EXPERIMENT NO. 2 (Group A)

Aim: Study of different operating systems for Raspberry-Pi/Beagle board/Arduino. Understanding the process of OS installation.

Outcome: To study operating systems for platforms such as Raspberry-Pi/ Beagle board/Arduino.

Hardware Requirement: Raspberry-Pi

Software Requirement: Raspbian OS

Theory:

Raspberry-Pi: - The Pi can run the official Raspbian OS, Ubuntu Mate, Snappy Ubuntu Core, the Kodi- based media centers OSMC and LibreElec, the non-Linux based Risc OS (one for fans of 1990s Acorn computers). It can also run Windows 10 IoT Core, which is very different to the desktop version of Windows, as mentioned below.

OS which install on Raspberry-Pi: Raspbian, Ubuntu MATE, Snappy Ubuntu, Pidora, Linutop, SARPi, Arch Linux ARM, Gentoo Linux, etc.

Raspbian is a Debian-based computer operating system for Raspberry Pi. Since 2015 till now it is officially provided by the Raspberry Pi Foundation as the primary operating system for the family of Raspberry Pi single-board computers.

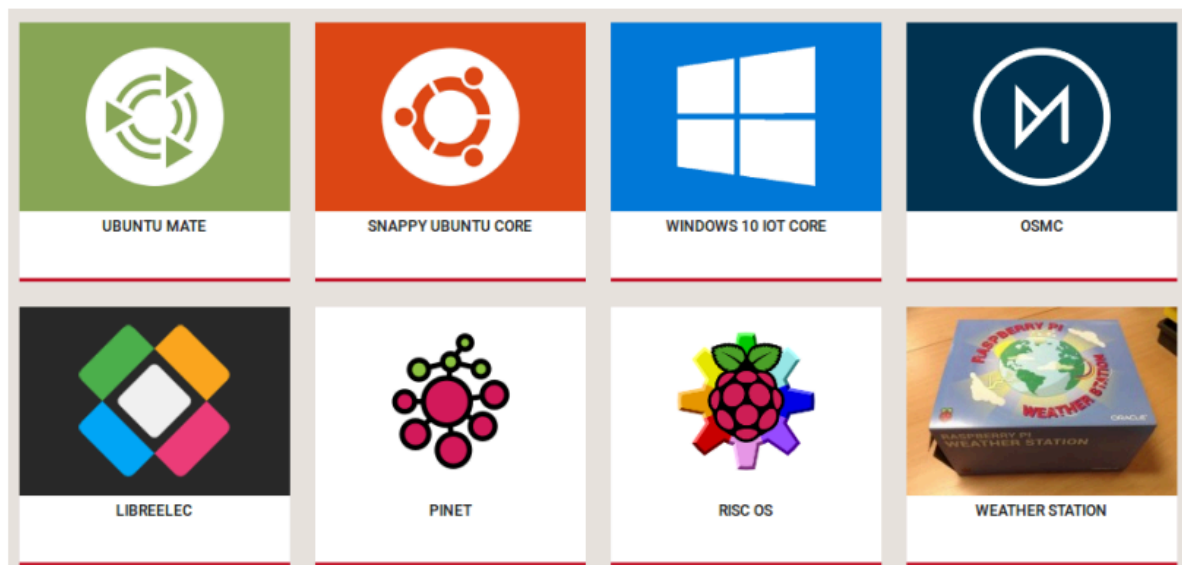Raspbian was created by Mike Thompson and Peter Green as an independent project.

The initial build was completed in June 2012.

The operating system is still under active development. Raspbian is highly optimized for the Raspberry Pi line's low-performance ARM CPUs.

From where to download
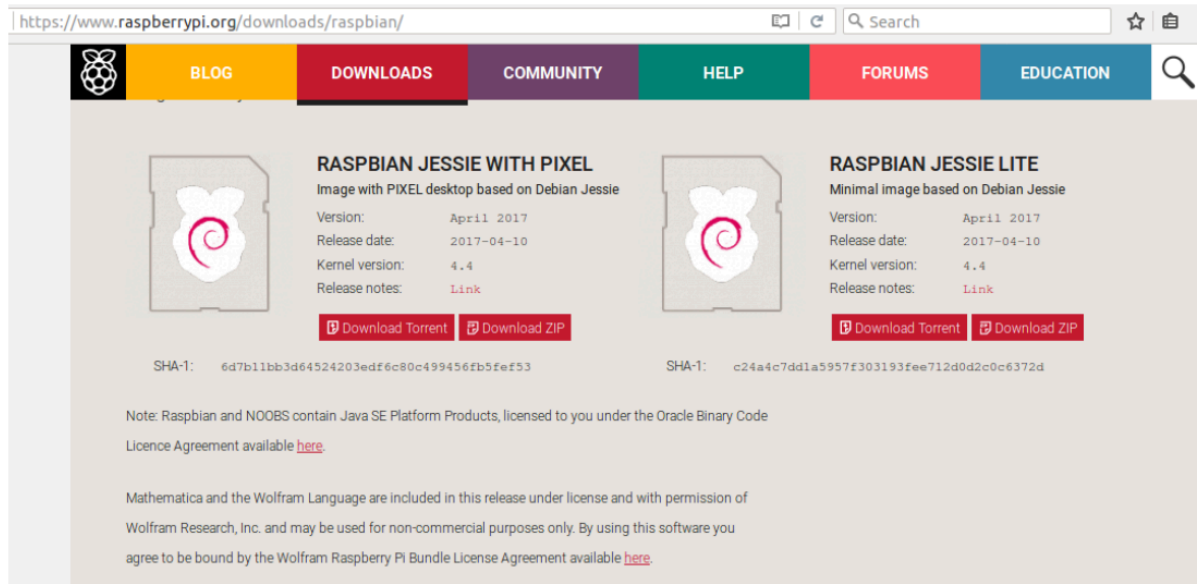
Various Raspberry Pi Operating System

How to install Raspbian on Raspberry-Pi:

Step 1: Download Raspbian

Step 2: Unzip the file. The Raspbian disc image is compressed, so you'll need to unzip it. The file uses the ZIP64 format, so depending on how current your built-in utilities are, you need to use certain programs to unzip it.

Step 3: Write the disc image to your microSD card. Next, pop your microSD card

into your computer and write the disc image to it. The process of actually writing the image will be slightly different across these programs, but it's pretty self-explanatory no matter what you're using. Each of these programs will have you select the destination (make sure you've picked your microSD card!) and the disc image (the unzipped Raspbian file). Choose, double-check, and then hit the button to write.

Step 4: Put the microSD card in your Pi and boot up. Once the disc image has been written to the microSD card, you're ready to go! Put that sucker into your Raspberry Pi, plug in the peripherals and power source, and enjoy. The current edition to Raspbian will boot directly to the desktop. Your default credentials are username pi and password raspberry.

1) BeagleBone Black: - The BeagleBone Black includes a 2GB or 4GB on-board eMMC flash memory chip. It comes with the Debian distribution factory pre-installed. You can flash new operating systems including Angstrom, Ubuntu, Android, and others.

1. Os which install on BeagleBone Black: Angstrom, Android, Debian, Fedora, Buildroot, Gentoo, Nerves Erlang/OTP, Sabayon, Ubuntu, Yocto, MINIX 3

- How to install Debian on BeagleBone Black:
- Step 1: Download Debian img.xz file.
- Step 2: Unzip the file.
- Step 3: Insert your MicroSD (uSD) card into the proper slot. Most uSD cards come with a full-sized SD card that is really just an adapter. If this is what you have then insert the uSD into the adapter, then into your card reader.

- Step 4: Now open Win32 Disk imager, click the blue folder icon, navigate to the debian img location, and double click the file. Now click Write and let the process complete. Depending on your processor and available RAM it should be done in around 5 minutes.

- Step 5: Alright, once that's done, you'll get a notification pop-up. Now we're ready to get going. Remove the SD adapter from the card slot, remove the uSD card from the adapter. With the USB cable disconnected insert the uSD into the BBB.

- Step 6: Now, this next part is pretty straight forward. Plug the USB cable in and wait some more. If everything is going right you will notice that the four (4) leds

just above the USB cable are doing the KIT impression. This could take up to 45 minutes; I just did it again in around 5 minutes. Your mileage will vary. Go back and surf reddit some more.

- Step 7: If you are not seeing the leds swing back and forth you will need to unplug the USB cable, press and hold down the user button above the uSD card slot (next to the 2 little 10 pin ICs) then plug in the USB cable. Release the button and wait. You should see the LEDs swinging back and forth after a few seconds. Once this happens it's waiting time. When all 4 LEDs next to the USB slot stay lit at the same time the flash process has been completed.

- Step 8: Remove the uSD card and reboot your BBB. You can reboot the BBB by removing and reconnecting the USB cable, or hitting the reset button above the USB cable near the edge of the board.

- Step 9: Now using putty, or your SSH flavor of choice, connect to the BBB using the IP address 192.168.7.2. You'll be prompted for a username. Type root and press Enter. By default, there is no root password. I recommend changing this ASAP if you plan on putting your BBB on the network. To do this type password, hit enter, then enter your desired password. You will be prompted to enter it again to verify.

2) Arduino: - The Arduino itself has no real operating system. You develop code for the Arduino using the Arduino IDE which you can download from Arduino - Home. Versions are available for Windows, Mac and Linux. The Arduino is a constrained microcontroller. Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board. You are literally writing the "firmware" when you write the code and upload it. It's both good and its bad.

Conclusion: -

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