Introduction to Mobile and Mobile Programming

Unit 1

Outlines

- Mobile Device
  - Features
  - Categories
  - History
  - Brands
  - Models
  - Platform
- Introduction to Mobile Programming

Mobile Devices

- Any handheld computer or smartphone is Mobile Device
- Examples: Tablets, e-readers, smartphones, PDAs, and portable music players with smart capabilities, smartwatches, etc.
- A mobile device is a small hand-held deice that has a display screen with touch input or a QWERTY keyboard and may provide users with telephony capabilities. *(source: NIST SP 8000-101 Rev.1 under Mobile Devices)*
    - Note: if the device only has storage capacity and is not capable of processing or transmitting/receiving information, then it is considered a portable storage device, not a mobile device

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Features

- A mobile device has following features:
  1. **Portable**
  2. **Personal**
  3. **Companion**
  4. **Easy usage**
  5. **Connected device**

Categories of Mobile Device

1. **Mobile Phones**
2. **Low-end mobile devices**
3. **Mid-end mobile devices**
4. **High-end mobile devices**
5. **Smartphones**
6. **Non-phone devices**
7. **Small Personal Object Technology (SPOTs)**
8. **Tablets, netbooks, and notebooks**

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1. Mobile Phones

- Those devices which have **Call and SMS** support can be categorized as mobile phones
- They don’t have any web browsers/connectivity, and they don’t have any installation possibilities
- Examples: Nokia 1100

Figure : Nokia 1100 mobile phone which support call and SMS

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2. Low-end mobile devices

- Those devices which have web support, call and SMS.
- They have a very basic browser, so don’t tend to be heavy Internet users
- Example: Nokia, Motorola, LG, Samsung, Sony Ericsson and Kyocera have devices for this market. No any touch support, have limited memory, and include very basic camera and a basic music player.

3. Mid-end mobile devices

- Those device which have a good user experience, moderate cost, a medium-sized screen, basic HTML-browser support, sometimes 3G, a decent camera, a music players, games and application support.
- Key feature of mid-end devices is the Operating System (OS)
- They don’t have well known OS; they have a proprietary one with any portability across vendors
- Native applications generally aren’t available publicly and some runtime, like Java ME(Micro Edition) the preferred way to develop installed applications

4. High-end mobile devices

- Those device which have not multi touch but have advanced features like an accelerometer, a good camera, and Bluetooth and google web support(but not best in the market)
- Better than mid-end devices(not in context with smartphones)
- The key differences is the enhanced user experience on smartphones
- Other difference is that high-end devices generally are not sold with flat Internet rates.

5. Smartphones

- A smartphone, as defined toady, has a multitasking operating system, a full desktop browser, Wi-Fi and 3G connections, a music players, and several of the following features:
  - GPS/A-GPS
  - Digital Compass
  - Video-capable camera
  - TV out
  - Bluetooth
  - Touch support
  - Accelerometer

6. Non-phone device

- Those device which doesn’t contains call and SMS feature
- Example: Apple’s iPod Touch and iPad

7. Small Personal Object Technology (SPOTs)

- The only difference between SPOTs and the other devices is their size: a SPOT may be a watch or a pair of glasses
- Example: LG GD910 is a watch with 3G support
- Small widgets are created to update information

Figure: The LG GD910 is the first new generation of mobile devices that have web support through widgets with updatable information

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8. Tablets, netbooks, and notebooks

- A minimum 9 inch display which is more like desktops than mobile devices
- Some have desktop OS and browsers, while others, such as the iPad have mobile software
- If a device has a full operating system, we need to install antivirus protection and a firewall on it, so it won't meet the criterion for a mobile device

History

1. The Brick Era (1973-1988)
2. The Candy Bar Era (1988-1998)
3. The Feature Phone Era (1998-2008)
4. The Smartphone Era (around 2002- present)

2. The Brick Era

- First era, the Brick Era (1973-1988)
- In 1980s, behemoths back
- Nothing is more emblematic of this era than the **Motorola DynaTAC** introduced in 1983 and it is first commercially available handheld cellular mobile phone
- Brick era phones required enormous batteries to get the power needed to reach the nearest cellular network
- Brick era phones useful only to those who truly needed a constant communication, such as stockbrokers or those who worked in the field, such as salespeople or real estate agents because they were so enormous and so expensive

Figure: The **Motorola DynaTAC 8000X** was the first mobile phone to receive FCC acceptance, in 1983; DynaTAC was actually an abbreviation of Dynamic Adaptive Total Area Coverage

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2. The Candy Bar

- Second era, The Candy Bar era (1988-1998), one of the most significant leaps in mobile technology
- At this point, network operators started to see the clear value (and big profits) in their burgeoning cellular networks, and a “perfect storm” ensued.
- The network shifted to second-generation (2G) technology, starting in Finland in 1991.
- The density of cellular sites caused by increased usage decreased the power demands of the device, making it small enough to fit in your pocket
- Candy bar phones—so commonly associated with 2G GSM (Global System for Mobile communications) networks— included SMS (Short Message Service) capabilities
- SMS is free but voice call is very expensive and the 140 character limit was born

Figure: A Nokia candy bar phone

3. The Feature Phone Era

- Third era, The Feature Phone Era (1998-2002), evolution nonetheless
- Up to this point, mobile phones had done three things: make voice calls, send text messages, and play the Snake game
- Variety of applications and services on the phone, like listening to music and taking photos, and introduced the use of the Internet on a phone.
- GSM network providers added GPRS (General Packet Radio Service), allowing packet-switched data services.
- Network evolution often referred to 2.5G, or halfway between 2G and 3G networks
- The introduction of the Motorola V3, known as the RAZR.

Figure: The Motorola RAZR, probably the most iconic device from the Feature Phone Era

4. The Smartphone Era

- Smartphone era, 2002 to present
- Smartphones have all the same capabilities of a feature phone, like making a phone call, sending an SMS, taking a picture, and accessing the mobile web, most smartphones are distinctive in that they use a common operating system, a larger screen size, a QWERTY keyboard or stylus for input, and Wi-Fi or another form of high-speed wireless connectivity.
- A joint venture of mobile device makers Nokia, Motorola, Ericsson, and Psion, and now fully owned by Nokia—created the **Symbian OS**, a smartphone operating system containing common libraries, tools, and frameworks.
- Nokia defined the devices of the Smartphone Era

5. The Touch Era

- Touch era,
- January 9,2007 introduced of iPhone

Brands, Models and Platform

- **Apple**
- **Nokia**
- **BlackBerry**
- **Samsung**
- **Sony Ericsson**
- **Motorola**
- **LG Mobile**
- **HTC**
- **Android**
- **Windows Mobile**
- **Palm**
- **Symbian Foundation**

Apple

- Well known desktop computer company, later entered to mobile world with revolutionary device: iphone
- They have multi-touch screen with 3.5” screen size, WLAN connections, and safari an the browser
- An operating system called ios (formerly iPhone OS) that is based on Mac OS X (a Unix-based desktop OS)
- Develop applications for ios devices on only two platforms:
  - Using mobile web techniques
  - Using the framework built using Objective-C or Swift

Nokia

- Nokia was the most popular brand and has the largest share in mobile device and smartphones world wide.
- Nokia has devices in all the mobile categories, from very low-end devices to very high-end smartphones
- Previously Symbian OS is used but now Nokia smartphone uses Android operating system

BlackBerry

- BlackBerry ,earlier called Research in Motion (RIM) is he Canadian manufacturer of he BlackBerry devices
- mobile devices focuses on being “always connected”
- Used by corporate users who need to remain connected to intranets and corporate networks
- Very popular in the corporate market because of is integration with Exchange and other corporate servers
- BlackBerry user can browse the Internet via the corporate Internet connection through proxy

- Many other manufactures, such as Nokia, LG, HTC, Ericsson, support the BlackBerry email client
- RIM calls all its devices “smartphones”
- QWERTY keyboards devices and is not designed for gaming
- BlackBerrys have the RIM OS, a proprietary operating system compatible with Java ME

Samsung

- Samsung has many devices on the market, most of which are divided into 3 different series
  - Native devices
  - Symbian devices
  - Windows devices
- Samsung launch own operating system called Bada
- Low and mid-end mobile devices are Samsung native devices with a proprietary OS
- High end devices into two categories by operating system Symbian and Windows mobile
- Starting in 2010, Samsung had delivered mobile devices with Bada, Android, and Windows Phone

Sony Ericsson

- Ericsson built many mobile phones in he 1990s
- In 2001, Sony and Ericsson company was merged and created the Sony Ericsson Company
- Sony Ericsson produces a range of low and mid-end devices and a couple of smartphones
- It offers low and mid-end devices using a proprietary Sony Ericsson operating system, as well as Windows Mobile devices, Android devices, and Symbian devices

Motorola

- Leading manufacturer of low and mid-end devise for many years
- First company to mass produce handheld devices on the market and the company pioneered the clamshell design with the classic Motorola StarTac
- Motorola’s mobile devices have traditionally used either a proprietary OS(Motorola v3), Symbian UIA, Windows Mobile, or a Linux-based operating system
- On the proprietary OS-based devices, Java ME and the browser were the only supported development platforms
- The windows-based Motorola devices, like Motorola Q, which has a QWERTY keyboard are intended for corporate market

LG Mobile

- It has many low to high end devices on the market today
- Some are based on proprietary OS with Java Me, Flash, and web support
- Some of them support web widgets based on WebKit
- And the new one are based on Android

HTC

- HTC has become very popular in the mobile market since it created the first and second Android devices in the world
- The first Google phone, the Nexus One
- HTC creates both Android and Windows mobile
- A key feature is that HTC tries to emulate the same user experience on all its devices

Android

- Android is open source, Linux-based Operating system created and maintained by a group of software and hardware companies and operators called the Open Handset Alliances
- It is sometimes known as the “Google Mobile Operating System”
- Android is a software stack including a Linux-core, multitasking operating system based on the concept of a virual machine
- Google used kotlin as a official language, previously Java was the main language
- Android devices comes with Google Maps, Google Calendar, and an email client and many free Google web services

Mobile Programming

- Mobile programming is a set of processes and procedures involved in writing software for small, wireless computing devices
- It is the act or process by which mobile apps are developed for mobile devices
- Two dominant platforms :
  - iOS platform from Apple Inc
  - Android operating system by Google devices
- Different languages are used to develop applications like Java, Kotlin, C#, python, etc for android platform and Objective-C, Swift, etc are for iOS platform

Different approaches to build mobile applications

1. **Native Application**
   Swift or Objective-C for iOS and Kotlin or Java for Android
1. **Cross-platform Application**
   React Native, Flutter, Xamarin and Ionic
1. **Hybrid-Web Application**
   Apache Cordova and PhoneGap
1. **Progressive Web Applications**

Mobile Application Development Lifecycle

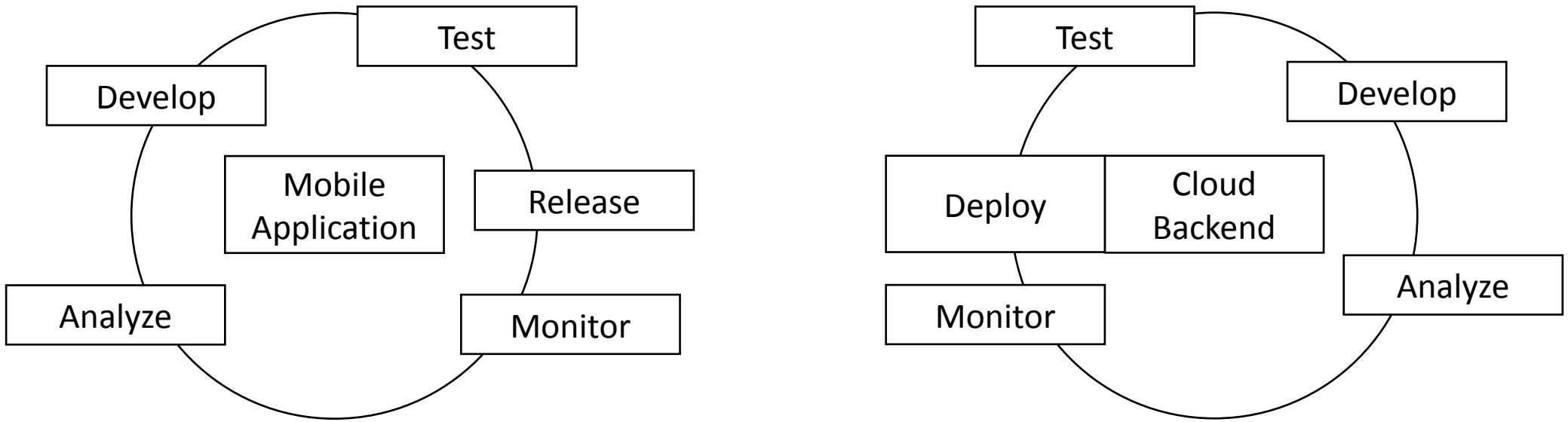

Figure: Mobile Application Development Life Cycle

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