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| COLLEGE OF MANAGEMENT & INFORMATION TECHNOLOGY  **BACHELOR IN INFORMATION TECHNOLOGY**  **Mobile Computing**  **BIT**  **Submitted by: Submitted by:**  Name: Amir Shrestha Dipak Adhikari  Year/ Semester: III Year /V Semester  LCID: LC00017000502  **Date: 7/29/2021** |

**QUESTION No 1:**

Define mobile computing. Explain its characteristics and applications.

**Answer:**

Mobile computing is a technology that is used to transmit data like voice, video, and text any time through a mobile device to a wireless network.

Characteristics of mobile computing are:

* Portability - The Ability to move a device within a learning environment or to different environments with ease.
* Social Interactivity - The ability to share data and collaboration between users.
* Small Size - Mobile devices are also known as handhelds, palmtops and smart phones due to their roughly phone-like dimensions.
* Wireless Communication - Mobile devices are typically capable of communication with other similar devices, with stationary computers and systems, with networks and portable phones.

Applications of mobile computing are:

* Traffic - During traveling in traffic if we require to know road situation, latest news and when if feel more stress in driving then can play music and other important broadcast data are received through digital audio broadcasting (DAB).
* Emergencies Situation - To play a vital role in the medical sector can hire an ambulance with great quality wireless connection and help of this can carry significant information about injured persons.
* Use in Business - As per business point of view CEO help of this computing system can represent the presentation at the front of their clients while can access hot news of the market.

**QUESTION No 2:**

List out the differences between Mobile Computing and Wireless Networking.

**Answer:**

The differences between Mobile Computing and Wireless Networking are mentioned below:

|  |  |  |  |
| --- | --- | --- | --- |
| S.N. | Mobile Computing | S.N. | Wireless Networking |
| 1 | Mobile computing means that the computing device is not continuously connected to the base or central network. | 1 | Wireless communication is basically a data communication without the use of landlines. |
| 2 | A mobile device is one that is made to be taken anywhere. | 2 | Wireless means computers or other non-mobile devices can access without wire. |
| 3 | Mobile is subgroup from wireless. | 3 | Wireless can be classified on various devices. |
| 4 | Mobile devices already have inherent access to the Internet or other wireless systems through those cell towers. | 4 | Devices that do not have its own internal Internet access are wireless networking devices. |
| 5 | Mobile system offers all of the resources of that distributed network to something that can go anywhere, barring any issues with local reception or technical area coverage. | 5 | Wireless system provides a fixed or portable endpoint with access to a distributed network. |

**QUESTION No 3:**

Write short notes on:

i) Mobile IP, ii) DHCP, iii) VNET.

**Answer:**

Mobile IP

Mobile IP is a communication protocol (created by extending Internet Protocol, IP) that allows the users to move from one network to another with the same IP address. It ensures that the communication will continue without user’s sessions or connections being dropped.

DHCP

DHCP stands for dynamic host configuration protocol and is a network protocol used on IP networks where a DHCP server automatically assigns an IP address and other information to each host on the network so they can communicate efficiently with other endpoints.

VNET

A VNET is the address space. It hosts subnet, where you will connect resources. VNet peering (or virtual network peering) enables you to connect virtual networks.

**QUESTION No 4:**

Explain ad-hoc network and list any three characteristics of ad-hoc networks?

**Answer:**

An ad hoc network is a temporary type of Local Area Network (LAN). If you set up an ad hoc network permanently, it becomes a LAN.A wireless ad hoc network or mobile ad hoc network is a decentralized type of wireless network. The network is ad hoc because it does not rely on a pre-existing infrastructure, such as routers in wired networks or access points in managed wireless networks.

Three characteristics of ad-hoc networks are:

Network nodes in a wireless ad hoc network can be randomly deployed to form the wireless ad hoc network.

Network nodes in a wireless ad hoc network directly communicate with other nodes within their ranges.

Wireless ad hoc networks are self-organizing. Without fixed infrastructures and central administration, wireless ad hoc networks must be capable of establishing cooperation between nodes on their own.

**QUESTION No 5:**

Compare Wired Networks and Wireless Networks.

**Answer:**

|  |  |  |
| --- | --- | --- |
| Parameter | Wired | Wireless |
| Security | High | Lower than Wired. Also, easy to hack |
| Speed / Bandwidth | High Speed up to 1 Gbps | Lower speed than Wired Network. |
| Access to Network | Physical Access Required | Proximity Required |
| Delay | Low | High |

**QUESTION No 6:**

Write a note on android, blackberry, windows phone in detail.

**Answer:**

android:

Android is a mobile operating system based on a modified version of the Linux kernel and other open source software, designed primarily for touchscreen mobile devices such as smartphones and tablets.

blackberry:

BlackBerry is a brand of smartphones, tablets, and services originally designed and marketed by Canadian company BlackBerry Limited

windows phone:

Windows Phone is a discontinued family of mobile operating systems developed by Microsoft for smartphones as the replacement successor to Windows Mobile and Zune.

**QUESTION No 7:**

What is TCP? Explain the architecture of TCP/IP with a schematic diagram

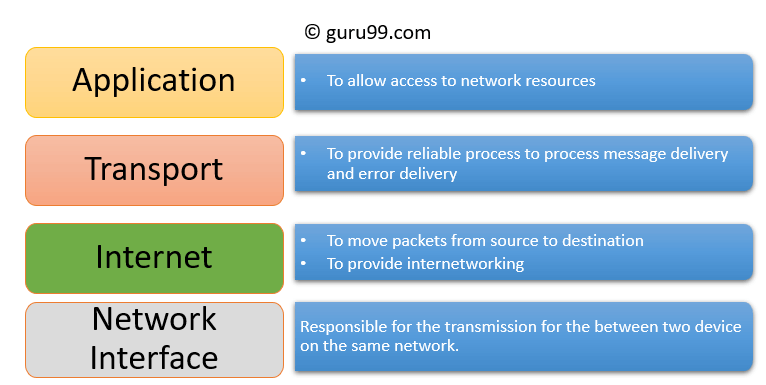
**Answer:**

The Transmission Control Protocol (TCP) is an Internet protocol that connects a server and a client.

Architecture of TCP/IP consist of 4 layers:

Application Layer

Application layer interacts with an application program, which is the highest level of OSI model. The application layer is the OSI layer, which is closest to the end-user. It means the OSI application layer allows users to interact with other software application.



Transport Layer

Transport layer builds on the network layer in order to provide data transport from a process on a source system machine to a process on a destination system. It is hosted using single or multiple networks, and also maintains the quality-of-service functions.

Internet Layer

An internet layer is a second layer of TCP/IP layes of the TCP/IP model. It is also known as a network layer. The main work of this layer is to send the packets from any network, and any computer still they reach the destination irrespective of the route they take.

The Network Interface Layer

Network Interface Layer is this layer of the four-layer TCP/IP model. This layer is also called a network access layer. It helps you to defines details of how data should be sent using the network.

**QUESTION No 8:**

What are the mobile services offered by GSM?

**Answer:**

The mobile services offered by GSM systems are:

Telephone services

Teleservices include Standard mobile telephone Mobile-originated Base-originated traffic. emergency calling Fax Videotext Tele text, SMS MMS.

Bearer services

The data services include the communication between computers and packet switched traffic.

Supplementary ISDN services

This service are digital in nature and include Call diversion, Caller line ID, Closed user group, Call barring, Call waiting, Call hold, Connected line ID, Multiparty (Teleconferencing), Call charge advice.

**QUESTION No 9:**

What are the types of handovers in GSM? Explain.

**Answer:**

There are four basic types of handovers in GSM:

Intra-cell handover

Such a kind of handover is performed to optimize the traffic load in the cell or to improve quality of a connection by changing carrier frequency.

Inter-cell handover

It is also known as Intra-BSC handover.Here the mobile moves from one cell to another but remains within the same BSC (Base station controller).

Inter-BSC handover

It is also called as Intra-MSC handover.As BSC can control only a limited number of cells, we might usually need to transfer a mobile from one BSC to another BSC.

Inter-MSC handover

It occurs when a mobile moves from one MSC region to another MSC.MSC cover a large area. It can be imagined as a handover from Maharashtra MSC to Gujarat MSC while travelling.

**QUESTION No 10:**

What is the importance of software development kit iOS and Blackberry? Explain.

**Answer:**

iOS

iOS (originally iPhone OS) is a mobile operating system created and developed by Apple Inc. and distributed exclusively for Apple hardware.Major versions of iOS are released annually. The current release, iOS 9.1, was released on October 21, 2015. In iOS, there are four abstraction layers: the Core OS layer, the Core Services layer, the Media layer, and the Cocoa Touch layer.

BlackBerry

BlackBerry OS is a proprietary mobile operating system developed by BlackBerry Ltd for its BlackBerry line of smart phone handheld devices. The operating system provides multitasking and supports specialized input devices that have been adopted by BlackBerry Ltd. for use in its handhelds, particularly the track wheel, trackball, and most recently, the trackpad and touch screen.

**QUESTION No 11:**

Explain the mobile payment system and list out security issues.

**Answer:**

A mobile payment is a money payment made for a product or service through a portable electronic device such as a tablet or cell phone. Mobile payment technology can also be used to send money to friends or family members, such as with the applications PayPal and Venmo.

Security issues of mobile payment system are:

Phishing Emails

Despite numerous security expert warnings, email users continue to fall prey to emails that appear to come from trusted senders like banks and retailers.

Smishing Messages

Criminals also commit fraud via Short Message Service (SMS) messages. The same phishing rules above apply to text messages.

App Clones

“App clones”, or apps purposefully designed to look like well-known, highly-secure payment apps, make it simple for criminals to commit credit card fraud or obtain other valuable personal information.

Weak Authentication

Criminals love mobile payment systems that have weak authentication tools. Any payment systems that you use, including e-commerce browser apps and virtual wallets, should have multi-factor authentication and multi-level data encryption.

Unsecured Wi-Fi and Poor Passwords

Some mobile users also believe foolishly that unsecured Wi-Fi spots in public places like cafes, hotels and libraries are 100 percent safe.

**QUESTION No 12:**

Briefly explain the distinguishing features of various generations of wireless cellular networks.

**Answer:**

Various generations of wireless cellular networks:

1G - First Generation:

The very first generation of commercial cellular network was introduced in the late 70's with fully implemented standards being established throughout the 80's. It was introduced in 1987 by Telecom (known today as Telstra), Australia received its first cellular mobile phone network utilizing a 1G analog system. 1G is an analog technology and the phones generally had poor battery life and voice quality was large without much security, and would sometimes experience have dropped calls. The maximum speed of 1G is 2.4 Kbps.

2G - Second Generation:

Cell phones received their first major upgrade when they went from 1G to 2G. The main difference between the two mobile telephone systems (1G and 2G), is that the radio signals used by 1G network are analog, while 2G networks are digital. It implemented the concept of CDMA and GSM. Provided small data service like SMS and mms. During 2G Cellular phones are used for data also along with voice. Before making the major leap from 2G to 3G wireless networks, the lesser-known 2.5G and 2.75G was an interim standard that bridged the gap.

3G - Third Generation:

This generation set the standards for most of the wireless technology we have come to know and love. Web browsing, email, video downloading, picture sharing and another Smartphone technology were introduced in the third generation. Some of facilitate are greater voice and data capacity, support a wider range of applications, and increase data transmission at a lower cost. 3G has faster data rate than 2G. 3G has Multimedia services support along with streaming are more popular. The theoretical max speed for HSPA+ is 21.6 Mbps. Like 2G, 3G evolved into 3.5G and 3.75G as more features were introduced in order to bring about 4G.

4G - Fourth Generation:

4G is a very different technology as compared to 3G and was made possible practically only because of the advancements in the technology in the last 10 years. Its purpose is to provide high speed, high quality and high capacity to users while improving security and lower the cost of voice and data services, multimedia and internet over IP. Potential and current applications include amended mobile web access, IP telephony, gaming services, high-definition mobile TV, video conferencing, 3D television, and cloud computing. All carriers seem to agree that OFDM is one of the chief indicators that a service can be legitimately marketed as being 4G. And again, we have the fractional parts: 4.5G and 4.9G marking the transition of LTE.

5G - Fifth Generation:

5G is a generation currently under development, that's intended to improve on 4G. 5G promises significantly faster data rates, higher connection density, much lower latency, among other improvements. Some of the plans for 5G include device-to-device communication, better battery consumption, and improved overall wireless coverage. The max speed of 5G is aimed at being as fast as 35.46 Gbps, which is over 35 times faster than 4G. Next Generation Mobile Networks Alliance feel that 5G should be rolled out by 2020 to meet business and consumer demands.

(Reference: http://net-informations.com)

**QUESTION No 13:**

Explain the following in brief in the context of GSM networks:

Mobile station, BSS, NSS, OSS, IMSI

**Answer:**

Mobile station:

A mobile station comprises all user equipment and software needed for communication with a mobile network. The term refers to the global system connected to the mobile network, i.e. a mobile phone or mobile computer connected using a mobile broadband adapter.

BSS:

In the GSM network, the Base Station Subsystem (BSS) is the part of the network taking care of radio resources, that is, radio channel allocation and quality of the radio connection.

NSS:

The Network switching system (NSS), the main part of which is the Mobile Switching Center (MSC), performs the switching of calls between the mobile and other fixed or mobile network users, as well as the management of mobile services such as authentication.

OSS:

The OSS or operation support subsystem is an element within the overall GSM mobile communications network architecture that is connected to components of the NSS and the BSC.

IMSI:

An International Mobile Subscriber Identity (IMSI) is a unique number associated with all Global System for Mobile Communications (GSM) and Universal Mobile Telecommunications System (UMTS) network mobile phone users used for identifying a GSM subscriber.

**QUESTION No 14:**

Explain the WAP (wireless application protocol) with WAP Architecture and Stack protocol.

**Answer:**

Wireless Application Protocol is a technical standard for accessing information over a mobile wireless network. A WAP browser is a web browser for mobile devices such as mobile phones that uses the protocol.

Layers of WAP Protocol

Application Layer

Wireless Application Environment (WAE). This layer is of most interest to content developers because it contains among other things, device specifications, and the content development programming languages, WML, and WMLScript.

Session Layer

Wireless Session Protocol (WSP). Unlike HTTP, WSP has been designed by the WAP Forum to provide fast connection suspension and reconnection.

Transaction Layer

Wireless Transaction Protocol (WTP). The WTP runs on top of a datagram service, such as User Datagram Protocol (UDP) and is part of the standard suite of TCP/IP protocols used to provide a simplified protocol suitable for low bandwidth wireless stations.

Security Layer

Wireless Transport Layer Security (WTLS). WTLS incorporates security features that are based upon the established Transport Layer Security (TLS) protocol standard. It includes data integrity checks, privacy, service denial, and authentication services.

Transport Layer

Wireless Datagram Protocol (WDP). The WDP allows WAP to be bearer-independent by adapting the transport layer of the underlying bearer. The WDP presents a consistent data format to the higher layers of the WAP protocol stack, thereby offering the advantage of bearer independence to application developers.

The WAP protocol stack has a multi-layered architecture (this is very similar to the seven layers model of OSI. The WAP stack consists of the following layers: WAE – WIRELESS APPLICATION ENVIRONMENT. The Wireless Application Environment (WAE) defines the following functions: Wireless Markup Language (WML).

Reference : (https://www.tutorialspoint.com/wap/wap\_architecture.html)

Thank You!