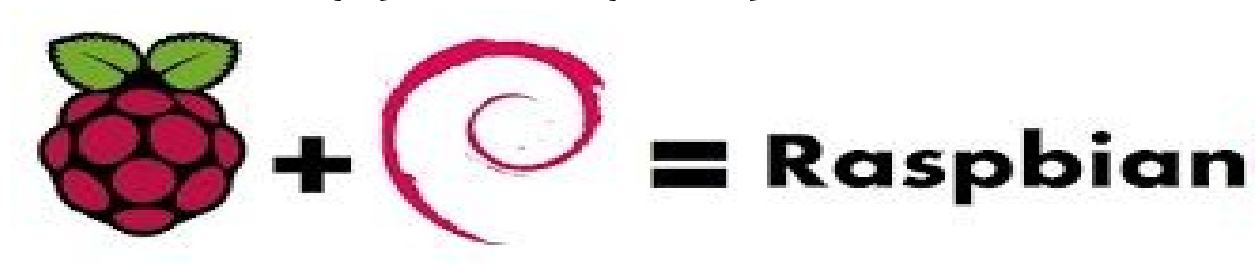# Day 03 LAB 1: Setup your RPi [Part 1]
How to Setup your Raspberry Pi (RPi)🍓

Objectives

Part 1: Download & Install an SD Card Formatter and Imager Software using a Laptop

- **Step 1: Download and Install SD Formatter Software**
- **Step 2: Download and Install Win32DiskImager Software**

Part 2: Download Latest Version of Raspbian OS, Format SD Card, and Burn OS Image using a Laptop

- **Step 1: Download the Latest version of the Raspbian OS on your PC**
- **Step 2: Format the SD Card using the SD Formatter Tool**
- **Step 3: Burn a RPi OS Image onto an SD or Micro-SD Card using Win32Imager Tool**

Part 3: Boot your Raspberry Pi for the First Time

- **Step 1: Connect all Devices and Access the Wi-Fi**
- **Step 2: Raspberry Pi Configuration Tool (GUI)**
- **Step 3: Using raspi-config Configuration Tool (Command-Line)**
- **Step 4: Some of the Pre-Installed Applications on the latest Raspbian Distribution**

Background / Scenario

In this lab you will learn how to setup your Raspberry Pi (RPi) from scratch. Once are done with with this lab, you should feel pretty confident (I Hope!) and you will be able to setup a basic RPi environment at home.

First, you will download and install an SD card formatter and imager software on a PC, and download the latest version of Raspbian OS so you can format and burn the latest Raspberry Pi image on an SD (or Micro-SD) card. Then, you will connect all devices to your Raspberry Pi and boot the OS for the first time. You will access a Wi-Fi router or AP (Access Point) in order to update and upgrade all packages, and use GUI & command-line to configure your RPi for the first time.

Required Resources

- 1 Computer (Windows, MAC OS X, Linux) with:
  - Internet Access:
    - Wi-Fi support (802.11x) (**preferible**), or
    - Wired Ethernet connection using a CAT5/5e/6 patch cable (**optional**)
  - SD card reader/writer
- 1 **Raspberry Pi** (**RPi)** computer (any model will work, but **RPi 3 Model B** used in this class) with:
  - 1 USB Keyboard
  - 1 USB Mouse
  - 1 RPi power adapter (**RPi 1 B/B+@1A**, **RPi 2@2A**, **RPi 3@2.4A**)
  - 1 **HDMI-HDMI**, or **HDMI-DVI**, or **HDMI-VGA** monitor cable.
  - 1 Class 10 SD (Micro-SD) card compatible with the RPi (SD to Micro-SD adapter included if necessary).
  - 1 Wi-Fi dongle compatible with the RPi (**only** if using a **RPi 1 B/B+** or **RPi 2**).

Part 1: Download & Install an SD Card Formatter and Imager Software using a Laptop (SKIP IT: SOFTWARE INSTALLED!)

The Raspberry Pi (RPi) doesn't have a hard drive. The RPi Operating System (OS) it is stored on an SD (Raspberry Pi Model A/B) or Micro-SD (Raspberry Pi Zero/A+/B+/2/3) card depending on the RPi model. In this section you will download and install the software needed to format SD cards and create OS images (similar to ISO files) for the RPi on a MS Windows 10 laptop. You will use the SD Formatter 4.0 software to format an SD card, and the Win32 Disk Imager software to burn the image onto the SD card. During this lab, you will be using the Windows 10 laptop assigned to you by the instructor. If you would like to perform this tasks at home on your personal laptop, and your laptop is not running Windows OS, follow the instructions below for other operating systems. For additional information click here **RPi Easy SD Card Setup**.

Step 1: Download and Install SD Formatter Software

SD Formatter is a tool for formatting SD/SDHC/SDXC cards. Visit the Official SD Formatter website and download the installer for your operating system. SD Formatter runs on Windows and MAC OS:

➢ Download and install **SD Formatter 4.0** for Windows:
https://www.sdcard.org/downloads/formatter_4/

Step 2: Download and Install Win32DiskImager Software

Win32 Disk Imager is a tool for writing images to USB sticks or SD/CF cards:

➢ Download and install **Win32 Disk Imager** (Windows only):
https://sourceforge.net/projects/win32diskimager/

MAC users: **Pi Filler** is a simple tool for copying a Raspberry Pi operating system image file to an SD card, or restoring an SD card backup created by **Pi Copier**.

Part 2: Download Latest Version of Raspbian OS, Format SD Card, and Burn OS Image using a Laptop

In this section we will start by downloading the latest version of Raspbian from the RaspberryPi.org website, format an SD card using the SD Formatter tool, and burn the OS image on an SD or Micro-SD card using the Win32Imager tool.

Step 1: Download the Latest version of the Raspbian OS on your laptop

IMPORTANT: Download this version of the RASPBIAN: 2017-04-10-raspbian-jessie.zip, uncompress, and then go to "Step 2". I'll explain in class!

> ➢ Open your favorite browser on your PC, and go to the RaspberryPi.org main web site:
>
> **https://www.raspberrypi.org/**

> ➢ Click on "**DOWNLOADS**":
>
> **https://www.raspberrypi.org/downloads/**

➢ Click on "**RASPBIAN**":

https://www.raspberrypi.org/downloads/raspbian/
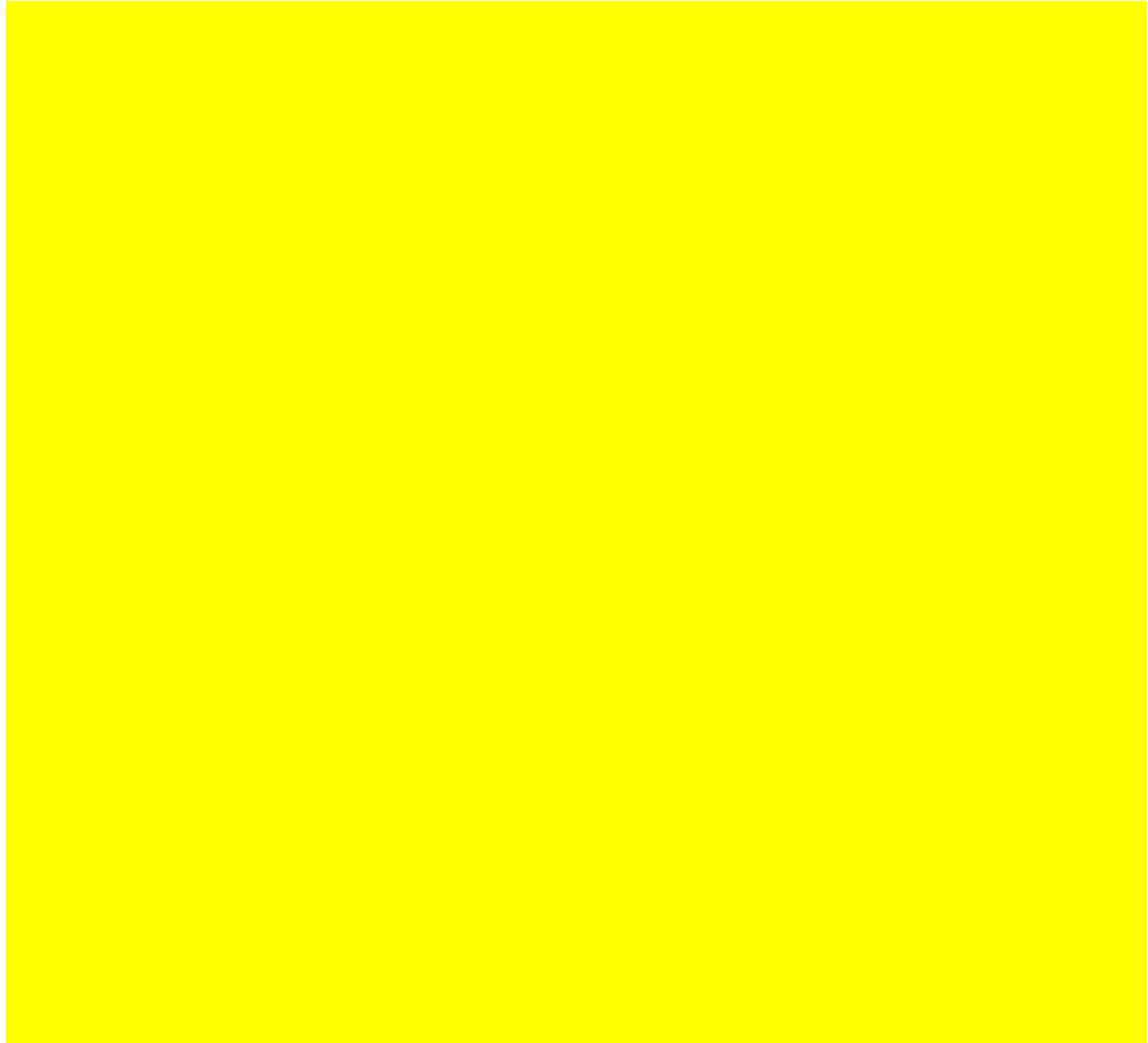
_NOTE__: Try "NOOBS" (New Out Of Box Software) at home for fun! NOOBS is an easy operating system installation manager for the Raspberry Pi._

➢ Download "**RASPBIAN JESSIE WITH PIXEL**" by clicking on "**Download ZIP**":

➢ Click on "**Save File**" and "**Ok**"

➢ By default, all downloaded files under Windows are saved under the "**C:\My PC\Downloads**" folder. Once the **Raspbian** image is downloaded, you must **unzip** the file by **right-click** on it and select "**Extract All...**":

➢ Once your file is uncompressed, it shout look like this:

Step 2: Format the SD Card using the SD Formatter Tool

When you get a brand new SD card, or attempt to reuse an old SD card, you may find that the usable capacity is less than you were expecting. This could be due to partitions previously configured on the SD card. It is very common to see RPi SD cards showing only to have a capacity of 56MB in Windows, while the physical size is 4GB, 8GB, 16GB, etc. That is because Windows OS cannot see the much larger Linux OS partition. In order to ensure that your SD card are completely blank, you must always erase it with SD Formatter on your laptop.

➢ Insert your SD card on your laptop, and run the "**SDFormatter**" application:

NOTE: *Double check the drive letter. You do not want to format another device by accident!*

➢ To make sure we get the true capacity of the SD card, click on "**Option**" and turn "**Format Size Adjustment**" to "**ON**", and click "**OK**":

➢ Define a label for the SD card, for example "**iCREAT2017**" (optional):

➢ Click "**Format**" to start the process, and click "**OK**" twice to proceed. The process should start and it will take few seconds:

➢ When the process finishes it will provide a summary of the SD card capacity:

➢ Then, you should click "**OK**" and "**Exit**".
➢ "Eject your SD card". Now are ready to write a new Raspberry Pi image to it.

Step 3: Burn a RPi OS Image onto an SD or Micro-SD Card using Win32Imager Tool

In this section you will use the Win32Imager tool (on Windows) in order to burn an image on an SD or Micro-SD card.

> ***MAC users**: **Pi Filler** is a simple tool for copying a Raspberry Pi OS image file to an SD card, or restoring an SD card backup created by **Pi Copier**.*

➢ Run the "**Win32DiskImager**" application on your laptop:

➢ Make sure the SD (Micro-SD) card in inserted on the proper SD drive (you don't what to wipe out your Windows OS by mistake, by selecting the wrong drive letter!). Open the windows "**File Explorer**" and check the drive letter for your SD card:

➢ Select the RPi image file you downloaded in "**Step 1**" (in our case, "**RASPBIAN JESSIE**"), by clicking on the folder icon:

➢ Click on "**Write**", and then "**Yes**" and wait until it finishes writing the OS image. It will take 3-10 min depending on your SD card drive. Please, be patient:

➢ If everything goes as planned, you should receive this message and you should click "**OK**", and then click on "**Exit**":

➢ You can eject your SD card. Now are ready to boot your RPi for the first time.

Part 3: Boot your Raspberry Pi for the First Time

In order to boot your RPi for the first time, you need to connect all the devices to the Pi and insert your SD card with a copy of the latest version of Raspbian in the SD slot. Then you can use the Raspberry Pi Configuration tool (GUI) to easily setup your Pi. You could also use the raspi-config tool to configure your Pi from the command-line terminal.

Step 1: Connect all Devices and Access the Wi-Fi

Once you have an SD (Micro-SD) card with the Raspbian OS installed, you must at least have a monitor, keyboard, mouse, SD or Micro-SD card, and a power adapter connected to the Pi in order to boot. You may also have a wired Ethernet cable attached to a switch or router, a speaker(s), RPi camera, USB flash drives, Wi-Fi dongle, or other devices as needed. The Pi can be connected to a RCA TV or an HDTV using an HDMI-HDMI, HDMI-DVI, or HDMI-VGA cable. The RPi 3 already have support for Wi-Fi and Bluetooth on the board (no dongle required). The following figure shows a typical configuration using a RPi 1. In this class you will use the most powerful **Raspberry Pi 3 Model B**:

NOTE: an SD card MUST be installed on the Pi in order to boot. A typical symptom of this problem is a black screen even if the power is on!

➢ Insert an SD (Micro-SD) card with RPi image file (Raspbian in this case) that you burnt in **[Part 2]**, and connect a monitor, keyboard, and mouse. Then plug in power adapter and let the RPi boot. If you are using a Raspbian Jessie distribution, your screen should look like this:

➢ If you have a RPi 3, you should use the Wi-Fi (Wireless Access Point/WAP) provided by your instructor. For this lab, you must connect to the following SSID (password will be provided during class):

MassBay-Cisco

*NOTE: If you have a **RPi Model B/B+/2** you may use with a Wi-Fi dongle, or connect your RPi to the Internet by using a an Ethernet cable (CAT5/5e/6).*

Step 2: Raspberry Pi Configuration Tool (GUI)

In this section you will use the **Raspberry Pi Configuration** tool to perform the basic configuration for your Pi using a very easy GUI.

➢ Click on " >**Preferences->Raspberry Pi Configuration**" to open the Raspberry Pi Configuration too:

➢ After a fresh Raspbian install, the default "**Hostname**" is "raspberrypi", "**Username**" is "pi", and "**Password**" is "raspberry". Change the hostname to

"**rpi3-<your_name>**" so it will be easier to identify your Pi on the network (this will be useful for other labs). For example:

➢ Then, click on "**Interfaces**" and enable: "**Camera**", "**SSH**", "**VNC**", "**SPI**", "**I2C**", and "**SPI**" (more info later):

➢ Under "**Localisation**", click on "**Set Locale…**" and set the "**Country:**" to "**US (USA)**" and click "**OK**":

➢ Click on "**Set Timezone…**", and set the "**Area:**" to "<mark>US</mark>" and "**Location:**" to "<mark>**Eastern**</mark>" and click "<mark>**OK**</mark>":

➢ Click on "**Set Keyboard…**", and set the "**Country**" to "<mark>**United States**</mark>" and "**Variant**" to "<mark>**English (US)**</mark>" and click "<mark>**OK**</mark>":

➢ Click on "**Set WiFi Country…**", and set the "**Country:**" to "<mark>US United States</mark>" and click "<mark>**OK**</mark>":

➢ Finally, click "<mark>**OK**</mark>" and the "<mark>**Yes**</mark>" to reboot and accept the changes.

➢ After your RPi is rebooted, you will see the following message. Don't worry , click "**OK**" but please **NO NOT CHANGE YOUR RPi PASSWORD!** (more info later):

Step 3: Using raspi-config Configuration Tool (Command-Line)

You can also perform the basic configuration of your Raspberry Pi from a terminal window using the *raspi-config* command (**homework: do it at home for fun!**):

➢ Open a terminal, and run the following command:

➢ Your screen should look like this. Click "**tab**" several times until **<Finish>** is selected, and then hit **ENTER** to exit:

Step 4: Some of the Pre-Installed Applications on the latest Raspbian Distribution

In this section you will check and play with some of the coolest pre-installed applications on the latest Raspbian distribution.

➢ **Programming Tools**:

➢ **Office Tools**:

➢ **Internet Tools**:

➢ **Games Tools**:

➢ **Accessories Tools**:

➢ **Help Tools**:

➢ **Preferences Tools**:

➢ **Shutdown options**

➢ *IMPORTANT: Please, make sure that you ALWAYS shut down your RPi properly. Your operating systems (Raspbian) it is stored on the SD card, and if not treated properly can get corrupted very easily and all data on the SD card can be lost.*

➢ You did it! Feel free to explore the menus to see what cool application and tools are installed on the RPis, and experiment.

Step 5: Set DNS servers (OPTIONAL)

If you have a RPi 3, it may be necessary to setup your DNS (Domain Name System) servers in your RPi. In order to do this you need to edit the **/etc/resolv.conf** configuration file, using your prefered Linux Editor (**gedit**, **Geany**, **Leaf**, etc).