

Unit 3: Mobile Operating System

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3.1 LEARNING OBJECTIVE

To gain the knowledge regarding the different android mobile operating systems run on different devices.

3.2 INTRODUCTION

Mobile operating system is used to run the smartphones, tablets and handheld devices. Mobile operating system combines the features of the computer operating system with other features which are useful to mobile devices as well as the hand held devices. Modern mobile operating system includes the Bluetooth, WI-FI, cellular, touchscreen, protected access, GPS (Global Positioning System) for mobile navigation, camera to capture the high quality video and images, speech recognition, voice recorder, music player and infrared blaster.

Mobile devices which having the ability to communication which are contain operating system such as the real time operating system support to the serving the real time applications that are process the data in real time mode. Real time operating system working on the basis of the time bound which has the well-defined fixed time constraints.

3.3 TYPES OF MOBILE OPERATING SYSTEM

3.3.1 ANDROID

In 2005 Google bought the Android OS. After that Android mobile operating system is developed by the Google. It is the modified version of the Linux kernel and the open source software's. Firstly Android mobile operating system is developed for the touchscreen devices like smartphone and the tablets.



Figure-39 Current Android Logo [1]

Further Google is developed the Android operating system, Android Auto for car, Android TV for television and wear OS for the smartwatches. In September 2008 the first commercial android smartphone was launched and its name is HTC dream developed by the HTC Company.



Figure-40 HTC Dream [2]

On March 2019 Google released the Android Q version which is supportable to all pixel mobile phones. Android Q is the 17th version of the Android mobile operating system which supports to build in screen recorder, better support to the biometric authentications in the app and dynamic depth format for the photos.

Initially Android code is known as the Android Open Source Project licensed under the Apache. Android is also related to the closed-source software which is available only after the purchasing developed by the Google called the Google mobile services. Google mobile services are not a part of the Android Open Source Project. Android needs the Licensed from the Google to install the Google Mobile Services on to the Android device. Google Mobile services are preinstalled on to the Android devices such as Google chrome and the Google search. Android is the bestselling operating system in the world.

➤ **Features**

User interface is working on the basis of direct manipulation by using the touch input like swapping, tapping and pinching along with the virtual keyboard. Also physical keyboard and the game controls are support by using the Bluetooth and the USB. Android smartphone is boot to the home screen; home screen is working like as the computer desktop. Android device home screen is consisting by the app icons and the widgets. App icons are used to launch the specific app while widgets displaying the live and auto updating contents such

as Gmail inbox and the weather forecasting. Google play provides the facility to download the third party apps.

➤ **Android versions**

- Android 1.5: Android Cupcake
- Android 1.6: Android Donut
- Android 2.0: Android Eclair
- Android 2.2: Android Froyo
- Android 2.3: Android Gingerbread
- Android 3.0: Android Honeycomb
- Android 4.0: Android Ice Cream Sandwich
- Android 4.1 to 4.3.1: Android Jelly Bean
- Android 4.4 to 4.4.4: Android KitKat
- Android 5.0 to 5.1.1: Android Lollipop
- Android 6.0 to 6.0.1: Android Marshmallow
- Android 7.0 to 7.1: Android Nougat
- Android 8.0 to Android 8.1: Android Oreo
- Android 9.0: Android Pie

3.3.2 IOS MOBILE OPERATING SYSTEM

iOS mobile operating system developed by the Apple mainly for its hardware. iOS operating system is running on different devices such as iPhone, iPad and iPod Touch. iOS is the second popular mobile operating system after the Android mobile operating system. According to survey apple store contain 2.1 million iOS application in 2018 from that 1 million apps for iPad and this apps are downloaded more than 130 billion times.

iOS mobile operating system supports to multi gesture control which provides the better user interface, based on the direct manipulation. Interface controls the contents which are consist by using switches, buttons and sliders. User can interact with mobile operating system with the help of swapping, tapping and pinching. Inbuilt accelerometer support to some applications for shaking control or rotation control, gives good control experience to the user. In 2018 iOS released 12th version which are available for all iOS devices running on the basis of 64-bit processor.



Figure-41 Logo of iOS [3]

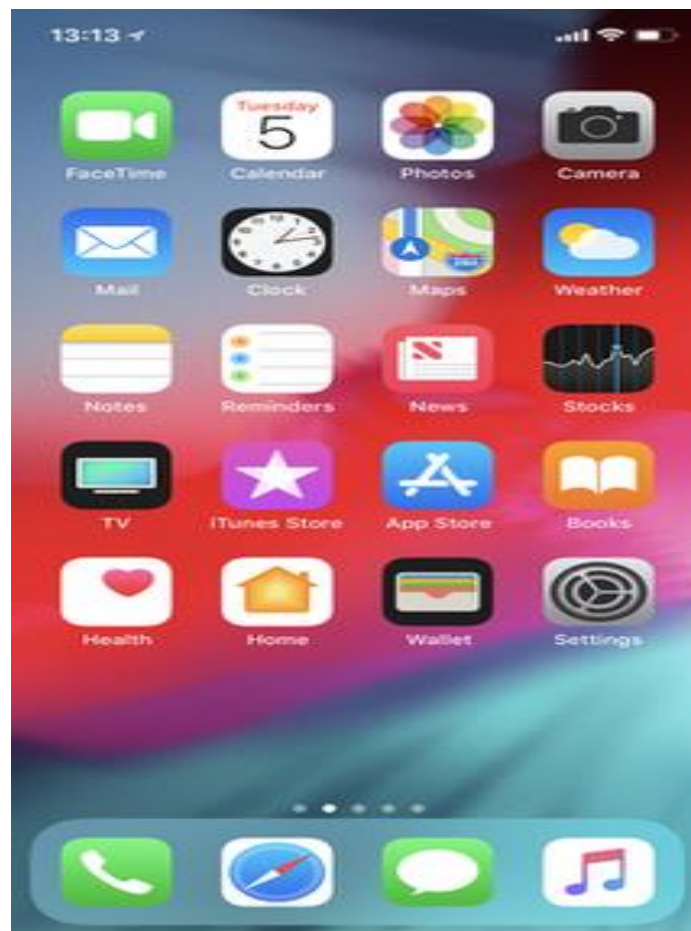


Figure-42 iOS 12 Running on iPhoneX [4]

➤ Features

- **Homescreen**

Homescreen display the application icons and the dock at the bottom where user can capable to ping its favorite applications. Homescreen is appearing when user unlocks the device.

- **System Fonts**

iPhone 4 support to the Helvetica Neue. For iPhone 7 Apple move on to the Helvetica Neue Light as the system font. iOS 7 introduced the ability to scale the text. Apple changes the font in iOS 9 such as the San Francisco.

- **Folders**

iOs 4 introduced the folder icons which are renamed automatically by its category. A title for folder is automatically selected as well as user is capable to rename the title of the folder. Folder on iPhone could include up to 12 apps while folder on to the iPad capable to include 20 apps on the folder.

- **Notification Center**

Before iOS 5 notifications are delivered on to the modal window, in iOS 5 Apple introduced the notification center which allows viewing the notification history. Also user can capable to open the app by tapping on to the notification.

- **Accessibility**

iOS offers deferent accessibility features to the users with the vision and disabilities. Voiceover is the major features provide voice reading information on to the screen includes buttons, links and icons. Apple developed new pronunciation editor features for the iOS 10 which are supportable to the voiceover feature.

3.3.3 BLACKBERRY

BlackBerry mobile operating system is a proprietary mobile operating system. It means BlackBerry mobile operating system is not open source mobile operating system like Android. BlackBerry mobile operating system is developed by Research in Motion for its BlackBerry line of smartphones. The BlackBerry is the best platform for native support for the corporate communication which allows wireless activation and synchronization of email, tasks, calendar and contacts.

Current version of BlackBerry device software is V5.0, BlackBerry 6 mobile operating system and the BlackBerry 7 mobile operating system. You can quickly manage the communicator by using the BlackBerry hub with instant actions.

- Email- Toggle the read status and files or delete a message with a single tap
- Transfer conversion- when composing an email, you can transfer the conversion to the voice call.
- Calendar- accept or reject the invitation without opening the calendar.
- SMS- Use quick reply to respond the SMS

3.3.4 WINDOWS PHONE

Windows phone is a proprietary mobile operating system developed by the Microsoft. Windows phone mobile operating system provides new design language previously called Metro UI. In 2011 Nokia announced to choose the windows phone mobile operating system for all its future smartphones. Windows phone mobile operating system provides good user interface because it use metro design language. Also windows phone mobile operating system provides the on screen virtual keyboard which has dedicated key to insert the emoticons. Windows phone mobile operating system support to the internet explorer which provides better web surfing experience to the user.

3.3.5 SYMBIAN OS

Symbian is a proprietary mobile operating system developed by the Symbian Ltd which developed the software as well as the mobile operating systems. Firstly Symbian operating system is developed for the PDA's. Symbian operating system is used in different branded phones such as Nokia, Samsung, Motorola and Sony Ericsson. AVKON is the native graphics tool kit used by the Symbian operating system. Symbian support to webkit based browser which is used in the Apple's safari browser. Symbian operating system is support for the 48 different languages.

3.3.6 BADA

Bada mobile operating system is developed by the Samsung electronics for the smartphones and the tablets. To adaptation of Bada mobile operating system, Samsung release the source code under the open source license. Bada mobile operating system also support to the smart TV. Samsung electronics is the South Korean multinational electronic company.

In 2012 Bada is merge with the Tizen project but meanwhile they used own Bada mobile operating system. All devices running on Bada branded under the Wave name except Samsung devices running on Android mobile operating system. Samsung announced at 2013 to stop the development of Bada mobile operating system.



Figure-43 Bada OS [16]

Bada is support to the real time operating system hybrid keranal(RTOS)) or the linux kernel. According to copyright displayed on to the Samsung Wave S8500, Bada used different codes from the FreeBSD, Net BSD and Open BSD. Bada mobile operating system supports to the different UI controls such as the Color Picker, List box and Tab. Bada OS supports to the Webkit based browsers. Bada OS also supports to the 3D graphics API under the OpenGL interface. Bada supports to the various sensors such as the motion sensing, accelerometer face detection, magnetometer, GPS and multi-touch. Applications are developed by using C++ with the Bada software development kit in the eclipse development environment. IDE contains the UI builder which provides support to developers to make efficient UI for their applications.

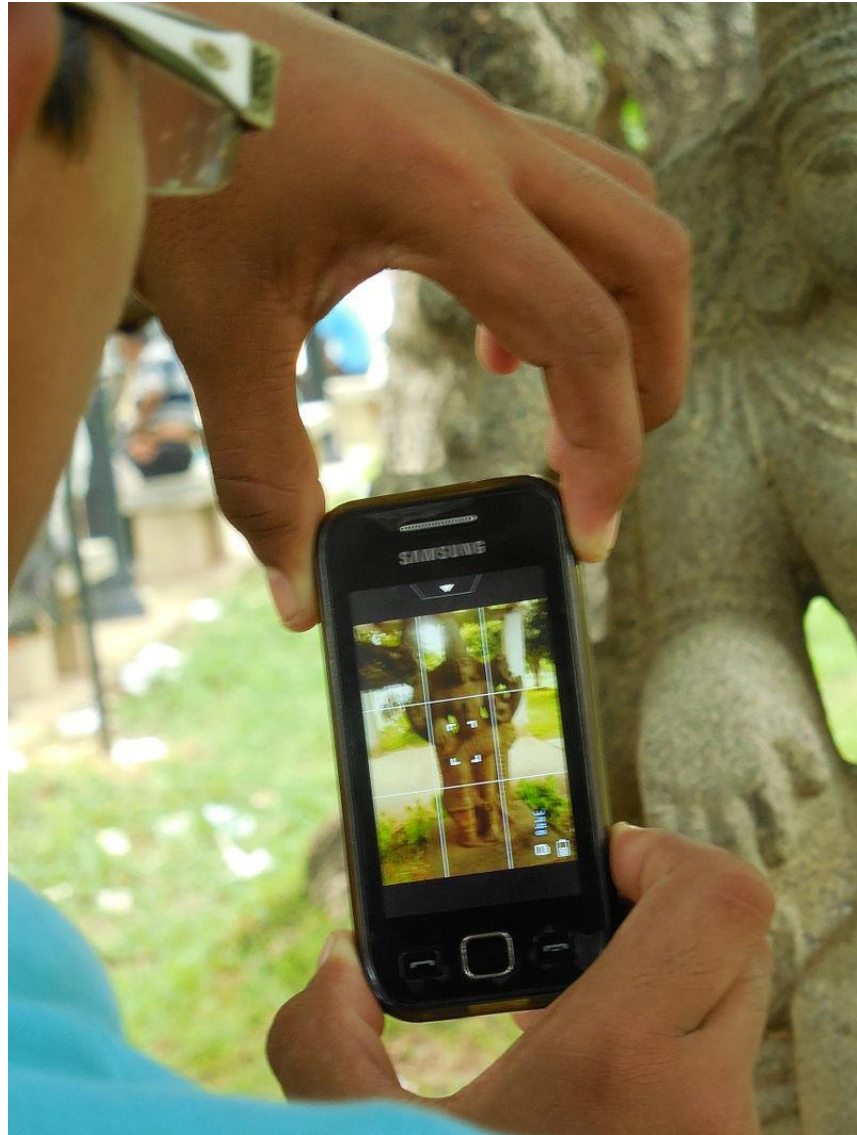


Figure-44 Image acquisition using Bada OS [16]

3.3.7 PALM

Palm operating system is also called as the Garnet OS, developed by the Palm, Inc. which is the American company. Palm Inc. are specially manufacture the PDA (personal digital assistants). Initially Palm OS only supports to the personal digital assistance but later versions of the Palm OS are supports to the smartphones.



Figure-45 Palm OS 4.0 [17]

- Simple and single tasking interface support to launch the full screen applications with the basic GUI sets.
- Support to the handwriting recognition.
- Supports to the 480x320 pixel resolution of the screen.
- Hotsync technology provides facility to data synchronization between device and computer.
- Support to the record and sound playback mechanism.
- Supports to the expandable memory card which provides more storage to the user.
- Support to the security mechanism, lock the device by password.

3.3.8 WEB OS

Web OS is also called as the LG web OS, is the Linux kernel based multitasking operating system to develop for the smart devices such as smart TV. After that web OS is extended which are supports to the smartphones. Initially web OS is developed by the Palm Inc. which is the American Company, later web OS sold out to the LG Electronics in 2014. web OS running on to devices such as the pre, pixi and veer smartphone. This OS support to the LG smartphone as well as the refrigerators and the smart projectors.



Figure-46 LG web OS [18]



Figure-47 LG OS on smart Watch [18]

- LG web OS introduced some new features which are used by the Apple and Microsoft such as the card interface.
- LG web OS supports to the multitasking interface by using the line cards.
- LG web OS supports to the gesture control with the help of magic remote. Also open web OS support to gesture control by using its touch screen and physical keyboard.
- LG web OS developed its app store which provides the different applications to the user.
- LG web OS is partially open source, but Open Web OS is fully open source and its blueprints and source code is freely available.
- Multitasking interface

- It supports to the gesture control with the help of multi-touch on to the screen. The interface uses the card to manage the multitasking mechanism.
- Synergy
- User can use the multiple Gmail accounts which are provided by different service providers.
- Sync
- Data synchronization is done by using could base approach rather than using the desktop client.

3.3.9 MEEGO

MeeGo is discontinued mobile operating system hosted by the linux foundation, using source code such as Moblin and Maemo. Moblin source code is developed by the Intel and the Maemo source code is developed by the Nokia. Initially MeeGo is developed for the hardware like netbook, tablet computers, nettops and mobile computing. Also MeeGo is used in the communication devices such as the smart TV, Vehicle infotainment devices and embedded systems.



Figure-48 MeeGo running on Netbook [19]

Linux foundation canceled the MeeGo OS in 2011 in the favor of the Tizen project. MeeGo provides the support for the ARM and Intel x86 processors.

- User Interface

MeeGo operating system supports to the various graphical user interfaces called as UX (User Experiences).

Netbook user interface is developed by using the Moblin interface, writing by using the clutter based MX tool kit. MeeGo OS support to running the applications at the background such as Gmail, calendar, Messenger and web browsers.

- Handset

Handset UX is developed with the help of Qt with the GTK+ and the Clutter.

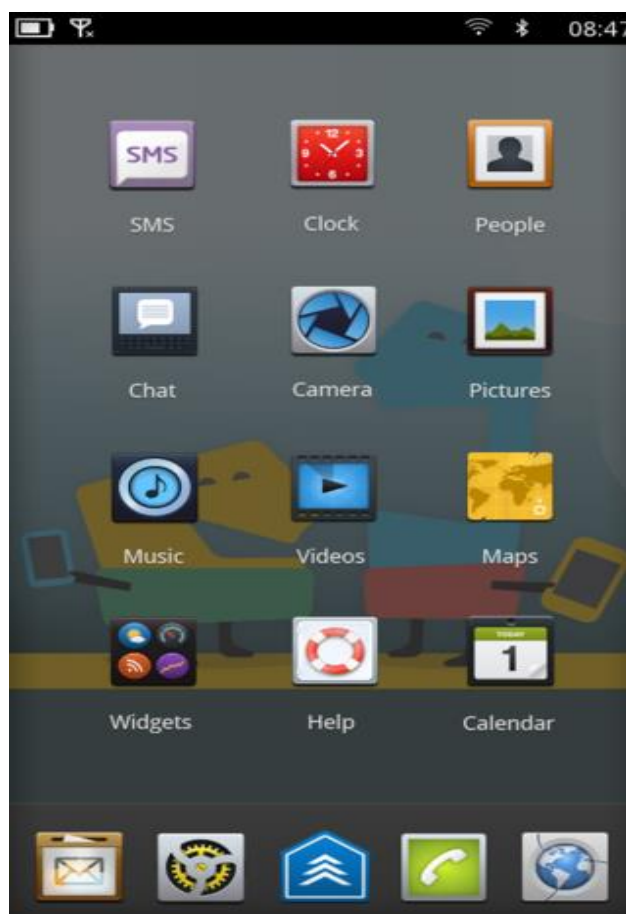


Figure-49 MeeGo on smartphone [19]

3.4 LET US SUM UP

Android mobile operating system becomes popular as compared to other mobile operating systems because android mobile operating system is open source and it supports to different hardware parts.

3.5 CHECK YOUR PROGRESS

1. What is android? Explain different android versions?
2. Explain use of ios mobile operating system?
3. Explain blackberry mobile operating system?
4. Give the features of the MeeGo OS?

3.6 CHECK YOUR PROGRESS: POSSIBLE ANSWERS

1. Refere 3.3.1
2. Refere 3.3.2
3. Refere 3.3.3
4. Refer 3.3.9

3.7 ASSIGNMENTS

1. Give brief history of Symbian OS?
2. Explain architecture of Bada OS?
3. What is Palm OS?
4. What is the use of Web OS?
5. Give the features of the MeeGo mobile operating system?
6. Differentiate between windows phone mobile operating system and android mobile operating system?

3.8 ACTIVITIES

1. Make case study on different Android version?

3.9 FURTHER READING AND REFERENCES

1. https://en.wikipedia.org/wiki/File:Android_robot.svg
2. https://en.wikipedia.org/wiki/HTC_Dream
3. <https://1000logos.net/ios-logo/>
4. <https://en.wikipedia.org/wiki/IOS>
5. <https://www.cellunlocker.net/unlock-blackberry-10-os/instructions/>
6. https://en.wikipedia.org/wiki/BlackBerry_10

7. https://en.wikipedia.org/wiki/BlackBerry_Z10
8. https://en.wikipedia.org/wiki/BlackBerry_Q10
9. https://en.wikipedia.org/wiki/Windows_Phone
10. <https://en.wikipedia.org/wiki/Emoticon>
11. <https://en.wikipedia.org/wiki/Symbian>
12. <https://en.wikipedia.org/wiki/Microkernel>
13. <https://freebiesupply.com/logos/symbian-os-logo/>
14. <https://en.wikipedia.org/wiki/WebKit>
15. <https://en.wikipedia.org/wiki/Symbian>
16. <https://en.wikipedia.org/wiki/Bada>
17. https://en.wikipedia.org/wiki/Palm_OS
18. <https://en.wikipedia.org/wiki/WebOS>
19. <https://en.wikipedia.org/wiki/MeeGo>