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Android Programming (03606351)

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CHAPTER-1

Introduction to Android and Architecture Framework

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Topics

1. A brief history of Mobile,
2. Types of mobile phone generations,
3. Types of Mobile Applications,
4. Mobile Information Architecture Android Versions,
5. Features of Android,
6. Open Handset Alliance,
7. Android Development Environment setup,
8. Installing Android SDK Tools,
9. Configuring Android Studio,
10. Android Development Tools (ADT),
11. Creating Android Virtual Devices (AVD),
12. Application Framework,
13. Applications,
14. Android Debug bridge,
15. Android Permission model,
16. Android Manifest File,
17. Android Project Framework

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A Brief History of Mobile

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History of Mobile

History of Mobile

- **1983**: The world's first transportable mobile phone, the **Motorola DynaTAC 8000X**, cost **$4,000** to build.
- **1985**: The first mobile phone call in the UK was made by **Sir Ernest Harrison**, chairman of Vodafone.
- **1989**: Motorola launched the **MicroTAC 9800X** with a fold-down keyboard, marking advancements in design.
- Early mobile phones were bulky "car phones," but the **DynaTAC 8000X** was the first truly transportable phone.
- Despite being large and expensive, the DynaTAC became a **symbol of pop culture**.

History of Mobile

- Art designer **Craig Jones** noted mobile phones were initially marketed for **business use**, not personal use.
- Later models, like **Nokia Mobira Talkman** and **Motorola 2900**, offered **longer battery life** and **talk time**, making them more popular.
- Mobile phone history traces back to **1908**, with a patent for a "wireless telephone" issued in Kentucky.
- Early phones resembled **two-way radios** and evolved significantly to impact modern society.

History of Mobile

- Mobile phones initially served only for calls, with **text messaging** introduced later, expanding their functionality.
- The first mobile phone cost **$4,000**, while the **iPhone 13 Pro Max** is priced at **$1,399**, reflecting technological advancement.
- Mobile phones have become **affordable, convenient**, and an integral part of daily life, driving rapid technological progress.

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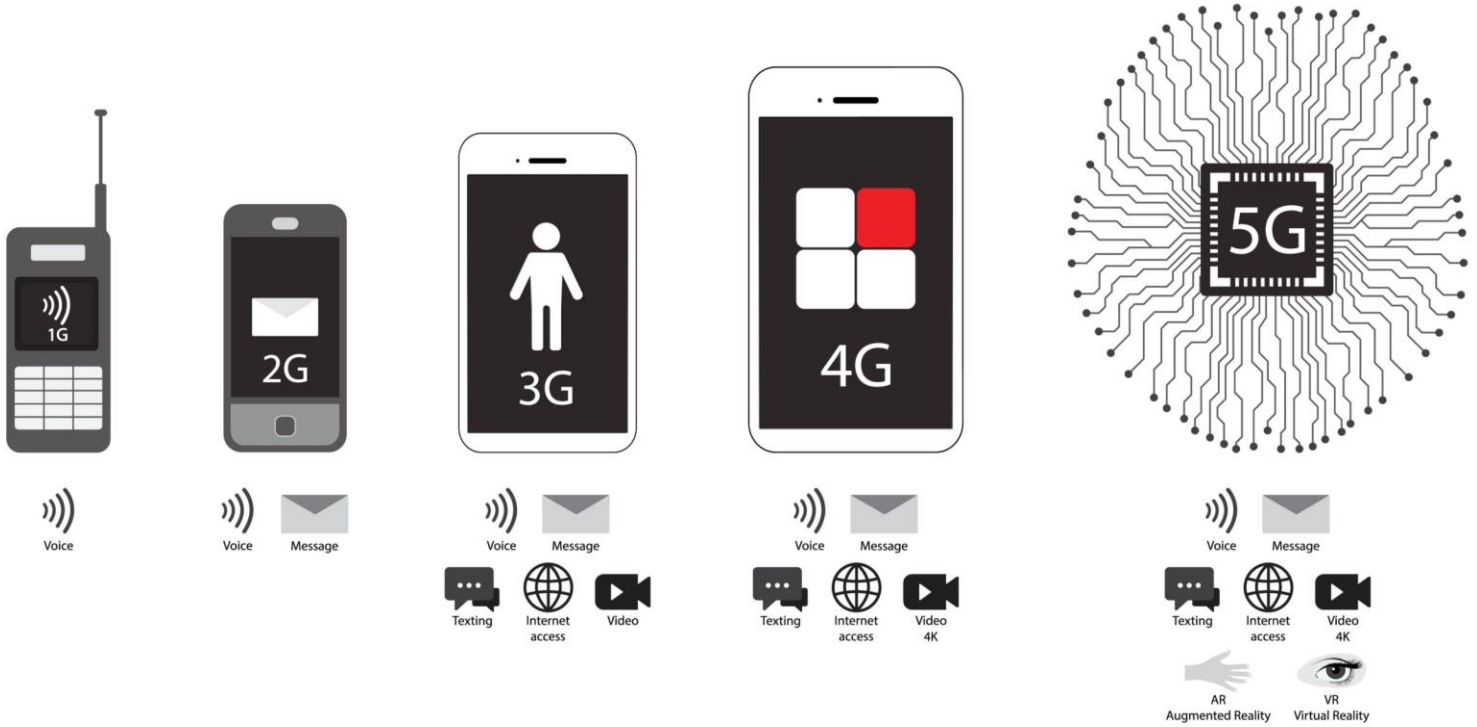
Types of Mobile Generation



Types of Mobile Generation

1. First Generation (1G) Technology. ...
2. Second Generation (2G) Technology. ...
3. Third Generation (3G) Technology. ...
4. Fourth Generation (4G) Technology. ...
5. Fifth Generation (5G) Technology.

First Generation (1G) Technology

Launch:

- Introduced in 1979 by Nippon Telegraph and Telephone (NTT) in Tokyo.
- Expanded nationwide in Japan by 1984 (first country with nationwide 1G coverage).
- Launched in the U.S. by Ameritech on March 6, 1983, followed by Canada in the mid-1980s.

First Generation (1G) Technology

Impact:

1. Despite being bulky and expensive, it exceeded sales expectations.
2. First Year Sales: 1,200 units sold by Ameritech.
3. By 1998, cellphones and related services made up two-thirds of Motorola's revenue.

First Generation (1G) Technology

Motorola DynaTAC (1983):

- Nicknamed "The Brick.“

Specs:

1. Weight: 2 pounds.
2. Talk Time: 30 minutes.
3. Charging Time: 10 hours.
4. Price: USD 3,995 (equivalent to USD 10,300 today).

Video(1G)

Second Generation (2G) Technology

Launch:

- Introduced in 1991 in Finland on GSM.

Advancements:

- Encrypted calls for improved privacy.
- Enhanced sound quality (reduced static and crackling).
- Faster download speeds (~0.2 Mbps).

Second Generation (2G) Technology

Key Features:

- Enabled data transfer, introducing basic smartphone functionality.
- Revolutionized communication with SMS (text messaging) and MMS (multimedia messaging).
- Popular Devices:
- Nokia 3210 ("Candy Bar" phones) – sold over 160 million units.

Second Generation (2G) Technology

Popular Devices:

Nokia 3210 ("Candy Bar" phones)
– sold over 160 million units.

Impact:

- Massive adoption of mobile phones for both consumers and businesses.
- Increased demand for data services.

Third Generation (3G) Technology

Launch:

- Introduced in 2001 by NTT DoCoMo in Japan.

Advancements:

- Standardized network protocols for global connectivity and roaming.
- Data speeds up to 2 Mbps (4x faster than 2G).

Third Generation (3G) Technology

- the 3G era, smartphones were new. This new technology allowed users to listen to music, call, text, and search through the internet on their mobile devices. There were two major smartphone competitors at the time – Blackberry and Apple.

Fourth Generation (4G) Technology

- Introduced for commercial use in Norway near the end of 2009.
- Starting at a minimum of 12.5 Mbps, 4G provided high-quality video streaming/chat, fast mobile web access, HD videos, and online gaming.

Fourth Generation (4G) Technology

- when 4G first came out, what you were seeing was 3.9G or 3.95G instead
- By mid-2011, Canada launched its first LTE wireless network in Ottawa, Ontario, thanks to Rogers. The release offered speeds just under 12.5 Mbps labelling it 4G LTE. Today though, speeds are faster. In 2020, Canada's median 4G download speed was 55.5 Mbps.

Fourth Generation (4G) Technology

- when 4G first came out, what you were seeing was 3.9G or 3.95G instead
- By mid-2011, Canada launched its first LTE wireless network in Ottawa, Ontario, thanks to Rogers. The release offered speeds just under 12.5 Mbps labelling it 4G LTE. Today though, speeds are faster. In 2020, Canada's median 4G download speed was 55.5 Mbps.

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Fourth Generation (4G) Technology

Fifth Generation (5G) Technology

Launch:

Rolled out in 2019 in South Korea by KT, LG Uplus, and SK Telecom.

Advancements:

- Speed: Up to 20x faster than 4G; median speeds in Canada: 169.46 Mbps.
- Latency: Reduced from 50ms (4G) to ~10ms, with potential for 1ms latency.
- Frequency Range: Operates between 30 GHz to 300 GHz, supporting IoT and smart cities.

Fifth Generation (5G) Technology

Impact:

Essential for mass IoT deployment, enabling smart technologies.

Supports industries with high bandwidth needs.

Challenges:

Concerns around electromagnetic hypersensitivity (EHS).

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Types of Mobile Generation

Technology	1G	2G/2.5G	3G	4G	5G
Deployment	1970/1984	1980/1999	1990/2002	2000/2010	2014/2015
Bandwidth	2kbps	14-64kbps	2mbps	200mbps	>1gbps
Technology	Analog cellular	Digital cellular	Broadbandwidth/ cdma/ip technology	Unified ip & seamless combo of LAN/WAN/WLAN/PAN	4G+WWWW
Service	Mobile telephony	Digital voice, short messaging	Integrated high quality audio, video & data	Dynamic information access, variable devices	Dynamic information access, variable devices with AI capabilities
Multiplexing	FDMA	TDMA/CDMA	CDMA	CDMA	CDMA
Switching	Circuit	Circuit/circuit for access network&air interface	Packet except for air interface	All packet	All packet
Core network	PSTN	PSTN	Packet network	Internet	Internet
Handoff	Horizontal	Horizontal	Horizontal	Horizontal& Vertical	Horizontal& Vertical

Types of Mobile Application

1. Native Apps
2. Hybrid Apps
3. Web Apps
4. Progressive

Types of Mobile Application

1. **Native Apps**

   Definition:

   - Apps developed specifically for a single platform or operating system, such as Android, iOS, or Windows.

   Example:

   - **Android**: WhatsApp
   - **iOS**: Apple Maps

- **Pros**:
  - High performance with a rich user experience.Extensive APIs allow advanced functionalities.
  - Available in respective app stores for broader reach.
- **Cons**:
  - Expensive development due to platform-specific coding.
  - Requires separate maintenance for each platform.

Types of Mobile Application

2. **Hybrid Apps**
   - **Definition:** Apps that use web technologies like HTML5, CSS, and JavaScript, wrapped in a native container to run on multiple platforms
   - **Example:**
     - Instagram
     - Uber

Pros:
- Multi-platform functionality with a single codebase.
- Faster and more cost-effective to develop.
- Access to APIs like geolocation and accelerometer.

Cons:
- Slower performance compared to native apps.
- Design inconsistencies may occur across platforms

Types of Mobile Application

3. Web Apps

- Web apps function similarly to native apps but run on a browser rather than requiring installation.

Features:

- Built using CSS, JavaScript, or HTML5.
- Users access the app by visiting a URL and saving it as a bookmark.

Advantages:

- Minimal storage requirements as data is stored on a server.
- Accessible from any internet-connected device.

Disadvantages:

- Limited access to device-specific APIs, restricting advanced functionalities.
- Performance is entirely dependent on internet speed and browser capabilities.

Types of Mobile Application

4. Progressive Web Applications (PWA)

Definition: Progressive Web Applications (PWAs) are web applications that combine the features of both web and native apps. They run in a browser but provide app-like experiences, such as offline functionality, push notifications, and the ability to add them to the home screen without downloading from an app store.

Types of Mobile Application

Pros:

Offline Access: PWAs work offline or with poor network connections using service workers.

Example: Google Maps PWA allows users to access preloaded maps offline.

Cross-Platform Compatibility: They run on any device with a browser, eliminating platform restrictions.

Example: Flipkart Lite provides a seamless shopping experience across devices.

Cost-Effective: PWAs have a single codebase for web and mobile, reducing development and maintenance costs.

Example: Twitter Lite serves as a PWA, minimizing the need for separate app development.

No Installation Required: Users can access PWAs instantly via a URL and save them to their home screen without app store downloads.

Example: Starbucks PWA is accessible directly from a browser and offers app-like features.

Fast Loading: PWAs use caching strategies to load faster than regular websites.

Example: Pinterest PWA is optimized for speed, even on slow networks.

Types of Mobile Application

Cons:

- **Limited Device Features:** PWAs have restricted access to device features like Bluetooth, NFC, and advanced hardware sensors.
  Example: Unlike native apps, Spotify PWA cannot control advanced audio hardware features.
- **Browser Dependency:** The performance and functionality of PWAs depend on the browser and its compatibility.
  Example: Certain PWA features may not work on older versions of browsers like Safari.
- **No App Store Presence:** PWAs are not listed on app stores by default, which may affect visibility and user trust.
  Example: A user searching for the AliExpress PWA on the Play Store may not find it easily.
- **Performance:** PWAs may lack the high performance and rich user experience of native apps for resource-intensive tasks.
  Example: Canva PWA is functional but slower compared to its native app for heavy graphic editing.
- **Limited Push Notifications:** Not all browsers fully support push notifications for PWAs.
  Example: Push notifications for PWAs like Telegram Web may not work on certain devices or browsers.

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THANK YOU

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