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MOBILE COMPUTING

LECTURE-1 INTRODUCTION

Presented By:
Mohamed Al-Tantawy Yehya

Date
10/10/2025

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Lecture Contents

1. Introduction to Mobile Computing
2. Why Mobile Computing?
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Introduction to Mobile Computing

Mobile computing systems are computing systems that may be easily moved physically and whose computing capabilities may be used while they are being moved.

Examples : laptops, personal digital assistants (PDAs), and mobile phones

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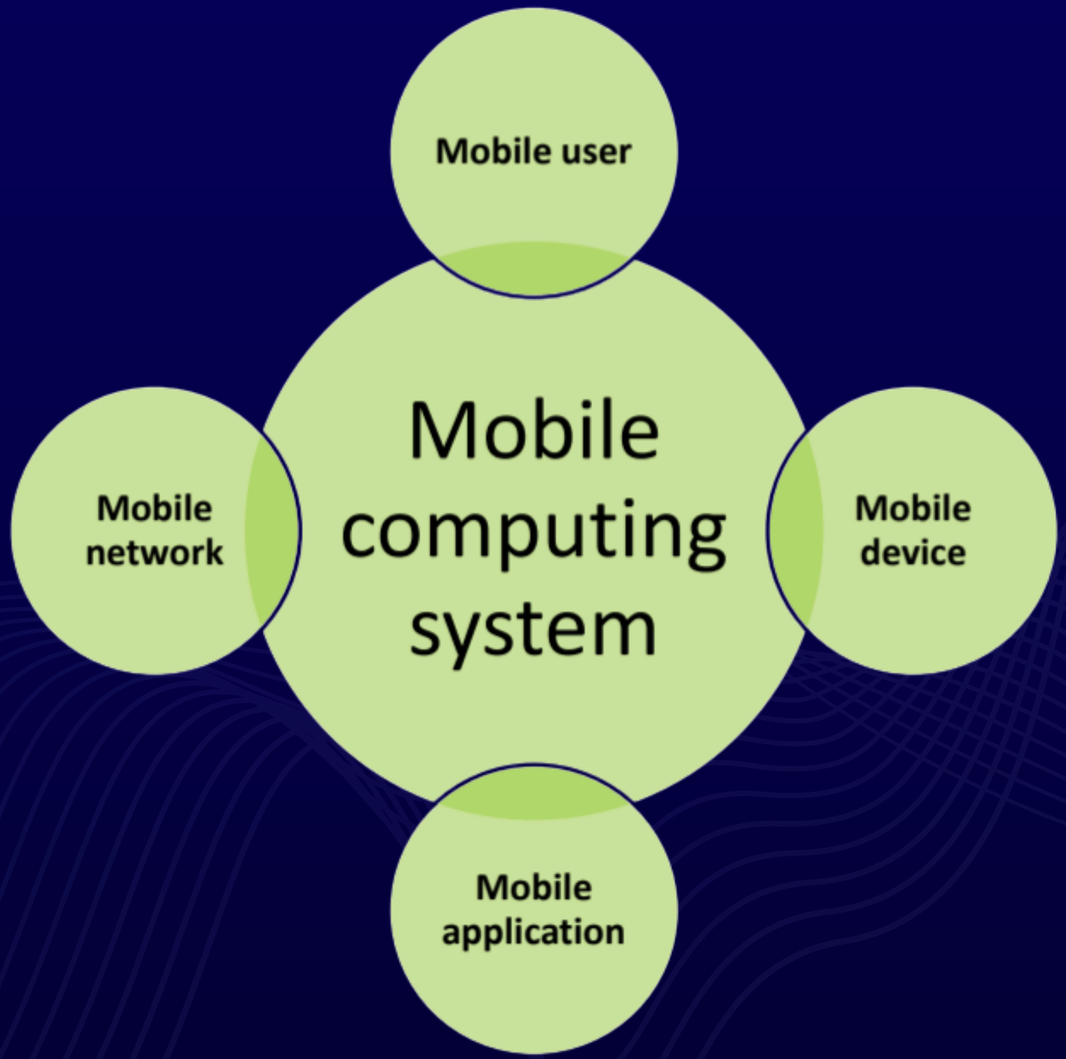
Mobile App. Puzzle



Why Mobile Computing?

→ Mobile computing system can do set of properties a stationary computing system can’t do mobility includes:

- moving between different geographical locations
- moving between different networks
- Moving between different applications

→ Advantages of mobile computing systems:

- **P**revalent wireless network connectivity
- Small size
- The mobility nature of their use
- Power sources
- Their functionalities that are particularly suited to the mobile user.

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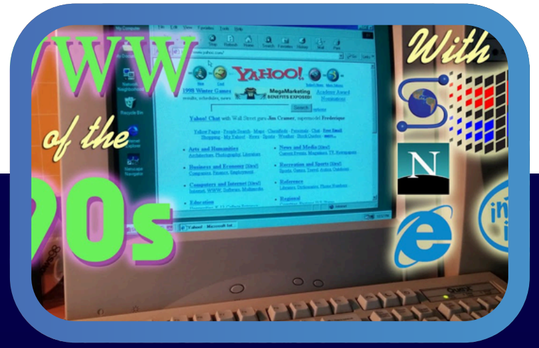
Brief History

Mainframes

1950's - 1960's

Personal Computing

1980's - 1990's



Internet Computing

1990's - 2000's

Mobile Computing

2010 - Present

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Brief History

	<2000BC	2000BC-1800AD	1800s	1900-1940	1940-1960	1960s	1970s	1980s	1990s	2000s	>2010
Computing	Tally Stick, Abacus	Slide Rules	Mechanical & Analogue computers		Transistors, integrated circuit	Gemini & Apollo missions	Intel 4004, Portable calculator	PC, Laptops ARM,	NewsPad WebPad Newton	Nokia 770	iPad Kindle Nook
User Interface			QWERTY		Batch interface	OS/360, CP/M	touch screens	GUI, MAC OS	Symbian	IOS	Android
Display			RGB Photography	CRT & Television	colour tv			CGA, EGA, VGA, LCD TV			Google Glass
Comms		Optical telegraph	electrical telegraph, mechanical fax	walkie-talkie, commerical radio	bell/motorola car phone, Sputnik	ARPANET	Invention of Mobile Phone	1G, Commercial Cell Phones, Motorola, Nokia	2G & 3G, WIFI, Blackberry phones	4G, iPhone	
Storage		Punch cards		Magnetic drum	Selectron Magnetic tape IBM Model 350		Floppy disk	CD	ZIP DVD MMC	SD Card Blueray	
Battery		Leyden Jar	Battery				Lithium-ion battery				

Is wireless mobile ?
Or
Is mobile wireless ?

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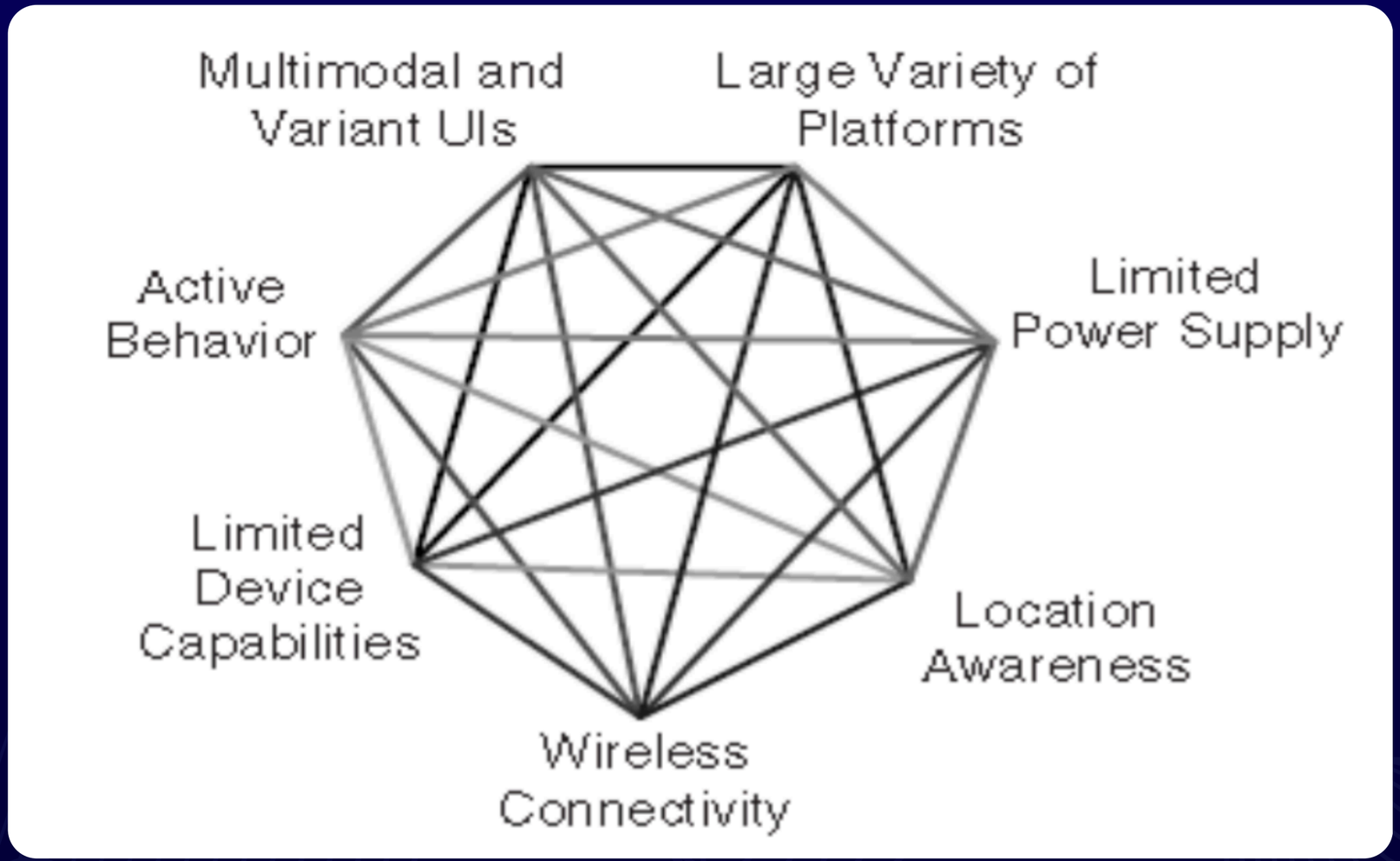
Dimensions of mobility

dimensions of mobility are the tools that allow us to qualify our problem of building mobile software applications and mobile computing systems.

- Dimensions of mobility are not completely orthogonal with respect to each other.
- Some of these dimensions are limitations

Dimensions of mobility



Location awareness

acquiring position information requires connectivity to some network-based infrastructure.

- localization
- location sensitivity

Methods for collecting and using the location of the user and the device
user may simply be prompted for his or her location (user unfriendly)
Location-sensing technology

- Triangulation
- proximity
- scene analysis

- Proximity-based methods:
  measure the relative position of the unknown point to some known point.
- Scene analysis method:
  relies on image processing and topographical techniques to calculate the location of the unknown point based on a view of the unknown point from a known point

Quality of Service (QoS)

Moving from one physical location to another may cause some disconnected time from the network.
The quality and type of the available network connectivity can significantly affect QoS.
network connectivity and QOS need to be taken into account while designing a mobile application.

- Available bandwidth
- Probability of connectivity
- Statistical traffic measurements

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Quality of Service (QoS) Cont.

All mobile applications should know how to stop working when the application suddenly disconnects from the network and then resume working when it connects again

QoS is provided by the network operator.

Designing applications should dynamically adapt their features and functionality to the available bandwidth

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Mobile Devices Limitations

→ **Limited Device Storage and CPU**
Smaller physical size limitation imposes boundaries on volatile storage, non-volatile storage, and CPU on mobile devices when it comes to mobile systems and devices, smaller is nearly always better.

→ **Limited Power Supply**
The power supply has a direct or an indirect effect on everything in a mobile device.

→ **Challenges:**

- Battery life
- Mobility effect on battery life
- Connectivity effect on battery life
- Battery management

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Mobile Devices Limitations Cont.

→ **Platforms should provide:**

- monitoring of the remaining power and other related power information.
- allow multiprocessing and multithreading which have an effect on the control over the variation of the CPU activity, which in turn has an effect on the control over the power consumed by the device.

→ **Varying User Interfaces**

- Stationary application users have more efficient user interface capabilities than mobile application users
- Multichannel systems This is not true for all application
- The challenge is how to choose the best UI for the context

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Mobile Devices Limitations Cont.

User interfaces are difficult to design and implement for the following reasons:

1. Designers have difficulties learning the user's tasks.
2. The tasks and domains are complex.
3. A balance must be achieved among the many different design aspects.
4. The existing theories and guidelines are not sufficient.
5. Iterative design is difficult.
6. There are real-time requirements for handling input events.
7. It is difficult to test user interface software.
8. Today's languages do not provide support for user interfaces.
9. Programmers report an added difficulty of modularization of user interface software.

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Mobile Devices Limitations Cont.

→ Platform Proliferation

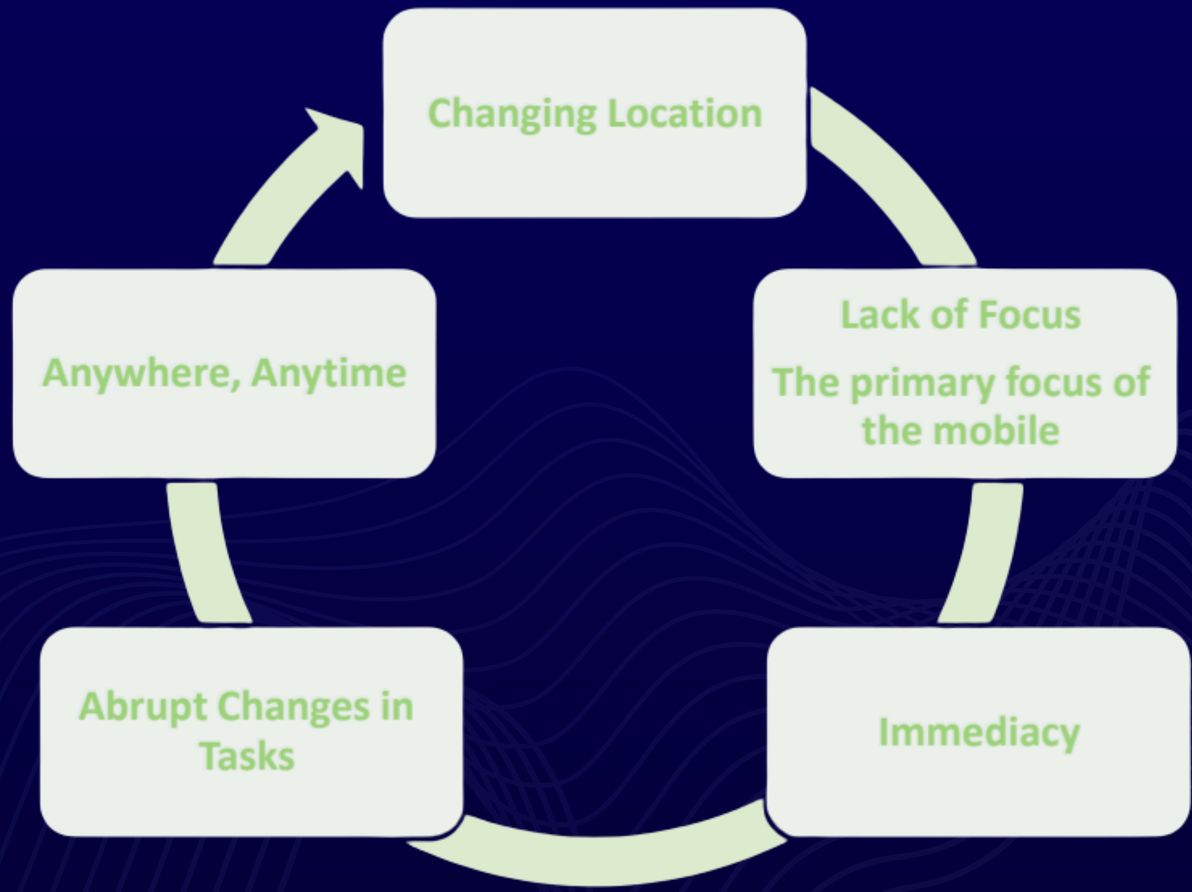
Due to commercial competence in the world of mobile devices, every manufacture has his own platform proliferation (android vs ios) It affects the device supported-applications

Platform proliferation heighten the importance of designing and developing mobile devices independent of the platforms UML based design

→ Active Transactions

- Passive transaction
- Active transaction
- synchronous
- asynchronous

CONDITION OF THE MOBILE USER



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ARCHITECTURE OF MOBILE SOFTWARE APPLICATIONS

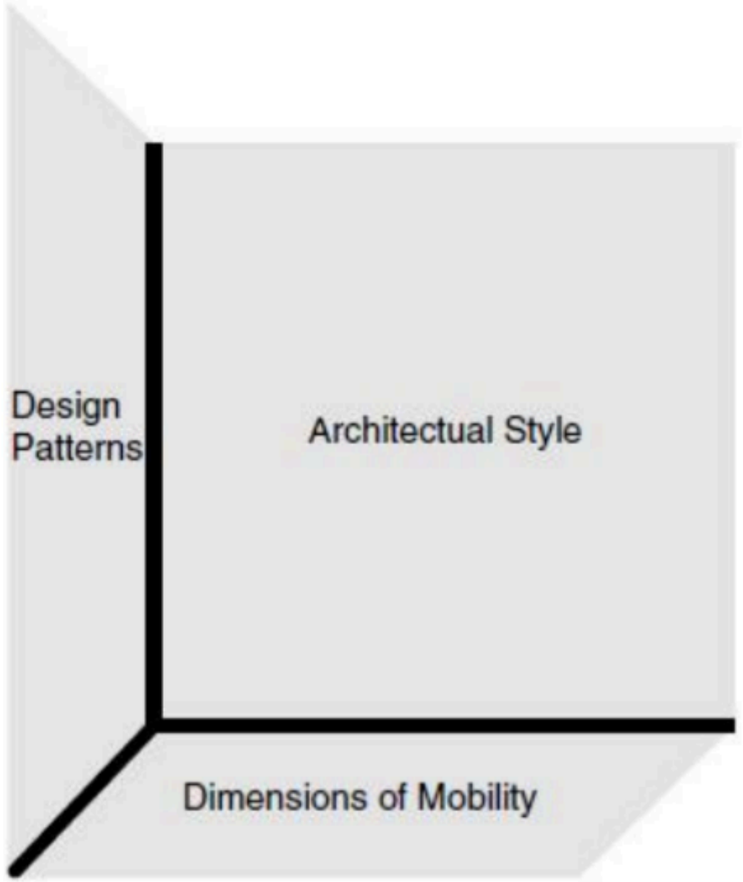

FIGURE 1.6. Mobile Application Development Design Consideration Space.

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THANK YOU

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