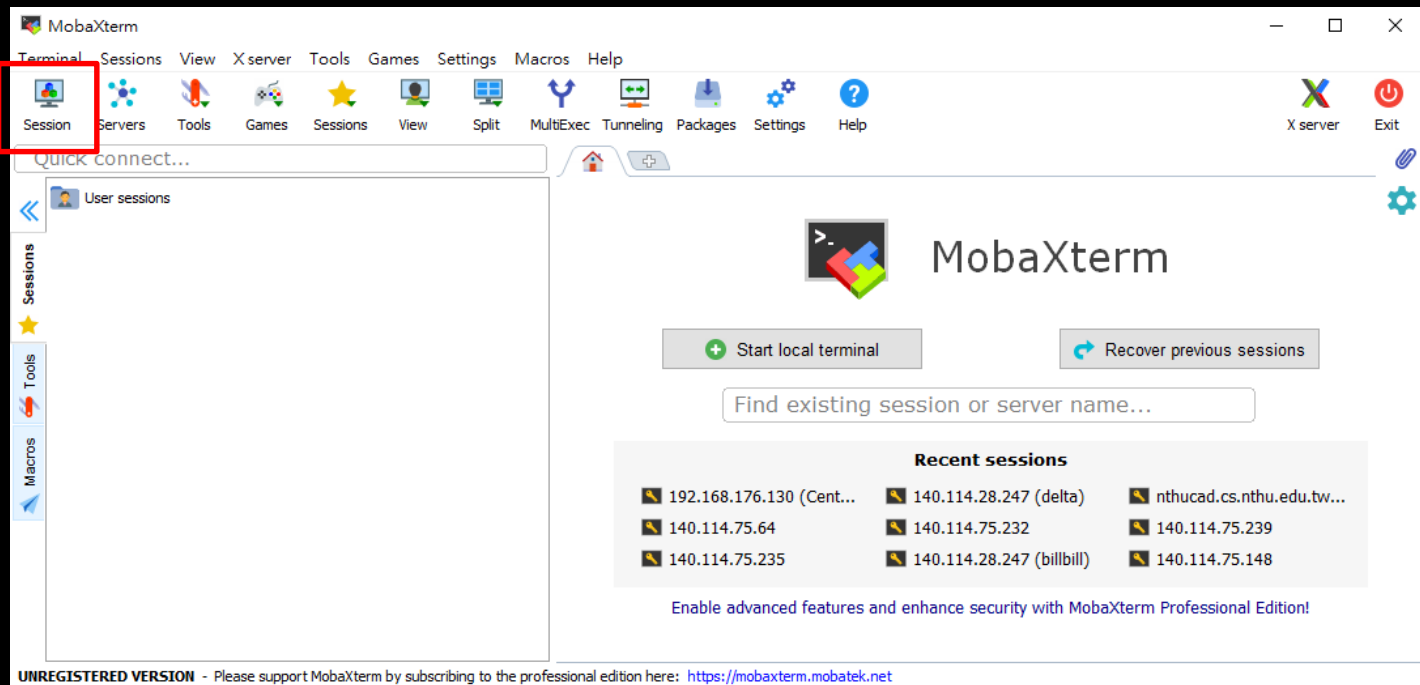


MobaXterm Download

- ▣ Download the free version of MobaXterm
 - <https://mobaxterm.mobatek.net/download-home-edition.html>



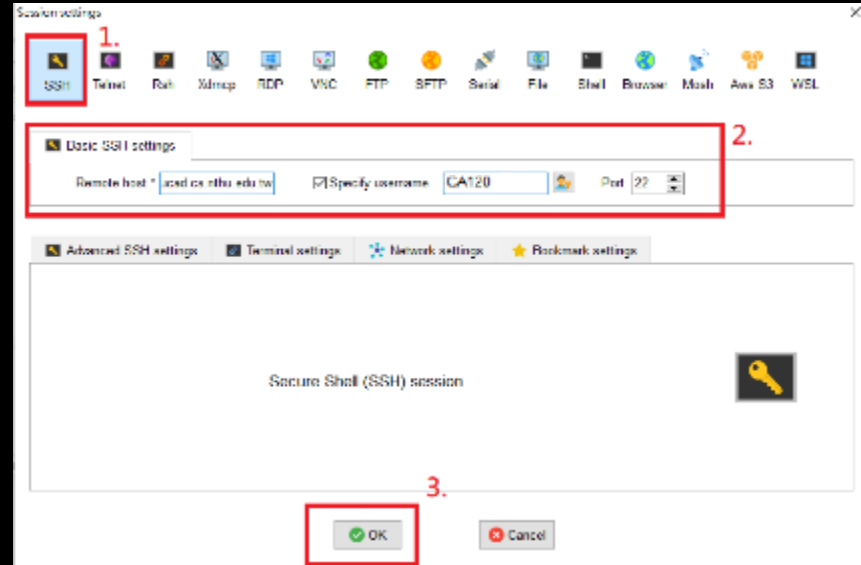
Workstation Setup



Workstation Setup (Cont.)

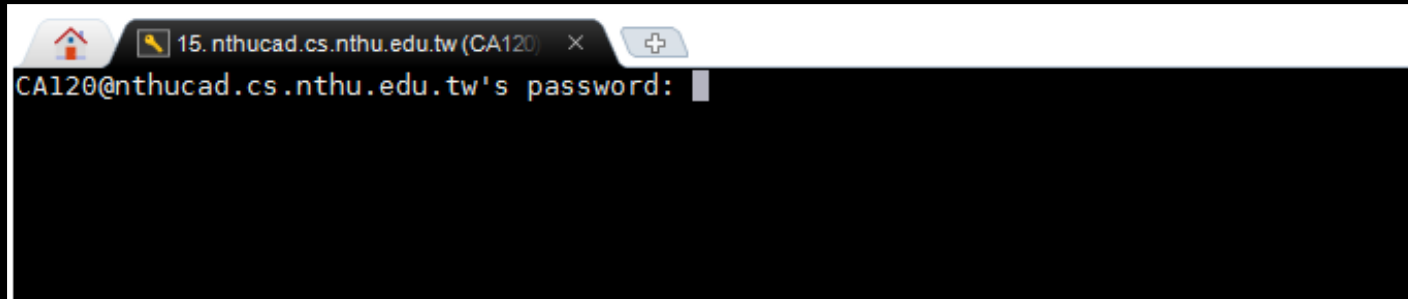
- Enter the following blank
 - Remote host: nthucad.cs.nthu.edu.tw
 - Specify username: (your account)
 - Port: 22

- Click “OK”



Login at the First Time

- Key in your initial password from e mail



Change your Password

- Type “passwd” to change your password

```
-----users---load average-----users---load average---
ic5  (l): 0   0.01, 0.04, 0.05  ||  ic18 (D): 0   -----
ic19 (D): 0   -----          ||  ic21 (l): 1   0.13, 0.11, 0.04
ic22 (l): 1   0.01, 0.04, 0.00  ||  ic23 (l): 1   0.14, 0.08, 0.02
ic24 (l): 1   0.05, 0.08, 0.03  ||  ic25 (l): 0   0.06, 0.03, 0.01
ic26 (l): 0   0.00, 0.00, 0.00  ||  ic27 (l): 1   0.16, 0.19, 0.09
ic28 (l): 1   0.06, 0.09, 0.04  ||  ic29 (D): 0   -----
ic30 (l): 0   0.08, 0.09, 0.02  ||  ic52 (l): 0   0.00, 0.00, 0.00
ic53 (l): 0   0.00, 0.00, 0.00  ||  ic54 (l): 3   0.00, 0.00, 0.00
ic56 (l): 1   0.00, 0.00, 0.00  ||  ic57 (l): 2   0.00, 0.00, 0.00
ic58 (l): 4   1.64, 1.80, 2.10  ||
last updated: Tue Mar 13 16:55:01 CST 2018
(l) Linux, (s) SunOS, (D) Shutdown

----- You have 3 process(es) before login -----
UID      PID  PPID  C  STIME TTY      TIME CMD
CA120    5548 5543  0 16:55 ?        00:00:00 sshd: CA120@notty
CA120    5550 5548  0 16:55 ?        00:00:00 tcsh -c /usr/libexec/openssh/sftp-server
CA120    5565 5550  0 16:55 ?        00:00:00 /usr/libexec/openssh/sftp-server

[CA120@nthucad ~]$ passwd
Changing password for user CA120.
Changing password for CA120
(current) UNIX password:
New UNIX password:
Retype new UNIX password:
passwd: all authentication tokens updated successfully.
[CA120@nthucad ~]$
```



Connecting to Workstation

- Find a workstation with less users

```
-----users---load average-----users---load average---
ic21 (l): 5    0.02, 0.04, 0.00    ||    ic22 (l): 2    0.02, 0.03, 0.00
ic23 (l): 3    0.31, 0.44, 0.36    ||    ic26 (l): 4    0.00, 0.02, 0.00
ic27 (D): 0    ----, ----, ----    ||    ic29 (D): 0    ----, ----, ----
ic30 (l): 0    2.30, 2.18, 2.07    ||    ic52 (D): 0    ----, ----, ----
ic53 (l): 0    0.00, 0.02, 0.00    ||    ic55 (l): 5    0.23, 0.13, 0.10
ic56 (D): 0    ----, ----, ----    ||    ic57 (l): 10   1.00, 1.00, 1.00
ic58 (l): 2    0.00, 0.00, 0.00    ||
last updated: Tue Apr 13 11:38:01 CST 2021
(l) Linux, (s) SunOS, (D) Shutdown
```



Connecting to Workstation (Cont.)

- Connect to a work station
 - `ssh -X icXX` (XX should be 21~58)



Connecting to Workstation (Cont.)

```
[CA120@nthucad ~]$ ssh -X ic26
The authenticity of host 'ic26 (192.168.75.56)' can't be established.
RSA key fingerprint is d5:5b:44:76:cc:40:6d:fa:d6:bc:4e:d1:10:c9:2d:5b.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'ic26,192.168.75.56' (RSA) to the list of known hosts.
CA120@ic26's password:
Last login: Tue Mar 22 00:17:44 2016 from nthucad.cs.nthu.edu.tw
-----users---load average-----users---load average---
ic5 (l): 0 0.00, 0.01, 0.05 || ic18 (D): 0 -----
ic19 (D): 0 ----- || ic21 (l): 1 0.16, 0.06, 0.01
ic22 (l): 1 0.05, 0.03, 0.00 || ic23 (l): 1 0.06, 0.04, 0.01
ic24 (l): 1 0.01, 0.05, 0.01 || ic25 (l): 1 0.03, 0.04, 0.00
ic26 (l): 0 0.00, 0.00, 0.00 || ic27 (l): 1 0.07, 0.06, 0.06
ic28 (l): 0 0.00, 0.03, 0.01 || ic29 (D): 0 -----
ic30 (l): 0 0.00, 0.00, 0.00 || ic52 (l): 0 0.00, 0.00, 0.00
ic53 (l): 0 0.00, 0.00, 0.00 || ic54 (l): 3 0.00, 0.00, 0.00
ic56 (l): 1 0.00, 0.00, 0.00 || ic57 (l): 2 0.00, 0.00, 0.00
ic58 (l): 4 1.81, 1.70, 1.84 ||
last updated: Tue Mar 13 17:08:01 CST 2018
(l) Linux, (s) SunOS, (D) Shutdown

-----NTHU CS VLSI/CAD News-----
.For gcc 4.8.5 on centos 5 or gcc 4.9.3 on centos 6, use command
"source /tools/linux/gnu/setup_toolkit.csh".
.For loading information, use command "lab_uptime".
.For platform information, use command "lab_plat".
.For apply new account, please fill this sheet:
https://goo.gl/ym7Qt5
.If you have any problem, please contact us:
az55000055@gmail.com
Synopsys licenses have set!
Cadence license have set!
[CA120@ic26 ~]$
```

Should be [XXXXX@icXX ~]\$ if connect successfully



Create directory

- Right click to create new directory “example”
or by command line “mkdir example”



Create directory

The screenshot displays the MobaXterm interface with an SSH session to `nthucad.cs.nthu.edu.tw`. The left sidebar shows the file explorer for the path `/users/student/mr109/cichung20/`. A red box labeled '1.' highlights the 'New directory' option in the sidebar. The main terminal window shows the SSH session details and a large ASCII art logo for 'NTHU VLSI/CAD'. A second red box labeled '2.' highlights a 'MobaXterm' dialog box that prompts the user to 'Please enter the new directory name' with an input field containing 'example' and 'OK'/'Cancel' buttons.

1. Parent directory
New directory
New empty file
Refresh current folder
Upload to current folder

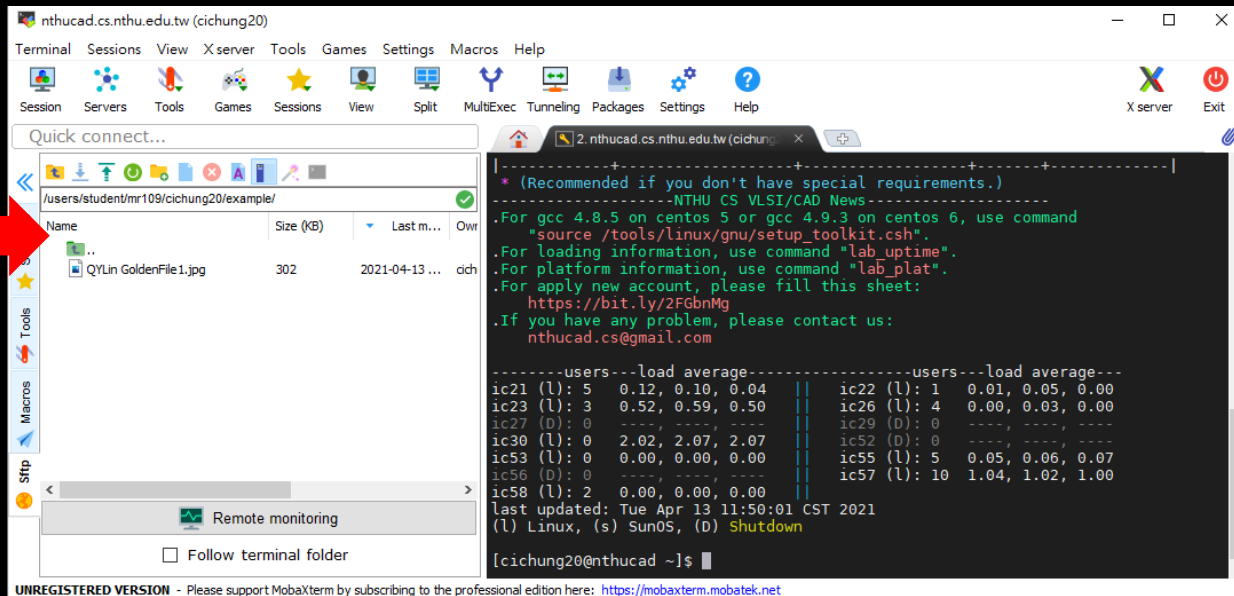
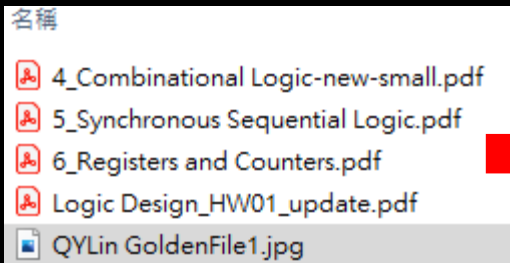
2. MobaXterm
Please enter the new directory name
example
OK Cancel

UNREGISTERED VERSION - Please support MobaXterm by subscribing to the professional edition here: <https://mobaxterm.mobatek.net>



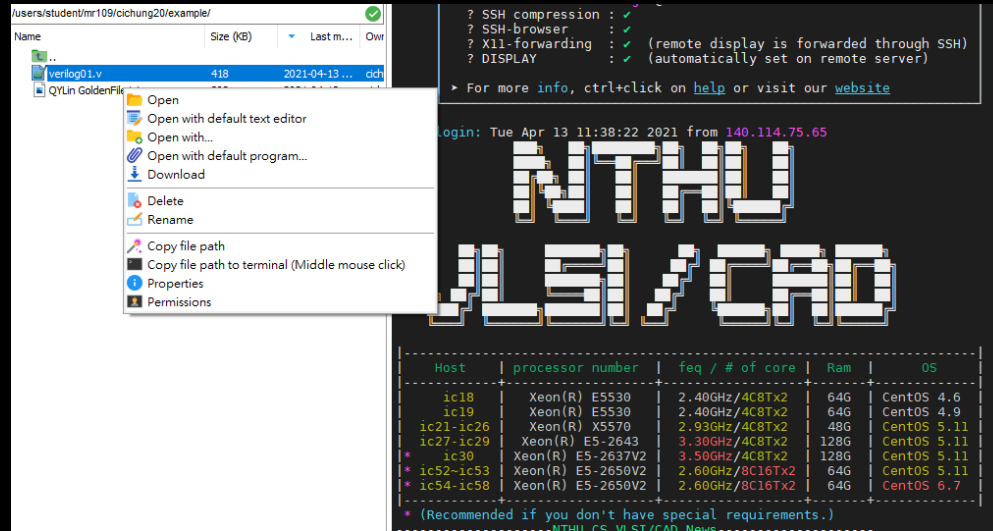
Uploading Files

- Upload files
 - Upload your files by dragging them in to directory



Edit files in workstation

- ❑ Right click open with mobaXterm's editor
- ❑ Vim is available in workstation
- ❑ You can also edit in Windows then upload it



The screenshot displays a workstation interface with three main components:

- File Manager:** Shows a directory listing for `/users/student/mr109/cichung20/example/`. The file `verilog01.v` is selected, and a context menu is open with options like "Open", "Open with default text editor", "Download", "Delete", "Rename", "Copy file path", "Copy file path to terminal", "Properties", and "Permissions".
- Terminal Window:** Displays SSH connection status (SSH compression, SSH-browser, X11-forwarding, DISPLAY) and a login prompt for `Tue Apr 13 11:38:22 2021 from 140.114.75.65`. Below the prompt is the NTHU VLSI/CAD logo.
- System Information Table:** A table listing host details, including processor, frequency, core count, RAM, and OS version.

Host	processor number	freq / # of core	Ram	OS
ic18	Xeon(R) E5530	2.40GHz/4C8Tx2	64G	CentOS 4.6
ic19	Xeon(R) E5530	2.40GHz/4C8Tx2	64G	CentOS 4.9
ic21-ic26	Xeon(R) X5570	2.93GHz/4C8Tx2	48G	CentOS 5.11
ic27-ic29	Xeon(R) E5-2643	3.30GHz/4C8Tx2	128G	CentOS 5.11
ic30	Xeon(R) E5-2637V2	3.50GHz/4C8Tx2	128G	CentOS 5.11
* ic52-ic53	Xeon(R) E5-2650V2	2.60GHz/8C16Tx2	64G	CentOS 5.11
* ic54-ic58	Xeon(R) E5-2650V2	2.60GHz/8C16Tx2	64G	CentOS 6.7

* (Recommended if you don't have special requirements.)

NTHU CS VLSI/CAD News requirements...



Run simulation

- Use NC verilog as standard simulation platform
- You can use any IDE/Editor to program



Run simulation (Cont.)

- ▣ \$ ncverilog all.v file you need
 - i.e. \$ ncverilog Test_Bench.v Simulator.v



Run simulation (Cont.)

```
[cychen21@ic51 ~/temp]$ ncverilog test_t.v test.v
ncverilog: 15.20-s039: (c) Copyright 1995-2017 Cadence Design Systems, Inc.
Loading snapshot worklib.ripple_carry_adder_tb:v ..... Done
*Verdi* Loading libsscore_ius152.so
ncsim> source /usr/cad/cadence/INCISIV/cur/tools/inca/files/ncsimrc
ncsim> run
ncsim: *W,DVEXACC: some objects excluded from $dumpvars due to access restrictions, use +access
nd line for access to all objects.
      File: ./test_t.v, line = 273, pos = 10
      Scope: ripple_carry_adder_tb
      Time: 0 FS + 0

      0: 0000 + 0000 = 0000, 0 ,signed_overflow=0 ,unsigned_overflow=0
     10: 0000 + 0001 = 0001, 0 ,signed_overflow=0 ,unsigned_overflow=0
     20: 0000 + 0010 = 0010, 0 ,signed_overflow=0 ,unsigned_overflow=0
     30: 0000 + 0011 = 0011, 0 ,signed_overflow=0 ,unsigned_overflow=0
     40: 0000 + 0100 = 0100, 0 ,signed_overflow=0 ,unsigned_overflow=0
     50: 0000 + 0101 = 0101, 0 ,signed_overflow=0 ,unsigned_overflow=0
     60: 0000 + 0110 = 0110, 0 ,signed_overflow=0 ,unsigned_overflow=0
     70: 0000 + 0111 = 0111. 0 .sianed_overflow=0 .unsianed_overflow=0
```

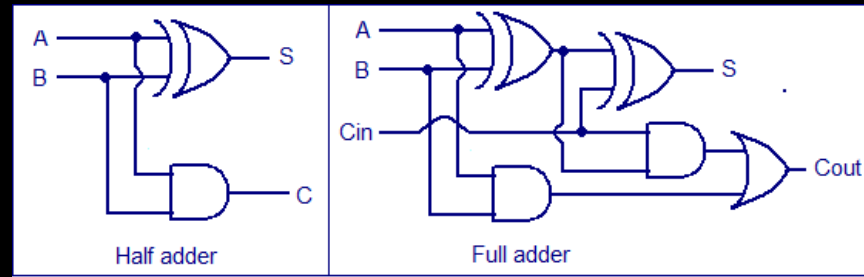
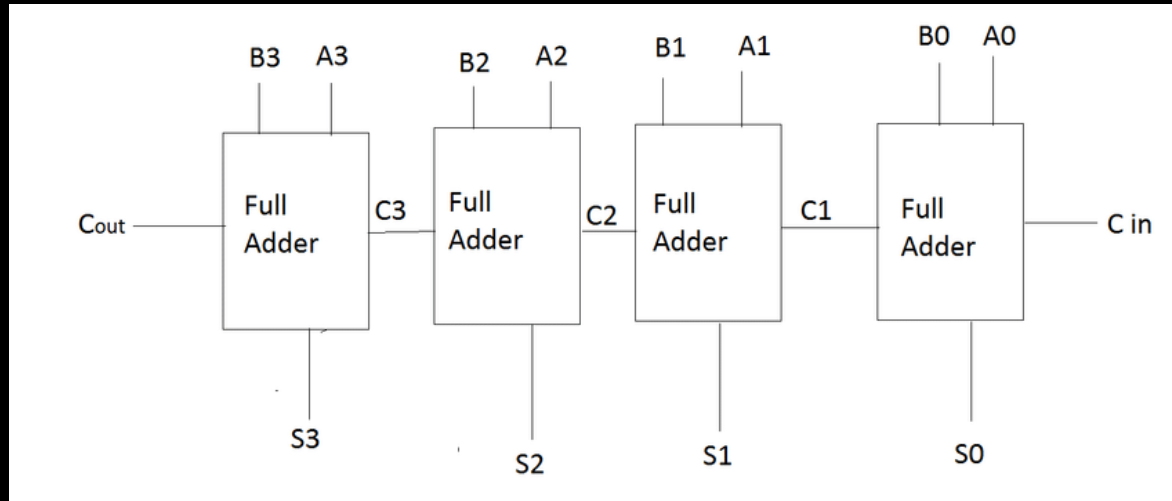


Outline

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4 bit Ripple Carry Adder



Rules

- $A_3A_2A_1A_0$, $B_3B_2B_1B_0$ are unsigned numbers
- Only basic logic gates are ALLOWED (and, or, nand, nor, not) ,no xor & xnor
- Please **AVOID** using
 1. Continuous assignment and conditional operators
 2. Behavioral operators (e.g., +, -, &, |, ^, &&, !, ~....., etc.)
 3. Behavioral operators are ALLOWED in your TESTBENCH
- Edit your own testbench



Please Follow The Format Below

```
module Ripple_Carry_Adder (in0, in1, out,cout,s_overflow,u_overflow);  
input [4-1:0] in0;  
input [4-1:0] in1;  
output [4-1:0] out;  
output cout;  
output s_overflow;  
output u_overflow;  
// here is your design  
  
endmodule
```



Submission

- Lab 1 code submission due date & time: 2022/04/07,11:59pm
- Please submit your Verilog codes to eeclass
 - Lab1_YourStudentID_Codes.v
- We will test your codes by our own testbench

