To install Quartus-II, ModelSim, UrJTAG, GHDL, GTKWave and Krypton CPLD board drivers

**** README document for Ubuntu 12.04 and Ubuntu 14.04 only ****

** Please read the instructions carefully and type the commands without any mistake

A) For Ubuntu updates:

- sudo apt-get update

(**(Don't use "IIT ftp servers" in the Ubuntu centre for downloading updates. Use "Servers in India")**

**** Only for 64-bit Ubuntu,** following libraries are required on the machine. So run these (additional) commands

---

sudo apt-get install libxft2

sudo apt-get install libxft2:i386

sudo apt-get install libncurses5

sudo apt-get install libncurses5:i386

sudo apt-get install libxtst6

sudo apt-get install libsm6:i386

sudo apt-get install libxtst6:i386

B) Altera Quartus II:- is a programmable logic device design software produced by Altera. Quartus II enables analysis and synthesis of HDL designs, which enables the developer to compile their designs, perform timing analysis, examine RTL diagrams, simulate a design's reaction to different stimuli, and configure the target device with the programmer. Quartus includes an implementation of VHDL and Verilog for hardware description, visual editing of logic circuits, and vector waveform simulation).

(Source: https://en.wikipedia.org/wiki/Altera_Quartus)

*** To install Quartus-II (Version 12.0):**

1) Download the TAR file from the WEL server (This will take time to download. File size approx. 3.8 GB).

http://wel.ee.iitb.ac.in/teaching_labs/WEL%20Site/ee214/resources/12.0_178_quartus_free_linux.tar.gz

2) Go to the location, where the file is downloaded.

3) Then run the command: sudo tar –zxvf **12.0_178_quartus_free_linux .tar.gz**

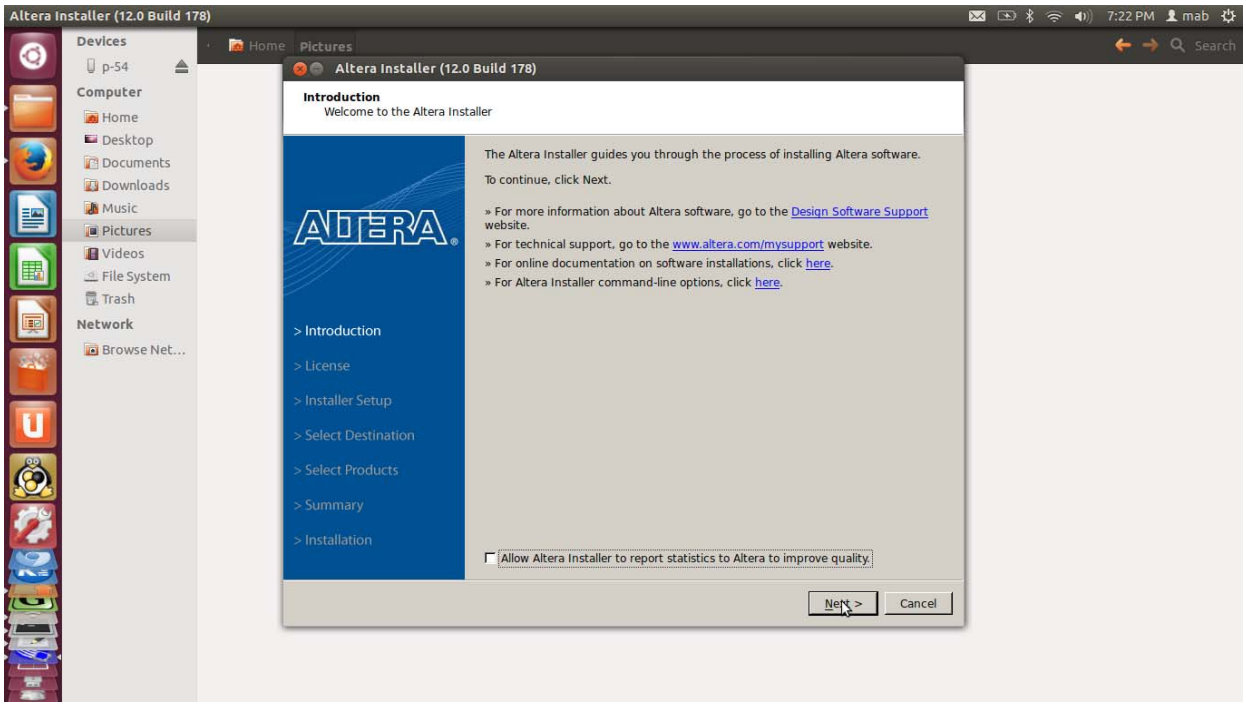
4) Then go to the uncompressed folder "**12.0_178_quartus_free_linux**",

cd **12.0_178_quartus_free_linux**

5) cd altera_installer

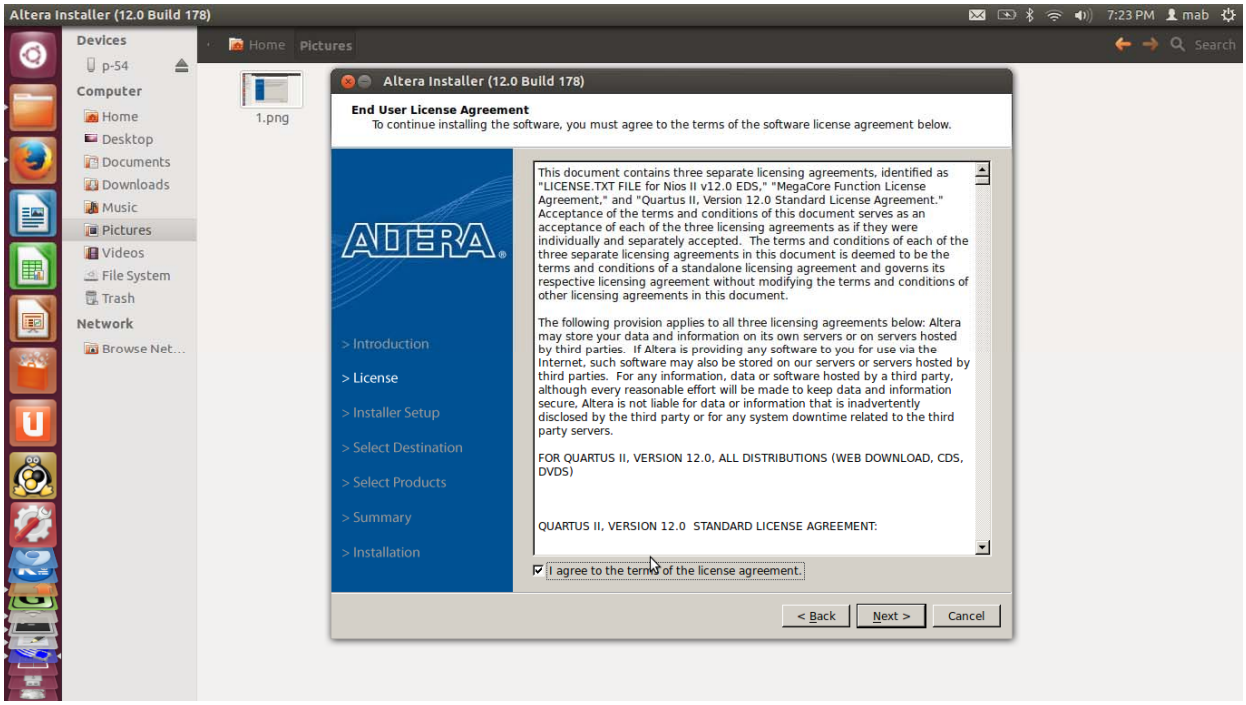
6) cd bin

7) sudo ./altera_installer_gui --gui

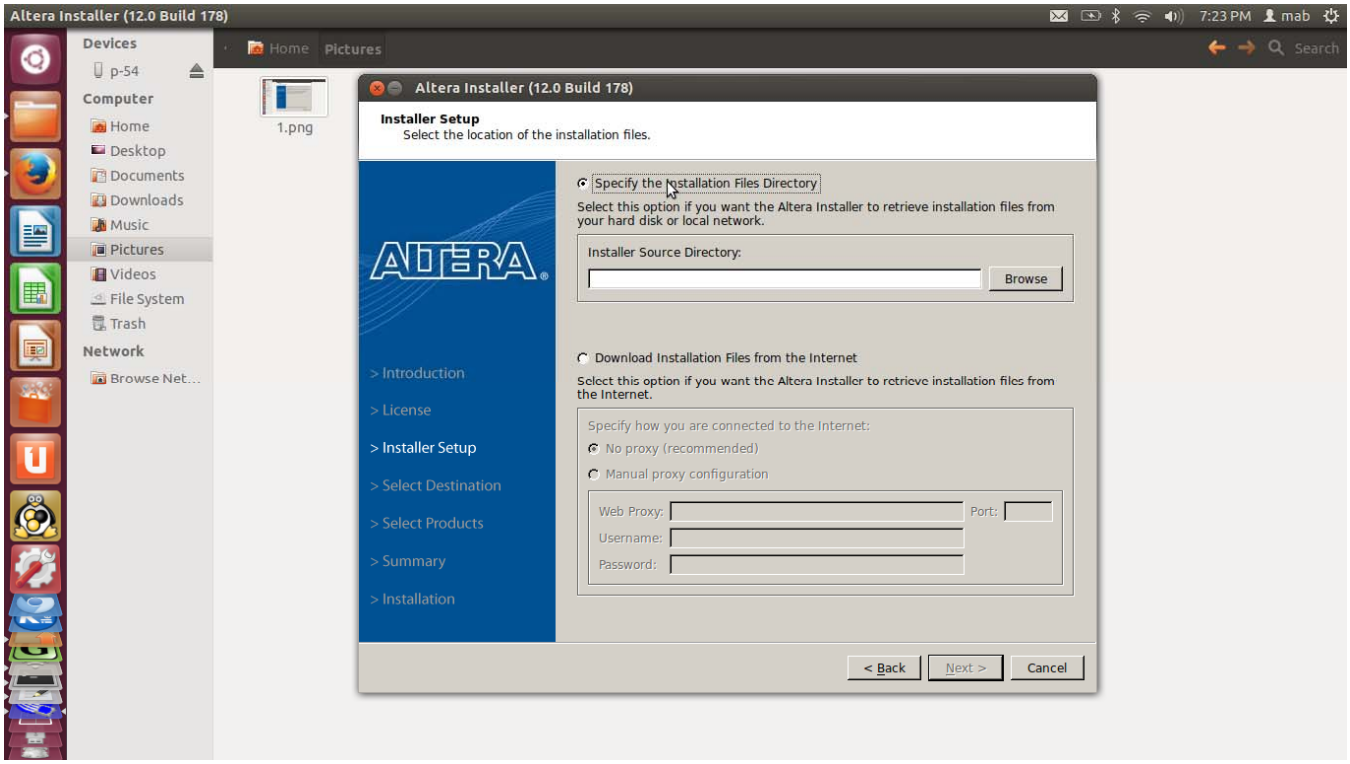


Click 'Next'

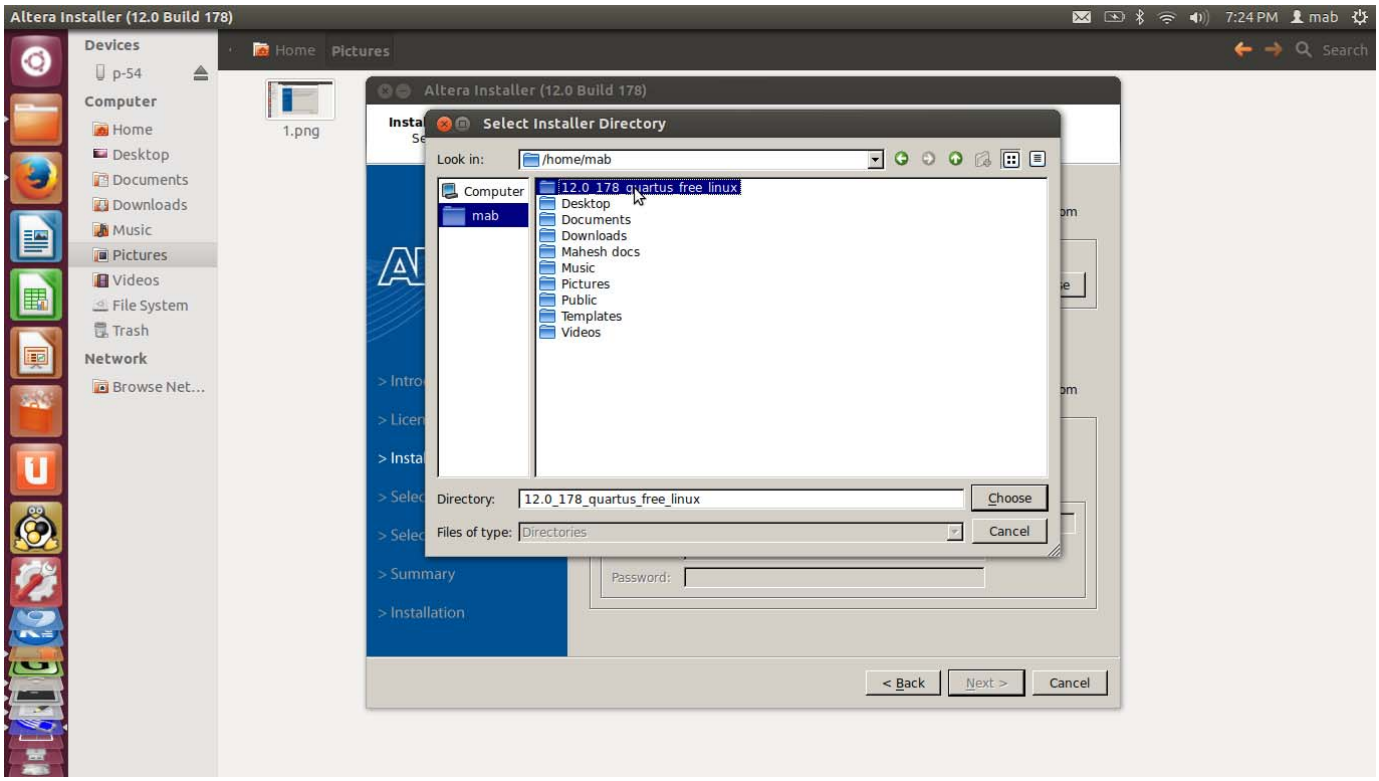
8) Tick ☑ I Agree and Click 'Next'



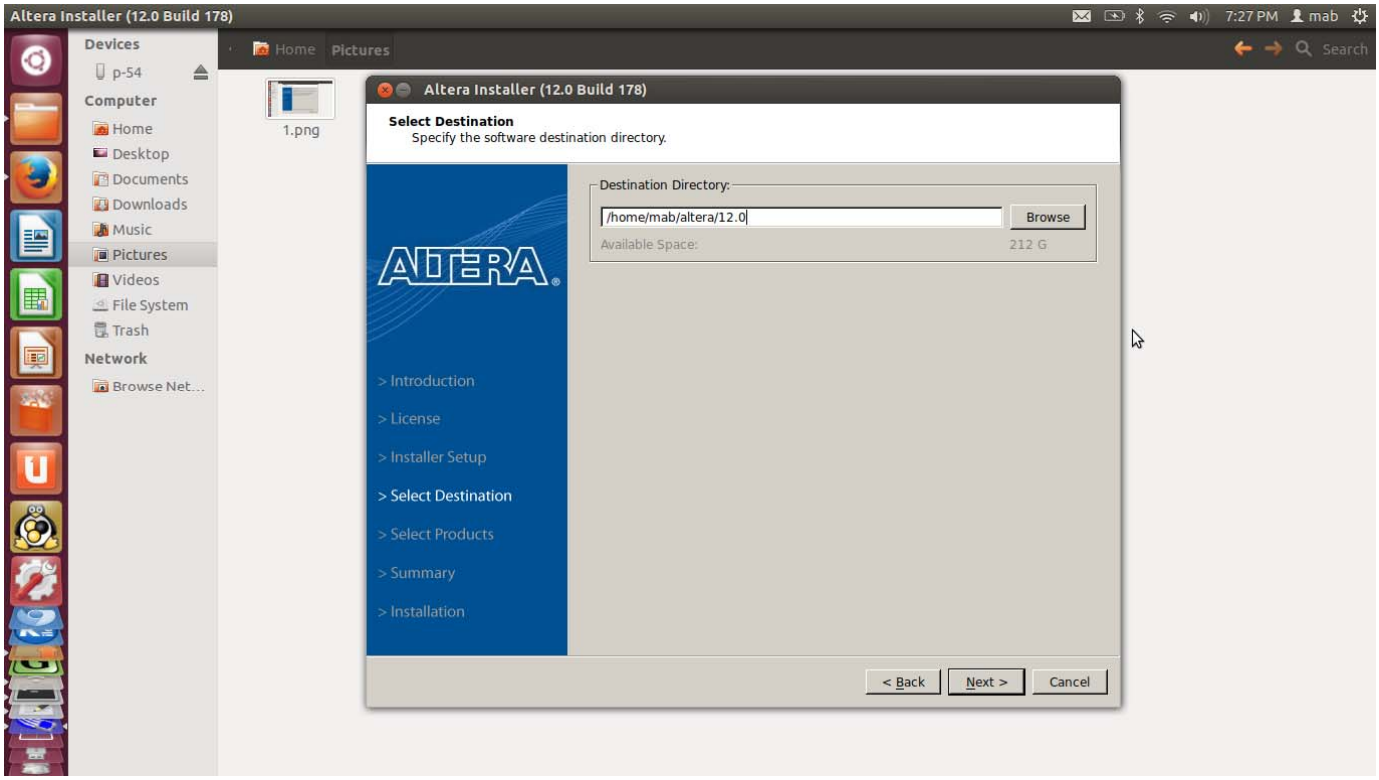
9) Select “Specify the Installation files Directory”



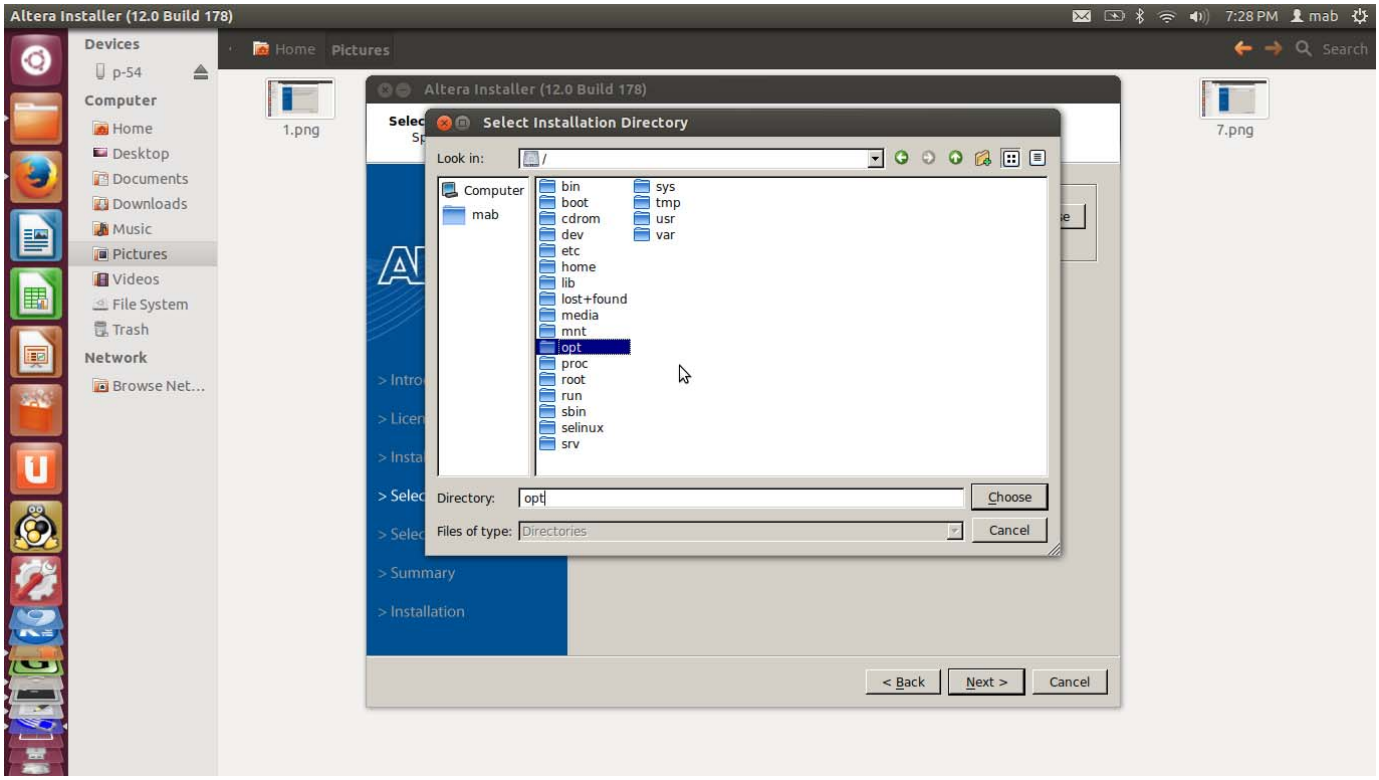
10) Browse and choose the location of the “12.0_178_quartus_free_linux” and click “Next”.



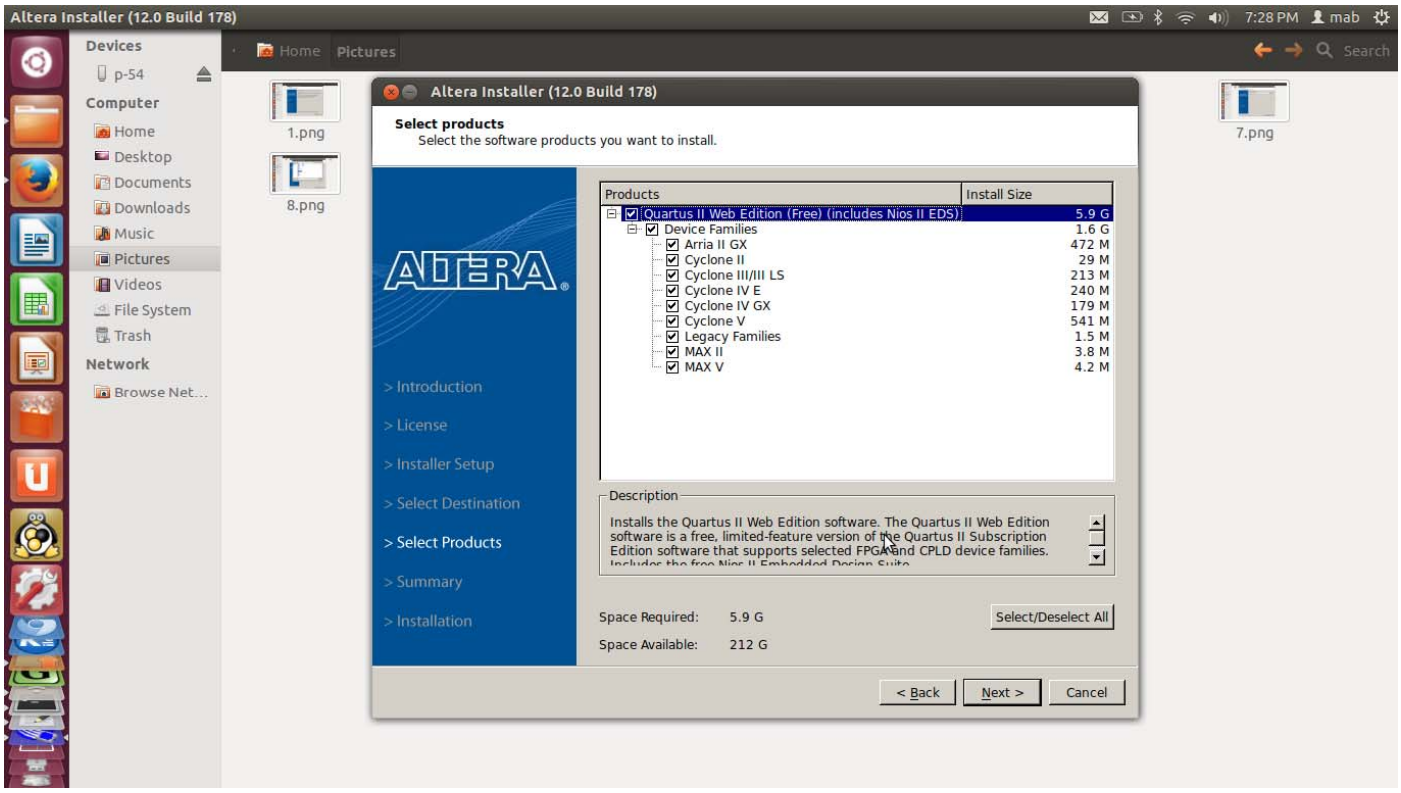
11) “Specify the software destination directory” on your machine and Click “Next”.



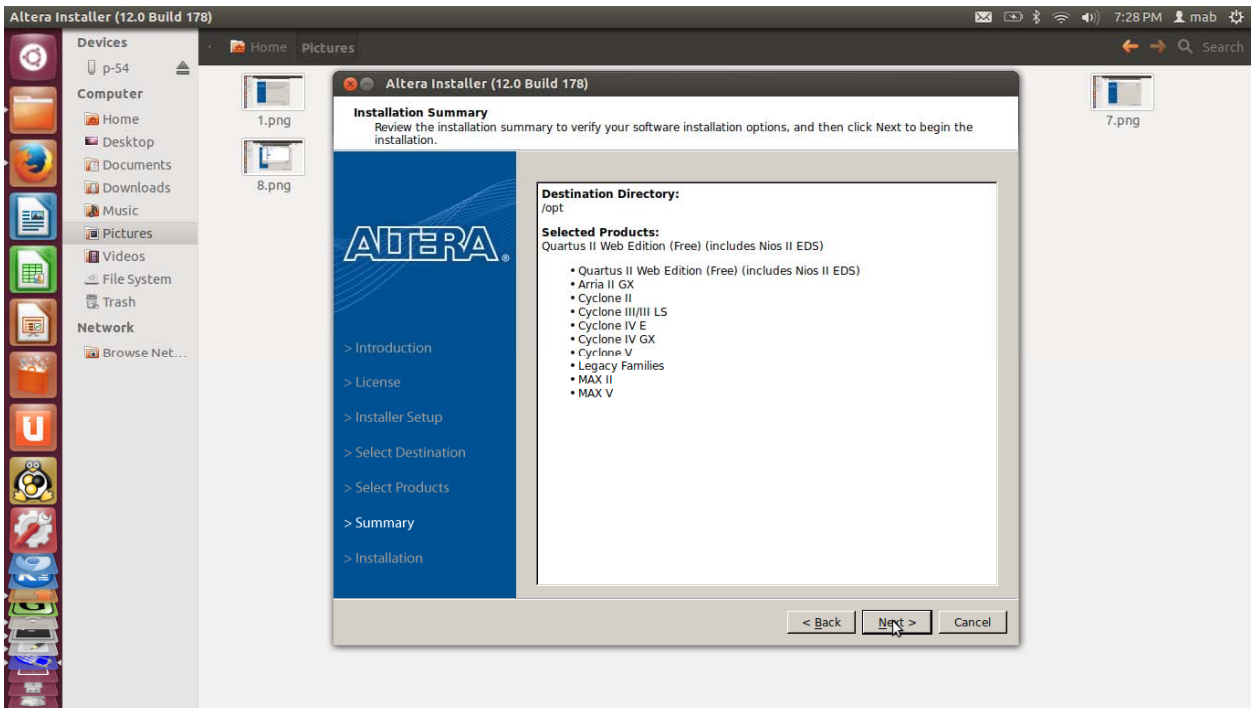
12) Choose Installation Directory “/opt” and Click “Next”.



13) Select the software products (Tick ☑ all products) and Click “Next”.

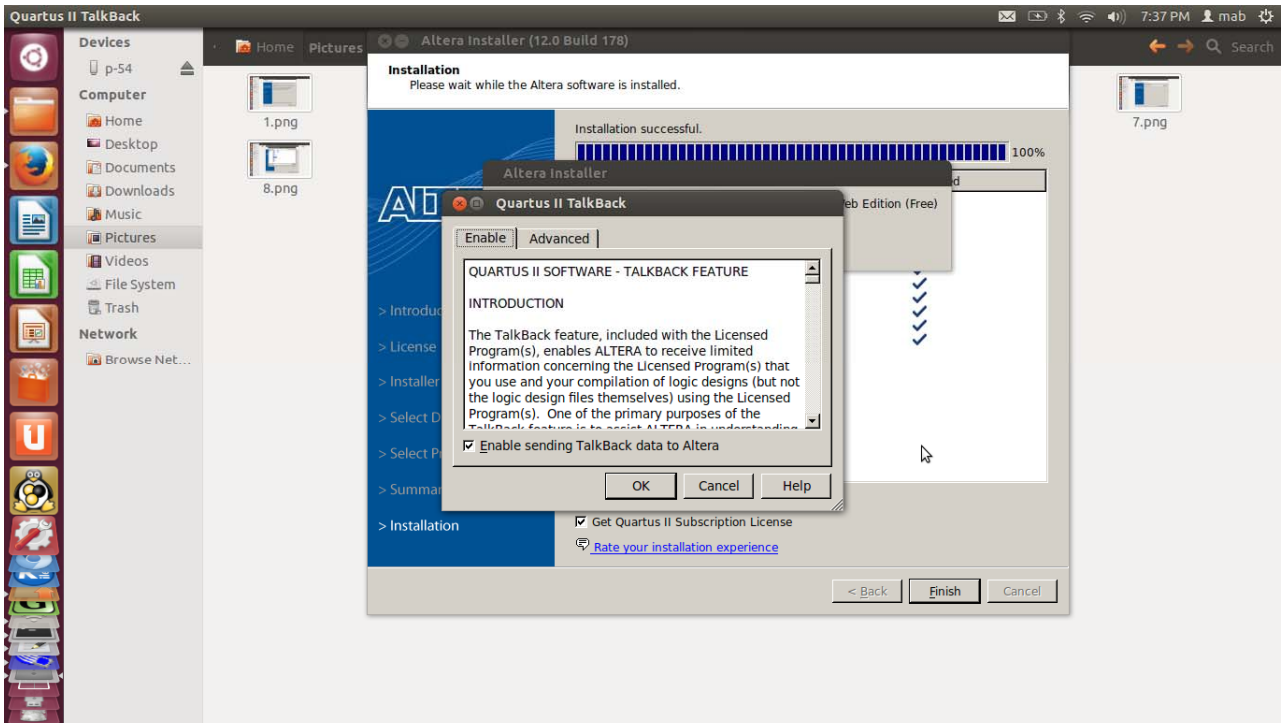


14) Now, the window will show “Summary of the installation”, Click “Next”.



15) Window will show the Installation progress.

16) At the end of the installation, you will get a pop-up window (Untick “Enable sending Talkback”)



17) In the end, for the pop-up window “Quartus II Installation finished”, Click “OK”.

18) Untick “Get Quartus II Subscription License” and Click “Finish”.

✓ **You are done with the Quartus- II Installation.**

Now, to use Quartus in future

1) **goto the location-** cd /opt/quartus/bin
2) quartus **(Press enter)**

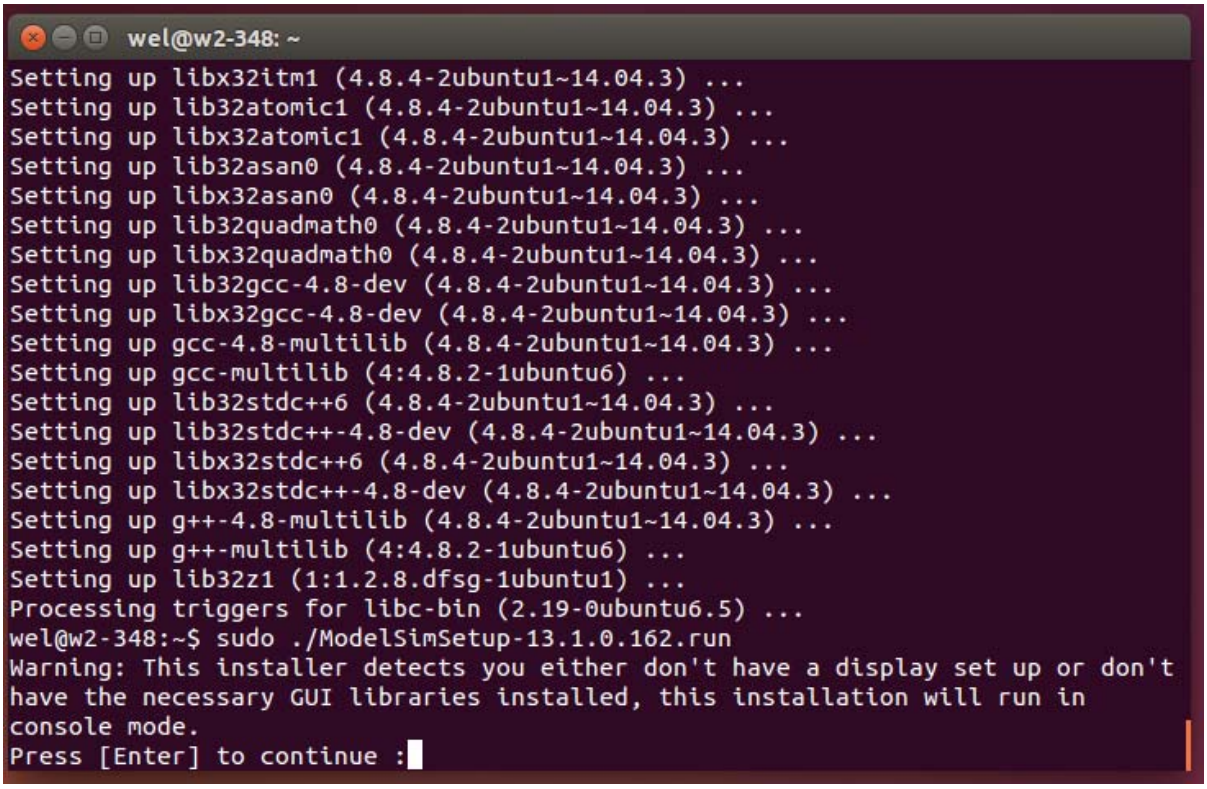
C) ModelSim Installation steps

1. Download “ModelSimSetup-13.1.0.162.run” installation file from the server

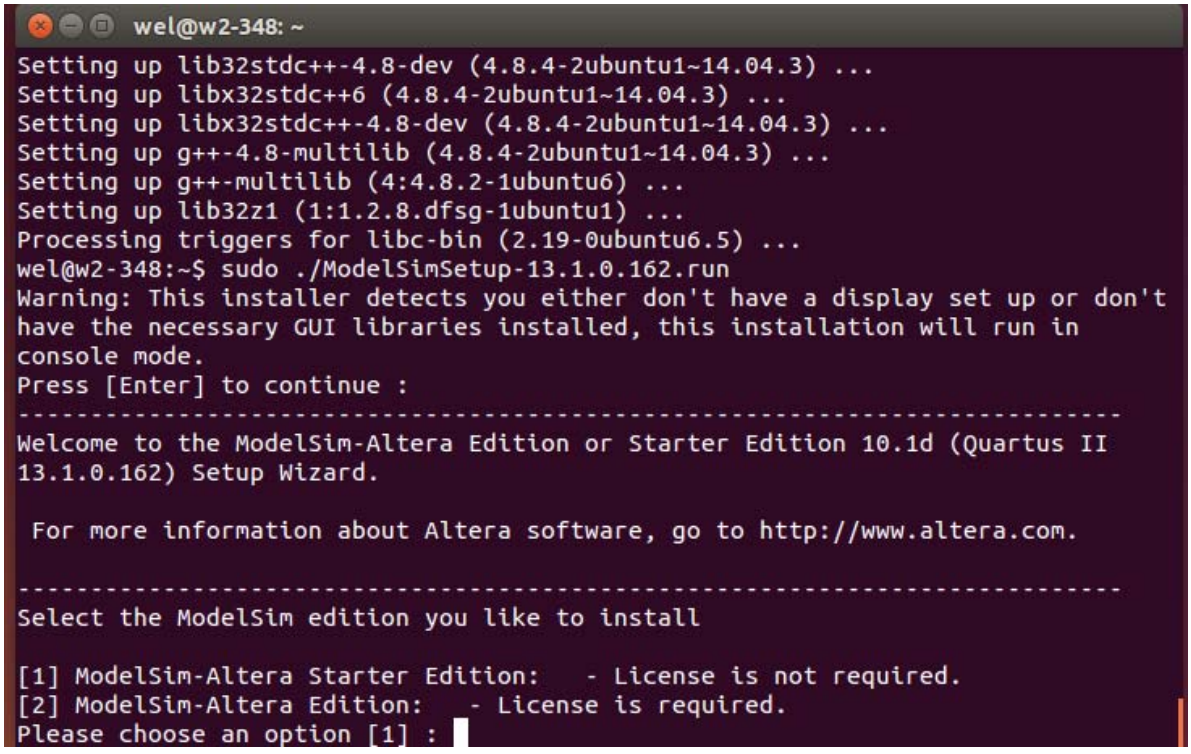
http://wel.ee.iitb.ac.in/teaching_labs/WEL%20Site/ee214/resources/ModelSimSetup-13.1.0.162.run

- chmod 755 /{dir}/ModelSimSetup-13.1.0.162.run

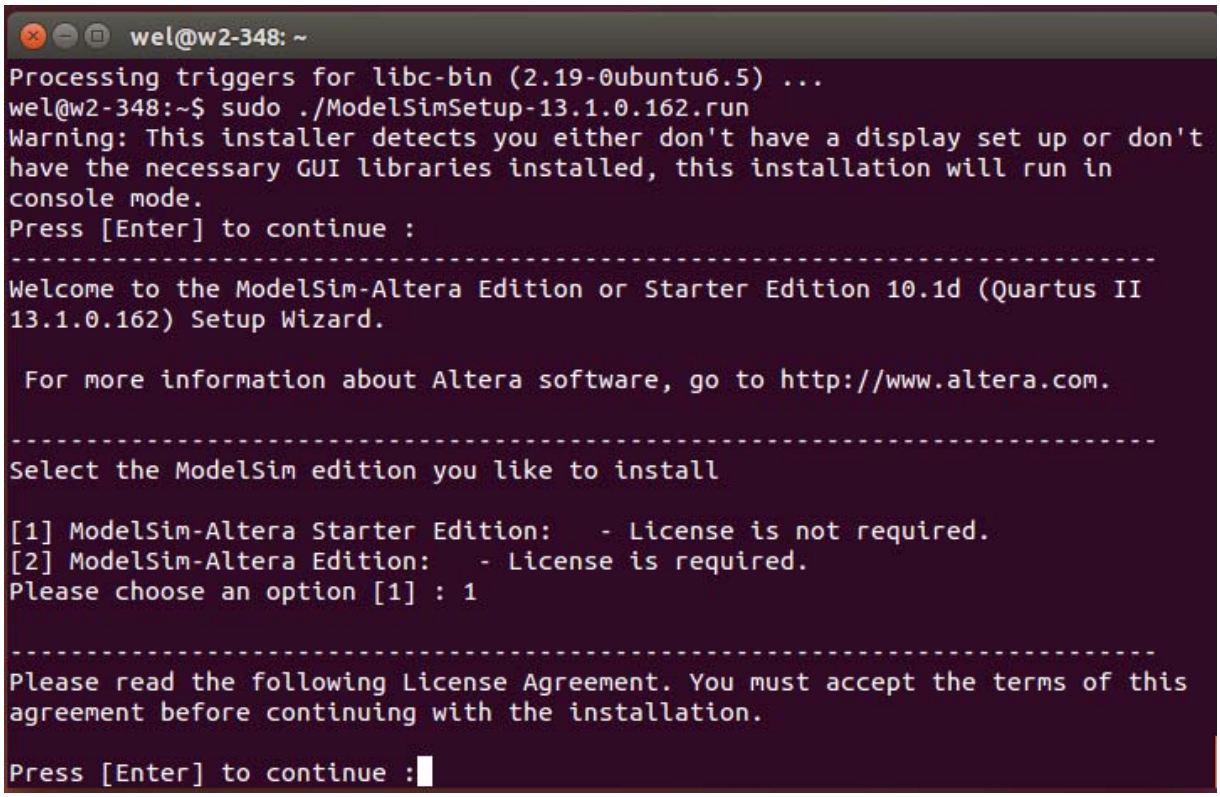
Then run, sudo ./{dir}/ModelSimSetup-13.1.0.162.run and Press [Enter] to continue



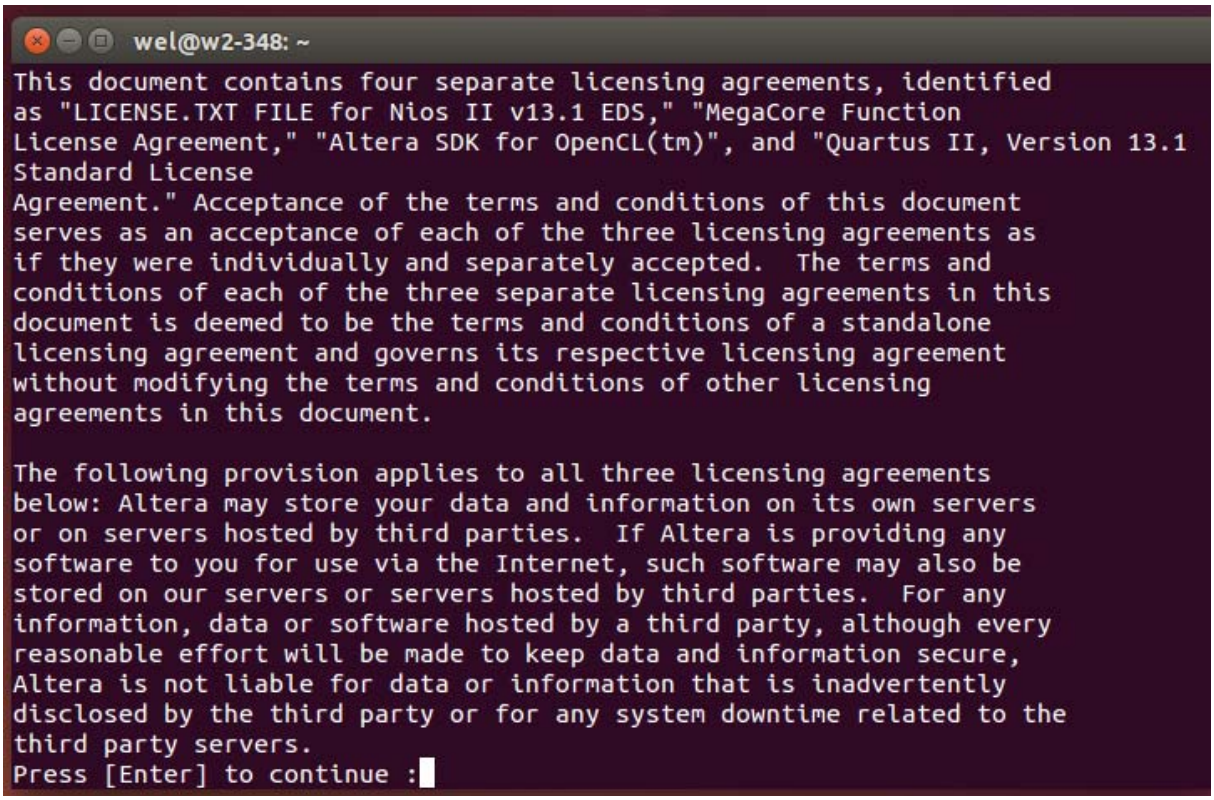
2. Choose an option [1] for starter edition



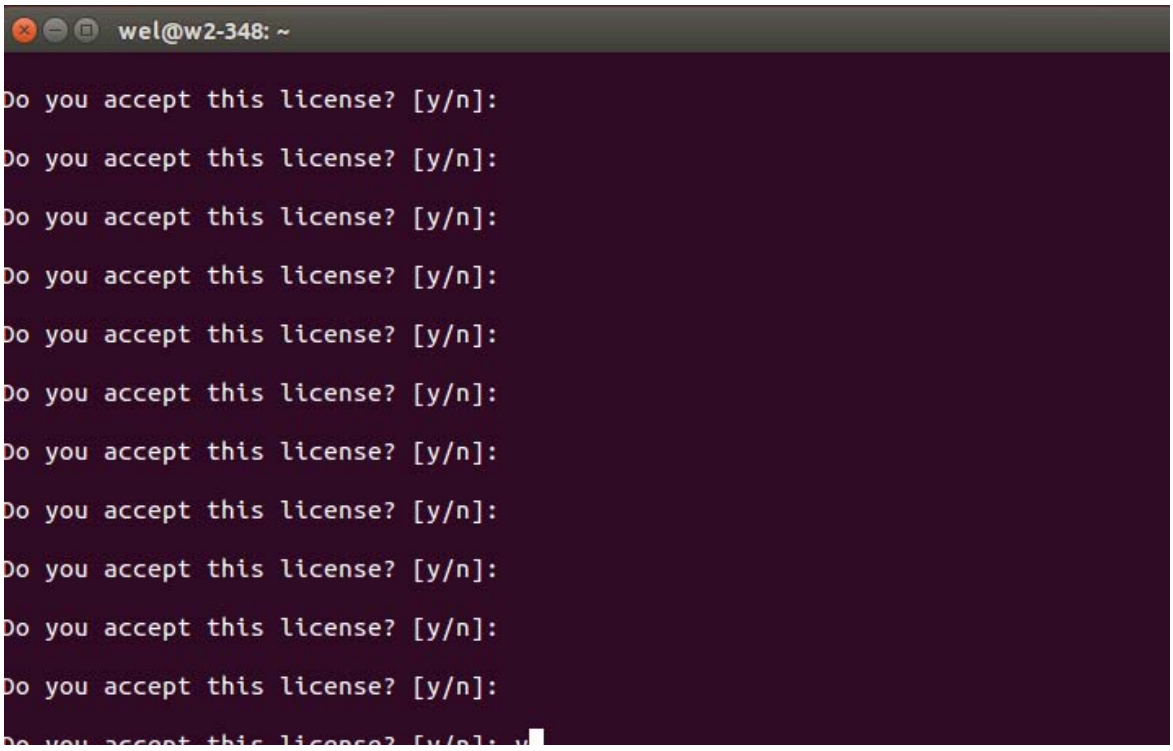
3. Press [Enter] to continue



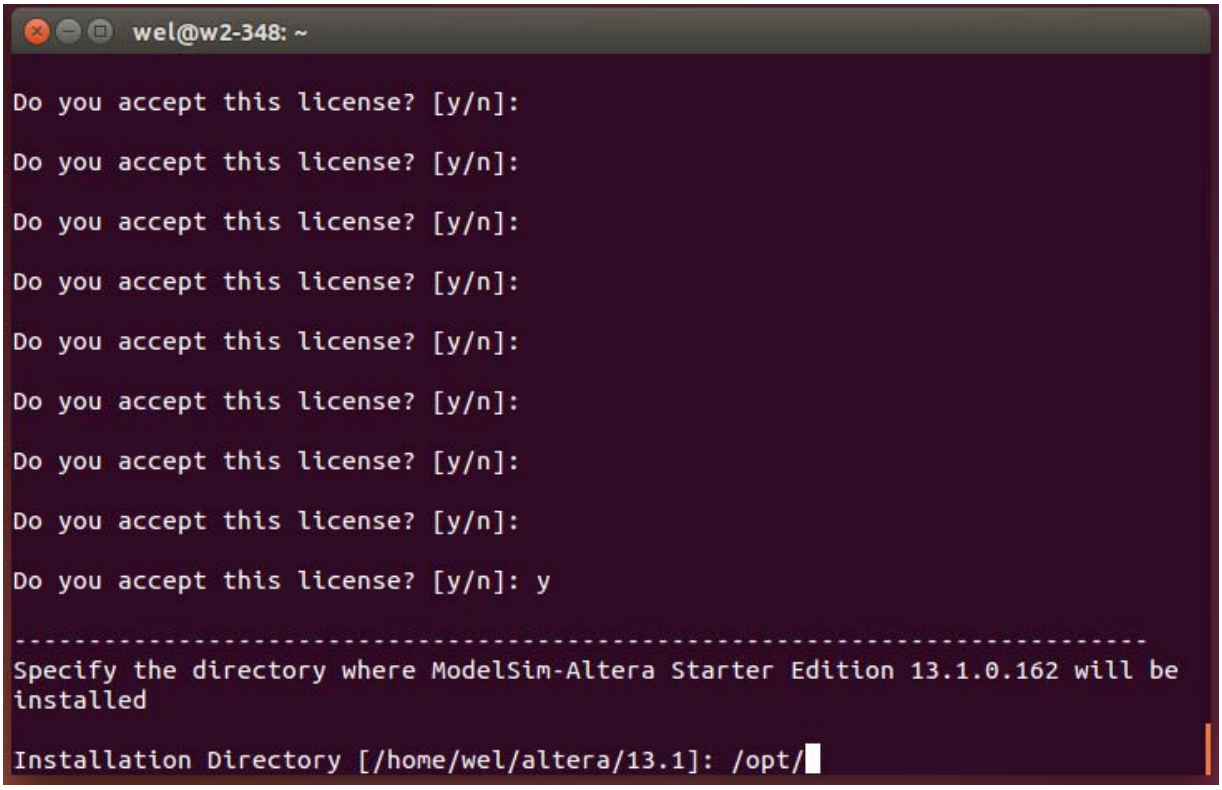
4. Press [Enter] to continue, till it reaches the option of accepting the license agreement



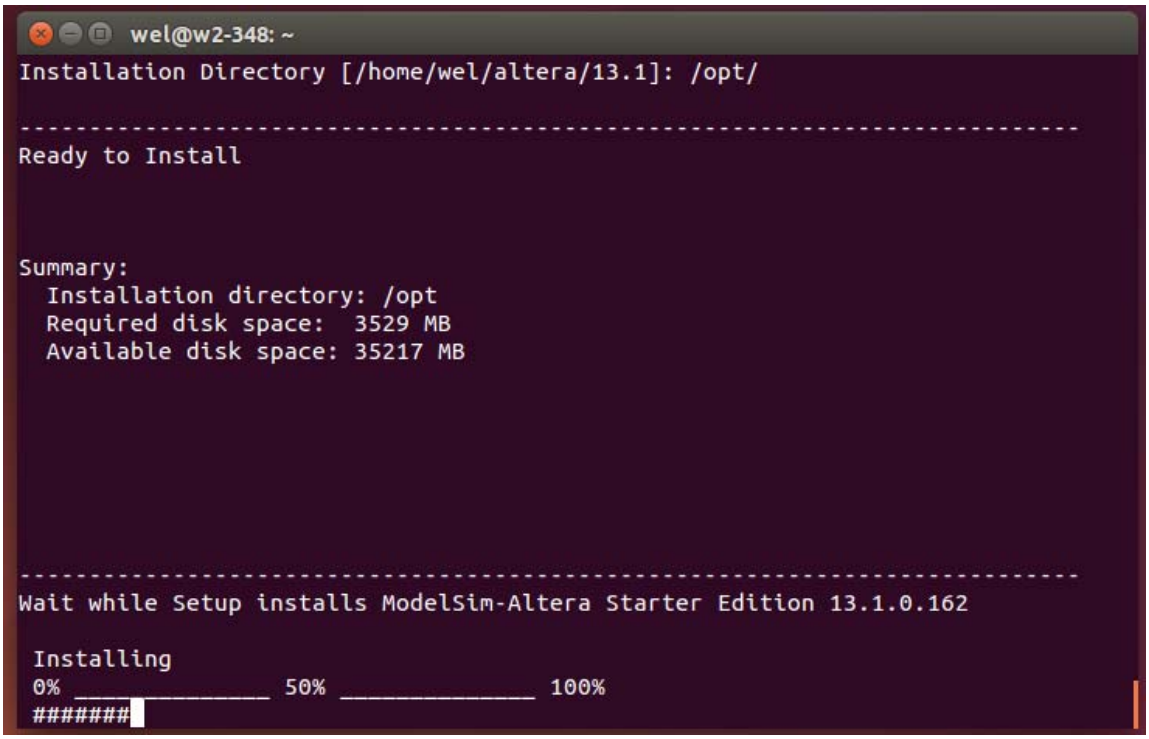
5. Press ‘y’ to accept the license



6. Choose Installation directory: /opt/



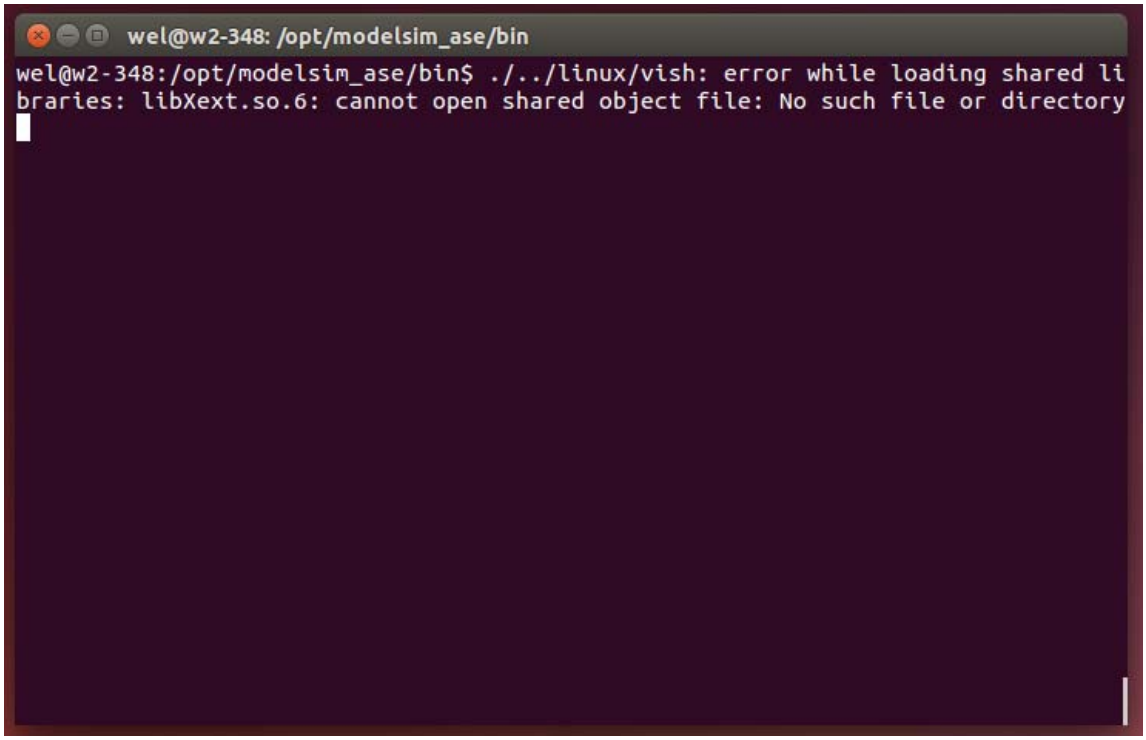
7. Next this will show the summary and progress of the installation



8. After completion of installation, cd /opt/modelsim_ase/bin then run the command **./vsim**. ModelSim Graphical environment will be available to test your simulation results.

If graphical interface don't work and shows the following error, install following dependencies:

- sudo apt-get install libxft2:i386
- sudo apt-get install libxrender1:i386 libxtst6:i386 libxi6:i386



After these installations, if you still find errors in invoking modelsim through Quartus II, try out the following steps to make **ModelSim ALTERA STARTER EDITION vsim** work on **Ubuntu-14.04** or sometimes in the other versions of Ubuntu

(Source: Matthew Swabey http://mattaw.blogspot.in/2014/05/making-modelsim-altera-starter-edition.html)

Problem 1: The free version of ModelSim Altera Edition is 32-bit only while the normal Linux PC will be 64-bit. On Linux this requires us to install the 32-bit versions of the libraries that it depends on and it is fully supported on linux like **Ubuntu 14.04**.

- `sudo dpkg --add-architecture i386`
- `sudo apt-get update` **(Don't use "IIT ftp servers" in the Ubuntu software centre for downloading updates. Use "Servers in India")**
- `sudo apt-get install build-essential`
- `sudo apt-get install gcc-multilib g++-multilib lib32z1 lib32stdc++6 lib32gcc1 expat:i386 fontconfig:i386 libfreetype6:i386 libexpat1:i386 libc6:i386 libgtk-3-0:i386 libcanberra0:i386 libpng12-0:i386 libice6:i386 libsm6:i386 libncurses5:i386 zlib1g:i386 libx11-6:i386 libxau6:i386 libxdmcp6:i386 libxext6:i386 libxft2:i386 libxrender1:i386 libxt6:i386 libxtst6:i386`

Problem 2: If you have the following error when running `vsim`:

```
** Fatal: Read failure in vlm process (0,0)
Segmentation fault (core dumped)
```

Then you need to build a new version of freetype, a font setting library and modify ModelSim to use it. First download the source code of freetype 2.4.12.

http://download.savannah.gnu.org/releases/freetype/freetype-2.4.12.tar.bz2

Now install the build dependencies needed for libfreetype6, extract the source (using tar) and configure and build libfreetype:

- `sudo apt-get build-dep -a i386 libfreetype6`
- `tar -xjvf freetype-2.4.12.tar.bz2` **(path to "freetype-2.4.12.tar.bz2")**
- `cd freetype-2.4.12` **(go to the extracted "freetype-2.4.12" folder)**
- `./configure --build=i686-pc-linux-gnu "CFLAGS=-m32" "CXXFLAGS=-m32" LDFLAGS=-m32"`
- `make -j8`

The finished libraries are now available inside the "`objs/.libs`" directory. As they are necessary to run ModelSim, we need to copy them into the install directory and then modify ModelSim's vsim script to use the new libraries instead of the system wide versions.

Change directory to the directory where ModelSim is installed, **`/opt/modelsim_ase/`**, on my system. Note you may need to edit the directory paths to match those used on your system.

- `sudo mkdir lib32`
- `sudo cp {freetype-2.4.12 PATH}/objs/.libs/libfreetype.so* ./lib32`

Now, edit the vsim launch script to ensure the new freetype libraries are used:

- `sudo vim /opt/modelsim_ase/bin/vsim`

Search for the following line: `dir='dirname $arg0'`

and underneath add the following new line: `export LD_LIBRARY_PATH=${dir}/lib32`

`Finally, Open quartus, go to --> Tools --> Options --> General --> EDA Tools options --> ModelSim-Altera and set the path` **`/opt/modelsim_ase/bin`**`. Then press OK.`

D) To install GHDL simulation software:

- sudo add-apt-repository ppa:pgavin/ghdl
- sudo install libc-bin libc-dev-bin libc6 libc6-amd64 libc6-dev-amd64
- sudo apt-get install glibc-doc
- sudo apt-get remove gnat-4.4-base
- sudo apt-get install ghdl

E) To install GTKWAVE (waveform viewer):

- sudo apt-get install gtkwave

F) To install USB drivers for the Krypton CPLD board:

1) Go to the link

http://wel.ee.iitb.ac.in/teaching_labs/WEL%20Site/ee214/resources/51-usbblaster.rules

Right click and save the file on your machine (Don't change the name of the file).

2) sudo cp –r 51-usbblaster.rules /etc/udev/rules.d (copy the file to the given location)

(Write the correct location of the "51-usbblaster.rules" file, while using the command, e.g., if the location of the file is /home/user/Downloads/, then the command will be "cp -r /home/user/Downloads/51-usbblaster.rules /etc/udev/rules.d")

Reload drivers:

- sudo udevadm control –reload

G) To install UrJTAG (Software tool to download bit file from PC to CPLD board)

- sudo apt-get install urjtag

** **To use UrJTAG with the Krypton board**

1) Download "altera.tar.gz' file from the link

http://wel.ee.iitb.ac.in/teaching_labs/WEL%20Site/ee214/resources/altera.tar.gz and then use the following steps

- sudo cp -r altera.tar.gz /usr/share/urjtag **(Mention correct location of "altera.tar.gz" file)**
- cd /usr/share/urjtag
- sudo tar -zxvf altera.tar.gz
- sudo chmod -R 755 altera
- jtag

**** To check the connection with the Krypton CPLD and to download the bit file to the board, use following commands**

1) jtag (**Connect the board with the PC/ laptop)**
2) cable ft2232 vid=0x0403 pid=0x6010
3) detect
4) svf (location of the svf file/filename.svf) progress **(to download the bit file to CPLD board)**

See the results in the following snapshot after running each command

```
saujal@srv:~$ jtag

UrJTAG 0.10 #2007
Copyright (C) 2002, 2003 ETC s.r.o.
Copyright (C) 2007, 2008, 2009 Kolja Waschk and the respective authors

UrJTAG is free software, covered by the GNU General Public License, and you are
welcome to change it and/or distribute copies of it under certain conditions.
There is absolutely no warranty for UrJTAG.

warning: UrJTAG may damage your hardware!
Type "quit" to exit, "help" for help.

jtag> cable ft2232 vid=0x0403 pid=0x6010
Connected to libftdi driver.
jtag> detect
IR length: 10
Chain length: 1
Device Id: 00000010000010100011000011011101 (0x020A30DD)
  Manufacturer: Altera (0x0DD)
  Part(0):      5M1270 (0x20A3)
  Stepping:     1
  Filename:     /usr/share/urjtag/altera/5m1270/5m1270
jtag> svf Desktop/On_board_peripheral.svf progress
warning: unimplemented mode 'ABSENT' for TRST
detail: Parsing  40830/40830 (100%)detail:
detail: Scanned device output matched expected TDO values.
jtag>
```

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