

Lab OverView

This document explains technical and operational issues important to this class. It is essential that you get familiar with these issues to avoid significant grade and/or financial consequences. We also provide helpful links and step by step guide here to help you get start with your lab activities.

1. Lab rules

- a. Do your lab assignment at home or at lab. Come back for grading during your lab session hours. You may be subject to significant grade loss for missing the lab time submission.
- b. The lab is an open, (student) self-managed space. Your attitude in caring of the equipment and space will directly translate to our costs and future students' privilege in enjoying the freedom.
- c. **Lab partner dispute:** It is your responsibility to report to the instructor or TA's of any partnership concerns. Team members will share the grade responsibility if such issue is not reported in time.
- d. All tools and kits are expected to be returned in original conditions, except for normal wear and tear. Report damages of parts ASAP.
- e. No restriction of which table you use during the lab assignment phase

2. Safety

Electrocution and fire hazards can happen even at low voltages. Please also observe the safety tips related to electronics benches in lab. Always have a partner, and let people know that you are in lab when you come to lab after the regular hours.

3. Raspberry Pi Basics

CPU	-Quad Core 1.2GHz Broadcom BCM 2837 -Not compatible with traditional PC software -Low power draw
RAM	-1 GB
Display & Audio	-full size HDMI -3.5mm jack -4 USB 2 ports -CSI camera port for connecting a Raspberry Pi camera -DSI display port for connecting a

	Raspberry Pi touchscreen -Micro SD port -wireless LAN and Bluetooth on board
GPIO	40-pin extended GPIO

4. Storage & installation: Micro-SD card

- a. Insert your Micro-SD card we provided into your computer.
- b. You need to format your SD card(even if it is a brand new micro SD card, formatting is recommended). Software can be found(recommendation: FAT32, overwrite format): https://www.sdcard.org/downloads/formatter_4/
- c. Download Noobs: <https://www.raspberrypi.org/downloads/noobs/> (You need to download the full version which contain **Raspbian**).
- d. Unzip the Noobs file into your micro-SD card.
- e. Take the micro-SD card, insert back into your Raspberry Pi 3.
- f. Power on your RPi 3, the installation process will start automatically. Select **Raspbian** to start installation. It will take a while.
- g. Finish your installation and RPi 3 will auto-restart and you are done!

5. Install and Get SSH

You can use SSH to do command line actions to raspberry Pi(You need to connect your RPi 3 to wifi, I **don't** think RPi 3 will be able to connect to TAMU wifi)

- a. Update apt-get package index files:
 - Sudo apt-get update
- b. Install SSH
 - Sudo apt-get install ssh
- c. SSH client for windows: Putty: www.putty.org
- d. Then on Raspberry side you do:
 - i. Open a command line window
 - ii. Sudo raspi-config
 - iii. Under interfacing option select SSH and enable it
 - iv. Reboot
 - v. Check your hostname by: hostname -l
 - vi. Ssh 127.0.0.1, setup password
 - vii. Ssh hostname(the one you just found), setup password
- e. On your computer, plug in ethernet cable(so you will not need wifi connect)
 - i. Ping 127.0.0.1
 - ii. Ping hostname address
 - iii. If both success, open putty, input hostname and login.

6. Python setup

We will use python for most project programming in this class. We will also have 1 or 2 lab to help you get familiar with assembler in RPi 3.

- a. Sudo apt-get install python-dev
- b. Sudo apt-get install python-rpi.gpio
- c. Python programming guide: <https://wiki.python.org/moin/BeginnersGuide>
- d. Python GPIO guide: <https://pypi.python.org/pypi/RPi.GPIO>
- e. Raspbian should have python installed as default. There is a folder called "python game" you can play with to get started with python programming.

7. Keyboard Configuration

The raspberry Pi 3 will have UK keyboard input as default, for your convenience you will need to switch the keyboard style into US keyboard input.

This instruction should help you:

<http://www.dummies.com/computers/raspberry-pi/raspberry-pi-for-kids-setting-the-keyboard-layout/>

8. Labs Schedule

This schedule is not finalized, it might change during the semester

Week	Lab	Demo Week
Sept 4th	Lab1: Assembler	Sept 11st
Sept 11st	Lab2: 7 segment LED	Sept 18th
Sept 18th	Lab3:Interrupt	Sept 25th
Sept 26th	Lab4:ADC	Oct 2nd
Oct 2nd	Lab5:DAC	Oct 9th
Oct 9th	Lab6:Sensors	Oct 16th