Assignment No. 2

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Aim

Study of different operating systems for Raspberry-Pi. Understanding the process of OS installation on Raspberry-Pi

Theory

Introduction

The Raspberry Pi is a wonderful but powerful little computer that fits the palm of your hand. Despite of its size it has enough power to run your operating system smoothly, home media center, a VPN and a lot more. The Raspberry Pi has a SD card slot for mass storage and will attempt to boot off that device from SD card when the board is powered on by 5v micro USB supply.

The Raspberry is a very capable minicomputer and moreover its very inexpensive, it is available at unbelievable price that you could not resist yourself to buy one, if you are technocrat. Latest Raspberry Pi ie. Pi 3 comes with case less computer with HDMI and analog composite video output. It comes with 4 USB port that makes it more user friendly and programmable to achieve specific goals. This Raspberry Pi has an integrated 802.11n wifi adaptor and Bluetooth 4.1.wifi and Bluetooth to make it more user friendly, you doesn't need TP link anymore to use wifi on this kit. It runs 5v micro UBS supply. It also provide RJ 45 port to use Ethernet connection. The Raspberry Pi 3 B model excellent processing speed provided by a powerful new 1.2GHz 64-bit quad core ARMv8 CPU with four ARM cortex –A53 cores and 1 GB of RAM. It does not include a built -in hard disk or solid-state drive, but uses an SD card for booting and long-term storage. We are going to compare different operating systems available for Raspberry Pi. Many from the available lists of operating systems, each one of them are
segregated based on their applications, features and specifications

Brief Discussion of Operating Systems

No matter how good and powerful the hardware of the Raspberry Pi is, without an operating system it is just a piece of silicon, fiberglass, and a few other semiconductor materials.
There are several different operating systems for the Raspberry Pi, including RISC OS, Pidora, Arch Linux,and Raspbian.

1. **Raspbian**

Currently, Raspbian is the most popular Linux-based operating system for the Raspberry Pi. Raspbian is an open source operating system based on Debian, which has been modified specifically for the Raspberry Pi (thus the name Raspbian).Raspbian is the default free and open source operating system that often comes with the Raspberry Pi kit, Raspbian is a official operating system of Raspberry Pi foundation. Raspbian is a version of Debian which is specially designed and optimized for the Raspberry Pi hardware and the build consists of more than 35,000 Raspbian packages. Raspbian is still under active development phase with an emphasis on improving the capability, stability and performance. For a beginner it's a good place to start especially if you're starting with programming and are used to a windows based system as it bears some resemblance to Windows. Raspbian comes with Python programming language. This OS is real treat to the python programmer. Raspbian also includes a 'Pi store' so you can download free and purchasable applications such as Libre Office, Free Civ (a game). Raspbian is a operating system which proves to be very efficient for the basic operating requirements with pi. Raspbian is designed to be easy to use and is the recommended operating system for beginners to start off with their Raspberry Pi.

2. **Pidora**

After waiting for a long, Raspberry Pi users are finally getting an optimized version of Fedora, the Pidora, to replace the current Rasbian OS. The news caused excitement among the Raspberry Pi community, who are finally getting the opportunity to enjoy Fedora on their devices after the previous attempt to introduce Fedora Remix for Pi ended up as a failure. However, the Seneca Center for Development of Open Technology (CDOT), the authority group behind Pidora, is confident that the Raspberry Pi community would love the newly optimized OS, coupled with greater speed and most of the features of Fedora 18. The current Rasbian OS, which was a remix of the Open Source Debian OS chip based on ARMv6 would make way for Pidora, currently available for download on the CDOT website.

3. **Arch Linux**

Arch Linux is an excellent choice for many reasons. One of the greatest advantages of the Arch Linux distribution is its simplicity in approach and attitude. Arch gives you the ability

to build your system from the ground up, including only the software you actually need. This minimizes the amount of SD card memory it takes to hold the operating system for your Raspberry Pi, leaving more space for everything else you'll be doing. On a cautionary note, Arch moves forward as technology evolves, and this can sometimes lead to documentation lagging behind. Arch has now finished it's transition to System D from the old initscripts

4. **OSMC**

OSMC (Open Source Media Center) is a free and open source media player based on Linux. Founded in 2014, OSMC lets you play back media from your local network, attached storage and the Internet. OSMC is the leading media center in terms of feature set and community and is based on the Kodi project. Although OSMC is derived from Linux, you don't need to have any experience with Linux to use it up and running in the way you want. Everything is easily managed through the OSMC interface. This OS comes with over 30,000 packages from Debian repository.

5. **RetroPIE**

Retro Pie allows you to turn your Raspberry Pi into a retro-gaming machine. Its platform developed on the base of Raspbian, Emulation Station, Retro Pie enable you to play your favorite Arcade, home-console, and classic PC games with the minimum set-up. For technocrat users it also provides a large variety of configuration tools to customize the system as per user need and purpose. The Retro Pie SD image is built on top of Raspbian but Retro Pie can be installed on any Debian based Linux distribution. Retro Pie has the most supported and customizable operating systems out of any retro programming software for the Raspberry Pi. This OS is very useful emulation many games.

6. **RISC OS**

RISC OS is a British operating system originally designed by Acorn Computers Ltd in Cambridge, England, and was first released in 1987. It was specifically designed to run on the ARM chipset. It is fast, compact and efficient. RISC OS is not a version of Linux, nor is it in any way related to Windows and interestingly was developed by the original ARM team. RISC OS Pi comes with a small set of utilities and applications, It includes a browser called NetSurf, a simple text editor, a scientific calculator, and it also has two software/package managers, packman and a store. Although it's not a modern operating system (when compared Linux, Windows and OSX) is does have number of unique features and aspects to its design.

It is available to download from RISC OS Open Website or RaspberryPi.org.

7. **Firefox OS**

Firefox OS (also known internally as Boot to Gecko/B2G) is an OS which is more associated with being a Linux kernel-based open-source operating system primarily designed for smart phones and tablet computers. It was primarily designed as a community based alternative system utilizing open standards and HTML5 applications, JavaScript and open web API's. It mainly competes with Android, Windows Phone and Jolla Sailfish OS Recently Mozilla on a Raspberry
Pi. This OS is based on Mozilla technology The device is affordable and flexible as it can run a number of operating systems and might therefore be a very suitable device to provide an entry level upgrade in network protection.

8. **Kali Linux**

Kali Linux is a Debian-based security auditing Linux distribution. It is specially designed for digital forensics and penetration testing. It is maintained and funded by Offensive Security Ltd. Kali Linux provides many pre-installed packages with numerous penetration testing programs, like nmap (a port scanner), Wire shark (a packet analyzer), John the Ripper (a password cracker), Air crack-ng(suite for penetration-testing wireless LANs), Burp suite and OWASP ZAP (security scanners).Recently support for TFT touch screens was added. If you want to install Kali on the Raspberry Pi kit you can download it from their official download page, it is freely available there.

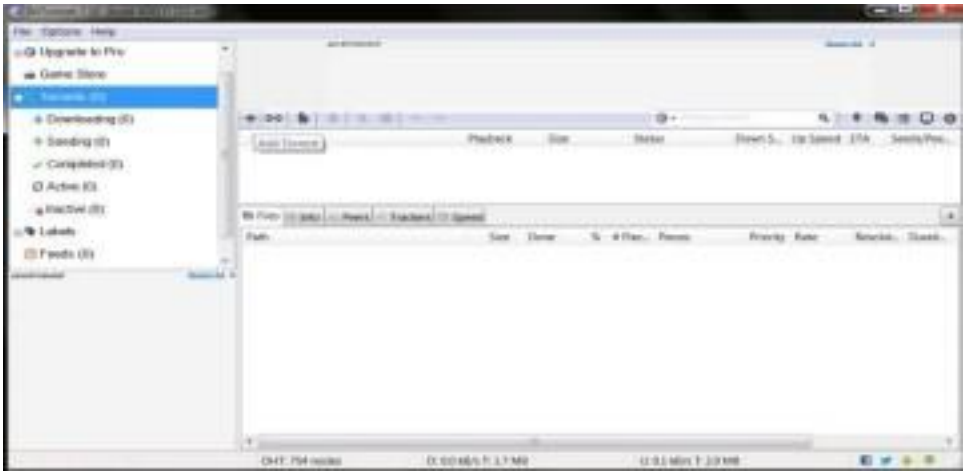
Raspberry Pi has changed the way of programming and usability. But without operating system it is just a piece of semiconductor material. Operating system have made the Raspberry Pi more popular and user friendly. We have gone through 8 different operating system. Each operating has its own features.

Process of OS installation on Raspberry Pi Board

1. Open the website: www.raspberrypi.org
2. Click on the “Downloads” tab

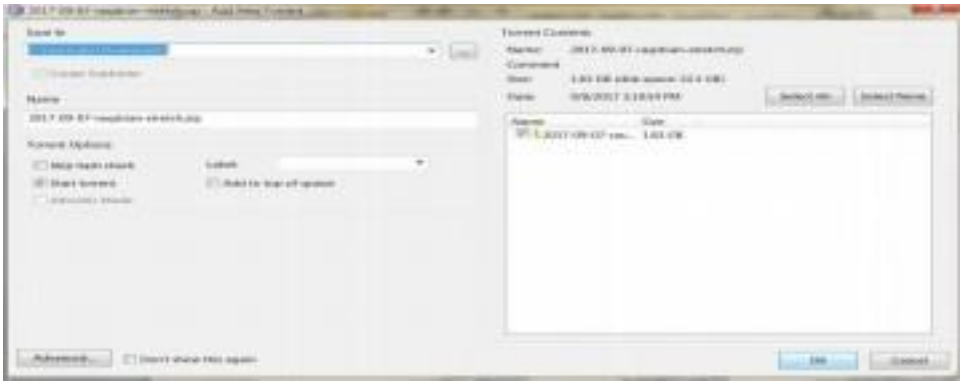
3. Click on the “RASPBIAN” option.

4. We require “RASPBIAN STRETCH WITH DESKTOP”, so under this heading, click on “Download Torrent” option.
5. A “Torrent file” is downloaded.
6. But the actual OS is present in the ZIP file of this torrent.
7. So using this “Torrent file” and the “Bit Torrent” software, we download the ZIP file of The Raspbian OS.
8. So download the “Bit Torrent” Software and install it.
9. Now open the “Bit Torrent” software.
10. Click on the option “+” and under this click on “Add Torrent”.



11. Here select the path of downloaded “Torrent file”.

12. After selecting the torrent file, following window appears. Here click on OK



13.After completion of this process, we get the zip file named as “raspbian-strethc.zip”. Now we have to unzip this file to get the actual disk image of the OS. AS the ZIP archive of the OS is more than 4GB, we require special software named “7Zip” To Unzip the file. So download the software and install it.

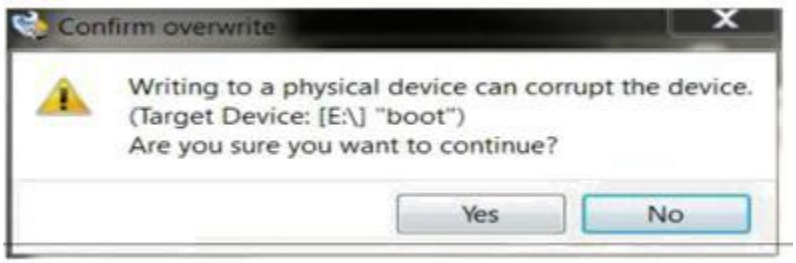
14. Using this 7Zip software, unzip of the file. After this we get the required disk image of the Raspbian OS (approx. 4GB)

15. Now we have to write this disk image on SD card.
16. To write the OS on SD card, we require the software “win32 disk imager”. So download this software and install it.
17. After completion of the installation, the following window appears.

18. Open the unzipped file in the “Image file” option by selecting the path from the Blue icon. The selected path is shown in the below image.
19. Now plug-in the SD card reader having SD card inside it, in the USB port of your PC.
20.

Ensure that your SD card reader is having the same drive which is shown in the Device option (near the blue icon)

21. After ensuring that the “Image file path” and the “Device” are selected correctly, now click ‘Write’ button to write the image on the SD card.
22. After this the following window
23. Appears.



24. Here click ‘Yes’ and Confirm the overwrite
25. Image file will be written on SD card.
26. After the procedure is completed, it gives “Write Successful” message.
27. Congratulations! Your SD card is ready with your OS to work in the Raspberry-Pi-3 board.
28. Insert this SD card in Raspberry pi3.

29. Do the necessary connections and make the power ON. Your Raspberry-Pi starts and theDesktop of the OS is shown on the screen. Now Raspberry -Pi is ready to work on.

Conclusion

Thus, we have studied installation for various OS in Raspberry Pi.