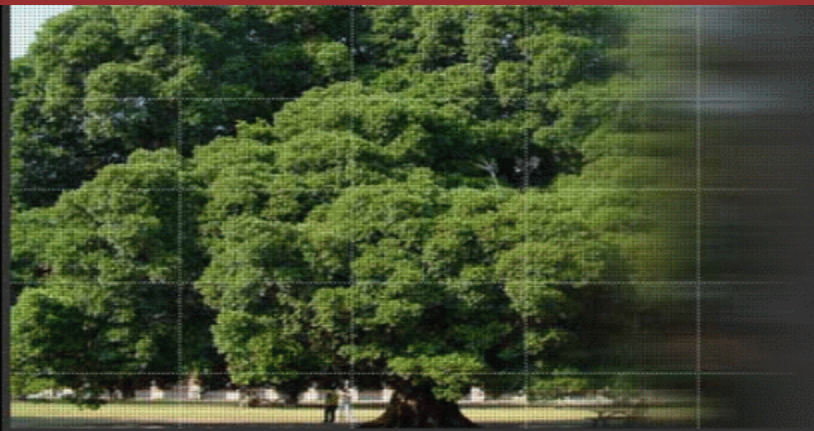




National Cheng Kung University



數位IC設計 Tool安裝&作業模擬教學

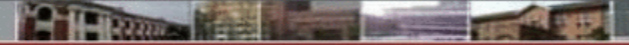
NCKU CSIE DICLAB

The simulation process

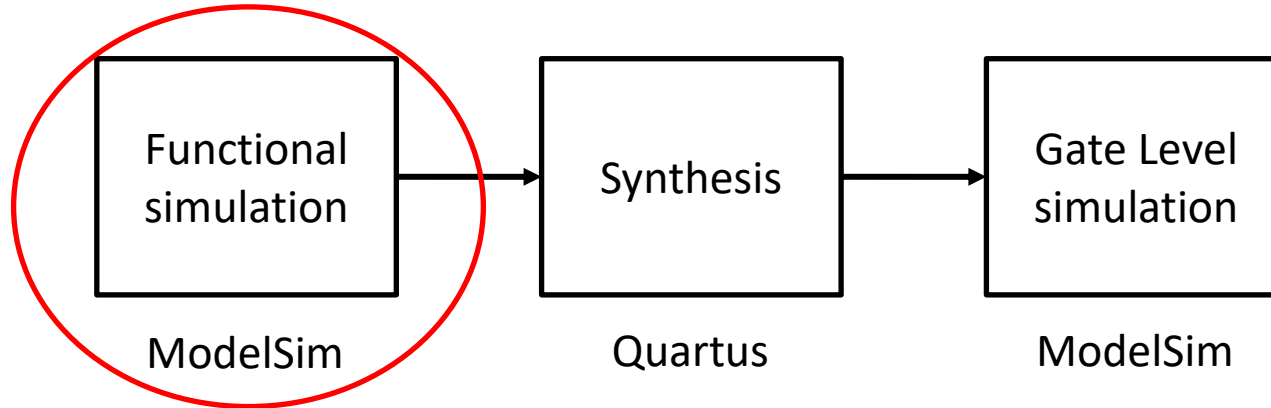


成功大學

COPYRIGHT 2002 NATIONAL CHENG KUNG UNIVERSITY



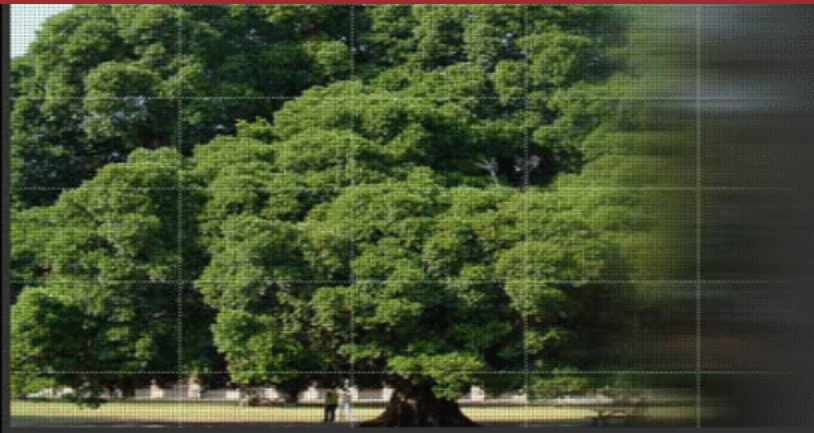
- ▶ The simulation process and the necessary tools in this class



- ▶ The tools can be downloaded from :
 - ▷ <https://www.intel.com/content/www/us/en/software/programmable/quartus-prime/download.html#>



National Cheng Kung University



Download and install Modelsim

Download and install Modelsim



► Step 1: Register and sign in

Click here to create an account and sign in

The screenshot shows the Intel Quartus Prime Software website. At the top, the Intel logo is on the left, and navigation links for PRODUCTS, SUPPORT, SOLUTIONS, DEVELOPERS, and PARTNERS are in the center. On the right, there is a user icon circled in red, a globe icon with 'USA (ENGLISH)', and a search bar labeled 'Search Intel.com'. Below the navigation bar, a breadcrumb trail reads: Intel® Products / Intel® FPGA, SoC FPGA and CPLD / Intel® FPGA Development Tools / Intel® Quartus® Prime Software. The main content area has a dark blue background with the text 'Intel® Quartus® Prime Software' and 'The intuitive high-performance design environment.' Below this are three links: 'Quick-Start for Intel® Quartus® Prime Pro Edition Software', 'Intel® Quartus® Prime Pro Edition User Guide: Getting Started', and 'Download Intel® Quartus® Prime Software Brochure'. On the right side of this section is an image of the Quartus Prime Design Software box. At the bottom of the main content area is a horizontal menu with 'Overview', 'Features', 'What's New', 'Downloads' (which is highlighted), and 'Videos'. Below the main content area, the text 'Download Intel® Quartus® Prime Software' is followed by 'Three Intel® Quartus® Prime editions to meet your system design requirements'.



成功大學

COPYRIGHT 2002 NATIONAL CHENG KUNG UNIVERSITY

Download and install Modelsim

- Step 2: Click “Download for Windows(free, no license required)”

[Overview](#) [Features](#) [What's New](#) [Downloads](#) [Videos](#)

Download Intel® Quartus® Prime Software

Three Intel® Quartus® Prime editions to meet your system design requirements

Pro Edition

The Intel® Quartus® Prime Pro Edition Software supports the advanced features in Intel's next-generation FPGAs and SoCs with the Intel® Agilex™, Intel® Stratix® 10, Intel® Arria® 10, and Intel® Cyclone® 10 GX device families.

Cyclone 10 GX devices supported for free in Intel Quartus Prime Pro Software Edition.

Download for Windows (paid license required)

Download for Linux (paid license required)

Standard Edition

The Intel® Quartus® Prime Standard Edition software includes extensive support for earlier device families in addition to the Intel® Cyclone® 10 LP device family.

Download for Windows (paid license required)

Download for Linux (paid license required)

Lite Edition

The Intel® Quartus® Prime Lite Edition software supports Intel's low-cost FPGA device families.

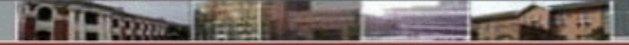
Refer to [Features](#) to review all devices supported by the Free Quartus Prime Software Lite Edition.

Download for Windows (free, no license required)

Download for Linux (free, no license required)

Click Here

Download and install Modelsim



► Step 3: Select software version (20.1.1)

Intel® Quartus® Prime Lite Edition Design Software Version 20.1.1 for Windows

ID	Date	Version	Select version 20.1.1
660907	11/22/2020	20.1.1	▼

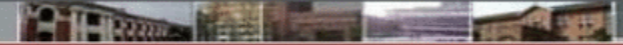
A newer version of this software is available, which includes functional and security updates. Customers should [click here](#) to update to the latest version.

Users should upgrade to the latest version of the Intel® Quartus® Prime Design Software. The selected version does not include the latest functional and security updates. If you must use this version of software, follow the [technical recommendations](#) to help improve security. For critical support requests, please contact our [support team](#).



成功大學

COPYRIGHT 2002 NATIONAL CHENG KUNG UNIVERSITY



Download and install Modelsim

► Step 4: Download Modelsim setup execution file

Downloads

1. Click the 'Individual Files' tab

Multiple Download

Individual Files

Additional Software

Copyright Licensed Source

Intel® Quartus® Software

ModelSim-Intel® FPGA Edition (includes Starter Edition)

2. Download Modelsim

Download

ModelSimSetup-20.1.1.720-windows.exe

Size: 1.2 GB

SHA1: d484e4c7882fca584a9b0243cbbd74953a4aeb25

Intel® Quartus® Prime (includes Nios® II EDS)

Download

QuartusLiteSetup-20.1.1.720-windows.exe

Size: 1.6 GB

SHA1: 5edd76cafa2a6a40077bc3eeed5bdc95cacdc8

** Nios® II EDS on Windows requires Ubuntu 18.04 LTS on Windows Subsystem for Linux (WSL), which requires a manual installation.

** Nios® II EDS requires you to install an Eclipse IDE manually.

Download and install Modelsim

► Step 5: Installation

The screenshot shows a Windows File Explorer window with the address bar set to 'DIC'. The ribbon includes '檔案' (File), '常用' (Home), '共用' (Share), '檢視' (View), '管理' (Manage), and '應用程式工具' (App Tools). The '管理' tab is active, showing options like '釘選到 [快速存取]' (Pin to QuickTime), '複製' (Copy), '貼上' (Paste), '剪下' (Cut), '複製路徑' (Copy path), '貼上捷徑' (Paste shortcut), '移至' (Move to), '複製到' (Copy to), '刪除' (Delete), '重新命名' (Rename), '新增資料夾' (New folder), '新增項目' (New item), '輕鬆存取' (QuickTime), '內容' (Content), '開啟' (Open), '編輯' (Edit), '歷程記錄' (History), '全選' (Select all), '全部不選' (Deselect all), and '反向選擇' (Inverse selection).

The left sidebar shows the navigation pane with '快速存取' (QuickTime) selected, and other options like 'OneDrive', '本機' (This PC), '3D 物件' (3D objects), '下載' (Downloads), and '文件' (Files).

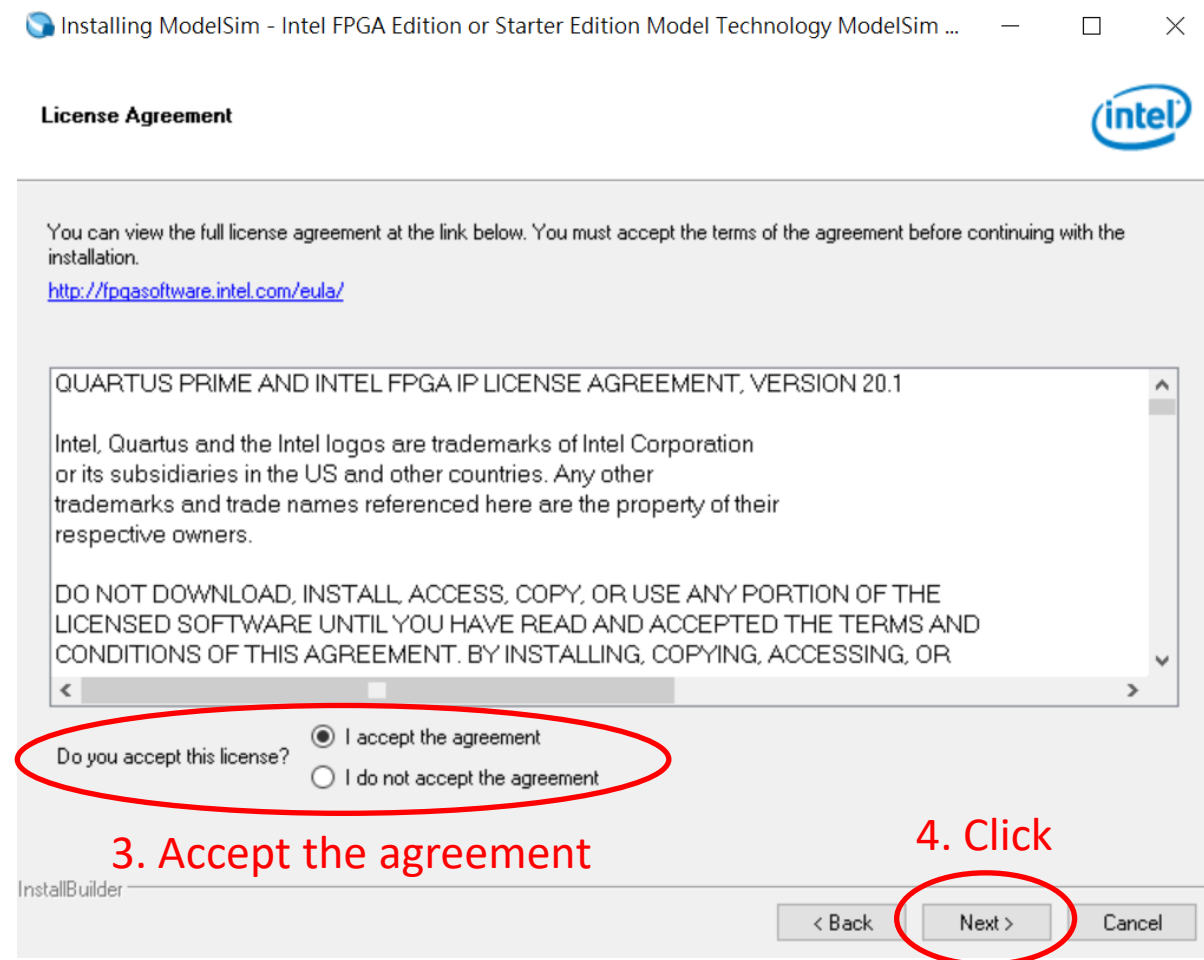
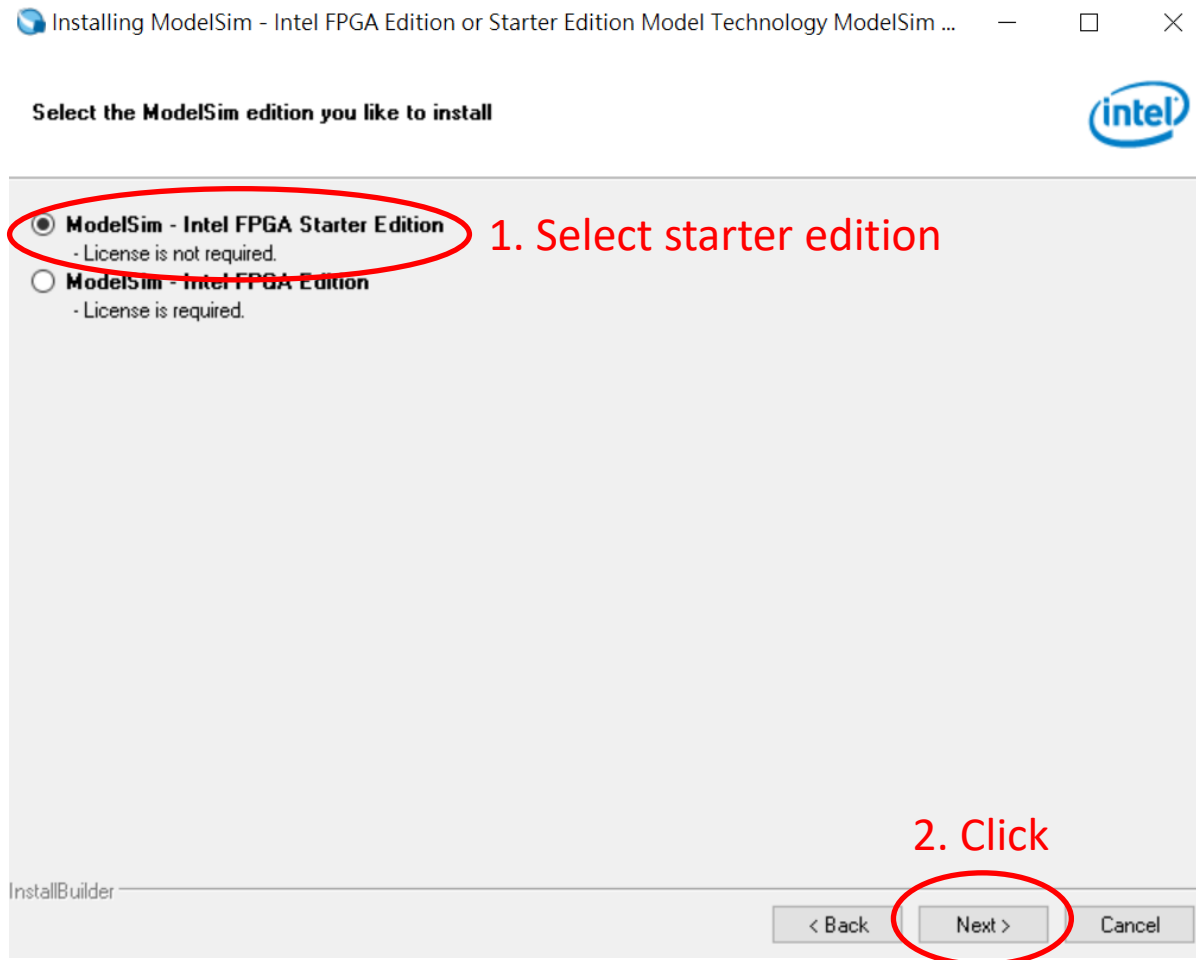
The main area displays a table of files in the 'DIC' folder:

名稱	修改日期	類型	大小
ModelSimSetup-20.1.1.720-windows	2023/3/7 上午 02:37	應用程式	1,216,151 KB

Download and install Modelsim



► Step 5: Installation



Download and install Modelsim



► Step 5: Installation

Installing ModelSim - Intel FPGA Edition or Starter Edition Model Technology ModelSim ...

Installation Directory



Specify the directory where ModelSim - Intel FPGA Starter Edition 20.1.1.720 will be installed

Installation Directory C:\intelFPGA\20.1

1. Set installation path

2. Click

< Back Next > Cancel

Installing ModelSim - Intel FPGA Edition or Starter Edition Model Technology ModelSim ...

Ready to Install



Summary:

Installation directory: C:\intelFPGA\20.1
Required disk space: 4340 MB
Available disk space: 353553 MB

3. Check available disk space

4. Click

< Back Next > Cancel



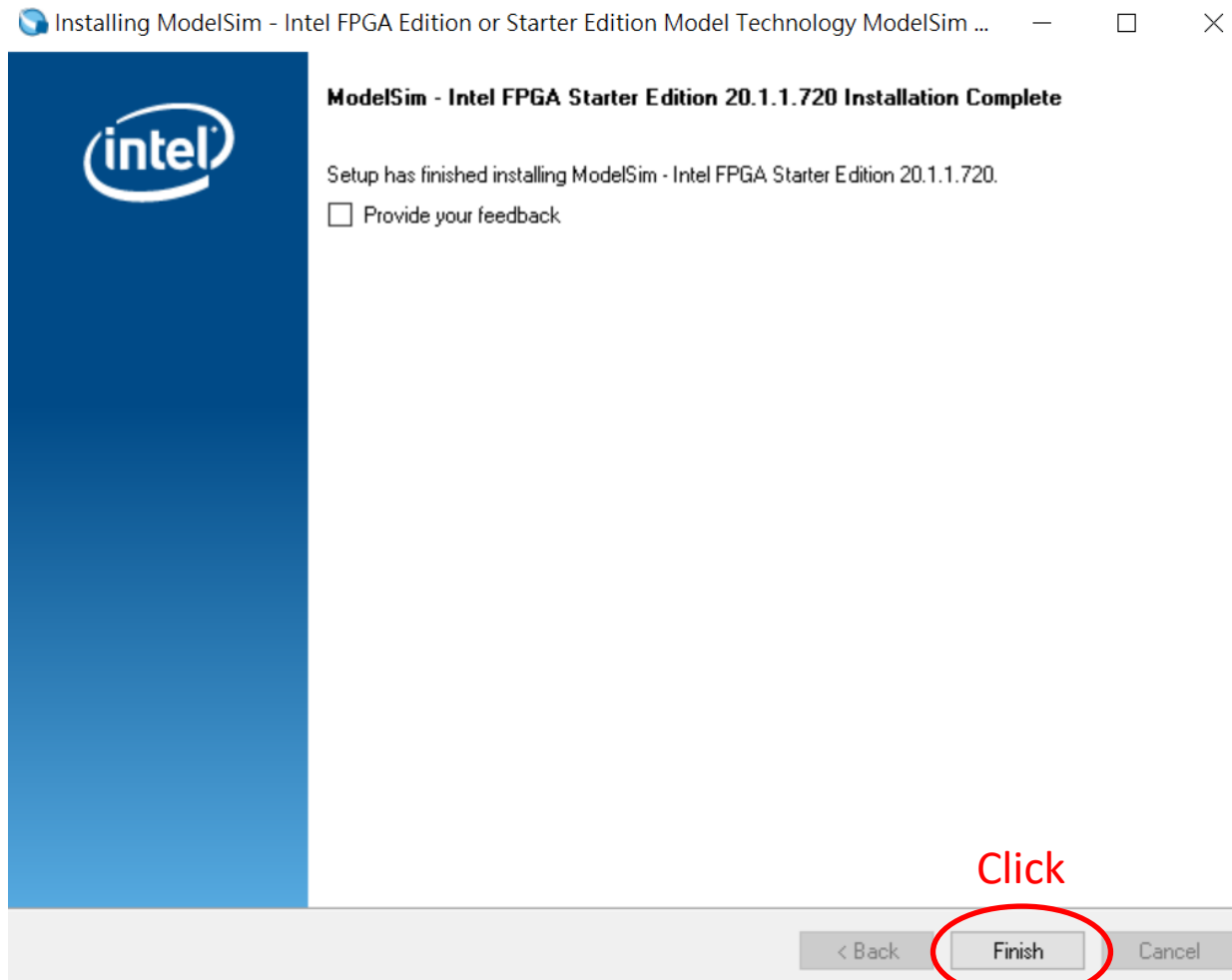
成功大學

COPYRIGHT 2002 NATIONAL CHENG KUNG UNIVERSITY



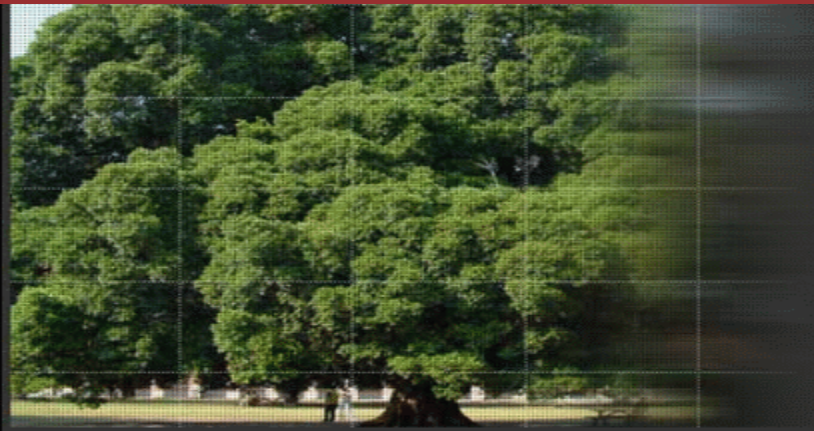
Download and install Modelsim

► Step 5: Installation

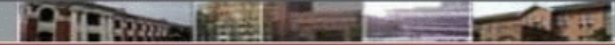




National Cheng Kung University



Functional Simulation by ModelSim

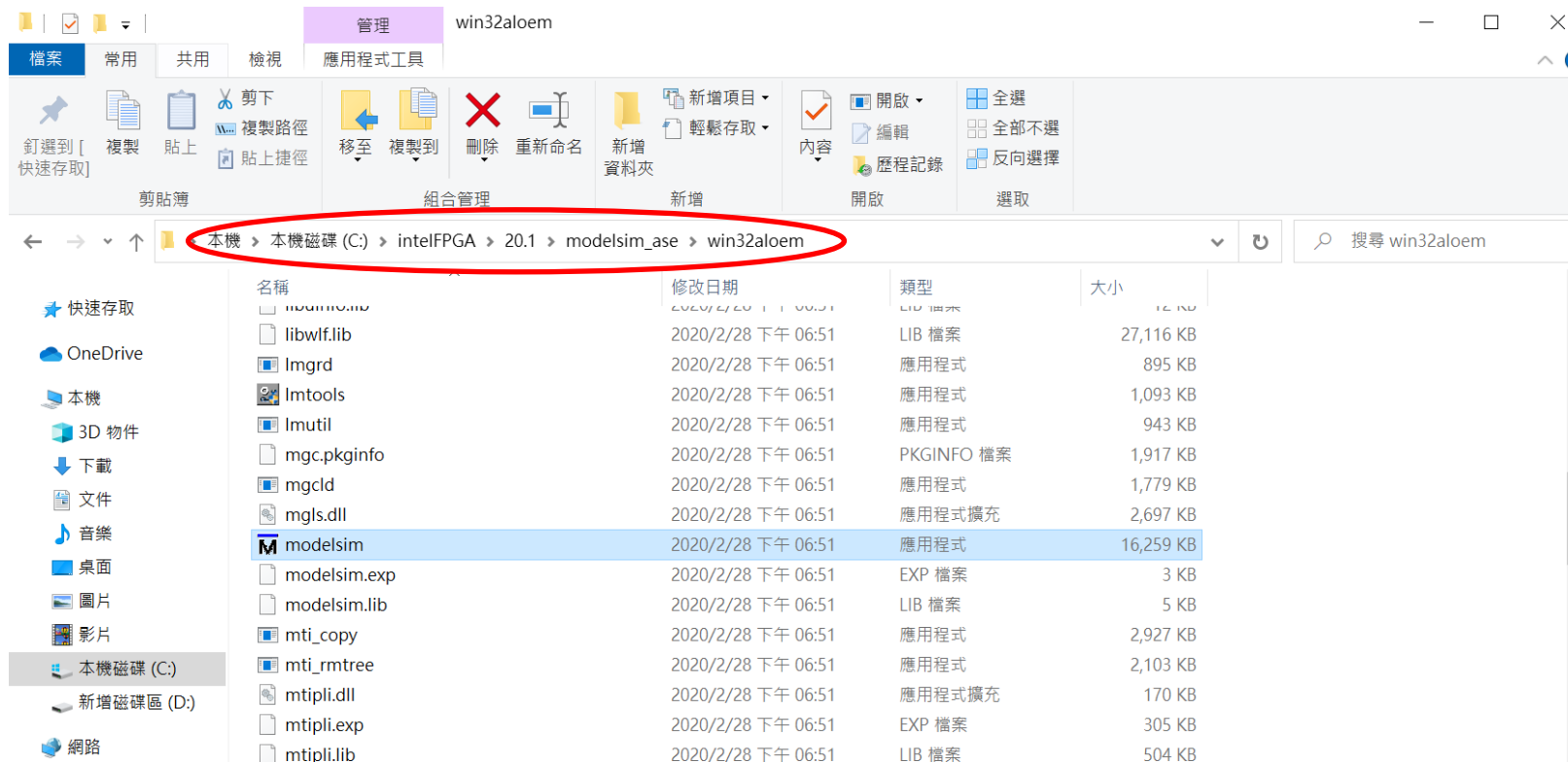


Functional Simulation by ModelSim

► Step 1: Run modelsim.exe

▷ Your installation path

- Ex: C:\intelFPGA\20.1\modelsim_ase\win32aloem\modelsim.exe



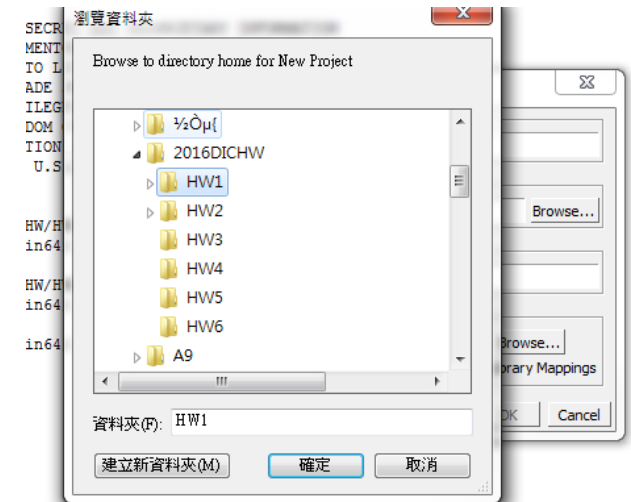
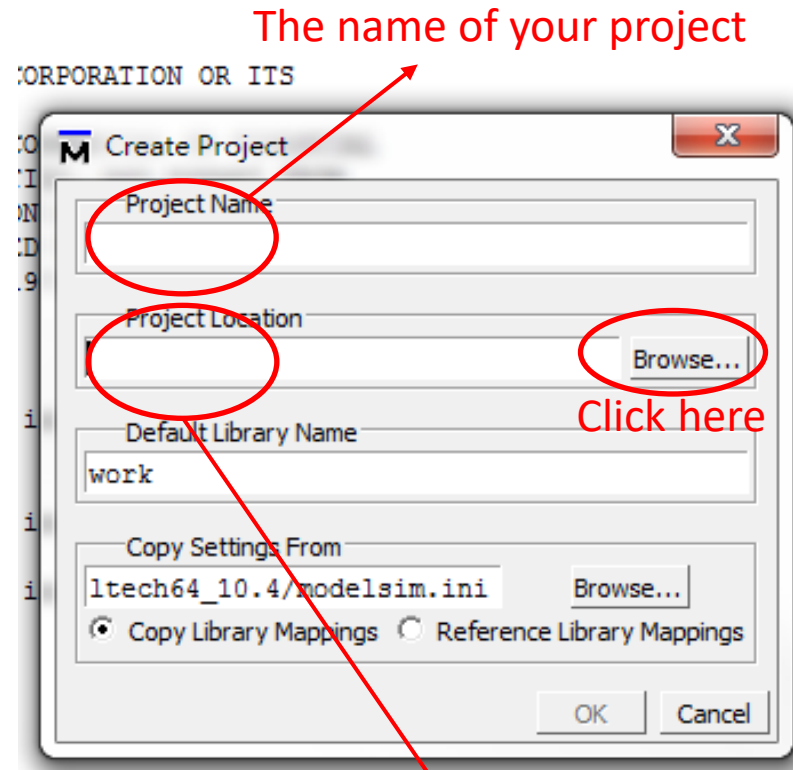
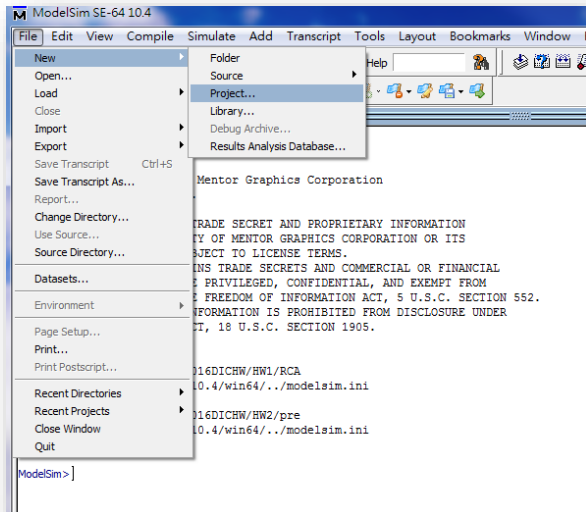
Functional Simulation by ModelSim



► Step 2: Create a new project

▷ File -> New -> Project

▷ Click “Browse...”



The file path should be ALL ENGLISH

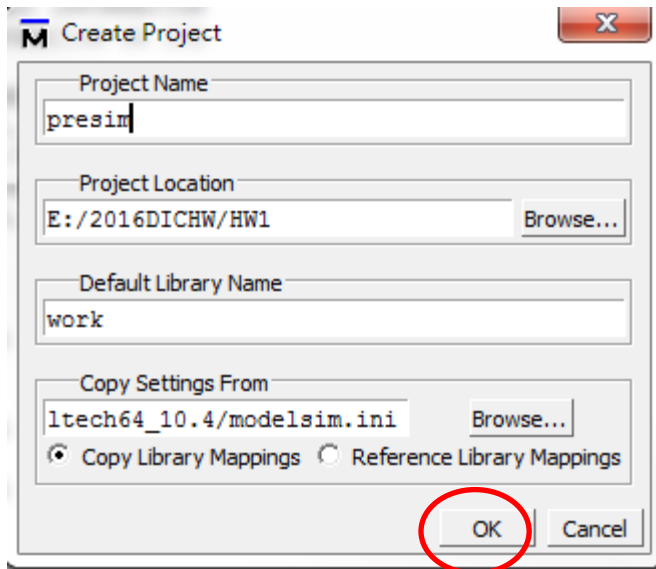
Functional Simulation by ModelSim



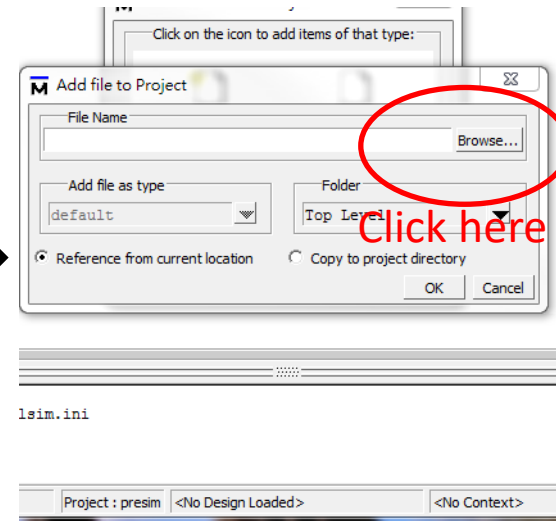
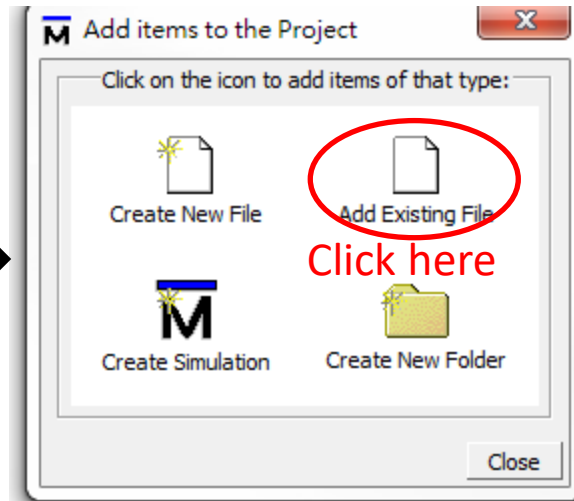
► Step 2: Add the files

▷ Select all the .v files including the testbench

- Verilog code could be stored in any location , “add existing file” would refer to the file location automatically .
- Remember to put the test data and golden data at the same directory of the testbench file.



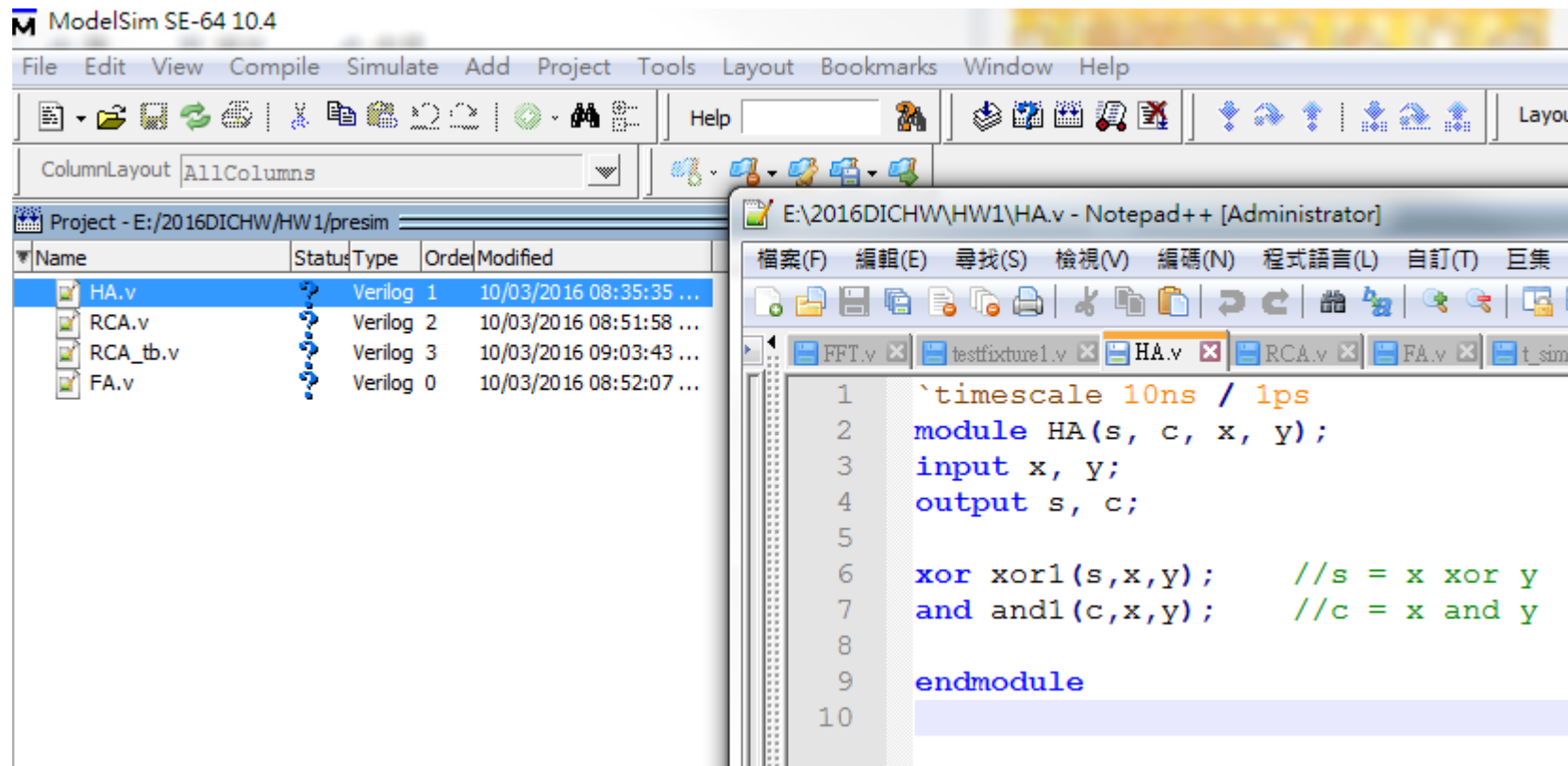
Click here





Functional Simulation by ModelSim

► Step 3 : Start coding...

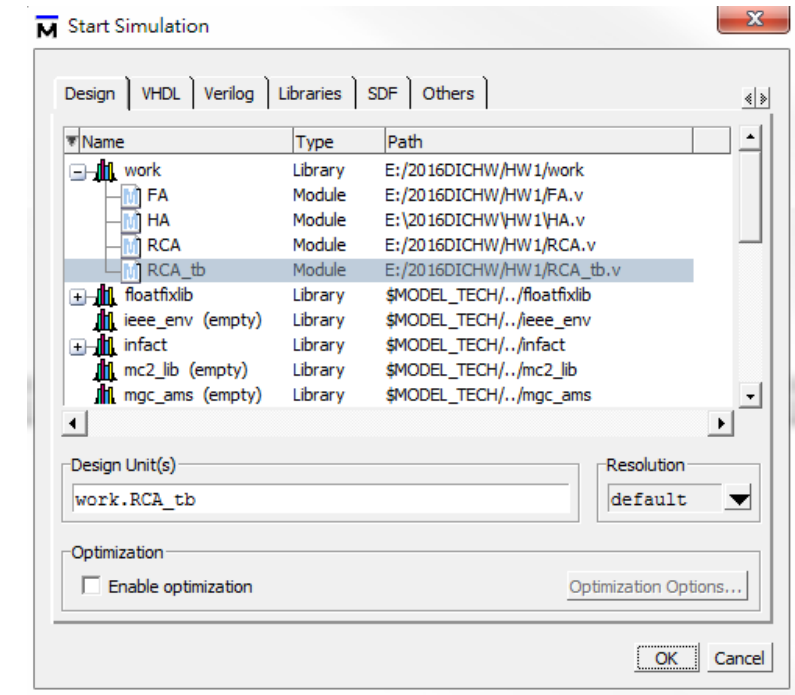
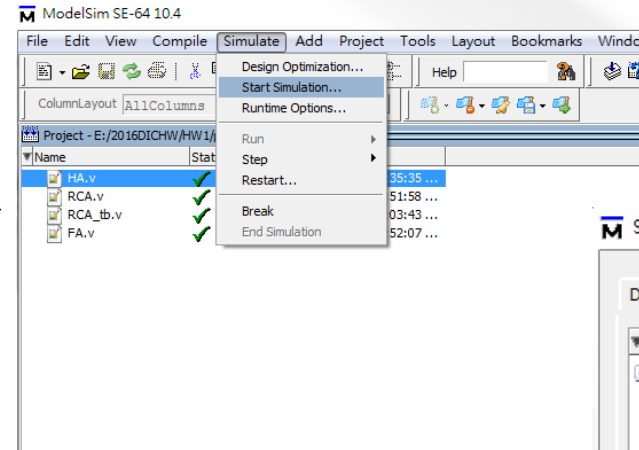
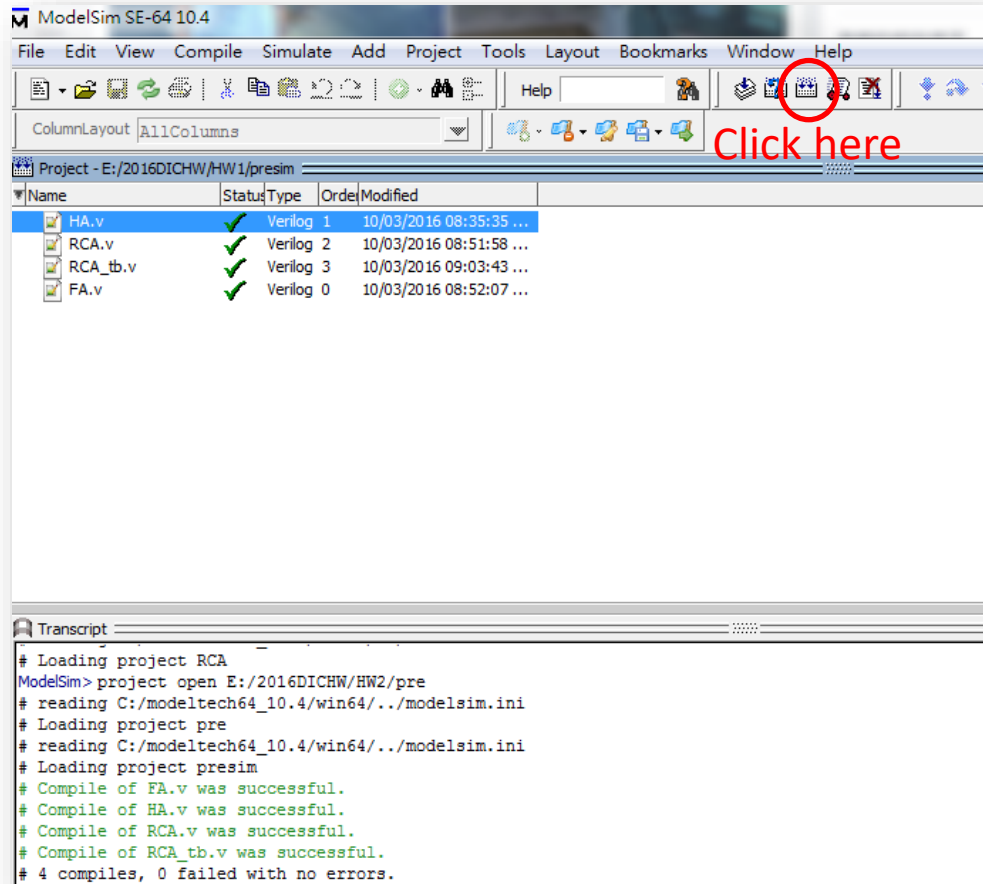


Functional Simulation by ModelSim

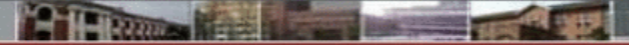


► Step 4: Compile & Start simulation

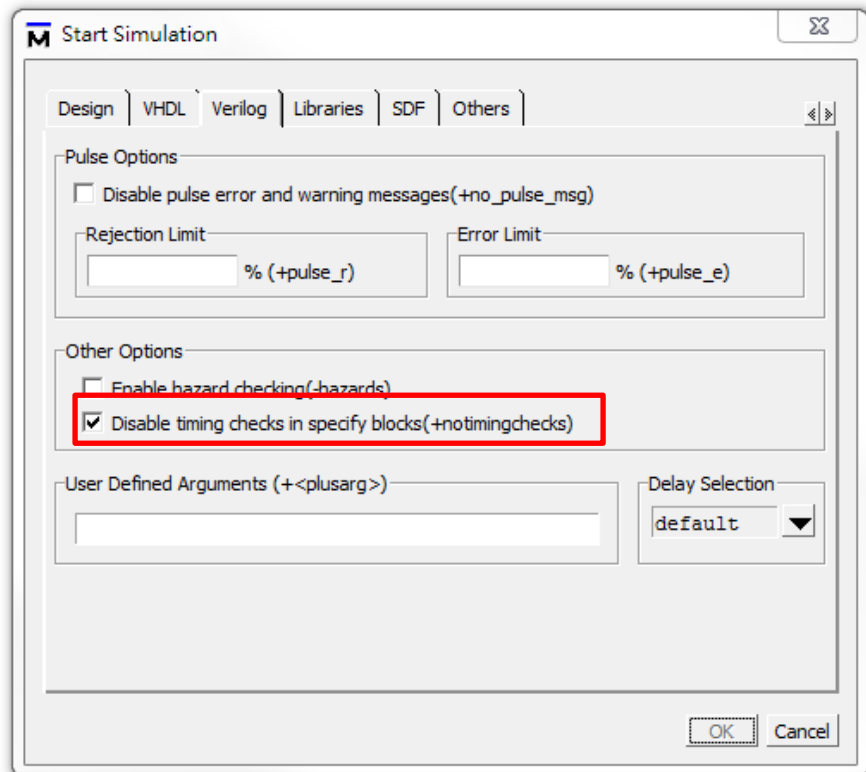
▷ Compile -> Simulate -> Start Simulation->work->testbench file



Functional Simulation by ModelSim



- ▶ Step 4: Start simulation
 - ▷ Check +notimingchecks



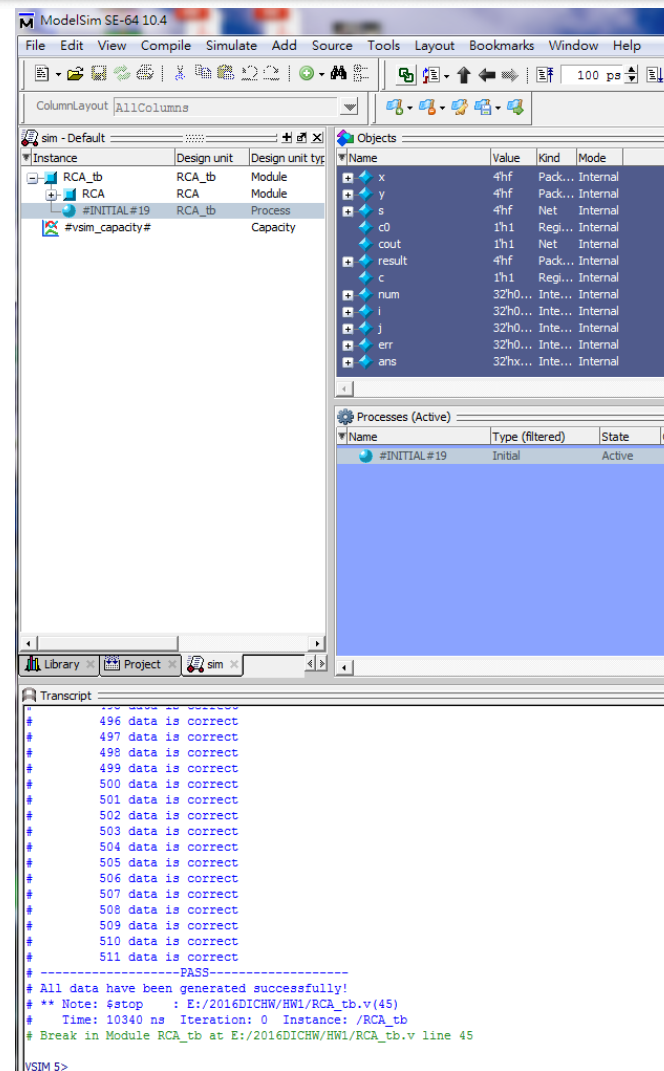
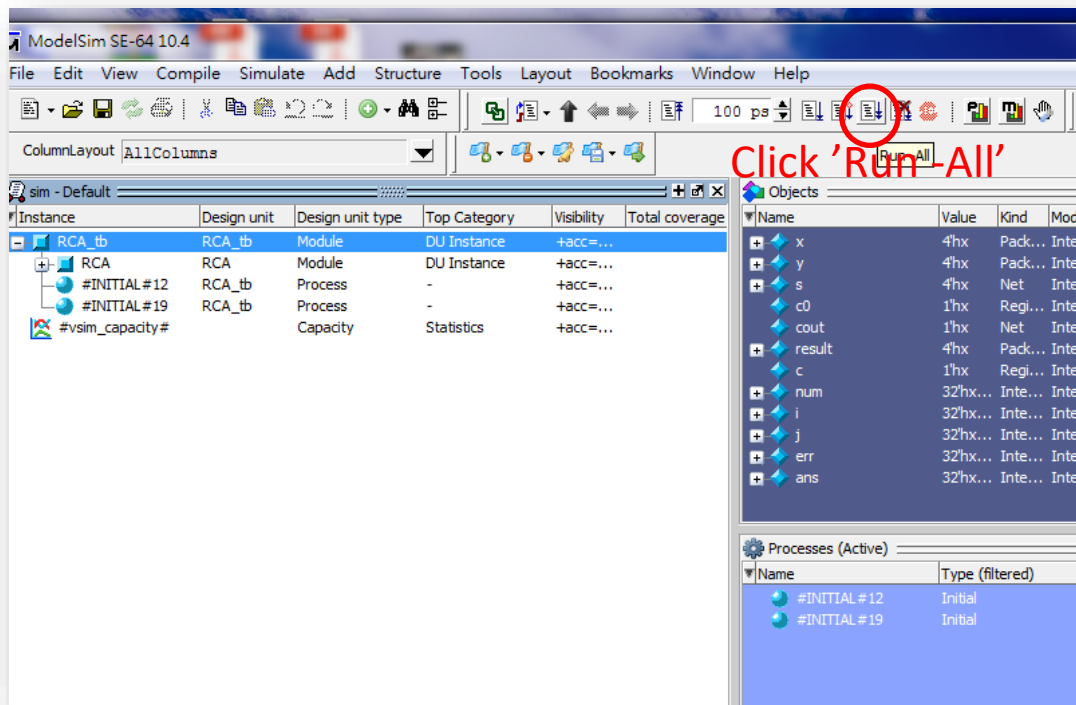


成功大學

COPYRIGHT 2002 NATIONAL CHENG KUNG UNIVERSITY

Functional Simulation by ModelSim

► Step 5 : Simulation



Click '否(N)'

*If you click '是(Y)',
Modelsim will be closed

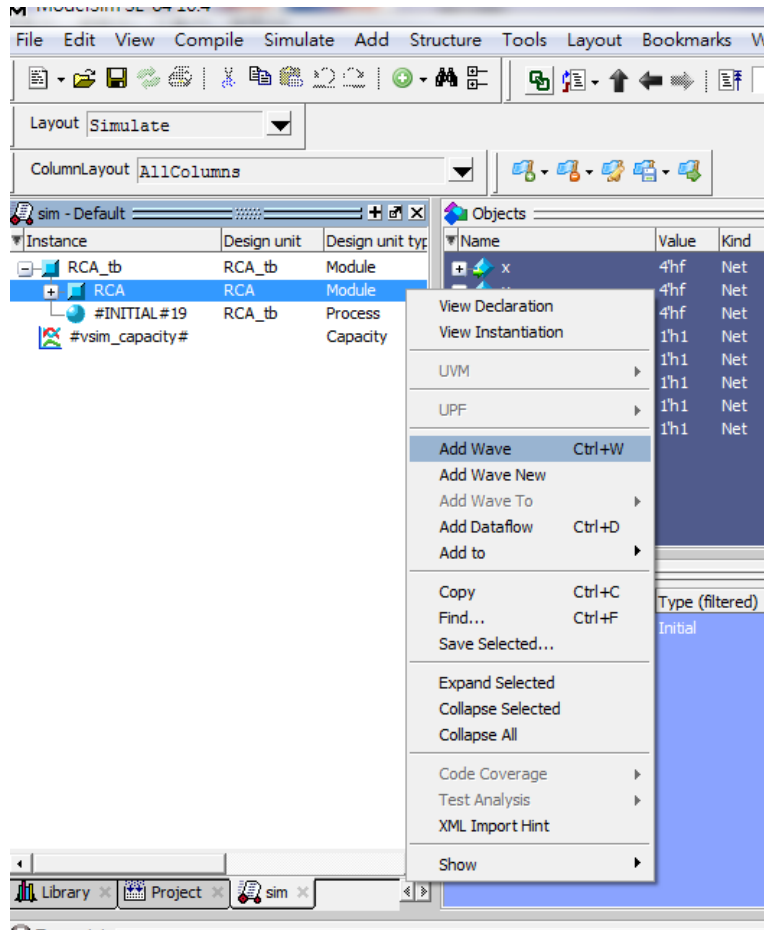
Functional Simulation by ModelSim



成功大學

COPYRIGHT 2002 NATIONAL CHENG KUNG UNIVERSITY

► Step 6 : Show waveform



You have to "restart" before a new simulation

