Assignment No 2

**Title:**

Study of different operating systems for Raspberry-Pi / Beagle board.

**Problem Statement:**

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

**Objectives**:

1. To Understand the different operating systems for raspberry-pi/ Beagle board.
2. To Understand the process of installation on raspberry-pi.

**Outcome**:

The students will be able to:

1. Install different operating system on Raspberry-pi

**S/W and H/W:**

1. Raspberry-Pi /Beagle board.
2. 64 bit Operating Systems
3. Open Source Fedora-GHz
4. 8 G.B. RAM
5. 500 G.B. HDD
6. Monitor ,Keyboard, Mouse

**Theory**:

**Different operating systems for Raspberry-Pi** :

1. Raspbian
2. Pidora
3. Retro PIE
4. SARPi
5. Arch Linux ARM
6. Gentoo Linux
7. OSMC
8. Kali Linux
9. RISC OS Pi
10. **Raspbian**:

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 an 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 a real treat to the python programmer. Raspbian also includes a ‘Pi store’ so you can download free and purchasable applications such as LibreOffice, FreeCiv (a game). Raspbian is an 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.

1. **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 Raspbian 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.

1. **Arch Linux ARM**:

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 SystemD from the old initscripts.

1. **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 theKodiproject.Although OSMC is derived fromLinux, 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.

1. **RISC OS Pi**

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, pacman and a store. Although it’s not a modern operating system (when compared Linux, Windows and OSX) it does have a number of unique features and aspects to its design.It is available to download from RISC OS Open Website or RaspberryPi.org.

1. **Kali Linux**:

Kali Linux is a Debian-based security auditing Linux distribution. It is specially designed for for digital forensics and penetration testing. It is maintained and funded by OffensiveSecurity Ltd.Kali Linux provides many pre-installed packages with numerous penetration-testing programs, likenmap (a port scanner), Wireshark (a packet analyzer), John the Ripper (a password cracker), Aircrack-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.

1. **Retro PIE**:

RetroPie allows you to turn your Raspberry Pi into a retro-gaming machine. Its platform developed on the base ofRaspbian, EmulationStation, RetroPieenable allows you to play your favourite 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 RetroPie SD image is built on top of Raspbian but RetroPie can be installed on any Debian based linux distribution.RetroPie has the most supported and customizable operating systems out of any retro programing software for the Raspberry Pi.This OS is very useful emulation many games.

**Different operating systems for BeagleBone** :

1. Angstrom
2. Debian
3. Fedora
4. ArchLinux
5. BuildRoot
6. Gentoo
7. Sabayon
8. Ubuntu
9. **Angstrom**:

Angstrom was started by a small group of people who worked on the OpenEmbedded, OpenZaurus and OpenSimpad projects to unify their effort to make a stable and user-friendly distribution for embedded devices like handhelds, set top boxes and network-attached storage devices. Ångström can scale down to devices with only 4MB of flash storage.The Angstrom community does not provide a forum, intentionally. Angstrom uses Busybox for many key utilities, which has both pros and cons. Advantages include requiring less storage space and a smaller memory footprint for many common utilities, which also improves system startup time and performance. The main disadvantages stem from those utilities not mirroring exactly their full-size counterparts. These differences can be annoying if one is used to standard behavior, and may also break shell scripts that rely on portable functionality. Angstrom uses connman for network connection management, but no documentation is available for this currently. Also, man and man pages are not provided by default, nor debugging utilities like strace and tcpdump. Getting started may therefore present difficulties, depending on experience.

1. **Debian**:

The ARM EABI port is the default port of the standard Debian distribution of Linux for the ARM architecture ("armel"). EABI ("Embedded ABI") is actually a family of ABIs, and one of the "subABIs" is the GNU EABI for Linux which is used for this port. Starting with Debian 7.0 (Wheezy) there is a port targeted at newer (armv7 with fpu) hardware with another ABI ("armhf"). The Debian Project is strongly committed to software freedom, and has a long pedigree and a good reputation.

1. **Fedora**:

The Fedora Project is sponsored by Red Hat, which invests in its infrastructure and resources to encourage collaboration and incubate innovative new technologies. Some of these technologies may later be integrated into Red Hat products. They are developed in Fedora and produced under a free and open source license from inception, so other free software communities and projects are free to study, adopt, and modify them. Red Hat has been a major player since the earliest days of Linux distributions, and has earned a good reputation for solidity which continues in Fedora. The Fedora ARM initiative is very active (see mailing list).

1. **ArchLinux**:

Arch Linux for BeagleBone is a version of the Arch Linux ARM distribution. This carries forward the Arch Linux philosophy of simplicity and user-centrism, targeting and accommodating *competent* Linux users by giving them complete control and responsibility over the system. Instructions are provided to assist in navigating the nuances of installation on the varied ARM platforms; however, the system itself will offer little assistance to the user. The entire distribution is on a rolling-release cycle that can be updated daily through small packages instead of huge updates on a defined release schedule. Most packages are unmodified from the code which upstream developers release.

1. **BuildRoot**:

Buildroot is a set of Makefiles and patches that makes it easy to generate a complete embedded Linux system. Buildroot can generate any or all of a cross-compilation toolchain, a root filesystem, a kernel image and a bootloader image. Buildroot is useful mainly for people working with small or embedded systems, using various CPU architectures (x86, ARM, MIPS, PowerPC, etc.) : it automates the building process of your embedded system and eases the cross-compilation process. The resulting root filesystem is mounted read-only, but other filesystems can be mounted read/write for persistence. Although user accounts can be created, in practice almost everything is done as root. Buildroot uses no package manager. Instead, package selection is managed through make menuconfig.

1. **Gentoo**:

Gentoo is a source-based *meta-distribution* of Linux. Instead of distributing a standard system image built with predefined options, Gentoo gives each user the means to create their own customized system that doesn't contain unused bloat and with minimum dependencies. Upgrades are incremental and under user control, so a Gentoo system is normally always up-to-date and wholesale upgrades are avoided. Being a source-based system, the downside of Gentoo for low-power ARM systems is very long install times for large applications. Cross-compilation on x86 machines and [distcc](http://www.gentoo.org/doc/en/distcc.xml) can overcome this problem, but they add complexity.

1. **Sabayon**:

Sabayon Linux uses the mechanisms of Gentoo to create a pre-configured Linux distribution that can be installed as rapidly as a normal binary distribution, but still retains the benefits of Gentoo's source-based package management. Sabayon on Intel/AMD also provides the Entropy binary package management system, which could in principle greatly ease installation of packages on resource-constrained embedded Linux devices, but this is not yet available for ARM. Although it is still early days for Sabayon on ARM (and hence on BeagleBone), there is regular progress reported on [lxnay's blog](http://lxnay.wordpress.com/2012/), and contributions from the community would probably accelerate the work.

1. **Ubuntu**:

The vision for Ubuntu is part social and part economic: free software, available free of charge to everybody on the same terms, and funded through a portfolio of services provided by Canonical. The first version of Ubuntu was based on the GNOME desktop, but has since added a KDE edition, Kubuntu, and a server edition. All of the editions of Ubuntu share common infrastructure and software. In recent years, special emphasis has been placed on netbooks for lightweight, connected, mobile computing, and on the cloud as a new architecture for data centres.

**Installing Raspbian**:

Step 1: Download the Raspbian disc image using <https://www.raspberrypi.org/downloads/raspbian/>.

Step 2: Unzip the file:

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

Step 4: Put the microSD card in your Pi and boot up.

**Conclusion**:

Thus, we studied different operating systems for Raspberry-Pi and Beagle board. And also understood the process of OS installation on Raspberry-Pi.