Hardware Functional Verification
COEN413/COEN6541

QuestaSIM Demo

Concordia University

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Outline:

1. Prerequisite
2. QuestaSIM Access
   - Window User
   - MAC OS User
   - Linux User
3. Concordia Remote Desktop Connection Set-Up
4. QuestaSIM Simulation

Prerequisite

- **ENCS User Account:** All students within Gina Cody School of Engineering and Computer Science are given an ENCS user account.
  - If you are a first-time user, please submit request to IT service Desk or email to help@concordia.ca to get access.
  - If you don’t remember your password, contact IT service Desk (link) or email to help@concordia.ca to get new password.

- **ENCS Account Storage:** Make sure you have storage space in your ENCS account. You can check it using your ENCS account. https://fis.encs.concordia.ca/helpdesk-cgi/quota.cgi

- **QuestaSIM License:** All students enrolled in COEN413/COEN6541 are authorized to use the QuestaSIM, licensed by CMC Microsystems.

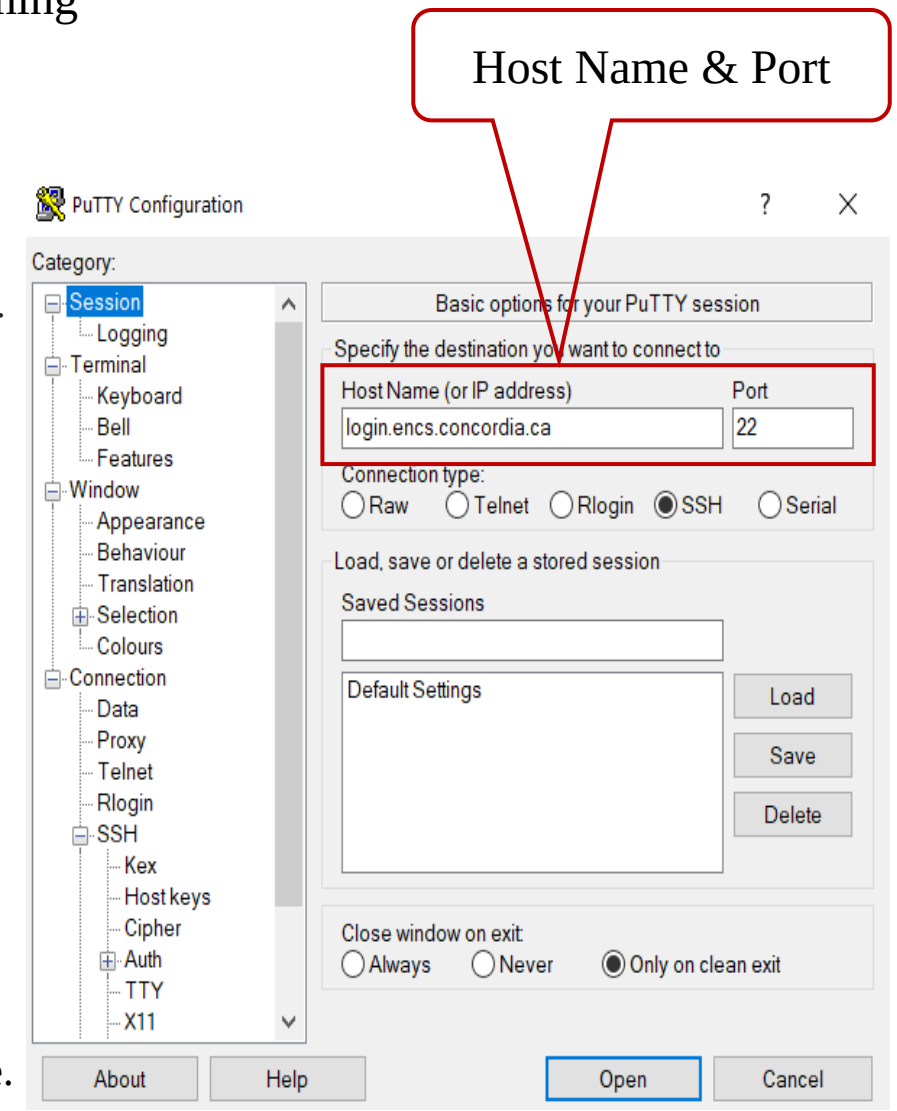
QuestaSIM Access – Windows

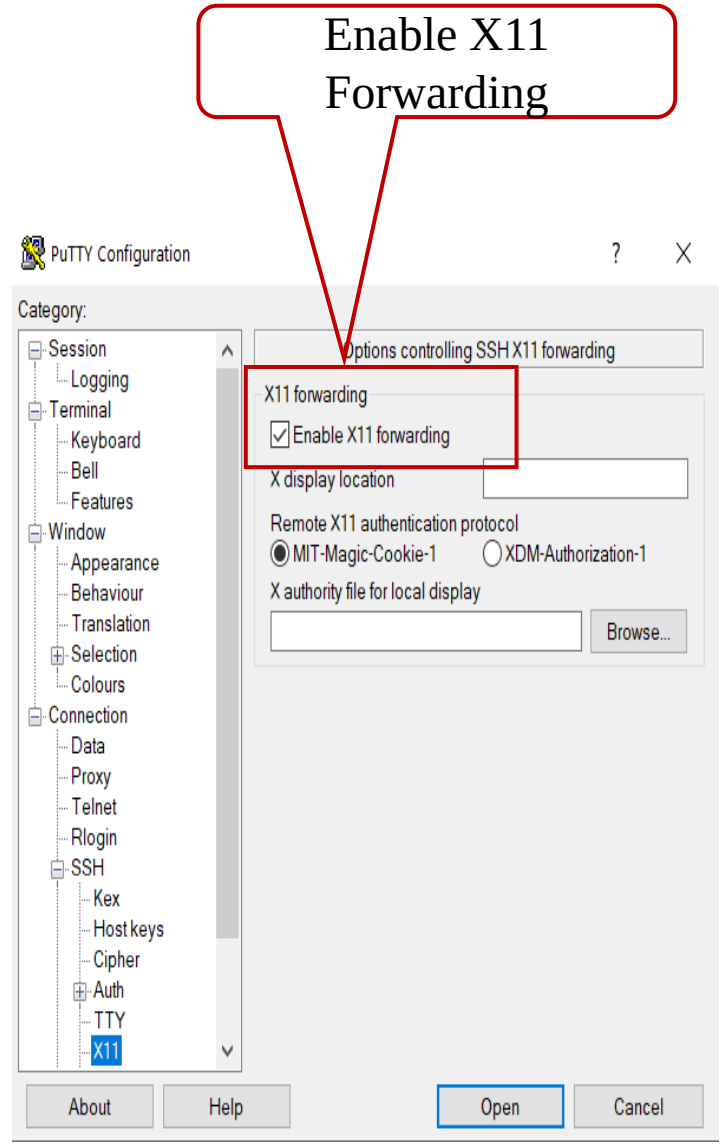
Install:

- SSH Software : Putty
- X11 Forwarding software: Xming

Steps to connect ENCS server:

- As of Dec. 19, 2022, the use of Forticlient VPN software is required for all remote connections (ie. Putty) to a University server.
- Run Xming software in the background.
- Launch Putty
- Enter Host name and port number:
  - Host: login.encs.concordia.ca
  - Port: 22
- Enable X11 Forwarding: You can find it in putty console.
  - Connection > SSH >> X11 >> Enable X11 Forwarding
- Click “Open”: It will launch window console.

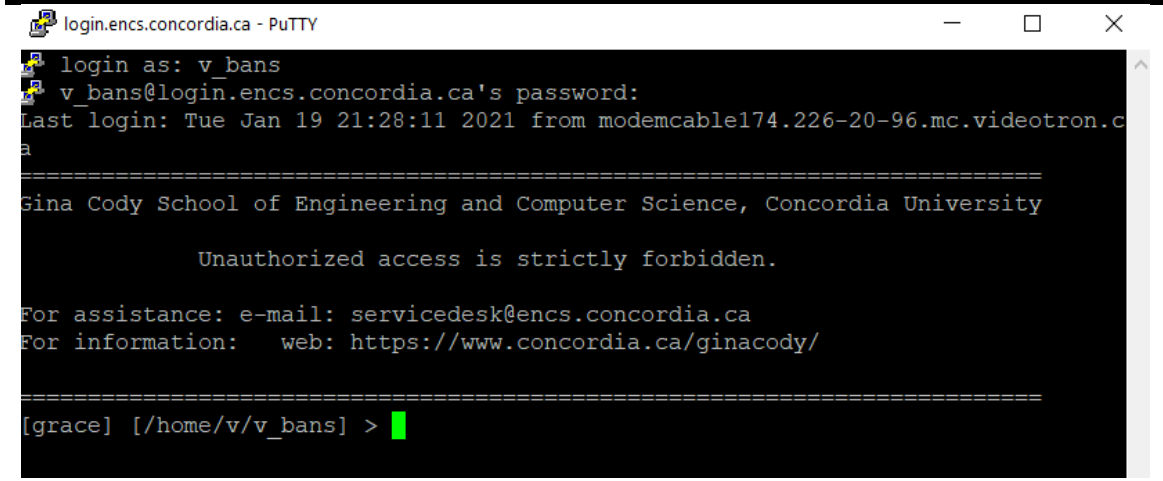




QuestaSIM Access – Windows (Continue)

Steps to connect ENCS account:

- Enter your ENCS User name & press enter
- Enter your ENCS password & press enter



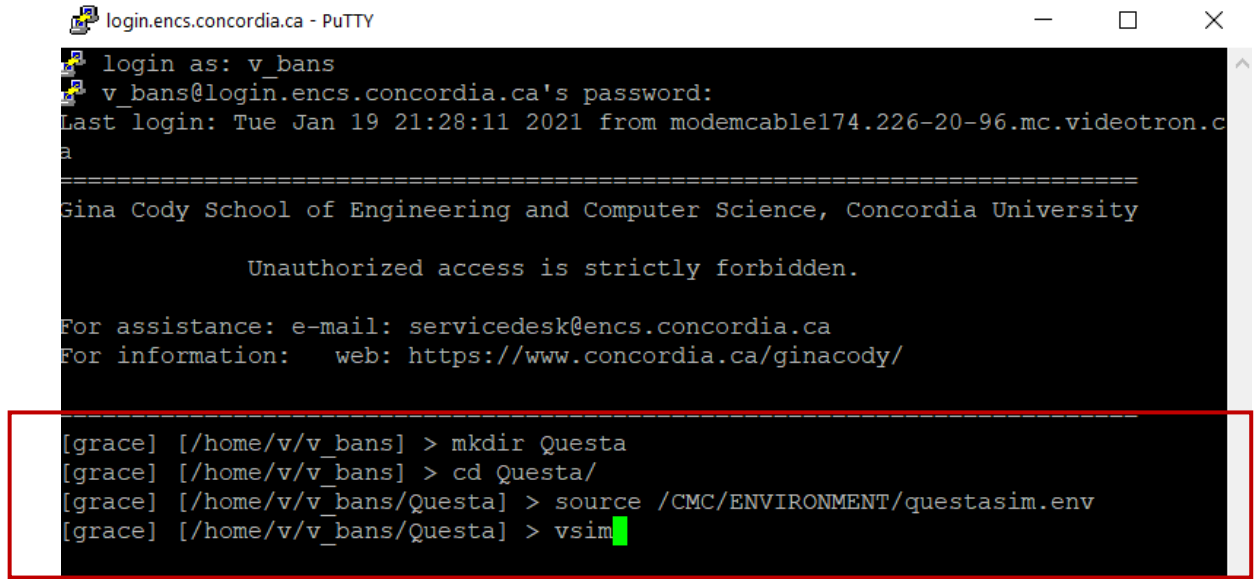
Steps to Launch QuestaSIM:

- **Step 1:** Create a directory called Questa: **mkdir Questa**
  - Go to that directory: **cd Questa**
- **Step 2:** Set up Questa Environment
  - **source /CMC/ENVIRONMENT/questasim.env**
  - **vsim**

QuestaSIM Tool will be launched using Graphical User Interface

Note: Make sure that **Xming** is running in background. Otherwise, we will get display error.

Command Line window



QuestaSIM Access – MAC OS

Download

- X11 Forwarding software: XQuartz

Steps to connect ENCS server:

- Run XQuartz in the background.
- Open Xterm from XQuartz
- To connect SSH Server:
  - ssh -X encs_user_name@encs.concordia.ca
- Enter your ENCS user-name & password

Steps to Launch QuestaSIM:

- **Step 1:** Create a directory called Questa: **mkdir Questa**
  - Go to that directory: **cd Questa**
- **Step 2:** Set up Questa Environment
  - **source /CMC/ENVIRONMENT/questasim.env**
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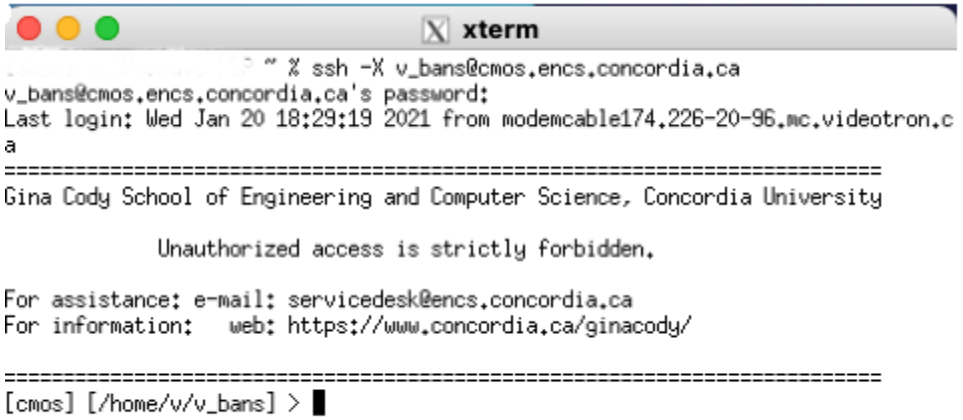
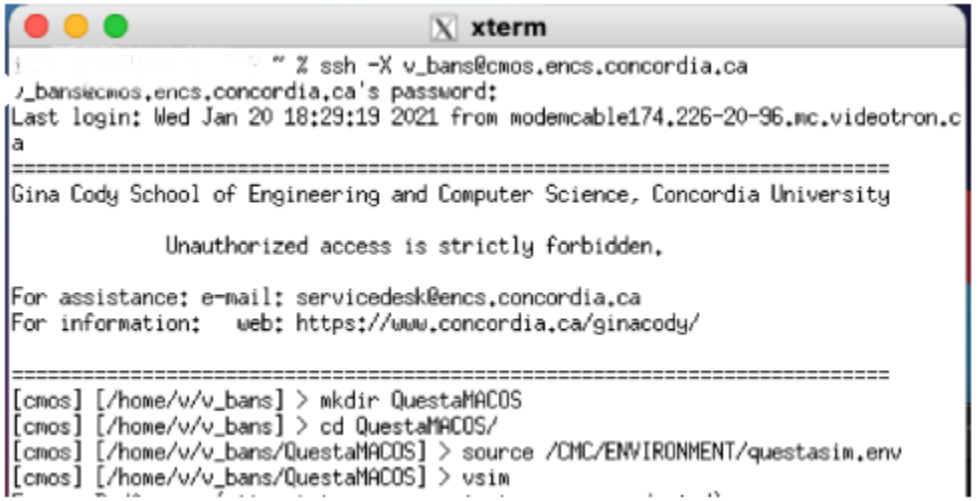
QuestaSIM Tool will be launched using Graphical User Interface





QuestaSIM Access – LINUX

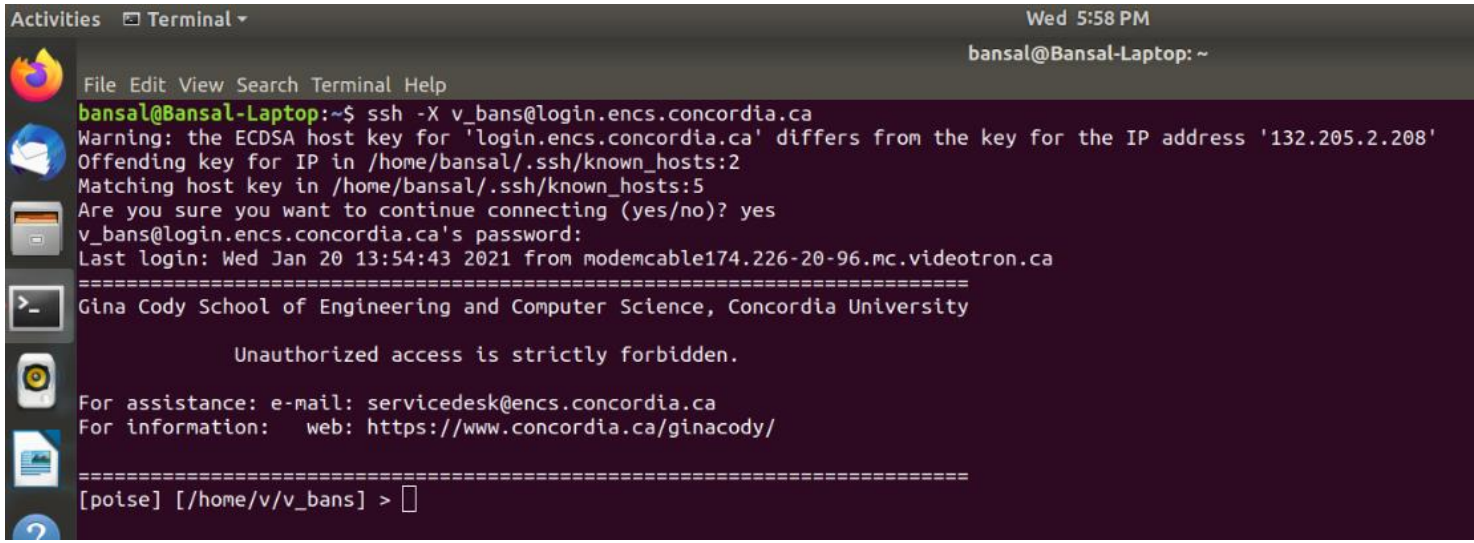
Steps to connect ENCS server:

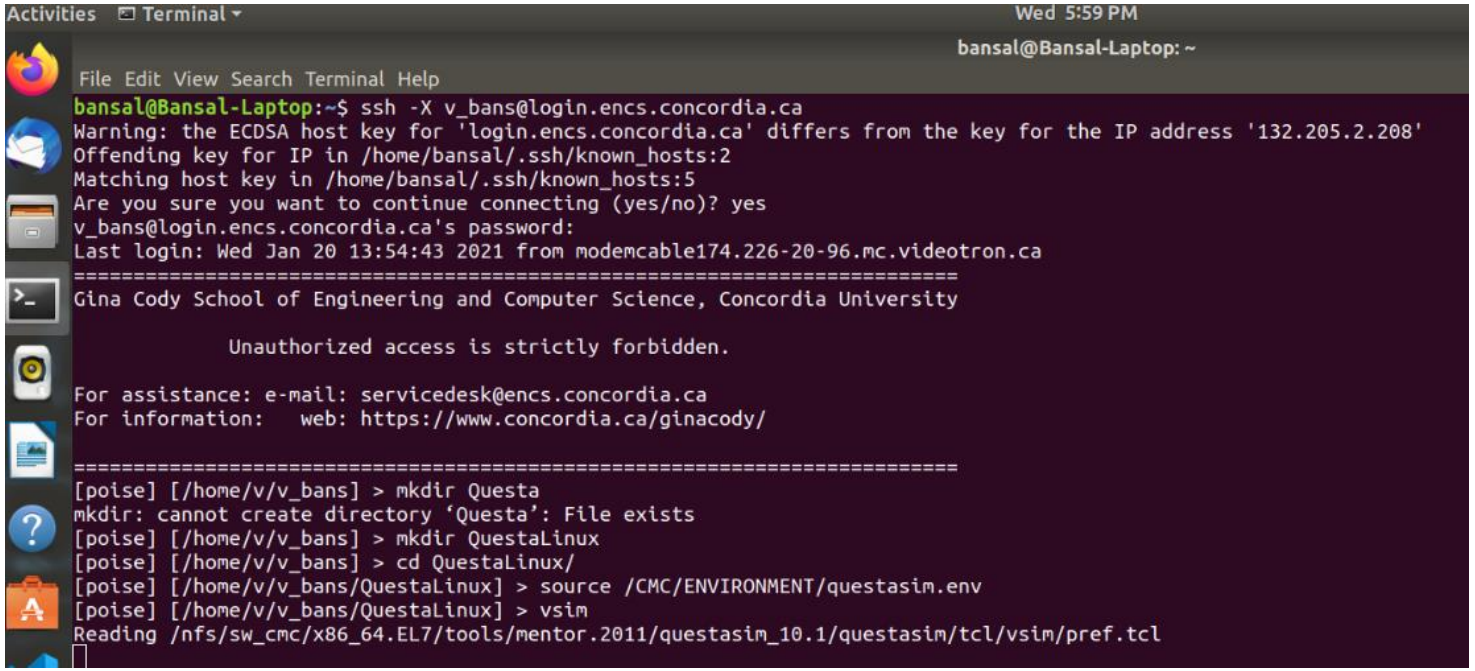
- Open Terminal.
- To connect SSH Server:
  - ssh -X encs_user_name@encs.concordia.ca
- Enter your ENCS user-name & password

Steps to Launch QuestaSIM:

- **Step 1:** Create a directory called Questa: **mkdir Questa**
  - Go to that directory: **cd Questa**
- **Step 2:** Set up Questa Environment
  - **source /CMC/ENVIRONMENT/questasim.env**
  - **vsim**

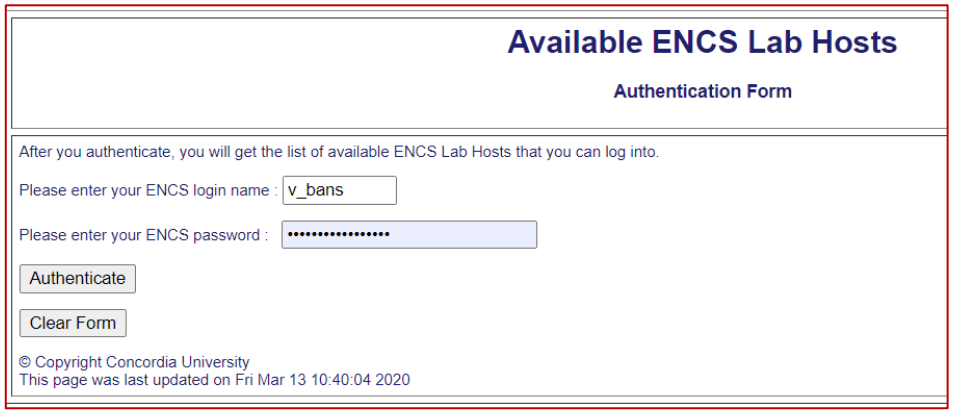
QuestaSIM Tool will be launched using Graphical User Interface





QuestaSIM Access – Concordia Remote Desktop Connection

Step 1: Get the GCS Lab Available computer's name: Log in to the Available GCS Lab Hosts service with your ENCS user account credentials ((https://fis.encs.concordia.ca/helpdesk-cgi/available-hosts.cgi)



Step 2: Connecting to the Concordia Network: To download the VPN FortiClient software, visit the Software and Applications section of the MyConcordia portal. Once the software has been installed, enter your Concordia Netname and password to establish a connection.

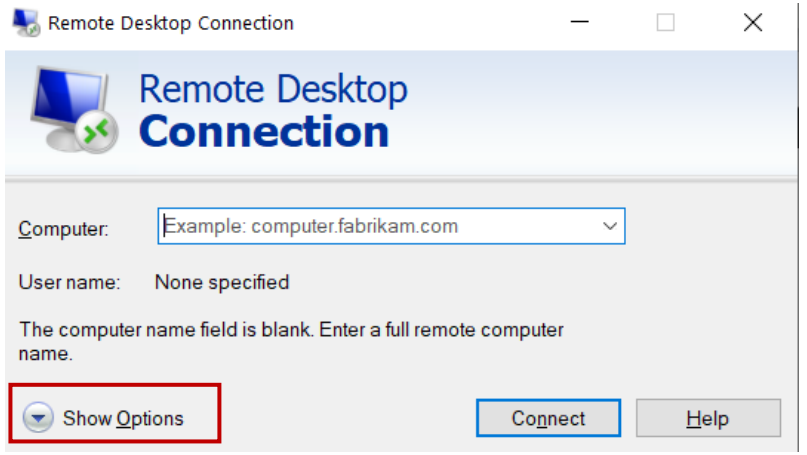
For more information: https://www.concordia.ca/ginacody/aits/support/faq/connect-from-home.html

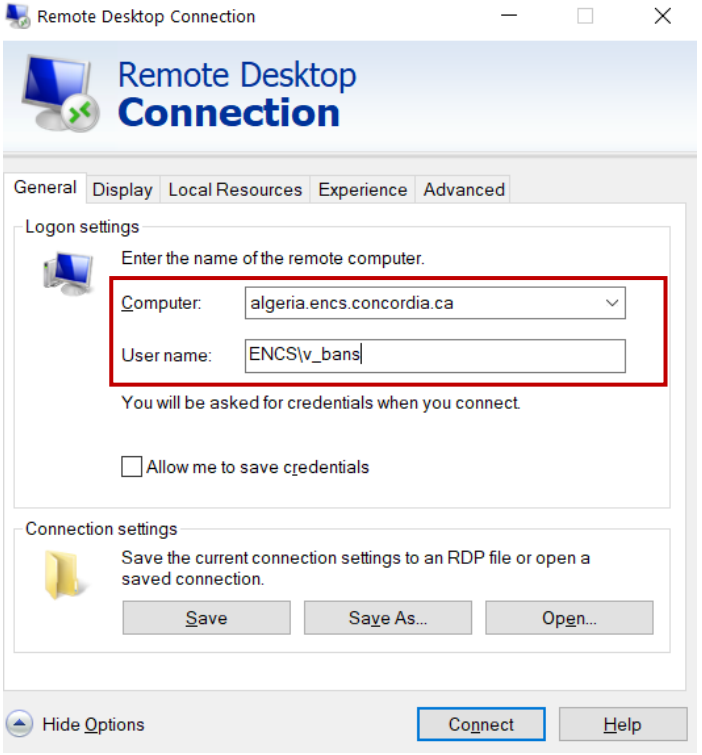
QuestaSIM Access – Concordia Remote Desktop Connection (Continue)

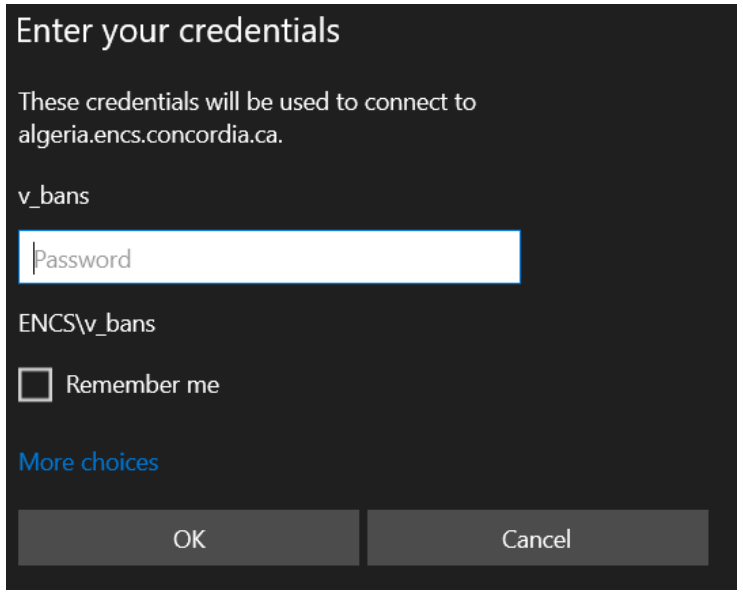
Step 3: Connecting to a GCS Lab computer (Window User)

- Open Remote Desktop Connection by navigating to the following location:

  Start > All Programs > Accessories > Remote Desktop Connection
- Enter the full computer name of the GCS lab computer (from step 1) and your encs account user-name.







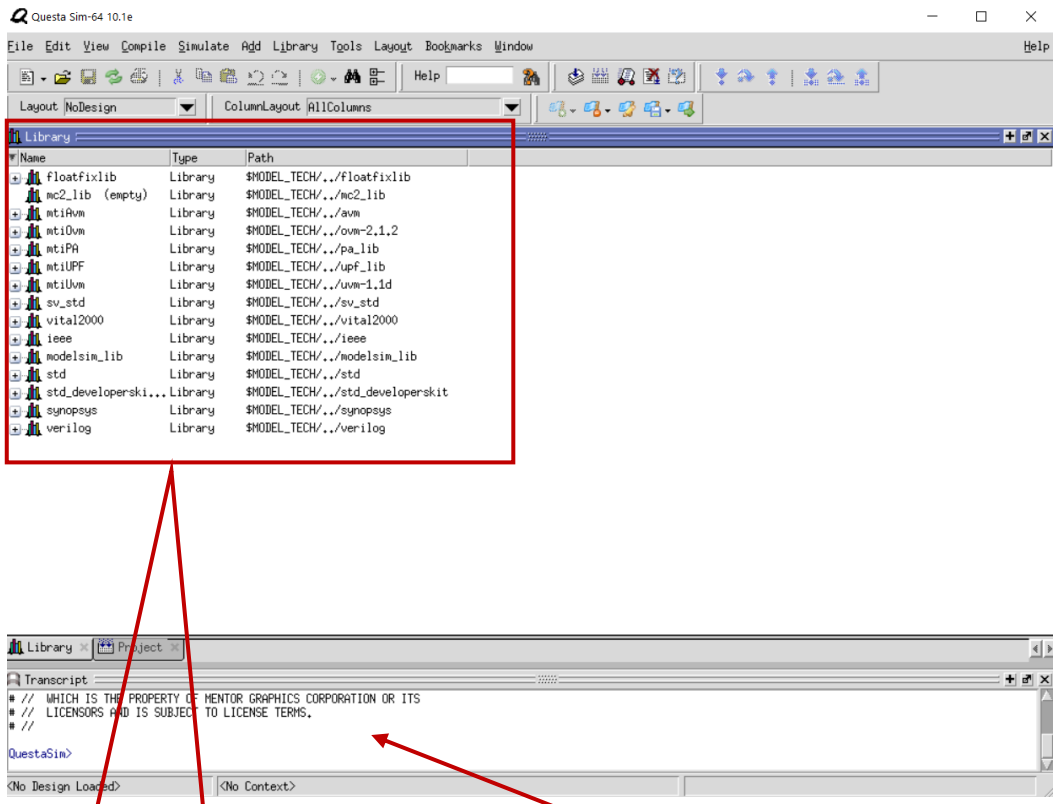
After a minute or so, you will be setup with a Remote Desktop to the chosen computer. It is as if you are sitting in front of the computer in the lab. You can now run any of the available Window's software (e.g. Putty, Xming) which is installed on the remote lab PC. Any results will be displayed on your home monitor.

MAC OS user: Install Microsoft Remote Desktop and follow same steps

For more information: https://www.concordia.ca/ginacody/aits/support/faq/connect-from-home.html

Simulation using QuestaSIM

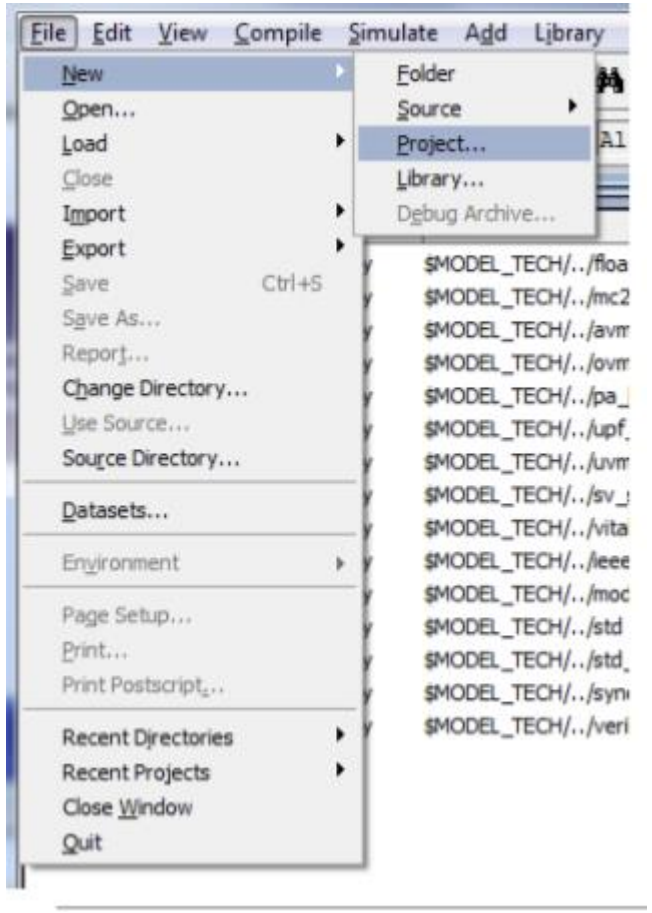
Graphical User Interface will be invoked after command **vsim** in terminal.

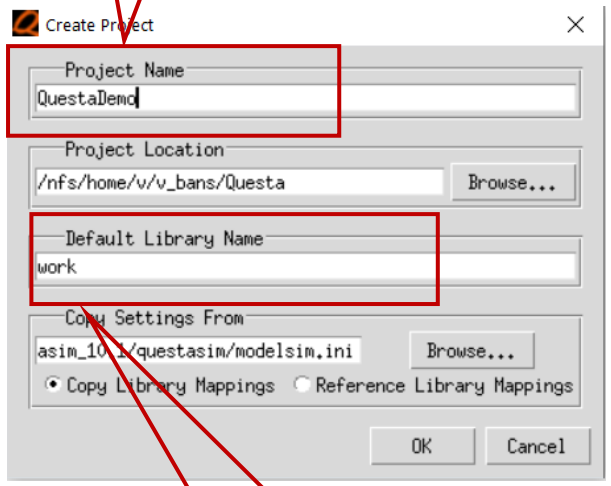


Libraries that contain Compile components

Shell (tcl) to write and execute commands from the prompt

Step 1: Create a new project





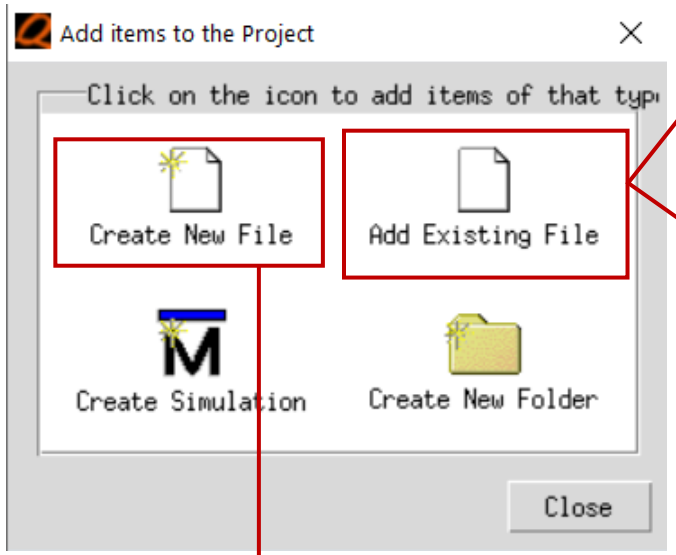
Project Name

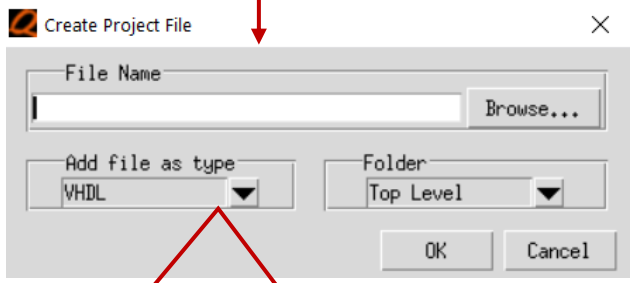
Library used for simulation

If it is the first time and the work directory is not yet made it will ask to permission to make one. Click yes.

Simulation using QuestaSIM (Continue)

Step 2: Add/Create VHDL/Verilog Files





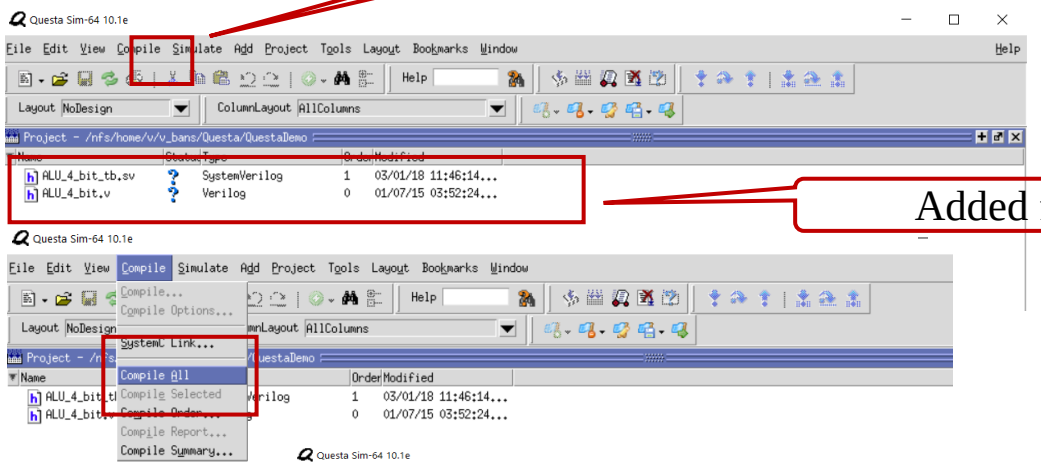
Add all the files already stored in directory (ENCS Server Directory)

To transfer files from personal system to ENCS server, we can use File Transfer Protocol Software (e.g. WINscp).

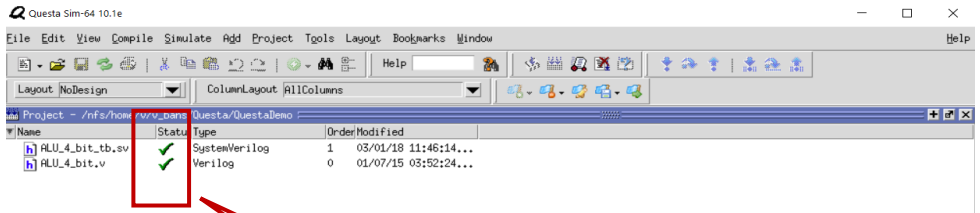
We can directly create a file in QuestaSIM. Select the file type as per requirement.

Step 3: Compilation

Compile Icon

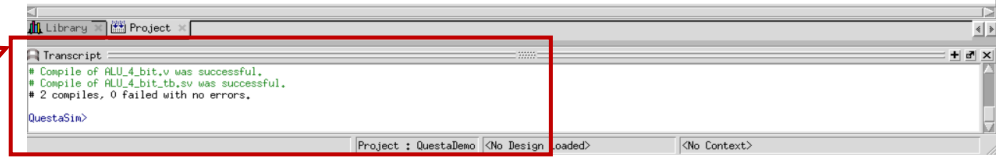


Added files



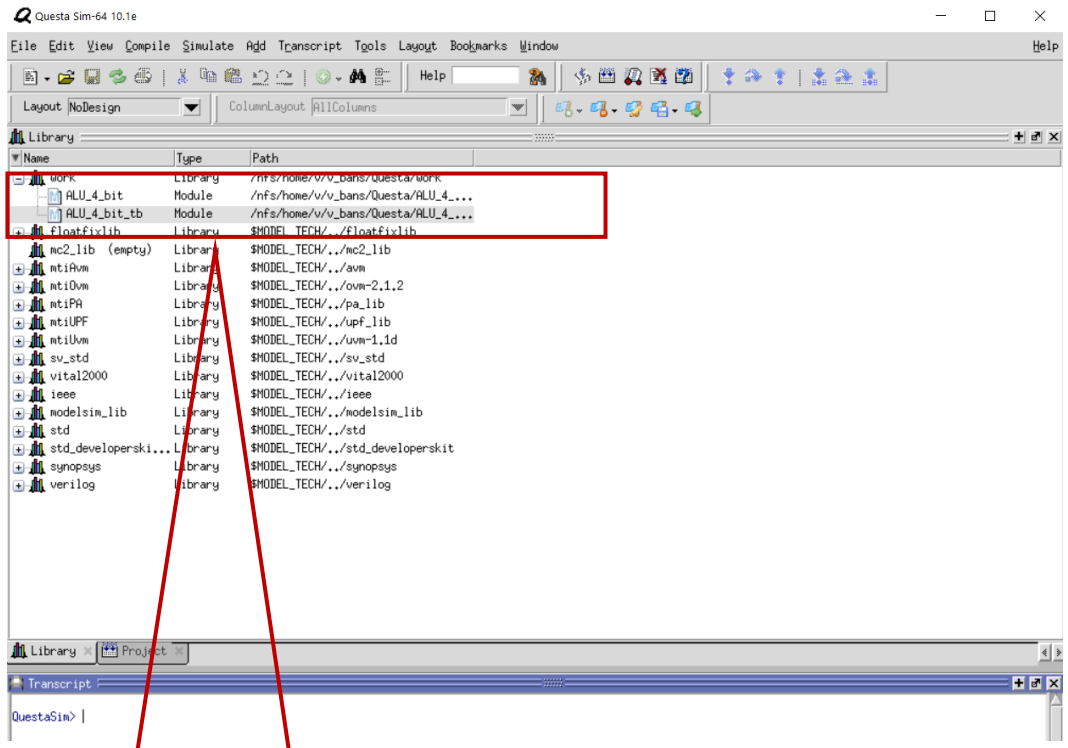
A green check shows for each file if the compilation was successful

Command Window to check compilation error if any



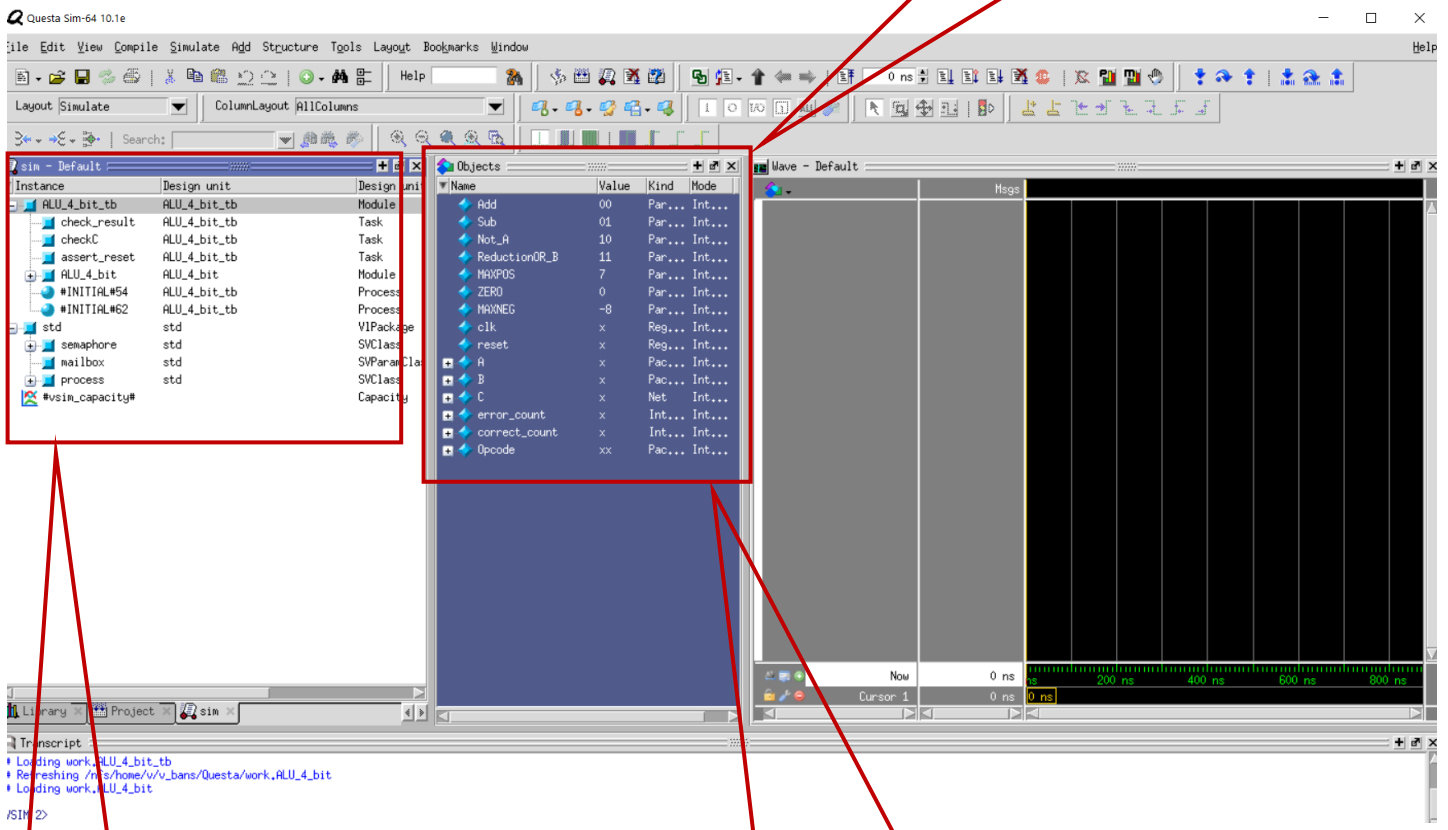
Simulation using QuestaSIM (Continue)

Step 4(a): Run simulation for top level design



Under work library, right click on the top- level design file (testbench) and start simulation

Signal on top level

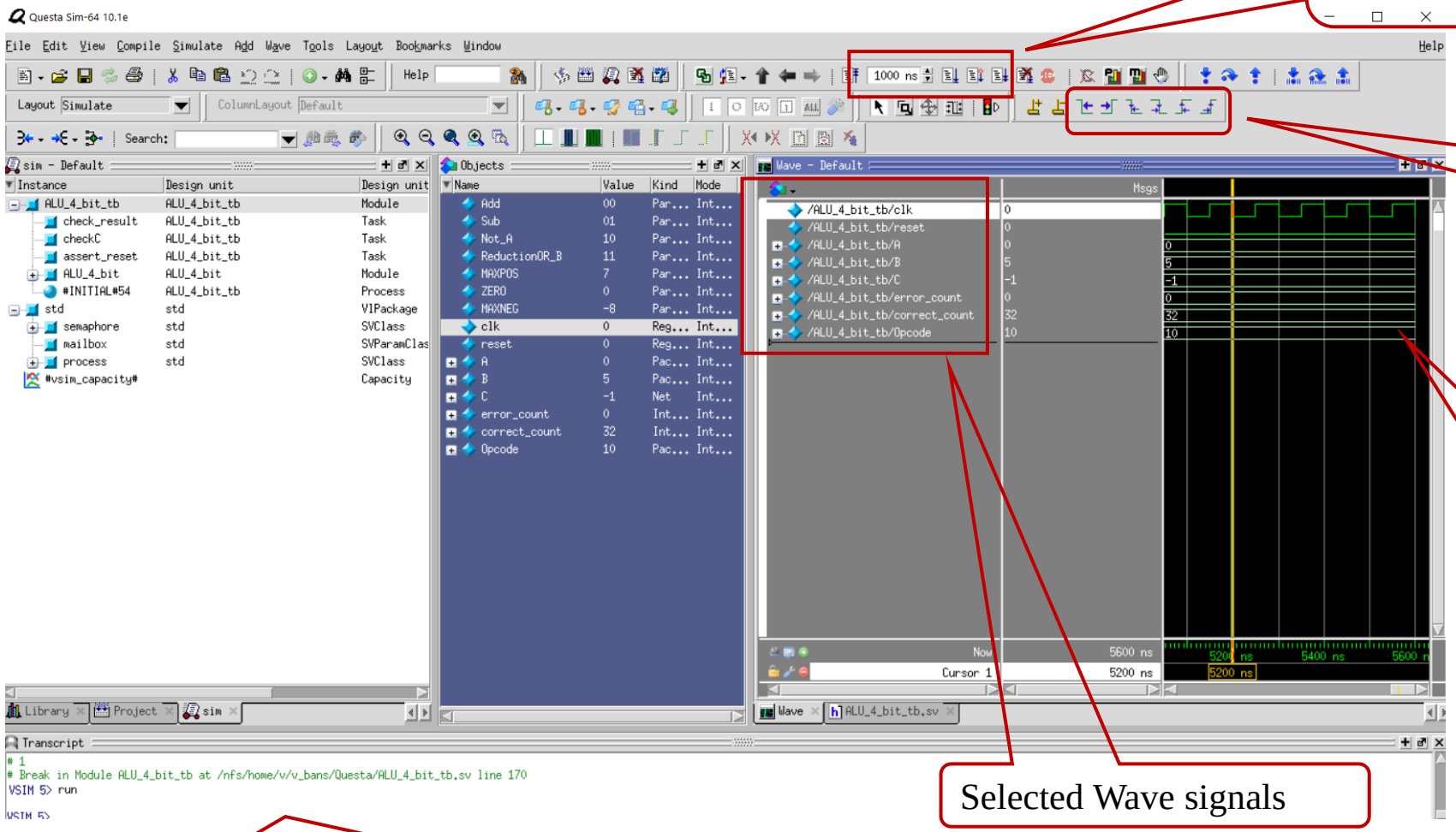


Hierarchical Design Tree

Mark signals to be shown in waveform and right click on it to Add to Wave block

Simulation using QuestaSIM (Continue)

Step 4 (b): Add waves & Run simulation



Set run time, start simulation run or restart simulation after recompilation

Different options to jump with the cursor to falling or rising Edges of the clock

Waveform

Selected Wave signals

Transcript window stating the errors/warnings pops-up if any. Double-click on the message in the window to get the error/warning messages

Thank You!