

Linux Software



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Chapter 1

Software installation in Ubuntu, Lubuntu and Mint

Important:

- First, open “Software updates” and select “main repository” and enable “source code”.
- Then update the cache when prompted or run below command

```
sudo apt-get update
```

- I tried various other distros as well e.g. CentOS, Manjaro and OpenSUSE etc. But I like “Lubuntu” as it is lightweight and the software (related to Electronics designs) are very easy to install as compare to other distros. Also, use below method to create shortcuts in Lubuntu,

```
(open lubuntu-rc.xml)
sudo gvim ~/.config/openbox/lubuntu-rc.xml

(define C-A-End, i.e. ctrl+alt+end, to open logout screen)
(add below line between <keyboard> and </keyboard>)

<keybind key="C-A-End">
<action name="Execute">
<command>lubuntu-logout</command>
</action>
</keybind>
```

Note: Next install the ‘apt-fast’ as it allows fast downloading as shown next. Then update and upgrade the operating system.

1.1 apt-fast

- Used for high speed software-updates using “apt-fast” (instead of “apt-get”)
- During installation process, select “apt-get” and “max connection = 10”

```
sudo add-apt-repository ppa:saiarcot895/myppa && sudo apt-get update && sudo apt-get ↵
↵ install apt-fast
```

- Then update and upgrade the Linux

```
sudo apt-fast update && sudo apt-fast upgrade
```

1.2 Remove username from terminal

Modify the `.bashrc` file as below, to remove the username and working directory etc. from the terminal,

```
$ cd

(use "xed" in Mint and "gedit" in Ubuntu in below command)
$ gedit .bashrc

(add anyone of the following lines at the end)

# display $ (or # for root)
export PS1="\$ "

# display user-name $
export PS1="\u \$ "

# display user-name@working-dir $
export PS1="\u@\w \$ "
```

1.3 Partition manager

```
sudo apt-fast install gparted
```

1.4 Terminator

- Advance terminal that allows split-screen and other features

```
sudo apt-fast install terminator
```

1.5 Tree

- 'tree' command can be useful see the directory structure,

```
sudo apt-fast install tree
```

1.6 TMUX

- TMUX can be used with any of the terminal to enhance the functionalities e.g. splitting windows etc. Some of the keyboard shortcuts are added in [TMUX Guide](#)

```
sudo apt-fast install tmux
```

1.7 Git

A list of Git-commands is shown at [Git Guide](#)

```
sudo apt-fast install git
```

1.8 VIM

- A list of Vim-commands is shown at [Vim Guide](#)

```
sudo add-apt-repository ppa:jonathonf/vim && sudo apt-fast update && sudo apt-fast install vim-gtk
```

- Download `.vimrc` file and **save to home folder (rename it to `'vimrc'`)**. And comment/uncomment/add plugins as per requirement,
- Install Vundle : This is used for managing plugins

```
git clone --depth 1 https://github.com/VundleVim/Vundle.vim.git ~/.vim/bundle/Vundle.vim
```

- Then, open `gvim/vim` and run `:PluginInstall`

1.9 Sublime-text-3

- A list of Sublime-commands is shown at [Sublime Guide](#)

```
sudo add-apt-repository ppa:webupd8team/sublime-text-3 && sudo apt-fast update && sudo apt-fast install sublime-text-installer
```

- After installing sublime, press **ctrl+shift+p** and select **“Install Packages Control”**
- **Install packages: ctrl+shift+p** and select **Package Control: Install Packages**, then type the package
 - print to html,
 - reStructuredText Improved,
 - reStructured Text (RST) snippets.
 - Cython syntax support
 - VHDL package for sublime text
 - SystemVerilog
- Change tabs-to-spaces : go to “preferences->settings” and replace the existing code with

```
{
  "ignored_packages":
  [
    "RestructuredText",
    "Vintage"
  ],
  "translate_tabs_to_spaces": true,
}
```

- Convert existing ‘tabs’ to ‘spaces’ : go to “preferences->Key Bindings” and replace the existing code with

```
[
  { "keys": ["ctrl+shift+y"], "command": "expand_tabs", "args" : {"set_translate_tabs" : true} }
]
```

Now press ‘ctrl+shift+y’ in the file, to replace tabs with spaces in the existing files.

1.10 Emacs

```
sudo apt-add-repository ppa:ubuntu-elisp/ppa && sudo apt-fast update && sudo apt-fast install ↵
↳ emacs-snapshot
```

1.11 Unrar

```
sudo apt-fast install unrar
```

1.12 LibreOffice

```
sudo apt-get install libreoffice
```

1.13 Latex and Texstudio

- Latex

```
sudo apt-fast install texlive-full
```

- Texstudio:

```
sudo apt-fast install texstudio
```

- Open Texstudio and

- Copy below Makeindex-code and “replace” the existing Makeindex-code from “Option->Configure-TexStudio->Commands->Makeindex”. This is required to build the “index” and “list of abbreviations”

```
makeindex %.nlo -s nomencl.ist -o %.nls -t %.nlg
```

- Download and save dictionary. Next, add dictionary to latex “Option->Configure-TexStudio->Language Checking”; locate the directory where the dictionary is saved “Spelling Dictionary directories”, and selected the dictionary “en_us.oxt”.

1.14 Zim Desktop

- It is required for latex-equation and making notes/checklist etc.

```
sudo add-apt-repository ppa:jaap.karssenber/zim && sudo apt-fast update && sudo apt-
↳ fast install zim
```

- Then add the equation-plugin. Go to “Edit->preferences->Plugins->select Insert Equation”
- Then go to “Insert->Equation” to type the equation (**first install latex and then add it**).

1.15 GHDL and IVerilog simulator

GHDL and IVerilog simulators can be used to simulate the VHDL and Verilog codes respectively,

- GHDL


```
sudo apt-fast install gnat
git clone --depth 1 https://github.com/ghdl/ghdl
./configure --prefix=/usr/local
sudo make
sudo make install
```

– Execute the code as below,

```
-- syntax check (first design and then testbench)
ghdl -s <filename.vhd>

-- analyse the code (first design and then testbench)
ghdl -a <filename.vhd>

-- elaborate the code (testbench)
ghdl -e <entity-name>

-- run the code (testbench)
ghdl -r <entity-name>

-- run the code and save results in vcd file (testbench)
ghdl -r <entity-name> --vcd=<filename.vcd>
```

- IVerilog

```
sudo apt-fast install iverilog
```

1.16 Vivado

```
sudo ./xsetup

(add part to .bashrc)
export PATH="/opt/Xilinx/Vivado/2017.4/bin:$PATH"

(if required, change permission for .Xilinx folder)
sudo chmod -R 777 .Xilinx/

(run vivado to start)
vivado
```

1.17 Quartus & Modelsim

Note:

- These settings are for Quartus 17 (supports only 64 bit OS) and Ubuntu 16.04.4 (64 bit).
 - See [Section 3.11](#) for installing Quartus 13 (supports both 32 and 64 bit OS) on 32-bit Ubuntu.
-

- Download Quartus 17 (QuartusLite-Versions are free) with Modelsim and devices.
- Next, install following libraries on Ubuntu,

Warning: Open “Software updates” and select “main repository” and enable “unstable packages” and “source-code” for this step; as “libc6-dev” etc. may not be available in the other servers’ repositories.

```

sudo apt-fast install libxft2 libxft2:i386 lib32ncurses5
sudo apt-fast install libxrender1:i386 libxtst6:i386 libxi6:i386
sudo apt-fast install libc6-dev
('enable source code repositories' in software sources for below two packages)
sudo apt-fast build-dep -a i386 libfreetype6
sudo apt-fast install libc6-dev-i386

(optional : fonts for modelsim)
sudo apt-fast install xfonts-75dpi

```

- Change the permission for the 'Quartus—.run' file (i.e. e.g. QuartusLiteSetup-17.0.0.595-linux.run) and then install as shown below,

```
chmod 777 Quart*
```

- Install Quartus. Select Free-modelsim option and desired-Devices during installation,

```
./Quart*
```

- Modelsim settings

```
(go to modelsim_ase folder)
cd
```

- Modify 'vco' file i.e. find vco="linux_rh60" and change it to vco="linux"

```
(go to folder 'modelsim_ase')
cd intelFPGA_lite/17.0/modelsim_ase/

(change permission of vco file)
chmod 777 vco

(change vco="linux_rh60" to vco="linux")
sudo gedit vco

(go to modelsim_ase/bin folder and run 'vsim')
cd bin
./vsim
```

- Modify '.bashrc' file to run 'modelsim' from any folder,

```

cd
gedit .bashrc

(add following line at the end. Replace "meher" with correct username)
export PATH="/home/meher/intelFPGA_lite/17.0/modelsim_ase/bin:$PATH"
export PATH="/home/meher/intelFPGA_lite/17.0/quartus/bin:$PATH"

(now open quartus and modelsim using commands 'quartus' and 'vsim' respectively, as shown
↪ below)
$ quartus
$ vsim

```

1.17.1 JTAG Settings

- It is required for loading the .sof file on FPGA.
- Go to rules.d folder and create file with name '51-usbblaster.rules' as below,

```

cd /etc/udev/rules.d

(use "xed" in Mint and "gedit" in Ubuntu in below command)

sudo gedit 51-usbblaster.rules

```

- Next, paste following code to it

```
# Altera USB-Blaster for Quartus FPGA Software
SUBSYSTEMS=="usb", ATTR{idVendor}=="09fb", ATTR{idProduct}=="6001", MODE="0666"
SUBSYSTEMS=="usb", ATTR{idVendor}=="09fb", ATTR{idProduct}=="6002", MODE="0666"
SUBSYSTEMS=="usb", ATTR{idVendor}=="09fb", ATTR{idProduct}=="6003", MODE="0666"
# USB-Blaster II
SUBSYSTEMS=="usb", ATTR{idVendor}=="09fb", ATTR{idProduct}=="6010", MODE="0666"
SUBSYSTEMS=="usb", ATTR{idVendor}=="09fb", ATTR{idProduct}=="6810", MODE="0666"
```

- Connect the FPGA and type command 'lsusb'; it will show the 'Altera Blaster' as shown below (If not, reboot the computer)

```
lsusb

(Similar to following result will be displayed, look for the Altera Blaster)

/etc/udev/rules.d$ lsusb
Bus 002 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 007 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
Bus 006 Device 002: ID 03f0:0024 Hewlett-Packard KU-0316 Keyboard
Bus 006 Device 003: ID 09fb:6001 Altera Blaster
```

1.17.2 Modelsim-compilation from terminal

- Create the work directory,

```
vlib work
```

- Compile the VHDL or Verilog code using 'vcom' and 'vlog' respectively.

```
vcom <file_name>.vhd
vlog <file_name>.v

or

vcom *.vhd
vlog *.v
```

- Start the simulator. This will open the Modelsim GUI.

```
vsim <file_name>
```

- Simulate the design (but do not run the simulation).
- Then follow the steps in the section [Saving results in .vcd format using ModelSim](#), to save the results in vcd-file.

1.17.3 Saving results in .vcd format using ModelSim

Sometimes it is better to save the simulation results in .vcd format, which can be done using Modelsim as below,

- Compile and simulate the design (but do not run the simulation)
- Next create the vcd file at desired location,

```
vcd file /<location for vcd file>/test.vcd e.g.
vcd file /home/test.vcd
```

- add all waveforms to it,

```
vcd add -r /*
```

- Run the simulator using '-all' or desired time,

```
run -all

or

run 10ms
```

- Save the results

```
vcd checkpoint
```

- Close modelsim if required,

```
quit -f
```

1.17.4 .vcd to .wlf conversion

The .vcd files can not be read directly by Modelsim, therefore it is required to convert it into .wlf format, as shown below. Or use *gtk-wave* to open the .vcd file.

- First convert the .vcd format to .wlf format,

```
vcd2wlf <location of .vcd file> <location for .wlf file> e.g.

vcd2wlf /home/test.vcd /home/test.wlf
```

- Next, open this .wlf file i.e. “Files->Open->select all from drop-down menu->select .wlf file”

1.17.5 Shortcut icons

- Create three files at desired location with ‘.desktop’ extension and paste the codes as below
- Quartus.desktop (use correct quartus location and replace “meher” with correct username)

```
[Desktop Entry]
Type=Application
Version=0.9.4
Name=Quartus (Quartus Prime 17.0) Lite Edition
Comment=Quartus (Quartus Prime 17.0)
Icon=/home/meher/intelFPGA_lite/17.0/quartus/adm/quartusii.png
Exec=/home/meher/intelFPGA_lite/17.0/quartus/bin/quartus --64bit
Terminal=false
Path=/home/meher/intelFPGA_lite/17.0
```

– change the permission

```
chmod 777 Quartus.desktop
```

- Nios.desktop (use correct nios location and replace <username> with correct username)

```
[Desktop Entry]
Type=Application
Version=0.9.4
Name=NiosII
Comment=NiosII(Quartus Prime 17.0)
Icon=/home/meher/intelFPGA_lite/17.0/nios2eds/bin/eclipse_nios2/icon.xpm
Exec=/home/meher/intelFPGA_lite/17.0/nios2eds/bin/eclipse-nios2
Terminal=false
Path=/home/meher/intelFPGA_lite/17.0
```

– change the permission

```
chmod 777 Nios.desktop
```

- Modelsim.desktop (use correct modelsim location and replace <username> with correct username)

```
[Desktop Entry]
Type=Application
Version=0.9.4
Name=Modelsim
Comment=ModelSim(Quartus Prime 17.0)
Icon=/home/meher/intelFPGA_lite/17.0/modelsim_ase/tcl/bitmaps/m.gif
Exec=/home/meher/intelFPGA_lite/17.0/modelsim_ase/bin/vsim
Terminal=true
Path=/home/meher/intelFPGA_lite/17.0
```

- change the permission

```
chmod 777 Modelsim.desktop
```

1.18 PuTTY (TCP/IP client)

```
sudo apt-fast install putty
```

1.19 Anaconda (Python)

- Download correct version of [Anaconda](#) i.e. 32 bit or 64 bit with required Python version i.e. 2 or 3.
- Then run the following commands. And select ‘Yes’ at the end of installation to set the anaconda as default-python environment.

```
chmod 777 Ana*
./Ana*
```

- Close and reopen the terminal.
- Download `requirements.txt` and run below command to install the additional packages,

```
(install below for mysqlclient, see MySQL installation as well)
sudo apt-get install libmysqlclient-dev

pip install -r requirements.txt

# if mysqlclient does not connect then use '127.0.0.1' (instead of 'localhost')
DATABASES = {
    'default': {
        'ENGINE': 'django.db.backends.mysql',
        'NAME': 'myproject',
        'USER': 'meher',
        'PASSWORD': 'Meher123!',
        'HOST': '127.0.0.1',
        'PORT': '',
    }
}
```

- Test ‘virtualenv’
Test the virtualenv. Old version of matplotlib is used, as newer is not installed properly

```
virtualenv test -p python3.6

source test/bin/activate

pip install matplotlib==1.5.3
```

- To unset/set the anaconda as default-python, go to `~/.bashrc` file and remove/add following line there,

```
export PATH="<location of anaconda>/bin:$PATH" e.g.
export PATH="/home/<username>/anaconda3/bin:$PATH"
```

- Go to `<installed-location-anaconda>/bin` and rename 'python3' to 'python36' (optional step). Now, we can use following commands to open different python shells,

```
( open linux-python2 shell)
$ python2

( open anaconda-python3 shell)
$ python

( open linux-python3 shell)
$ python3
```

Or we can set any name to start Python by making following changes in `.bashrc` file,

```
(use "xed" in Mint and "gedit" in Ubuntu in below command)
gedit .bashrc

(add following line at the end)

(open python3 using 'python' command)
alias python='/usr/bin/python3'

(open anaconda-python using 'anaconda' command)
alias anaconda='<installed-location-anaconda>/bin/python'
```

1.20 MySQL Server

```
sudo apt-fast install mysql-server
```

```
sudo apt-fast install mysql-workbench
```

1.21 PostgreSQL

```
sudo apt-fast install postgresql postgresql-contrib

(graphical tool)
sudo apt-fast install pgadmin3

(commands)
(login : user 'postgres' is created during installation)
sudo su - postgres

(start postgre session)
psql

(create database, user and password)
CREATE DATABASE myproject;
CREATE USER root WITH PASSWORD 'root';
```

- pgadmin3 settings

```
* in above step we used "CREATE DATABASE myproject;" and "CREATE USER root WITH PASSWORD
↪ 'root';"
* Now open pgadmin3 and fill following details,

- Name : myproject
- HOST : localhost
- Port : 5432
- username : root
- password : root
- Group : Servers

* Above setting will connect to the database. Press 'ctrl-e' to write the queries
```

1.22 C++ and Fortran compiler

```
sudo apt-fast install g++

(linting tool)
sudo apt-fast install splint
```

```
sudo apt-fast install gfortran
```

1.23 Java

```
sudo apt-fast install default-jdk
```

1.24 Qt Designer

It can be used for designing the 'Desktop user interface'.

```
(install qt5, if required)
sudo apt-fast install qt5-default
```

Next, install any one of the two,

- qt4-designer is a part of IDE which creates only Form.
- qtcreator is the IDE

```
sudo apt-fast install qt4-designer
(run below to start qt4-designer)
designer

or

sudo apt-fast install qtcreator
(run below to start qtcreator)
qtcreator
```

- The '.ui' file can be converted into python as below,

```
pyuic5 -x input.ui -o output.py
```

1.24.1 selenium setup

- Go to [Selenium website](#) and download “Selenium Standalone Server (jar file)” and “Java : Selenium Client & WebDriver Language Bindings (zip file)”
- Extract the files from the zipped folder and copy all the jar-files in one folder (including jar-files in subfolders).
- Download [Chrome driver](#) for Selenium.
- Download [Eclipse IDE for Java EE Developers](#)

1.24.2 Test the setup

- Open Eclipse. Create project ‘TestSelenium’ and add package ‘my_package’ to it. Next, add a file ‘OpenChrome.java’ to it. Copy the below code to it.
- Provide correct location of ‘chromedriver’ i.e. replace “/home/meher/Desktop/java_eclipse/driver/chromedriver” with correct path.

```
package my_package;
import org.openqa.selenium.chrome.ChromeDriver;

public class OpenChrome {
    public static void main (String args []) {
        // location of chrome driver
        System.setProperty("webdriver.chrome.driver",
            "/home/meher/Desktop/java_eclipse/driver/chromedriver");

        ChromeDriver driver = new ChromeDriver();
        driver.get("https://www.google.com/");
    }
}
```

- Right click on the ‘TestSelenium->Build Path->Configure Build Path->Libraries->Add External Jars’. Add all the jar files and press ‘apply and close’.
- Right click on ‘OpenChrome.java’ and “Run as->Java application”.
- If everything is correct, then Chrome will open.

1.25 Scratch (visual coding)

```
sudo apt-fast install scratch
```

1.26 Simple Screen Recorder

```
sudo add-apt-repository ppa:maarten-baert/simplescreenrecorder && sudo apt-fast update &&
↪sudo apt-fast install simplescreenrecorder
```

1.27 Audacious (audio player)

```
sudo apt-fast install audacious
```


1.28 VLC (video player and converter)

```
sudo apt-fast install vlc browser-plugin-vlc
```

- To convert or clip the videos,
 - Go to “Media->Convert/Save” and “Add” the file
 - To clip the video,
 - * select “Show more option”
 - * Go to “Edit Options” and type the below code,

```
(modify the start time only)
:file-caching=300 :start-time=<time in second> e.g.
:file-caching=300 :start-time=2

(modify both the start time and end time)
:file-caching=300 :start-time=<time in second> :stop-time<time in second>

(define run-time to run fast)
:file-caching=300 :start-time=<time in second> :stop-time<time in second> :run-time
↪<time in second>
```

- * In the below step, the during conversion the complete time-duration may be displayed, but it will stop after the time which is defined in above step.
- Finally, press “Convert/Save” and select the correct “Profile” for conversion.

1.29 KDenlive video editors

- Use KDenlive for professional video editing

```
sudo add-apt-repository ppa:kdenlive/kdenlive-stable && sudo apt-fast update && sudo apt-
↪fast install kdenlive
```

1.30 Furius ISO Mount

```
sudo apt-fast install furiusisomount
```

1.31 Dictionary

```
sudo apt-fast install artha
```

1.32 Browser

- Chromium:

```
sudo apt-fast install chromium-browser
```

- Google Chrome: download .deb file from website and install
- Opera: download .deb file from website and install

1.33 PDF editors

- Okular : it allows highlighting and comments in PDF.

```
sudo apt-fast install okular
```

- PDF-Shuffler (for cropping and PDF-Shuffling):

```
sudo apt-fast install pdfshuffler
```

1.34 Indicator-StickyNotes

```
sudo apt-add-repository ppa:umang/indicator-stickynotes && sudo apt-fast update && sudo apt-
↳fast install indicator-stickynotes
```

1.35 gtk-wave

- It can be used for viewing VCD-Waveforms i.e. simulation results of FGPA

```
sudo apt-fast install gtkwave
```

1.36 Typing tutor

```
sudo apt-fast install klavaro
```

1.37 PCB design

```
sudo apt-fast install eagle
```

1.38 Bootable USB

```
(format USB with Fat32, it does not work for bootable-Windows)
sudo add-apt-repository ppa:gezakovacs/ppa && sudo apt-fast update && sudo apt-fast install
↳unetbootin

(format USB with NTFS)
sudo add-apt-repository ppa:nilarimogard/webupd8 && sudo apt-fast update && sudo apt-fast
↳install woeusb
```

Note: If grub is missing after installing Windows or for some other reasons, then

1. Start Ubuntu from 'ubuntu-live-cd' with option 'Try ubuntu'
2. Run below codes,

```
(replace sda1 with correct sda-value i.e. drive where 'Ubuntu' is installed)
sudo mount /dev/sda1 /mnt

(do not write number after 'sda')
sudo grub-install --root-directory=/mnt/ /dev/sda
```

3. Reboot the system and run system without 'ubuntu-live-cd'
4. Open terminal and run "sudo update-grub"
5. Use below to have same time settings in dual boot system

```
(to have same time in multiboot system)
timedatectl set-local-rtc 1

(use below to remove above settings)
timedatectl set-local-rtc 0
```

1.39 cups-pdf

- Print to pdf; by default the PDF is saved to location ~/PDF/. This is required to print the pdf through VIM using :hardcopy command

```
sudo apt-fast install cups-pdf
```

1.40 Image editors

1.40.1 Shutter screenshot program

- Install Shutter for screenshot and modifying image as paint-brush

```
sudo add-apt-repository ppa:shutter/ppa && sudo apt-fast update && sudo apt-fast install ↵
↳shutter
```

- To enable 'edit' option in Shutter, run following command

```
sudo apt-fast install libgoo-canvas-perl
```

- The "gnome-web-photo" is used to generate full size image files and thumbnails from HTML files and web pages. To enable screenshots of websites, run following command

```
sudo apt-fast install gnome-web-photo
```

- To compress the image, press 'ctrl+shift+p', and select 'resize->run'. Enter the width e.g. 500 (width will be filled automatically). Press 'save'.

1.40.2 Shotwell

Shutter does not provide the rotate-image feature. Shotwell can be used to rotate and crop the image quickly.

```
sudo add-apt-repository ppa:yg-jensge/shotwell && sudo apt-fast update && sudo apt-fast install shotwell
```

1.40.3 GIMP image editor

```
sudo add-apt-repository ppa:otto-kesselgulasch/gimp && sudo apt-fast update && sudo apt-fast ↵
↳ install gimp
```

1.40.4 PDF to JPG/PNG conversion

Use any combination for conversion as shown below,

```
convert -density 300 <file_name.pdf> <file_name.jpg>
convert -density 300 <file_name.pdf> <file_name.png>
convert -density 300 <file_name.jpg> <file_name.png>
```

1.41 Ultracopier

- Incomplete transfer is also displayed on the transferred-location; and it is very hard to find which files are transferred completely.
- Ultracopier removes this problem along with various other features i.e. pause/resume copy etc.

```
sudo apt-fast install ultracopier
```

- See [Start-up programs](#) to add the ultracopier and/or other programs in start-up list.
- After following the steps in [Start-up programs](#), restart the machine and Ultracopier will appear in the ‘task-bar (with floppy icon)’.
- **How to use Ultracopier:**
 - Right click on this floppy icon and select “Add copy/moving -> Add copy/transfer/move”.
 - A window will appear, which ask for the directory to be copied, **Close this window to copy the file.**
 - Now, click on the “More” option and click on the “+” sign and select the “file” option. Next select the file to be copied.
 - Finally it will ask for the paste location, select the paste-location for the file.
- To change the default copy option as ‘file (not folder)’, right click on ‘floppy icon->options->when manual open->ask source as file’.

1.42 Start-up programs

- Programs can be added to start up in two ways. Here [Ultracopier](#) is added as start-up program,
 - **Using Terminal :**
 - * go to ‘autostart’ folder (or create it, if not exist) and create a file with desired name (with .desktop extension) as below,

```
(try below)
cd ~/.config/autostart/

(if folder does not exist, then create one)
mkdir -p ~/.config/autostart

cd ~/.config/autostart/

(use "xed" in Mint and "gedit" in Ubuntu in below command)
gedit Ultracopier.desktop
```

- * And paste the below code to the file. Note that “/user/bin/ultracopier” is the location of the file

```
[Desktop Entry]
Type=Application
Exec=/usr/bin/ultracopier
X-GNOME-Autostart-enabled=true
NoDisplay=false
Hidden=false
Name[en_IN]=Ultracopier
Comment[en_IN]=copy manager
X-GNOME-Autostart-Delay=0
```

– Using “Start-up application”

- * Go to “Menu” and find “Startup Applications”
- * Click on “Add->Custom command” and fill the fields as below,

```
Name      : Ultracopier
Command   : /user/bin/ultracopier
Command   : copy manager
startup delay : 0
```

- * Restart the machine

1.43 WINE

- It is Windows Program Loader which is used to install .exe file in Linux

```
sudo apt-fast install wine
```

1.44 gtkpod

- It can be used to load the songs on IPod.
- Open ‘gtkpod’ and copy the song to IPod and **save all changes**.
- If IPod is not detected by ‘gtkpod’, then restore the IPod using iTunes software on Windows.

```
sudo apt-fast install gtkpod
```

1.45 Firefox Add-ons

- [1-Click YouTube Video Downloader](#)
- [DownloadThemAll!](#)
- [Firebug](#)
- [Firepath](#)
- [Selenium IDE](#)
- [SQLite Manager](#)
- [Video DownloadHelper](#)

1.46 Thunderbird Add-ons

- [Lightning \(calendar\)](#)

1.47 Custom screen resolution

Custom screen resolution may be required, when the correct resolution is not available in the list of resolutions. In this section, 1920x1080 resolution is added for the second screen (i.e. monitor connected to the laptop using VGA port),

1. First check the available display devices and corresponding screen-resolutions using following command. In the following outputs two displays are shown i.e. 'LVDS1 (i.e. Laptop screen)' and 'VGA1 (i.e. second screen)'. The * sign shows the currently used resolution.

```
$ xrandr

Screen 0: minimum 8 x 8, current 2304 x 800, maximum 32767 x 32767

LVDS1 connected primary 1280x800+0+0 (normal left inverted right x axis y axis) 300mm x 190mm
 1280x800    60.01**
 1024x768    60.00
  800x600    60.32   56.25
  640x480    59.94
  640x400    60.00

VGA1 connected 1024x768+1280+0 (normal left inverted right x axis y axis) 0mm x 0mm
 1024x768    60.00*
  800x600    60.32   56.25
  848x480    60.00
  640x480    59.94
```

2. We will add the screen resolution for the VGA1 i.e. the device which is connected to Laptop using VGA port.
3. For this, run the following command to find the CVT "mode line values" for the given resolution. In the below code, 1920x1080 resolution is used.

```
(type the desired resolution below)

$ cvt 1920 1080

# 1920x1080 59.96 Hz (CVT 2.07M9) hsync: 67.16 kHz; pclk: 173.00 MHz
Modeline "1920x1080_60.00" 173.00 1920 2048 2248 2576 1080 1083 1088 1120 -hsync +vsync
```

4. Now add the above 'new mode' as below.

```
(copy the mode line value from the above step and paste it after '--newmode')

$ sudo xrandr --newmode "1920x1080_60.00" 173.00 1920 2048 2248 2576 1080 1083 1088_
→1120 -hsync +vsync
```

5. Next, add the new mode to the desired display device, i.e. VGA1 here,

```
(replace VGA1 with correct name)

$ sudo xrandr --addmode VGA1 "1920x1080_60.00"
```

6. Now go to "System settings->Displays" and select the newly added resolution.
7. Finally save the settings in the .profile file, so that it will be available on the next start (otherwise we need to perform the above steps on each restart). Paste the commands in steps 4 and 5 (without 'sudo') at the end of the file as shown below,

```
(use "xed" in Mint and "gedit" in Ubuntu in below command)

$ gedit ~/.profile

(and paste the following line at the end of file)
```

(continues on next page)

(continued from previous page)

```
xrandr --newmode "1920x1080_60.00" 173.00 1920 2048 2248 2576 1080 1083 1088 1120 -  
↳hsync +vsync  
xrandr --addmode VGA1 "1920x1080_60.00"
```

1.48 SD card

Sometimes SD/MMC card is not detected. To avoid the problem, 'reinstall udisks2',

```
sudo apt-fast install --reinstall udisks2
```

1.49 Reduced size PDF

PDF compression can be done using following commands,

```
(first convert the pdf to ps format)  
pdf2ps file_name.pdf file_name.ps  
  
(next convert the ps to pdf again)  
ps2pdf file_name.ps new_file_name.pdf
```

1.50 Change the GRUB in multiboot system

New linux installation changes the Boot-menu at the startup (based on newly installed OS). It can be updated using boot-repair e.g. if we want the Boot-menu according to Linux-Mint, then run the below commands in the Linux-Mint and use the default settings,

```
sudo add-apt-repository ppa:yannubuntu/boot-repair && sudo apt-fast update && sudo apt-fast install boot-  
↳repair  
boot-repair
```

1.51 Virtual Box

```
sudo apt-fast install virtualbox
```

1.52 Calibre

This can be used for reading the PDF, EPUB and mobi etc. formats,

```
sudo -v && wget -nv -O- https://download.calibre-ebook.com/linux-installer.py | sudo python -  
↳c "import sys; main=lambda:sys.stderr.write('Download failed\n'); exec(sys.stdin.read());  
↳main()"
```

1.53 NES Game Emulator

Emulators for games like Mario and Tank,

```
sudo apt-fast install gfceu
```


Chapter 2

Software installation in Fedora

2.1 Update packages

Use 'dnf' or 'yum' to install the packages.

```
sudo dnf update && sudo dnf upgrade  
or  
sudo yum update && sudo dnf upgrade
```

Avoid updating packages

```
sudo gvim /etc/dnf/dnf.conf  
  
(add below line)  
exclude=mysql* otherPackages
```

2.2 Google chrome

Go to Activities->Software and activate the third-party packages. Search Google-chrome and install.

2.3 Update grub

Update grub if required

```
sudo grub2-mkconfig -o /boot/grub2/grub.cfg
```

2.4 Show the desktop

To enable it, go to Activities->Keyboard->Hide all normal widows->set keys 'super+shift+h'.

2.5 Remove username from terminal

Modify the .bashrc file as below, to remove the username and working directory etc. from the terminal,

```

$ cd
$ gedit .bashrc

(add anyone of the following lines at the end)

# display $ (or # for root)
export PS1="\$ "

# display user-name $
export PS1="\u \$ "

# display user-name@working-dir $
export PS1="\u@\w \$ "

```

2.6 Anaconda (Python)

- Download correct version of [Anaconda](#) i.e. 32 bit or 64 bit with required Python version i.e. 2 or 3.
- Then run the following commands. And select 'Yes' at the end of installation to set the anaconda as default-python environment.

```

chmod 777 Ana*

./Ana*

```

- Close and reopen the terminal.
- Download `requirements.txt` and run below command to install the additional packages,

```

(install below for mysqlclient, see MySQL installation as well)
sudo dnf install mariadb-devel
sudo dnf install python python-devel mysql-devel redhat-rpm-config gcc

pip install -r requirements.txt

# if mysqlclient does not connect then use '127.0.0.1' (instead of 'localhost')
DATABASES = {
    'default': {
        'ENGINE': 'django.db.backends.mysql',
        'NAME': 'myproject',
        'USER': 'meher',
        'PASSWORD': 'Meher123!',
        'HOST': '127.0.0.1',
        'PORT': '',
    }
}

```

- To unset/set the anaconda as default-python, go to `~/.bashrc` file and remove/add following line there,

```

export PATH="<location of anaconda>/bin:$PATH" e.g.

export PATH="/home/<username>/anaconda3/bin:$PATH"

```

- Go to `<installed-location-anaconda>/bin` and rename 'python3' to 'python36' (optional step). Now, we can use following commands to open different python shells,

```

( open linux-python2 shell)
$ python2

( open anaconda-python3 shell)
$ python

```

(continues on next page)

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```
( open linux-python3 shell)
$ python3
```

Or we can set any name to start Python by making following changes in .bashrc file,

```
gedit .bashrc

(add following line at the end)

(open python3 using 'python' command)
alias python='/usr/bin/python3'

(open anaconda-python using 'anaconda' command)
alias anaconda='<installed-location-anaconda>/bin/python'
```

2.7 Terminator

- Advance terminal that allows split-screen and other features

```
sudo yum install terminator
```

2.8 Git

Git is preinstalled in Fedora.

```
sudo yum install git
```

2.9 VIM

```
sudo yum install vim gvim
```

- Download .vimrc file and save to home folder (rename it to '.vimrc'). And comment/uncomment/add plugins as per requirement,
- Install Vundle : This is used for managing plugins

```
git clone --depth 1 https://github.com/VundleVim/Vundle.vim.git ~/.vim/bundle/
↳Vundle.vim
```

- Then, open gvim/vim and run :PluginInstall

2.10 Unrar

```
sudo yum install unrar
```

2.11 Latex and Texstudio

- Latex

```
sudo yum install texlive-scheme-full texlive latexmk
```

- Texstudio:

```
sudo yum install texstudio
```

Note: Use ‘sudo’ to open the ‘texstudio’,

```
$ texstudio

or

$ texstudio <filename.tex>
```

- Open Texstudio and
 - Copy below Makeindex-code and “replace” the existing Makeindex-code from “Option->Configure-TexStudio->Commands->Makeindex”. This is required to build the “index” and “list of abbreviations”

```
makeindex %.nlo -s nomencl.ist -o %.nls -t %.nlg
```

2.12 Sublime text

```
sudo rpm -v --import https://download.sublimetext.com/sublimehq-rpm-pub.gpg && sudo dnf
→config-manager --add-repo https://download.sublimetext.com/rpm/stable/x86_64/sublime-text.
→repo && sudo dnf install sublime-text
```

- After installing sublime, press **ctrl+shift+p** and select “**Install Packages Control**”
- **Install packages: ctrl+shift+p** and select **Package Control: Install Packages**, then type the package
 - print to html,
 - reStructuredText Improved,
 - reStructured Text (RST) snippets.
 - Cython syntax support
 - VHDL package for sublime text
 - SystemVerilog
- Change tabs-to-spaces : go to “preferences->settings” and replace the existing code with

```
{
  "ignored_packages":
  [
    "RestructuredText",
    "Vintage"
  ],
  "translate_tabs_to_spaces": true,
}
```

- Convert existing ‘tabs’ to ‘spaces’ : go to “preferences->Key Bindings” and replace the existing code with

```
[
  { "keys": ["ctrl+shift+y"], "command": "expand_tabs", "args" : {"set_
→translate_tabs" : true} }
]
```

Now press ‘ctrl+shift+y’ in the file, to replace tabs with spaces in the existing files.

2.13 Zim Desktop

- It is required for latex-equation and making notes/checklist etc.

```
sudo yum install Zim
```

- Then add the equation-plugin. Go to “Edit->preferences->Plugins->select Insert Equation”
- Then go to “Insert->Equation” to type the equation (**first install latex and then add it**).

2.14 Add application to favorites

Copy the ‘shortcut icon (i.e. .desktop file with execute permission)’ inside the /usr/share/applications/ folder. In this way, the application will be added to “Application bar” from where we can drag it to ‘Favorites bar’.

2.15 PuTTY (TCP/IP client)

```
sudo yum install putty
```

2.16 Postgre SQL

- Installation

```
sudo yum install postgresql-server postgresql-contrib

(graphical tool)
sudo yum install pgadmin3

(commands)
sudo su - postgres
psql
CREATE DATABASE myproject;
CREATE USER root WITH PASSWORD 'root'
```

- Settings for Django

```
(initialize server)
sudo postgresql-setup initdb

(start service)
sudo systemctl start postgresql

(make server available for users other than system-users e.g. Django-applications)
(change 'indent' to 'md5' as shown below)
sudo vim /var/lib/pgsql/data/pg_hba.conf

# TYPE DATABASE USER ADDRESS METHOD
# "local" is for Unix domain socket connections only
local all all peer
# IPv4 local connections:
#host all all 127.0.0.1/32 ident
host all all 127.0.0.1/32 md5
# IPv6 local connections:
#host all all ::1/128 ident
host all all ::1/128 md5
```

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```
# Allow replication connections from localhost, by a user with the
# replication privilege.
#local  replication  postgres                                peer
#host   replication  postgres          127.0.0.1/32        ident
#host   replication  postgres          ::1/128            ident

(restart and enable server)
sudo systemctl restart postgresql
sudo systemctl enable postgresql

(login : user 'postgres' is created during installation)
sudo su - postgres

(start postgre session)
psql

(create database, user and password)
CREATE DATABASE myproject;
CREATE USER root WITH PASSWORD 'root';
```

- pgadmin3 settings

```
* in above step we used "CREATE DATABASE myproject;" and "CREATE USER root WITH PASSWORD
↪ 'root';"
* Now open pgadmin3 and fill following details,

- Name : myproject
- HOST : localhost
- Port : 5432
- username : root
- password : root
- Group : Servers

* Above setting will connect to the database. Press 'ctrl-e' to write the queries
```

2.17 MySQL (version 80, Fedora 27)

```
sudo dnf install https://dev.mysql.com/get/mysql57-community-release-fc27-10.noarch.rpm

(install mysql server and workbench)
sudo dnf install mysql-community-server mysql-workbench-community

(start and enable service)
systemctl start mysqld.service
systemctl restart mysqld.service
systemctl enable mysqld.service

(see the temporary password generated during installation)
grep 'A temporary password is generated for root@localhost' /var/log/mysqld.log |tail -1

(run below command and enter temporary password. After that it will ask for new password)
(new password should be atleast 8 characters with Capital letter, number and special character)
(e.g. Meher123!)
/usr/bin/mysql_secure_installation

(start mysql)
mysql -h localhost -u root -p
```

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```
(install below for mysqlclient, see MySQL installation as well)
sudo dnf install mariadb-devel
sudo dnf install python python-devel mysql-devel redhat-rpm-config gcc

pip install mysqlclient
```

- Create database, user and give permission to users to access the database,

```
$ mysql -u root -p

CREATE DATABASE myproject;
CREATE USER 'meher' IDENTIFIED BY 'Password123!';
GRANT ALL ON myproject.* TO 'meher';
FLUSH PRIVILEGES;

# if mysqlclient does not connect then use '127.0.0.1' (instead of 'localhost')
DATABASES = {
    'default': {
        'ENGINE': 'django.db.backends.mysql',
        'NAME': 'myproject',
        'USER': 'meher',
        'PASSWORD': 'Password123!',
        'HOST': '127.0.0.1',
        'PORT': '',
    }
}
```

2.18 C++ and Fortran compiler

```
sudo yum install gcc-c++
```

```
sudo yum install gcc-gfortran
```

2.19 VLC

```
sudo dnf install https://download1.rpmfusion.org/free/fedora/rpmfusion-free-release-$(rpm -E %fedora).
↳noarch.rpm && sudo dnf install vlc
```

2.20 Audacious (audio player)

```
sudo yum install audacious
```

2.21 ISO Mount

```
(create the location for mount e..g 'disk')
sudo mkdir -p /mnt/disk

(mount the image)
```

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```
sudo mount -o loop /<location.iso> /mnt/disk

(unmount the image)
sudo umount /mnt/disk
```

2.22 Dictionary

```
sudo yum install artha
```

2.23 PDF editors

- Okular : it allows highlighting and comments in PDF.

```
sudo yum install okular
```

- PDF-Shuffler (for cropping and PDF-Shuffling):

```
sudo yum install pdfshuffler
```

2.24 gtk-wave

- It can be used for viewing VCD-Waveforms i.e. simulation results of FGPA

```
sudo yum install gtkwave
```

2.25 UNetbootin (Bootable USB)

```
sudo yum install unetbootin
```

2.26 cups-pdf

- Print to pdf; by default the PDF is saved to location ~/PDF/. This is required to print the pdf through VIM using :hardcopy command

```
sudo yum install cups-pdf
```

2.27 Image editors

2.27.1 Shutter screenshot program

- Install Shutter for screenshot and modifying image as paint-brush

Note:

- Login to Fedora with 'Gnome on Xorg' option, otherwise shutter will not work for capturing image.

- Otherwise use inbuilt ‘Screenshot’ tool for capturing images and then use ‘shutter’ to modify the image. Using ‘shift+print-screen’ to select the area for screenshot. Image will be saved in /pictures/ folder

```
sudo yum install shutter
```

- To compress the image, press ‘ctrl+shift+p’, and select ‘resize->run’. Enter the width e.g. 500 (width will be filled automatically). Press ‘save’.

2.27.2 Shotwell

Shutter does not provide the rotate-image feature. Shotwell can be used to rotate and crop the image quickly.

```
sudo yum install shotwell
```

2.27.3 GIMP image editor

```
sudo yum install gimp
```

2.27.4 PDF to JPG/PNG conversion

Use any combination for conversion as shown below,

```
convert -density 300 <file_name.pdf> <file_name.jpg>
convert -density 300 <file_name.pdf> <file_name.png>
convert -density 300 <file_name.jpg> <file_name.png>
```

2.28 gtkpod

- It can be used to load the songs on IPod.
- Open ‘gtkpod’ and copy the song to IPod and **save all changes**.
- If IPod is not detected by ‘gtkpod’, then restore the IPod using iTunes software on Windows.

```
sudo yum install gtkpod
```

2.29 Firefox Add-ons

- Video DownloadHelper
- DownloadThemAll
- Firebug
- Firepath
- SQLite Manager
- Selenium IDE

2.30 Thunderbird Add-ons

- MinimizeToTray revived (install and change preferences)
- Lightning (calendar)

- Lightning month tab (to display more than one month)
- Birthday reminder

2.31 Custom screen resolution

Note:

- Login to Fedora with ‘Gnome on Xorg’ option, otherwise shutter will not work for capturing image.
- Or, disable WAYLAND0 as shown in hte below process.

Custom screen resolution may be required, when the correct resolution is not available in the list of resolutions. In this section, 1920x1080 resolution is added for the second screen (i.e. monitor connected to the laptop using VGA port),

1. First check the available display devices and corresponding screen-resolutions using following command. In the following outputs two displays are shown i.e. ‘LVDS1 (i.e. Laptop screen)’ and ‘VGA-1 (i.e. second screen)’. The * sign shows the currently used resolution.

```
$ xrandr

Screen 0: minimum 8 x 8, current 2304 x 800, maximum 32767 x 32767

LVDS1 connected primary 1280x800+0+0 (normal left inverted right x axis y axis) 300mm x 190mm
 1280x800    60.01**
 1024x768    60.00
  800x600    60.32    56.25
  640x480    59.94
  640x400    60.00

VGA-1 connected 1024x768+1280+0 (normal left inverted right x axis y axis) 0mm x 0mm
 1024x768    60.00*
  800x600    60.32    56.25
  848x480    60.00
  640x480    59.94
```

Note: If WAYLAND0 is shown at the output of the ‘xrandr’ command (instead of LVDS or VGA-1 etc.), then disable ‘WAYLAND’ as below,

```
$ gedit /etc/gdm/custom.conf

(uncomment the below line i.e. remove '#')

WaylandEnable=false
```

2. We will add the screen resolution for the VGA-1 i.e. the device which is connected to Laptop using VGA port.
3. For this, run the following command to find the CVT “mode line values” for the given resolution. In the below code, 1920x1080 resolution is used.

```
(type the desired resolution below)

$ cvt 1920 1080

# 1920x1080 59.96 Hz (CVT 2.07M9) hsync: 67.16 kHz; pclk: 173.00 MHz
Modeline "1920x1080_60.00" 173.00 1920 2048 2248 2576 1080 1083 1088 1120 -hsync +vsync
```

4. Now add the above ‘new mode’ as below.

```
(copy the mode line value from the above step and paste it after '--newmode')
```

```
$ sudo xrandr --newmode "1920x1080_60.00" 173.00 1920 2048 2248 2576 1080 1083 1088 1120 -  
→hsync +vsync
```

5. Next, add the new mode to the desired display device, i.e. VGA-1 here,

```
(replace VGA-1 with correct name)
```

```
$ sudo xrandr --addmode VGA-1 "1920x1080_60.00"
```

6. Now go to “System settings->Displays” and select the newly added resolution.
7. Finally save the settings in the .profile file, so that it will be available on the next start (otherwise we need to perform the above steps on each restart). Paste the commands in steps 4 and 5 (without ‘sudo’) at the end of the file as shown below,

```
$ gedit ~/.profile
```

```
(and paste the following line at the end of file)
```

```
xrandr --newmode "1920x1080_60.00" 173.00 1920 2048 2248 2576 1080 1083 1088 1120 -  
→hsync +vsync  
xrandr --addmode VGA-1 "1920x1080_60.00"
```

2.32 Reduced size PDF

PDF compression can be done using following commands,

```
(first convert the pdf to ps format)  
pdf2ps file_name.pdf file_name.ps
```

```
(next convert the ps to pdf again)  
ps2pdf file_name.ps new_file_name.pdf
```

2.33 Partition manager

```
sudo yum install gparted
```

2.34 Tree

- ‘tree’ command can be useful see the directory structure,

```
sudo yum install tree
```

2.35 Scratch (visual coding)

```
sudo yum install scratch
```

2.36 Simple Screen Recorder

```
sudo rpm -Uvh http://download1.rpmfusion.org/free/fedora/rpmfusion-free-release-stable.noarch.
↪rpm
sudo dnf install simplescreenrecorder
```

2.37 Calibre

This can be used for reading the PDF, EPUB and mobi etc. formats,

```
sudo -v && wget -nv -O- https://download.calibre-ebook.com/linux-installer.py | sudo python -
↪c "import sys; main=lambda:sys.stderr.write('Download failed\n'); exec(sys.stdin.read());↵
↪main()"
```

2.38 NES Game Emulator

Emulators for games like Mario and Tank,

```
sudo yum install gfceu
```

2.39 Vivado setup

Note: Login with 'Gnome on Xorg' otherwise following error will be shown,

```
sudo ./xsetup
ERROR: Installer could not be started. Could not initialize class sun.awt.X11GraphicsEnvironment
```

```
sudo ./xsetup

(add path to .bashrc)
export PATH="/opt/Xilinx/Vivado/2017.4/bin:$PATH"

(if required, change permission for .Xilinx folder)
sudo chmod -R 777 .Xilinx/

(run vivado to start)
vivado
```

Chapter 3

Software installation in Fedora (32 bit)

3.1 yum-rocket

Install yum-rocket to increase the speed of download-packages using 'yum',

- First remove the 'yum-cache' and download the 'yum-rocket'

```
$ rm -f /var/cache/yum/timedhosts.txt
$ cd Desktop
$ git clone --depth 1 https://github.com/ryanuber/yum-rocket
```

- Then go to yum-rocket->yum-rocket->rocket.conf and add line 'maxthreads=10' (without quotes)

```
1 $ gedit yum-rocket/yum-rocket/rocket.conf
2
3 (add add the line as below)
4
5 # yum-rocket configuration file
6
7 [main]
8 enabled=1
9
10 # The maximum number of threads to use for downloading.
11 #maxthreads=5
12 maxthreads=10
13
14 # Allow YUM to use this many mirror servers for each repository. Setting this
15 # option to 1 would effectively match the default YUM functionality.
16 #spanmirrors=3
```

- Now copy the files from the 'yum-rocket' folder to 'installed-yum' location,

```
sudo cp yum-rocket/yum-rocket/rocket.py /usr/lib/yum-plugins
sudo cp yum-rocket/yum-rocket/rocket.conf /etc/yum/pluginconf.d
```

- Next, update the Fedora

```
sudo yum update
```

3.2 Remove username from terminal

Modify the .bashrc file as below, to remove the username and working directory etc. from the terminal,

```
$ cd
$ gedit .bashrc

(add anyone of the following lines at the end)

# display $ (or # for root)
export PS1="\$ "

# display user-name $
export PS1="\u \$ "

# display user-name@working-dir $
export PS1="\u@\w \$ "
```

3.3 Nautilus-open-terminal

It can be used to open the terminal at desired folder-location. Right click the mouse and select 'open in terminal'.

```
sudo yum install nautilus-open-terminal
```

3.4 Terminator

- Advance terminal that allows split-screen and other features

```
sudo yum install terminator
```

3.5 Git

```
sudo yum install git
```

3.6 VIM

```
sudo yum install vim gvim
```

- Download [.vimrc](#) file from the website and **save to home folder (rename it to '.vimrc' if 'dot' is not added in the name while downloading)**. And comment/uncomment/add plugins as per requirement,
- Install Vundle : This is used for managing plugins

```
git clone --depth 1 https://github.com/VundleVim/Vundle.vim.git ~/.vim/bundle/
↳Vundle.vim
```

- Then, open gvim/vim and run :PluginInstall

3.7 Unrar

```
sudo yum install unrar
```

3.8 Latex and Texstudio

- Latex

```
sudo yum install texlive-scheme-full texlive latexmk
```

- Texstudio:

```
sudo yum install texstudio
```

Note: Use ‘sudo’ to open the ‘texstudio’,

```
$ sudo texstudio

or

$ sudo texstudio <filename.tex>
```

- Open Texstudio and
 - Copy below Makeindex-code and “replace” the existing Makeindex-code from “Option->Configure-TexStudio->Commands->Makeindex”. This is required to build the “index” and “list of abbreviations”

```
makeindex %.nlo -s nomencl.ist -o %.nls -t %.nlg
```

- [Download and save dictionary](#). Next, add dictionary to latex “Option->Configure-TexStudio->Language Checking”; locate the directory where the dictionary is saved “Spelling Dictionary directories”, and selected the dictionary “en_us.oxt”.

3.9 Zim Desktop

- It is required for latex-equation and making notes/checklist etc.

```
sudo yum install Zim
```

- Then add the equation-plugin. Go to “Edit->preferences->Plugins->select Insert Equation”
- Then go to “Insert->Equation” to type the equation (**first install latex and then add it**).

3.10 GHDL and IVerilog simulator

GHDL and IVerilog simulators can be used to simulate the VHDL and Verilog codes respectively,

- GHDL

```
sudo apt-fast install ghdl
```

- Execute the code as below,

```
-- syntax check (first design and then testbench)
ghdl -s <filename.vhd>

-- analyse the code (first design and then testbench)
ghdl -a <filename.vhd>

-- elaborate the code (testbench)
ghdl -e <entity-name>

-- run the code (testbench)
ghdl -r <entity-name>
```

(continues on next page)

(continued from previous page)

```
-- run the code and save results in vcd file (testbench)
ghdl -r <entity-name> --vcd=<filename.vcd>
```

- IVerilog

```
sudo apt-fast install iverilog
```

3.11 Quartus & Modelsim

Note:

- These settings are for Quartus 13 for 32 bit OS.
- See [Section 1.17](#) for installing Quartus 17 on 64-bit OS.

- Download Quartus 13.0 or 13.1, as these versions contain more device support than higher versions.
- Change the permission for the 'Quartus--.run' file and then install as shown below,

```
chmod 777 Quart*
./Quart*
```

Warning: Do not run by double clicking the '.run' file.

- Add the quartus in '.bashrc' to run it using 'quartus' command (optional step),

```
$ gedit ~/.bashrc

(add following line at the end)
(user correct location for 'quartus')

alias quartus="/home/<username>/InstalledApps/altera/13sp1/quartus/bin/quartus"
```

Note:

- Run the quartus, if following error is shown, then install the libpng12.so.0 as below

```
(Quartus: error while loading shared libraries: libpng12.so.0: cannot open
↳shared object file: No such file or directory)

sudo yum install libpng12.so.0
```

3.11.1 JTAG Settings

- It is required for loading the .sof file on FPGA.
- Go to rules.d folder and create file with name '51-usbblaster.rules' as below,

```
cd /etc/udev/rules.d

sudo gedit 51-usbblaster.rules
```

- Next, paste following code to it


```
# Altera USB-Blaster for Quartus FPGA Software
SUBSYSTEMS=="usb", ATTR{idVendor}=="09fb", ATTR{idProduct}=="6001", MODE="0666"
SUBSYSTEMS=="usb", ATTR{idVendor}=="09fb", ATTR{idProduct}=="6002", MODE="0666"
SUBSYSTEMS=="usb", ATTR{idVendor}=="09fb", ATTR{idProduct}=="6003", MODE="0666"
# USB-Blaster II
SUBSYSTEMS=="usb", ATTR{idVendor}=="09fb", ATTR{idProduct}=="6010", MODE="0666"
SUBSYSTEMS=="usb", ATTR{idVendor}=="09fb", ATTR{idProduct}=="6810", MODE="0666"
```

- Connect the FPGA and type command `lsusb`; it will show the ‘Altera Blaster’ as shown below (If not, reboot the computer)

```
lsusb

(Similar to following result will be displayed, look for the Altera Blaster)

/etc/udev/rules.d$ lsusb
Bus 002 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 007 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
Bus 006 Device 002: ID 03f0:0024 Hewlett-Packard KU-0316 Keyboard
Bus 006 Device 003: ID 09fb:6001 Altera Blaster
```

3.11.2 Modelsim setting

- Do not forget to enter the correct path in below instructions e.g. replace `~/InstalledApps/altera/13sp1/` with correct installed location
- [Download and unzip the freetype-2.4.12.tar.bz2](#) file.
- Then go to unzip folder and run following commands.

```
./configure --build=i686-pc-linux-gnu "CFLAGS=-m32" "CXXFLAGS=-m32" "LDFLAGS=-m32"
↪
make -j8
```

- Now go to Altera modelsim folder (go to correct installed location)

```
cd ~/InstalledApps/altera/13sp1/modelsim_ase/
```

- And run following commands (note that unzip folder is on the Desktop) (use correct unzip location)

```
mkdir lib32

cp ~/Desktop/freetype-2.4.12/objs/.libs/libfreetype.so* ./lib32

chmod u+w vco
```

- Next modify the vco file, open it with gedit/sublime-text (use correct vco location)

```
gedit ~/InstalledApps/altera/13sp1/modelsim_ase/vco
```

- Then find the line `dir='dirname $arg0'` and add following line below it, (use correct lib32 location)

```
(replace <username> with correct name)

export LD_LIBRARY_PATH=/home/<username>/InstalledApps/altera/13sp1/modelsim_ase/
↪lib32
```

- Next edit the vsim file,

– Open vsim

```
gedit ~/InstalledApps/altera/13sp1/modelsim_ase/bin/vsim
```

– change `vco="linux_rh60"` to `vco="linux"`

- Then go to “modelsim_ase/bin/” and run modelsim

```
cd ~/InstalledApps/altera/13sp1/modelsim_ase/bin/
./vsim
```

- If following error is displayed then install “libncurses.so.5”

```
error while loading shared libraries: libncurses.so.5: cannot open shared object
↪file: No such file or directory
```

```
sudo yum install libncurses.so.5
```

- To run the modelsim from the terminal, run following commands

```
cd
gedit .bashrc

# and paste the below line at the end with correct location and username

export PATH="/home/<username>/InstalledApps/altera/13sp1/modelsim_ase/bin:$PATH"
```

Now run the modelsim using ‘vsim’ (not ./vsim) as below,

```
vsim
```

3.11.3 Modelsim-compilation from terminal

- Create the work directory,

```
vlib work
```

- Compile the VHDL or Verilog code using ‘vcom’ and ‘vlog’ respectively.

```
vcom <file_name>.vhd
vlog <file_name>.v

or

vcom *.vhd
vlog *.v
```

- Start the simulator. This will open the Modelsim GUI.

```
vsim <file_name>
```

- Simulate the design (but do not run the simulation).
- Then follow the steps in the section [Saving results in .vcd format using ModelSim](#), to save the results in vcd-file.

3.11.4 Saving results in .vcd format using ModelSim

Sometimes it is better to save the simulation results in .vcd format, which can be done using Modelsim as below,

- Compile and simulate the design (but do not run the simulation)
- Next create the vcd file at desired location,

```
vcd file /<location for vcd file>/test.vcd e.g.

vcd file /home/test.vcd
```

- add all waveforms to it,

```
vcd add -r /*
```

- Run the simulator using ‘-all’ or desired time,

```
run -all

or

run 10ms
```

- Save the results

```
vcd checkpoint
```

- Close modelsim if required,

```
quit -f
```

3.11.5 .vcd to .wlf conversion

The .vcd files can not be read directly by Modelsim, therefore it is required to convert it into .wlf format, as shown below. Or use *gtk-wave* to open the .vcd file.

- First convert the .vcd format to .wlf format,

```
vcd2wlf <location of .vcd file> <location for .wlf file> e.g.
vcd2wlf /home/test.vcd /home/test.wlf
```

- Next, open this .wlf file i.e. “Files->Open->select all from drop-down menu->select .wlf file”

3.11.6 Shortcut icons

- Create three files at desired location with ‘.desktop’ extension and paste the codes as below
- Quartus.desktop (use correct quartus location and replace <username> with correct username)

```
# Quartus
[Desktop Entry]
Type=Application
Version=0.9.4
Name=Quartus II 13.0sp1 (32-bit) Web Edition
Comment=Quartus II 13.0sp1 (32-bit)
Icon=/home/<username>/InstalledApps/altera/13sp1/quartus/adm/quartusii.png
Exec=/home/<username>/InstalledApps/altera/13sp1/quartus/bin/quartus
Terminal=false
Path=/home/<username>/InstalledApps/altera/13sp1
```

- change the permission

```
chmod 777 Quartus.desktop
```

- Nios.desktop (use correct nios location and replace <username> with correct username)

```
# NiosII
[Desktop Entry]
Type=Application
Version=0.9.4
Name=NiosII
Comment=NiosII(32-bit)
Icon=/home/<username>/InstalledApps/altera/13sp1/nios2eds/bin/eclipse_nios2/icon.xpm
Exec=/home/<username>/InstalledApps/altera/13sp1/nios2eds/bin/eclipse-nios2
Terminal=false
Path=/home/<username>/InstalledApps/altera/13sp1
```

- change the permission

```
chmod 777 Nios.desktop
```

- Modelsim.desktop (use correct modelsim location and replace <username> with correct username)

```
# Modelsim
[Desktop Entry]
Type=Application
Version=0.9.4
Name=ModelSim
Comment=ModelSim(32-bit)
Icon=/home/<username>/InstalledApps/altera/13sp1/modelsim_ase/tcl/bitmaps/m.gif
Exec=/home/<username>/InstalledApps/altera/13sp1/modelsim_ase/bin/vsim
Terminal=true
Path=/home/<username>/InstalledApps/altera/13sp1
```

- change the permission

```
chmod 777 Modelsim.desktop
```

3.12 Add application to favorites

Copy the ‘shortcut icon (i.e. .desktop file with execute permission)’ inside the /usr/share/applications/ folder. In this way, the application will be added to “Application bar” from where we can drag it to ‘Favorites bar’.

3.13 PuTTY (TCP/IP client)

```
sudo yum install putty
```

3.14 Anaconda (Python)

- Download correct version of [Anaconda](#) i.e. 32 bit or 64 bit with required Python version i.e. 2 or 3.
- Then run the following commands. And select ‘Yes’ at the end of installation to set the anaconda as default-python environment.

```
chmod 777 Ana*
./Ana*
```

- Close and reopen the terminal.
- To unset/set the anaconda as default-python, go to ~/.bashrc file and remove/add following line there,

```
export PATH="<location of anaconda>/bin:$PATH" e.g.
export PATH="/home/<username>/anaconda3/bin:$PATH"
```

- Install mysql-connector to connect with MySQL using Python

```
conda install mysql-connector-python
```

- Install ReadTheDoc theme for Sphinx

```
conda install sphinx_rtd_theme
```

- Install ‘MyHDHL’ using ‘pip’ (not conda)

```
pip install myhdl
```

- Go to `<installed-location-anaconda>/bin` and rename 'python3' to 'python36' (optional step). Now, we can use following commands to open different python shells,

```
( open linux-python2 shell)
$ python2

( open anaconda-python3 shell)
$ python

( open linux-python3 shell)
$ python3
```

Or we can set any name to start Python by making following changes in `.bashrc` file,

```
gedit .bashrc

(add following line at the end)

(open python3 using 'python' command)
alias python='/usr/bin/python3'

(open anaconda-python using 'anaconda' command)
alias anaconda='<installed-location-anaconda>/bin/python'
```

3.15 MySql Server

```
sudo yum install mysql-server
```

```
sudo yum install mysql-workbench
```

3.16 C++ and Fortran compiler

```
sudo yum install gcc-c++
```

```
sudo yum install gcc-gfortran
```

3.17 Scratch (visual coding)

```
sudo yum install scratch
```

3.18 Simple Screen Recorder

```
sudo yum install simplescreenrecorder
```

3.19 Audacious (audio player)

```
sudo yum install audacious
```

3.20 ISO Mount

```
(create the location for mount e.g 'disk')
sudo mkdir -p /mnt/disk

(mount the image)
sudo mount -o loop /<location.iso> /mnt/disk

(unmount the image)
sudo umount /mnt/disk
```

3.21 Dictionary

```
sudo yum install artha
```

3.22 PDF editors

- Okular : it allows highlighting and comments in PDF.

```
sudo yum install okular
```

- PDF-Shuffler (for cropping and PDF-Shuffling):

```
sudo yum install pdfshuffler
```

3.23 gtk-wave

- It can be used for viewing VCD-Waveforms i.e. simulation results of FGPA

```
sudo yum install gtkwave
```

3.24 Typing tutor

```
sudo yum install klavaro
```

3.25 UNetbootin (Bootable USB)

```
sudo yum install unetbootin
```

3.26 cups-pdf

- Print to pdf; by default the PDF is saved to location `~/PDF/`. This is required to print the pdf through VIM using `:hardcopy` command

```
sudo yum install cups-pdf
```

3.27 Image editors

3.27.1 Shutter screenshot program

- Install Shutter for screenshot and modifying image as paint-brush

```
sudo yum install shutter
```

- To compress the image, press `'ctrl+shift+p'`, and select `'resize->run'`. Enter the width e.g. 500 (width will be filled automatically). Press `'save'`.

3.27.2 Shotwell

Shutter does not provide the rotate-image feature. Shotwell can be used to rotate and crop the image quickly.

```
sudo yum install shotwell
```

3.27.3 GIMP image editor

```
sudo yum install gimp
```

3.27.4 PDF to JPG/PNG conversion

Use any combination for conversion as shown below,

```
convert -density 300 <file_name.pdf> <file_name.jpg>
convert -density 300 <file_name.pdf> <file_name.png>
convert -density 300 <file_name.jpg> <file_name.png>
```

3.28 gtkpod

- It can be used to load the songs on iPod.
- Open `'gtkpod'` and copy the song to iPod and **save all changes**.
- If iPod is not detected by `'gtkpod'`, then restore the iPod using iTunes software on Windows.

```
sudo yum install gtkpod
```

3.29 Firefox Add-ons

- Video DownloadHelper
- DownloadThemAll
- Firebug

- Firepath
- SQLite Manager
- Selenium IDE

3.30 Thunderbird Add-ons

- MinimizeToTray revived (install and change preferences)
- Lightning (calendar)
- Lightning month tab (to display more than one month)
- Birthday reminder

3.31 Custom screen resolution

Note:

- Login to Fedora with ‘Gnome on Xorg’ option, otherwise shutter will not work for capturing image.
 - Or, disable WAYLAND0 as shown in the below process.
-

Custom screen resolution may be required, when the correct resolution is not available in the list of resolutions. In this section, 1920x1080 resolution is added for the second screen (i.e. monitor connected to the laptop using VGA port),

1. First check the available display devices and corresponding screen-resolutions using following command. In the following outputs two displays are shown i.e. ‘LVDS1 (i.e. Laptop screen)’ and ‘VGA-1 (i.e. second screen)’. The * sign shows the currently used resolution.

```
$ xrandr

Screen 0: minimum 8 x 8, current 2304 x 800, maximum 32767 x 32767

LVDS1 connected primary 1280x800+0+0 (normal left inverted right x axis y axis) 300mm x 190mm
 1280x800    60.01**
 1024x768    60.00
  800x600    60.32   56.25
  640x480    59.94
  640x400    60.00

VGA-1 connected 1024x768+1280+0 (normal left inverted right x axis y axis) 0mm x 0mm
 1024x768    60.00*
  800x600    60.32   56.25
  848x480    60.00
  640x480    59.94
```

Note: If WAYLAND0 is shown at the output of the ‘xrandr’ command (instead of LVDS or VGA-1 etc.), then disable ‘WAYLAND’ as below,

```
$ gedit /etc/gdm/custom.conf

(uncomment the below line i.e. remove '#')

WaylandEnable=false
```

2. We will add the screen resolution for the VGA-1 i.e. the device which is connected to Laptop using VGA port.
3. For this, run the following command to find the CVT “mode line values” for the given resolution. In the below code, 1920x1080 resolution is used.


```
(type the desired resolution below)
```

```
$ cvt 1920 1080
```

```
# 1920x1080 59.96 Hz (CVT 2.07M9) hsync: 67.16 kHz; pclk: 173.00 MHz
```

```
Modeline "1920x1080_60.00" 173.00 1920 2048 2248 2576 1080 1083 1088 1120 -hsync +vsync
```

4. Now add the above 'new mode' as below.

```
(copy the mode line value from the above step and paste it after '--newmode')
```

```
$ sudo xrandr --newmode "1920x1080_60.00" 173.00 1920 2048 2248 2576 1080 1083 1088_
↵1120 -hsync +vsync
```

5. Next, add the new mode to the desired display device, i.e. VGA-1 here,

```
(replace VGA-1 with correct name)
```

```
$ sudo xrandr --addmode VGA-1 "1920x1080_60.00"
```

6. Now go to "System settings->Displays" and select the newly added resolution.
 7. Finally save the settings in the .profile file, so that it will be available on the next start (otherwise we need to perform the above steps on each restart). Paste the commands in steps 4 and 5 (without 'sudo') at the end of the file as shown below,

```
$ gedit ~/.profile
```

```
(and paste the following line at the end of file)
```

```
xrandr --newmode "1920x1080_60.00" 173.00 1920 2048 2248 2576 1080 1083 1088 1120 -
↵hsync +vsync
xrandr --addmode VGA-1 "1920x1080_60.00"
```

3.32 Reduced size PDF

PDF compression can be done using following commands,

```
(first convert the pdf to ps format)
```

```
pdf2ps file_name.pdf file_name.ps
```

```
(next convert the ps to pdf again)
```

```
ps2pdf file_name.ps new_file_name.pdf
```