



# Periyar Arts College

Guddalore

Re-Accredited with "B" Grade by NAAC

DEPT : DEPARTMENT OF COMPUTER SCIENCE

SUBJECT : MOBILE COMPUTING – UNIT- I

CLASS : II M.Sc.CS



WELCOME TO ALL

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# UNIT-I SYLLABUS

## Introduction to Mobile Computing and Wireless Networking

- What is a Mobile Computing
- Mobile Computing vs. Wireless Networking
- Mobile Computing Applications
- Characteristics of Mobile Computing
- Structure of Mobile Computing Applications

# What is Mobile Computing

## Definition:

- ❖ Mobile Computing (Sometimes called ubiquitous computing and also at times called nomadic computing) is widely described as the ability to compute remotely while on the move.
- ❖ This is new and fast emerging discipline that had made it possible for people to access information from anywhere and at anytime.

# Mobile Computing

- 1. Mobile Computing.
- 2. Mobile Communications.

## Mobile Computing

Mobile computing as encompassing two separate and distinct concepts: Mobile communication and computing.

Computing denotes the capability to automatically carryout some processing related to service invocations on remote computer.

## Mobile Communication:

Mobile Communication, on the other hand, provides the capability to change location while communicating to invoke computing services at some remote computer.

The main advantages of this type of mobile computing is the tremendous flexibility it provides to the users.

# Mobile Computing vs. Wireless Networking

1. We must distinguish between mobile computing and wireless networking.
2. Mobile computing essentially denotes accessing information and remote computational services while on the move.
3. Wireless networking provides the basic communication infrastructure necessary to make this possible.
4. Mobile computing is based on wireless networking and helps one to invoke computing services on remote servers while on the move.

# Mobile Computing vs. Wireless Networking

5. Wireless networking is an important ingredient of mobile computing, but forms only one of the necessary ingredients of mobile computing.
6. Mobile computing also requires the applications, their design and development, and the hardware at the client and server sides.
7. Wireless networks appear in various forms such as WLANs(Wireless LANs), mobile cellular networks, personal area networks(PANs), and ad hoc networks, etc.

# Mobile Computing vs. Wireless Networking

Wireless networks classified into two basic types.

- a. One is an extension of wired networks.
- b. The other type of wireless networks.



# Mobile Computing vs. Wireless Networking

## a. One is an extension of wired networks

It uses fixed infrastructure such as base station to provide essentially single hop wireless communication with a wired network as illustrated in fig.2.1

Ex.

Wireless LAN(WLAN)

# Mobile Computing vs. Wireless Networking

## b. The other type of wireless networks.

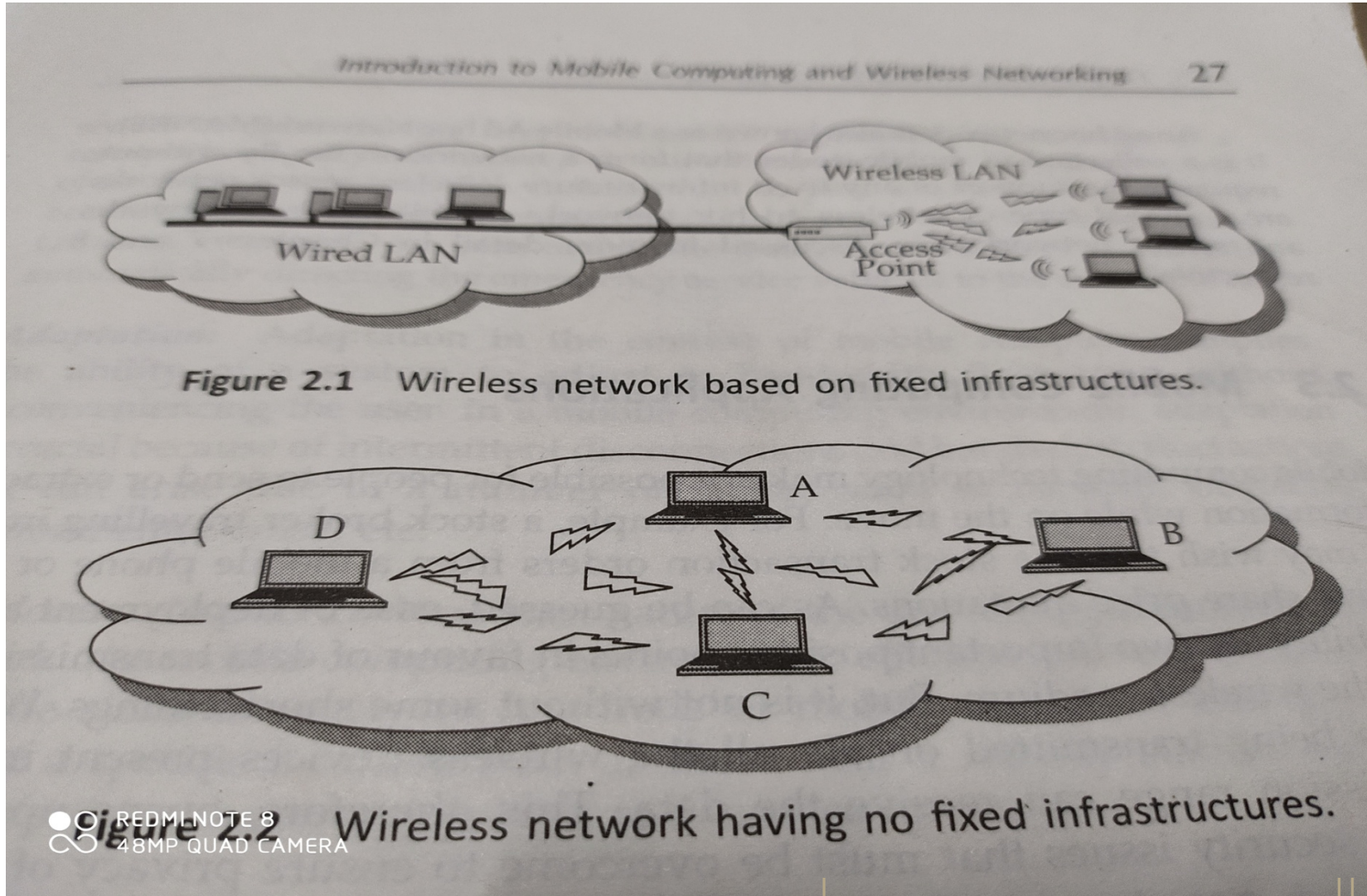
The other type of network is an ad hoc network.

An ad hoc network does not use any fixed infrastructure and is based on multi-hop wireless communication as shown fig.2.2.

Ex. Hd hoc network

# Mobile Computing vs. Wireless Networking

- a. One is an extension of wired networks.
- b. The other type of wireless networks.



# MOBILE COMPUTING APPLICATIONS

Mobile Computing technology make it possible for people to send or extract information while on the move.

For example,

A stock broker travelling in a car may wish to issue stock transaction orders from a mobile phone or to receive share price quotations.

# MOBILE COMPUTING APPLICATIONS

As can be guessed, ease of deployment and scalability are two important points in favour of data transmissions over the wireless medium.

When data is being transmitted on air, all the wireless devices present in the transmission range can receive the data.

This, therefore, opens up very difficult security issues that must be overcome to ensure privacy of data.

# Characteristics of Mobile Computing

A computing environment is said to be "mobile", When either the sender or receiver of information Can be on the move while transmitting or receiving information.

The following are some of the important characteristics of mobile computing environment.

1. Ubiquity
2. Location awareness
3. Adaptation
4. Broadcast
5. Personalization

# Characteristics of Mobile Computing

## I. Ubiquity:

The dictionary meaning of ubiquity is 'present everywhere'. In the context of mobile computing, ubiquity means the ability of user to perform computations from anywhere and at any time.

For example:

A business executive can receive business notifications and issue business transactions as long he is in the wireless coverage area.



# Characteristics of Mobile Computing

## 2. Location awareness:

A hand-held device equipped with global positioning system(GPS) can transparently provide information about the current location of a user to a tracking station. Many applications, ranging from strategic to personalized services, require or get value additions by location based services.

For example:

A person travelling by road in a car, may need to find out a car maintenance service that may be available nearby. He can easily locate such a service through mobile computing where an applications may show the nearby maintenance shop.

Another example:

Applications include traffic control.



# Characteristics of Mobile Computing

## 3. Adaptation:

Adaptation in the context of mobile computing implies the ability of a system to adjust to bandwidth fluctuation without inconveniencing the user. In a mobile computing environment, adaptation is crucial because of intermittent disconnections and bandwidth fluctuations that can arise due to a number of factors such as handoff, obstacles, environmental noise, etc.

# Characteristics of Mobile Computing

## 4. Broadcast:

Due to the broadcast nature of the underlying communication network of a mobile computing environment, efficient delivery of data can be simultaneously to hundreds of mobile users.

For example:

All users at specific location, such as those near a railway station, may be sent advertising information by a taxi service operator.

# Characteristics of Mobile Computing

## 5. Personalization:

Services in a mobile environment can be easily personalized according to user's profile. This is required to let the users easily avail the information with their hand-held devices.

For example:

A mobile user may need only a certain type of information from specific sources. This can be easily done through personalization.

# Structure of Mobile Computing Applications

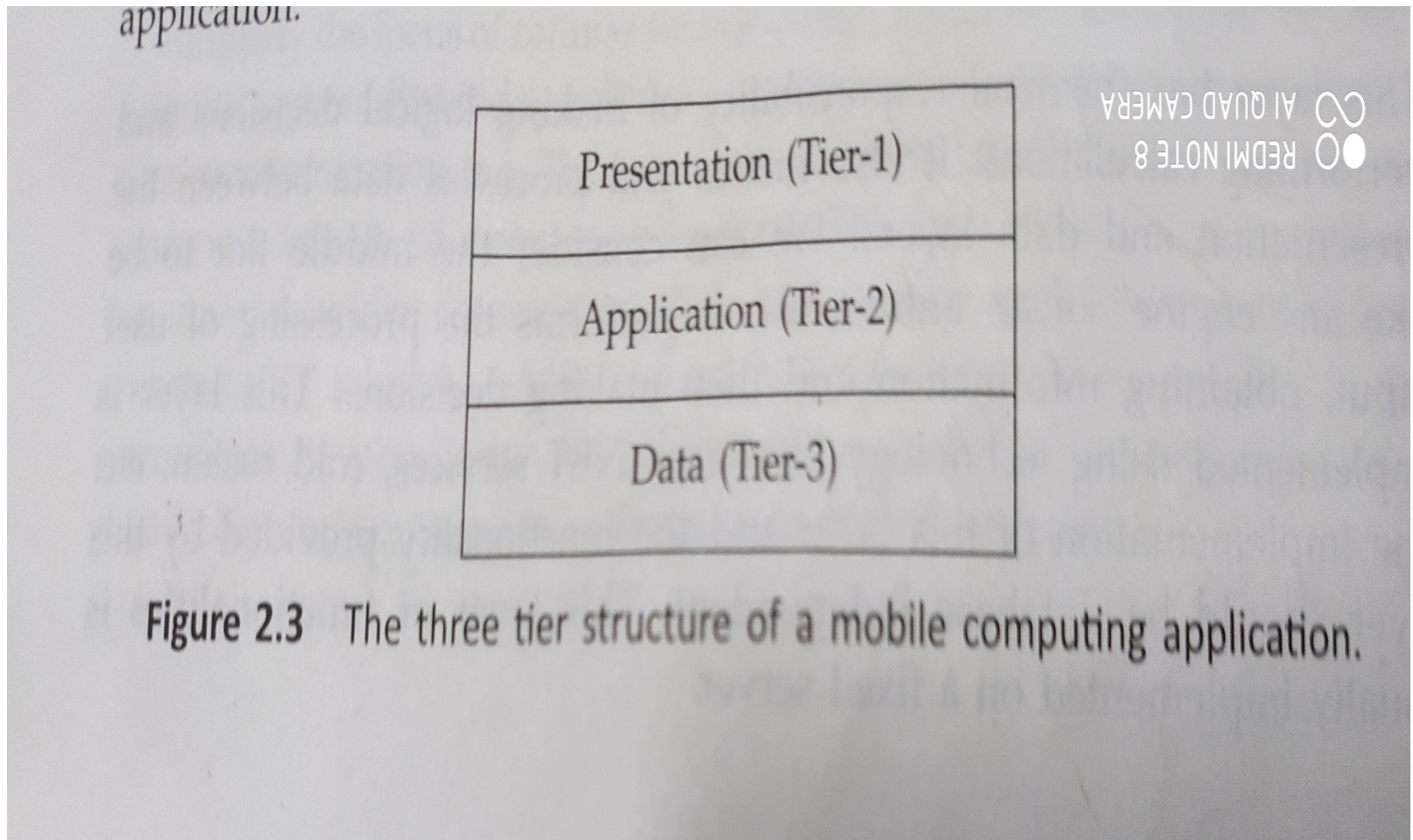
A mobile computing application is usually structured in terms of the functionalities implemented.

The simple three-tier structure of mobile computing application is depicted in fig.2.3 Fig.2.4 shows a specific scenario of the types of functionalities provided by each tier.

As shown in these figures, the three tiers are named

1. Presentation tier
2. Application tier
3. Data tier

# Structure of Mobile Computing Applications



# Structure of Mobile Computing Applications

## I. Presentation tier:

The topmost level of a mobile computing applications concerns the user interface. A good user interface facilitates the users to issue requests and to present the results to them meaningfully.

The programs at this layer run on the client's computer. This layer usually includes web browsers and customized client programs for dissemination of information and for collection of data from the user.



# Structure of Mobile Computing Applications

30 Fundamentals of Mobile Computing

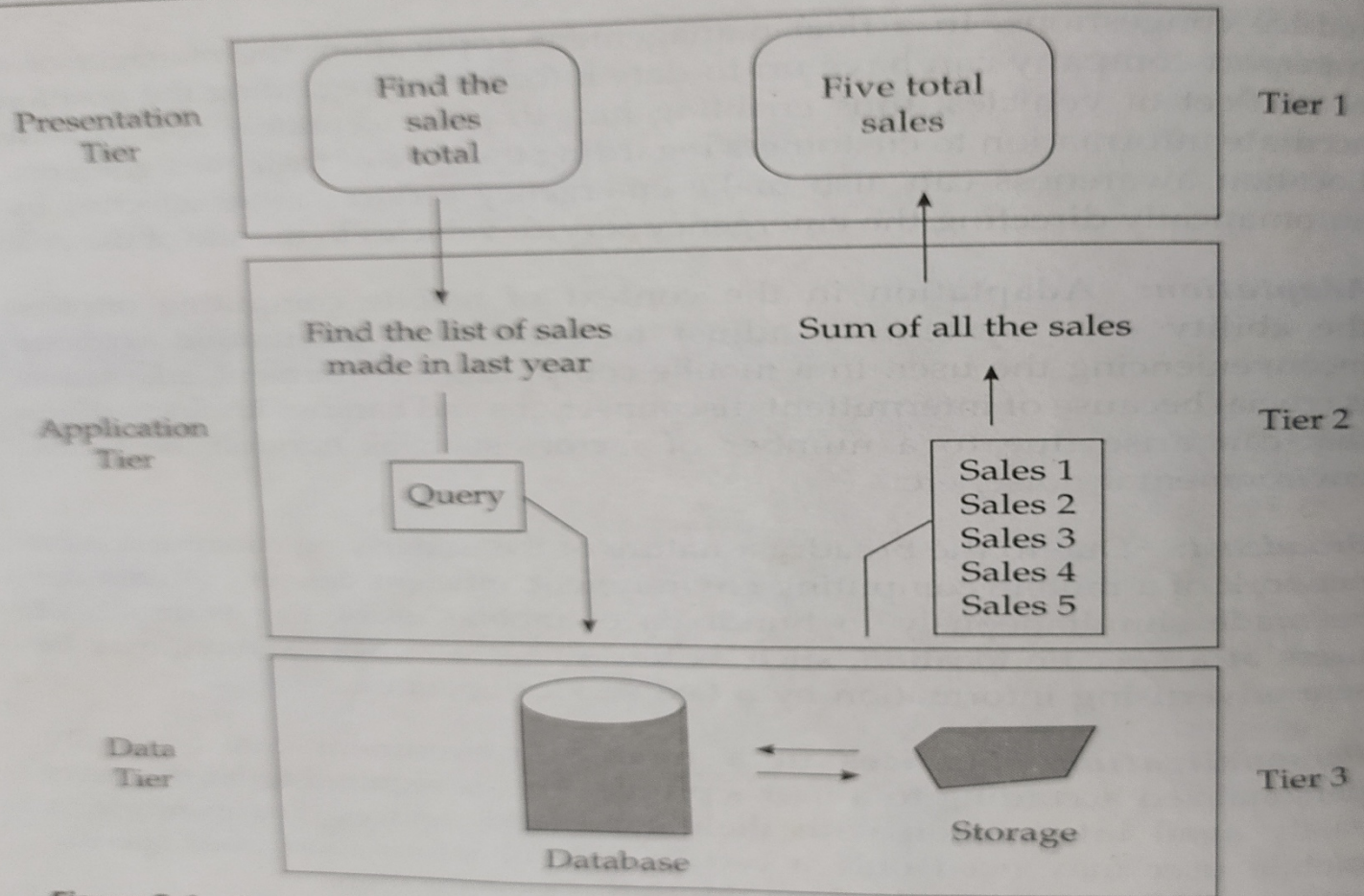


Figure 2.4 Functionalities provided by each tier structure of a mobile computing application.

Presentation tier

# Structure of Mobile Computing Applications

## 2. Application tier:

This layer has the vital responsibility of making logical decisions and performing calculations. It also moves and process data between the presentation and data layers.

We can consider the middle tier to be like an “engine” of an automobile. It performs the processing of user input, obtaining information and then making decisions.

This layer is implemented using technology like java, .NET services, etc.

The implementation of this layer and the functionality provided by this layer should be database independent. This layer of functionalities is usually implemented on a fixed server.



# Structure of Mobile Computing Applications

## 3. Data tier

The data tier is responsible for providing the basic facilities of data storage, access, and manipulation. Often this layer contains a database.

The information is stored and retrieved from this database. But, when only small amounts of data need to be stored, a file system can be used. This layer is also implemented on a fixed server.

# UNIT-I CONTINUE THE NEXT PPT

## MAC Protocols

**Reference:** Fundamentals of Mobile Computing, Second Edition.

by- Prasant Kumar Pattnaik and Rajib Mall.

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Dear students.

Thanks to all