

Sub. Code: CS8601

Year / Sem: III/VI

Sub. Name: MOBILE COMPUTING

2 MARKS**Unit - I****1. What is mobile computing?**

Mobile computing is a technology that allows transmission of data, via a computer, without having to be connected to a fixed physical link.

2. What is Mobility?

- **A person who moves**

- Between different geographical locations

- Between different networks

- Between different communication devices

- Between different applications

- **A device that moves**

- Between different geographical locations

- Between different networks

3. Find out the characteristics while device can thus exhibit during communication.

- Fixed and Wired
- Mobile and Wired
- Fixed and Wireless
- Mobile and Wireless

4. What are applications of Mobile Computing?

- Vehicles

- Emergencies

- Business

- Replacement of wired networks

- Infotainment

- Location dependent services

- Mobile and wireless devices

5. What are the obstacles in mobile communications?

- Interference

- Regulations and spectrum

- Low Bandwidth

- High delays, large delay variation

- Lower security, simpler to attack

- Shared Medium Adhoc-networks

6. Give the information's in SIM?

- Card type, serial no, list of subscribed services
- Personal Identity Number(PIN)
- Pin Unlocking Key(PUK)

- An Authentication Key(KI)

7. What are the Advantages of wireless LAN?

- Flexibility

- Planning

Design

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Robustness

8. Mention some of the disadvantages of WLANS?

Quality of service
 Proprietary solutions.
 Restrictions

Safety and Security

9. Describe about MAC layer in DECT architecture.

The medium access control (MAC) layer establishes, maintains and releases channels for higher layers by activating and deactivating physical channels. MAC multiplexes several logical channels onto physical channels. Logical channels exist for signaling network control, user data transmission, paging or sending broadcast messages. Additional services offered include segmentation/reassembly of packets and error control/error correction.

10. What are the basic tasks of the MAC layer?

Medium access Fragmentation of user data Encryption

11. What are the basic services provided by the MAC layer?

Asynchronous data service (mandatory)
 Time-bounded service (optional)

12. What are the techniques used for

MAC management? Synchronization
 Power management
 Roaming
 Management information base(MIB)

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14. Define hidden terminal.

The transmission range of A reaches B but not C. The transmission range of C reaches B but not A. B reaches A and C. A cannot detect C and vice versa. A starts sending to B, but C does not receive this transmission. C also wants to send something to B and senses the medium. The medium appears to be free, the carrier sense fails. C also starts sending, causing a collision at B. But A can't detect this collision at B and continues with its transmission. A is hidden for C and vice versa.

15. What is Mobile Computing and the applications ?

Mobile computing is the process of computation on a mobile device. In such computing, a set of distributed computing systems or service provider servers participate, connect, and synchronise through mobile communication protocols.

APPLICATIONS:

- i) Mobile computing offers mobility with computer power.
- ii) It provides decentralized computations on diversified devices, systems, and networks, which are mobile, synchronized, and interconnected via mobile communication standards and protocols.
- 13) Mobile computing facilitates a large number of applications on a single device.

16.Limitations of Mobile Computing?

- i)Resource constraints.
- ii)Interface
- iii)Bandwidth
- iv)Dynamic changes in communication environment.
- v)Network issues.
- vi)Interoperability issues.
- vii)Security Constraints.

17. Give the difference between the network 1G,2G,2.5G,3G mobile communication?

1G - Voice-only communication.

2G – Communicate voice as well as data signals.

2.5G – Enhancements of the second generation and sport data rates up to 100 kpbs.

3G – Mobile devices communicate at even higher data rates and support voice, data , and multimedia streams. High data rates in 3G devices enable transfer of video clips and faster multimedia communication.

18. What is MAC?

Message authentication codes (MAC) are also used to authenticate messages during transmission. MAC of a message is created using a cryptographic MAC function which is similar to the hash function but has different security requirements.

19. Define Mobile Binding?

A binding created for providing mobility to a mobile node after registration at a foreign network.

20. Agent-based Computing

An agent is any program that acts on behalf of a (human) user. A software mobile agent is a process capable of migrating from one computer node to another.

21. Ubiquitous computing

Ubiquitous computing enhances computer use by making many computers available throughout the physical environment, while making them effectively invisible to users.

22. Client-Server Computing

An architecture in which the client is the requesting machine and the server is the supplying machine. The client contains the user interface and may perform some or all of the application processing.

23. What do you mean by Digital Signature?

Digital signatures are used to enable verification of the records. A DSA (Digital Structure Algorithm) is used to sign a record before transmitting. It provides for a variable key length of maximum 512 Or 1024 bits. The DSS(Digital Signature Standard) is based on the DSA. Signatures enable identification of the sender identify the orgin of the message, and check message integrity.

24. Define the term wireless?

Wireless telecommunications refers to the transfer of information between two or more points that are not physically connected. Distances can be short, such as a few metres for television remote control, or as far as thousands or even millions of kilometers for deep-space radio communications. It encompasses various types of fixed, mobile, and portable applications, including two-way radios, cellular telephones, personal digital assistants (PDAs), and wireless networking.

25 What are the different types of mobile Middleware? 1.Adaptation

2.Agent

26.What are the logical channels in GSM? Traffic channel(TCH)
Control channel(CCH)

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28. Define GPRS?

General Packet Radio Service (GPRS) is a packet oriented service for mobile devices data communication which utilizes the unused channels in TDMA mode in a GSM network and also sends and receives packet of data through the internet.

29. What is Communication?

Communication is a two-way transmission and reception and reception of data streams. Transmissions are of two types,
Guided Transmission
Unguided Transmission

30. Explain difference between wired and wireless networks Wired Vs.

Wireless Networks

Wired Networks	Mobile Networks
- high bandwidth	- low bandwidth
- low bandwidth variability	- high bandwidth variability
- can listen on wire	- hidden terminal problem
- high power machines	- low power machines
- high resource machines	- low resource machines
- need physical access(security)	- need proximity
- low delay	- higher delay

31. What are the Types of Wireless Devices?

Laptops Palmtops PDAs
Cell phones
Pagers
Sensors

32. Why Mobile Computing?

Enable anywhere/anytime connectivity
Bring computer communications to areas without pre existing infrastructure
Enable mobility
Enable new applications
An exciting new research area

33.what are the New Forms of Computing available?.

Wireless Computing
Nomadic Computing

Mobile Computing
Ubiquitous Computing
Pervasive Computing
Invisible Computing

34. Mobile Communication Networks: Examples

GSM (Global System for Mobile Communications): worldwide standard for digital, cellular Mobile Radio Networks

UMTS (Universal Mobile Telecommunications System): European Standard for future digital Mobile Radio Networks

AMPS (Advanced Mobile Phone System): analog Mobile Radio Networks in USA

DECT (Digital Enhanced Cordless Telecommunications): European standard for cordless phones

TETRA (Terrestrial Trunked Radio): European standard for circuit switched radio networks

ERMES (European Radio Message System): European standard for radio paging systems (Pager)

802.11: International standard for Wireless Local Networks

Bluetooth: wireless networking in close/local

area Inmarsat: geostationary satellite systems

Teledesic: planned satellite system on a non-geostationary orbit

35. Components of a wireless communication system

Transmitter, receiver, filter, antenna, amplifier, mixers

36. Wireless Networking Standards (Table 1.1)

ITU, IEEE and ISO

IEEE 802.11 standards (a,b,c,d,e,f...u)

37. What are the disadvantages of small cells?

a) Infrastructure b) Handover c) Frequency

38 What are the benefits of reservation schemes?

a) Increased no other station is allowed to transit during this slot b) Avoidance of congestion.

c) Waiting time in clearly known.

3. Differentiate between free space loss and path loss. Free space loss Path loss

39 Define hidden terminal.

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40. Mobile Computing - Characteristics

– Mobile devices

• Laptops

• Palmtops

• Smart cell phones

– Requirements

• Data access:

– Anywhere

– Anytime

• Nomadic users

– Constraints

• Limited resources

- Variable connectivity:
- Performance
- Reliability

41. What are the different types of modulation ?

The Modulation types are:

- i). Amplitude Modulation.
- ii). Frequency Modulation.
- iii). Phase Modulation.

42. What are the multiplexing techniques ?

The Multiplexing techniques are: i) Space division multiplexing. ii) Time division multiplexing. iii) Frequency division multiplexing. iv) Code division multiplexing.

43. Define Space Division Multiplexing Access?

Space division multiple access (SDMA) means division of the available space so that multiple sources can access the medium at the same time. SDMA is the technique in which a wireless transmitter transmits the modulated signals and accesses a space slot and another transmitter accesses another space slot such that signals from both can propagate in two separate spaces in the medium without affecting each other.

44. Define Code division multiplexing Access?

CDMA (Code Division Multiple Access) is an access method in which multiple users are allotted different codes (sequence of symbols) to access the same channel (set of frequencies)

45. Define Time division multiplexing Access?

Time division multiplexing (TDMA) is an access method in which multiple users, data services, or sources are allotted different time-slices to access the same channel. The available time-slice is divided among multiple modulated-signal sources. These sources use the same medium, the same set of frequencies, and the same channel for transmission of data.

46. Define Frequency division multiplexing Access?

Frequency division multiple access (FDMA) is an access method in which entails assignments of different frequency-slices to different users for accessing the same carrier.

47. Difference between Circuit Switching and Packet Switching?

CIRCUIT SWITCHING :

Circuit switching is a method of data transmission in which a circuit (Communication channel or path) once established, continues to be used till the transmission is complete.

PACKET SWITCHING :

Packet switching is a means of establishing connection and transmitting data in which the message consists of packets containing the data frames. A packet is a formatted series of data, which follows a distinct path directed by a router from among a number of paths, available at that instant.

48. What is CSMA

The capacity of ALOHA or slotted ALOHA is limited by the large vulnerability period of a packet.

- By listening before transmitting, stations try to reduce the vulnerability period to one propagation delay.

- This is the basis of CSMA (Kleinrock and Tobagi, UCLA, 1975).

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- By listening before transmitting, stations try to reduce the vulnerability period to one propagation delay.

- This is the basis of CSMA (Kleinrock and Tobagi, UCLA, 1975). Station that wants to transmit first listens to check if another transmission is in progress (carrier sense).
- If medium is in use, station waits; else, it transmits.
- Collisions can still occur.
- Transmitter waits for ACK; if no ACKs, retransmits.

49. What is the aim of ubiquitous computing? (AUT-NOV/DEC 2012)

- The aim of ubiquitous computing is to design computing infrastructures in such a manner that they integrate seamlessly with the environment and become almost invisible.
- Present Everywhere Bringing mobile, wireless and sensor Ubiquitous computing (ubicom) integrates computation into the environment, rather than having computers which are distinct objects

UNIT-II

1. Define GSM?

The global system for mobile communication (GSM) was developed by Groupe Speciale Mobile(GSM) which was founded in Europe in 1992. The Gsm is a standard for mobile telecommunication through a cellular network at data rates if upto 14.4 kbps. Now a days it consist of a set of standards and protocols for mobile telecommunication.

2. Define GPRS?

General Packet Radio Service (GPRS) is a packet oriented service for mobile devices data communication which utilizes the unused channels in TDMA mode in a GSM network and also sends and receives packet of data through the internet.

3. What are subsystems in GSM system?

- Radio subsystem (RSS)
- Network & Switching subsystem (NSS)
- Operation subsystem (OSS)

4. What are the control channel groups in GSM?

The control channel groups in GSM are:

- Broadcast control channel (BCCH)
- Common control channel (CCCH)
- Dedicated control channel (DCCH)

5. What are the four types of handover available in

- GSM?** Intra cell Handover
- Inter cell Intra BSC
- Handover Inter BSC Intra
- MSC handover Inter MSC
- Handover

6. What is the frequency range of uplink and downlink in GSM network? The frequency range of uplink in GSM network is 890-960 MHz
The frequency range of downlink in GSM network is 935-960 MHz

7. What are the security services offered by GSM?

- The security services offered by GSM are:
- Access control and authentication.
- Confidentiality.
- Anonymity.

8. What is SUMR?

An important register in satellite networks is the satellite user mapping register (SUMR). This stores the current position of satellites and a mapping of each user to the current satellite through which communication with a user is possible.

9. Give the two basic reasons for a handover in GSM.

The mobile station moves out of the range of a BTS or a certain antenna of a BTS. The received signal level decreases continuously until it falls below the minimal requirements for communication. The error rate may grow due to interference. All these effects may diminish the quality of the radio link.

The wired infrastructure may decide that the traffic in one cell is too high and shift some MS to other cells with a lower load. Handover may be due to load balancing.

10. Give the security services offered by GSM. Access control and authentication

Confidentiality

Anonymity

11. What is the primary goal of GSM?

The primary goal of GSM was to provide a mobile phone system that allows users to roam throughout Europe and provides voice services compatible to ISDN and other PSTN systems.

12. Differentiate GSM and DECT.

GSM DECT

1. Global systems for mobile communications
2. Digital enhanced cordless telecommunications
3. Range is up to 70km.
4. Range is limited to about 300m.

13. What are the two new network elements in GPRS architecture?

Gateway GPRS support node (GGSN): It is the inter-working unit between the GPRS network and external packet data networks (PDN). Serving GPRS support node (SGSN): It supports the MS.

14. Describe about MAC layer in DECT architecture.

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15. What are the reasons for delays in GSM for packet data traffic?

Collisions only are possible in GSM with a connection establishment. A slotted ALOHA mechanism is used to get access to the control channel by which the base station is told about the connection establishment attempt. After connection establishment, a designated channel is installed for the transmission.

16. What is meant by beacon?

A beacon contains a timestamp and other management information used for power management and roaming. e.g., identification of the base station subsystem (BSS)

17. List out the numbers needed to locate an MS and to address the

MS. The numbers needed to locate an MS and to address the MS are:

Mobile station international ISDN number

(MSISDN) International mobile subscriber identity

(IMSI)

Temporary mobile subscriber identity (TMSI)

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Mobile station roaming number (MSRN)

18 . What is meant by GPRS?

The General Packet Radio Service provides packet mode transfer for applications that exhibit traffic patterns such as frequent transmission of small volumes.

19. What is meant by GGSN?

GGSN is Gateway GPRS Support Node. It is the inter-working unit between the GPRS network and external packet data networks. The GGSN is connected to external networks via the Gi interface and transfers packets to the SGSN via an IPbased GPRS backbone network.

20. What is meant by SGSN?

SGSN is Serving GPRS Support Node. It supports the MS via the Gb interface. The GSN is connected to a BSC via frame relay.

21. What is meant by BSSGP?

BSSGP is Base Station Subsystem GPRS Protocol. It is used to convey routing and QoS- related information between the BSS and SGSN. BSSGP does not perform error correction and works on top of a frame relay network.

22. Expand GSM, GPRS and UMTS.

■ Global System for Mobile Communication (GSM) ■
 ■ General Packet Radio Service (GPRS)
 ■ Universal Mobile Telecommunication System (UMTS)

23. What is RSS?

- RSS stands for Radio subsystem (RSS)
- RSS comprises all radio specific entities

24. Name the entities of RSS.

- Base Station Subsystem (BSS)
- Base Transceiver Station (BTS)
- Base Station Controller (BSC)
- Mobile Station (MS)

25. Mention the advantages of GSM.

- o Communication
- Total mobility
 - Worldwide connectivity
 - High capacity
- High transmission quality'
- Security functions

26. What does SIM card contain?

- a personal identity number (PIN)
- a PIN unblocking key (PUK)
- an authentication key Ki
- the international mobile subscriber identity (IMSI)

27. Mention the disadvantages of GSM.

- No end-to-end encryption of user data
- Reduced concentration while moving
- Electromagnetic radiation
- High complexity of system
- Several incompatibilities within the GSM standards
- Card-type
- Serial number
- A list of subscribed services

28. Mention the use of SS7.

- 5. Used for handling all signaling needed for
 - connection setup,
 - connection release and
 - connection release and

■ handover of connections to other MSCs

UNIT-III

1. What are the requirements of mobile IP?

- Compatibility
- Transparency
- Scalability and Efficiency
- Security

2. Mention the different entities in a mobile IP.

Mobile Node
 Correspondent Node
 Home Network
 Foreign Network
 Foreign Agent
 Home Agent
 Care-Of address

3. Define Mobile node:

A mobile node is an end-system or router that can change its point of attachment to the Internet using mobile IP. The MN keeps its IP address and can continuously with any other system in the Internet as long as link layer connectivity is given.

4. Explain Cellular IP.

Cellular IP provides local handovers without renewed registration by installing a single cellular IP gateway for each domain, which acts to the outside world as a foreign agent.

5. What do you mean by mobility binding?

The Mobile Node sends its registration request to the Home Agent. The HA now sets up a mobility binding containing the mobile node's home IP address and the current COA.

6. Define COA.

The COA (care of address) defines the current location of the MN from an IP point of view. All IP packets sent to the MN are delivered to the COA, not directly to the IP address of the MN. Packet delivery toward the MN is done using the tunnel. DHCP is a good candidate for supporting the acquisition of Care Of Addresses.

7. Define a tunnel.

A tunnel establishes a virtual pipe for data packets between a tunnel entry and a tunnel endpoint. Packets entering a tunnel are forwarded inside the tunnel and leave the tunnel unchanged.

8. What is encapsulation?

Encapsulation is the mechanism of taking a packet consisting of packet header and data putting it into the data part of a new packet.

9. What is decapsulation?

The reverse operation, taking a packet out of the data part of another packet, is called decapsulation.

10. What is MOT? Give its primary goal.

DAB faces a broad range of different receiver capabilities. So to solve this problem it defines a common standard for data transmission, the multi-media object transfer (MOT) protocol. The primary goal of MOT is the support of data formats used in other multi- media systems.

11. Give the full form for the following:

a) CKSN b) EIR c) DTMF d) MOC

8. CKSN- CIPHERING key sequence number b) EIR- Equipment Identity Register
 DTMF- Dual Tone multiple frequency d) MOC- Mobile originated call

12. Define MANET.

MANET - Mobile Adhoc NETWORKS

. Continuously self-configuring, infrastructure-less network of mobile devices connected without wires

13. List the advantages of MANET. Independence from central network administration

Self-configuring, nodes are also routers

- Self-healing through continuous re-configuration
- Scalable-accommodates the addition of more nodes
- Flexible-similar to being able to access 'the Internet from many different locations
- Ease of deployment
- Speed of deployment

. Reduced administrative cost

Supports anytime and anywhere computing

14. What are the limitations of MANET?

- Each node must have full performance
- Throughput is affected by system loading
- Reliability requires a sufficient number of available nodes
- Large networks can have excessive latency (time delay), which affects some applications
- Limited wireless range •Hidden terminals
- Packet losses due to transmission errors •Routes changes •Devices heterogeneity •Battery power constraints
- Link changes are happening quite often •Routing loop may exist.

15. Difference between cellular and Ad-Hoc Networks

CELLULAR	Ad-Hoc NETWORKS
Infrastructure Networks	Infrastructureless Networks
Fixed, pre-located cell sites and base stations	No base station, and rapid deployment
Static backbone network topology	Highly dynamic network topologies

Relatively caring environment and stable connectivity	Hostile environment and irregular connectivity
Detailed planning before base station can be installed	Ad-Hoc network automatically forms and adapts to changes
High setup costs	Cost-effective
Large setup time	Less setup time

16. What are the functions of each node in

MANET? Forward the packet to the next hop

Before forwarding, Sender has to ensure that:

- . the packet moves towards its destination
- ▣ the number of hops(path length) to destination is minimum
- ▣ Delay is minimized
- ▣ Packet loss is minimum through the path
- . Path does not have a loop

17. Comparison of Link state and Distance vector.

Routing protocol	Building Topological map	Router can Independently determine the shortest path to every network	Conver- gence	Event driven routing up- dates (instead of periodic updates)	Use of LSP
Link State	Yes	Yes	Fast	Generally Yes	Yes
Distance Vector	No	No	Slow	Generally No	No

18. List the Types of Communications.

p Unicast

- ▣ o Message is sent to a single destination node

Multicast

- ▣ o Message is sent to a selected subset of network nodes

Broadcast

Broadcasting is a special case of multicasting

Message is sent to all the nodes in the network

19. Define Proactive (table-driven) protocols.

Also known as table-driven routing protocols

Each node in the routing table maintains information about routes to every other node in the network

- o Tables are updates frequently due to
 - Changes in network topology
 - Node Movements

N odes shutting down

- o Nodes can determine the bestDownloaded routetostinationfrom EnggTree.com

Generates a large number of control messages to keep the routing tables up-to-date

- o Generates overhead which consumes large part of available bandwidth

20 Define Reactive protocols.

- ▣ Also called as On-demand routing protocol
- ▣ Nodes do not maintain up-to-date routing information

New routes are discovered only when required

- ▣ Uses flooding technique to determine the route
- ▣ Flooding technique is used when the node does not have routing knowledge

21. Compare MANET Vs VANET

MANET	VANET
MANET - Mobile Adhoc NETWORK	VANET- Vehicular Adhoc NETWORKS
Nodes moves randomly	Nodes moves regularly
Mobility is low	Mobility is high
Reliability is medium	Reliability is high
Node lifetime depends on power source	Node lifetime depends on vehicle lifetime
Network topology is sluggish and slow	Network topology is frequent and fast

UNIT-IV

1. What is slow start?

TCP's reaction to a missing acknowledgement is necessary to get rid of congestion quickly. The behavior TCP shows after the detection of congestion is called slow start.

2. What is the use of congestion threshold?

The exponential growth of the congestion window in the slow start mechanism is dangerous as it doubles the congestion window at each step. So a congestion threshold is set at which the exponential growth stops.

3. What led to the development of Indirect TCP?

TCP performs poorly together with wireless links

TCP within the fixed network cannot be changed.

This led to the development of I-TCP which segments a TCP connection into a fixed part and a wireless part.

4. What is the goal of M-TCP?

The goal of M-TCP is to prevent the sender window from shrinking if bit errors or disconnection but not congestion cause current problems.

It wants

- To provide overall throughput

- To lower the delay

- To maintain end-to-end semantics of TCP
- To provide a more efficient handover.

5. What do you mean by persistent mode?

Persistent mode is the state of the sender will not change no matter how long the receiver is disconnected. This means that the sender will not try to retransmit the data.

6. What are the characteristics of 2.5G/3.5G wireless networks?

- Data rates
- Latency
- Jitter
- Packet loss

7. What are the configuration parameters to adapt TCP to wireless environments?

- Large Windows
- Limited Transmit
- Large MTU
- Selective Acknowledgement
- Explicit Congestion Notification
- Timestamp
- No header compression

8. State the requirements of WAP.

- Interoperable
- Scalable
- Efficient
- Reliable
- Secure

9. Name the layers of WAP.

- Transport layer
- Security layer
- Transaction layer
- Session layer
- Application layer

10. Name some ICMP messages.

- Destination unreachable
- Parameter problem
- Message too big

Reassembly failure

Echo request/reply

11. What is WTP? What are its classes?

WTP stands for Wireless Transaction Protocol. It has been designed to run on very thin clients such as mobile phones. It has three classes:

Class 0: provides unreliable message transfer without any result message.

Class 1: provides reliable message transfer without exactly one reliable result message.

Class 2: provides reliable message transfer with exactly one reliable result message.

12. What is WSP?

The Wireless Session Protocol has been designed to operate on top of the datagram service WDP or the transaction service WTP. It provides a shared state between a client and a server to optimize content transfer.

13. Name some features of WSP adapted to web browsing.

HTTP/1.1 functionality

Exchange of session headers

Push and pull data transfer

Asynchronous request

14. What is WML?

The Wireless Markup Language is based on the standard HTML known from the www and on HDML. WML is specified as an XML document type.

15. What are the features of WML?

Text and Images

User interaction

Navigation

Context Management

16. What are the advantages of WML Script over WML?

WML Script offers several capabilities not supported by WML:

Validity check of user input

Access to device facilities

Local user interaction

Extension to the device software

17. Name the libraries specified by WML Script.

Lang
Float
String
URL
WML Browser
Dialogs

18. What are the classes of libraries?

Common network services
Network specific services
Public services

19. Name the operations performed by PAP.

Push access Protocol performs the following operations:

Push submission
Result notification
Push cancellation
Status query
Client capabilities query

20. What are the components of WAP2.0?

The protocol framework of WAP2.0 consists of four components:

Bearer networks
Transport services
Transfer services
Session services

21. What is the use of congestion threshold?

The exponential growth of the congestion window in the slow start mechanism is dangerous as it doubles the congestion window at each step. So a congestion threshold is set at which the exponential growth stops.

22. What is image scaling?

If a page contains a true color, high-resolution picture, this picture can be called down to fewer colors, lower resolution, or finally to only the title of the picture. The user can decide to download the picture separately. Further one can offer clipping, zooming, or detail Studies to users if they are interested in a part of the picture.

23. Define WAP

WAP is Wireless Application Protocol. It is the basic Objective of the WAP forum are to bring diverse Internet content and others data service to digital cellular phones and other wireless, mobile terminals. More ever a protocol suite should enable global wireless communication across different wireless network technologies. All WAP forum solution must be: interoperable, scalable, efficient, and reliable.

24. What is WML Browser?

WML Browser is a library that provides several functions typical for a browser, such as per to go back one card or refresh to update the context of the user interface.

25. What are the features of WML?

WML includes several basic features.

- i) Text and Images
- ii) User Interaction
- iii) Navigation iv) Context Management

26. What are the two functions of the transport layer in the internet?

The two functions of the transport layer in the internet are check summing over user data and multiplexing/ demultiplexing of data from applications.

27. What is called the exponential growth of the congestion window?

The senders always calculate congestion window for a window start size of the congestion window is one segment. Sender sends one packet and waits for acknowledgement. If acknowledgement arises it raises the level of congestion window by one. If sender sends two packets if acknowledgement arises it raises the level of congestion window by two. This scheme raises the level of congestion window every time the acknowledges come back, which takes roundtrip time (RTT). This is called the exponential growth of the congestion window.

28. Advantages of I-TCP:

I-TCP does not require any changes in the TCP protocol as used by the hosts in the fixed network or other hosts in a wireless network that do not use this optimization.

Without partitioning retransmission of lost packets would take place between mobile host and correspondent host across the whole network.

The short delay between the mobile host and foreign agent can be determined and is independent of other traffic streams. Therefore an optimized TCP can use precise time-outs to guarantee retransmission as fast as possible.

Partitioning into two connections also allows the use of a different transport layer protocol between the foreign agent and the mobile host or the use of compressed headers etc. The foreign agent can act as a gateway to translate between different protocols.

29. Disadvantages of I-TCP:

The loss of the end to end semantics of TCP cause problems if the foreign agent portioning the TCP connection crashes.

An_ increased handover latency is more problematic in practical use

The_ foreign agent must be a trusted entity because the TCP connections end at this point.

30. How does data transmission takes place?

Data transmission takes place using network adapters, fiber optics, copper wires, special hardware for routers etc.

31. Mention two WAP service provides. Find two cell phones supporting WAP and identify which WAP version they support.

Wireless application protocol (WAP) is a common effort of many companies and organizations to set up a framework for wireless and mobile web access using many different transport systems. Eg. GSM, GPRS, UMTS

32. How and why does I-TCP isolate problems on the wireless link? What are the main drawbacks of this solution?

The loss of the end to end semantics of TCP causes problems if the foreign agent portioning the TCP connection crashes. Increased handover latency is more problematic in practical use . The foreign agent must be a trusted entity because the TCP connections end at this point.

33. Can the problems using TCP for mobile communication be solved by replacing TCP with snooping TCP?

Justify your answer.

Ans: yes

Buffering of packets sent to the mobile host lost packets on the wireless link (both retransmitted immediately by the mobile host or directions) will be foreign agent, respectively (so called local retransmission)

The foreign agent therefore snoops the packet flow and recognizes acknowledgements in both directions, it also filters ACKs

Changes of TCP only within the foreign agent

34. What are the key elements of the WAP specification?

Networks and Network Bearers

TCP/IP as Transport Protocol

Processors

35. What are the goals of WTLS layer?

It provides the upper-level layer of WAP with a secure transport service interface that preserves the transport service interface below it. In addition, WTLS provides an interface for managing (e.g., creating and terminating) secure connections. It provides functionality similar to TLS 1.0 and incorporates additional features such as datagram support, optimized handshake and dynamic key refreshing.

36. What is mean by SCPS-TP?

The set of protocols developed for space communication is known as space communications protocol standards (SCPS), the extended TCP is called SCPS transport protocols (SCPS-TP).

37. What are Advantage and Disadvantage of Mobile TCP?

Advantage:

- i. M-TCP maintains the TCP end-to-end semantic. The SH does not send any ACK itself but forwards the ACKs from the MH.
- ii. If the MH is disconnected, M_TCP avoids useless retransmissions, slow starts or breaking connections by simply shrinking the sender's window to 0.
- iii. Since M-TCP does not buffer data in the SH as I-TCP does, it is not necessary to forward buffers to a new SH. Lost packets will be automatically retransmitted to the new SH.

Disadvantage:

- i. As the SH does not act as proxy as in I-TCP, packet loss on the wireless link due to bit errors is propagated to the sender. M-TCP assumes low bit error rates, which is not always a valid assumption.
- ii. A modified TCP on the wireless link not only requires modification to the MH, protocol software but also new network elements like the bandwidth manager.

38. What is fast retransmit?

The gap in the packet stream is not due to severe congestion, but a simple packet loss due to a transmission error. The sender can now retransmit the missing packet before the timer expires. This behavior is called fast retransmit.

39. What is fast recovery?

The receipt of acknowledgement shows that there is no congestion justifying a slow start. The sender can continue with the current congestion window. The sender performs a fast recovery from the packet loss. This mechanism can improve the efficiency of TCP dramatically.

40. What is HTTP?

The Hypertext transfer protocol is a stateless, lightweight, application level protocol for data transfer between servers and clients. An HTTP transaction consists of an HTTP request issued by a client and an HTTP response from the server. Stateless means that all HTTP transactions independent of each other.

41. Define Damping.

Transient changes in topology that are short duration should not destabilize the routing mechanism. Advertisements containing changes in topology currently stored are therefore not disseminated further. A node waits with dissemination if these changes are most likely not yet stable. Waiting time depends on the time between the first and the best announcement.

42. Define WDP.

WDP is Wireless Datagram Protocol operates on top of many different bearer services capable of carry in data. At the T-SAP WDP offers a consistent datagram transport service independent of the underlying bearer. WDP offers source and destination port numbers used for multiplexing and demultiplexing of data respectively.

43. What are the three ways of WTA extends the WAE application model?

- i. Content push: A WTA organ server can push the content.
- ii. Handling of network events: A device can have a table indicating how to react to certain events from the mobile network.
- iii. Access to telephony function: Application running on the client can access telephony functions from WML or WML script is very simple.

44. Define WCMP.

The wireless control message protocol provides error handling mechanism for WDP and should therefore be implemented. WCMP contains control messages that resemble the internet control message protocol for IPv4, messages and can also be used for diagnostic and informational purposes. WCMP can be used by WDP nodes and gateways to report error.

45. What are the capabilities of WML Script?

WML Script serves as a complement to WML and provides a general scripting capability in the WAP architecture. While all WML content is static WML Script offer several capabilities.

- i) Validity check of user input
- ii) Access to device facility
- iii) Local user interaction
- iv) Extensions to the device software

46. Define WSP.

The wireless session protocol has been designed to function on top of the datagram service WDP or the transaction service WTP. For both type security can be inserted using the WTLS security layer if required. WSP provide a shared state between a client and a server to optimize content transfer. HTTP, a protocol WSP tries to replace within the wireless domain.

47. What are key features of the current development in Internet technology?

- Improved radio technology and antennas
- Core network convergence
- Ad-hoc technologies
- Simple and open service platform

1) What is the significance of device os?

It moderates the relationship between the computer and its peripherals. It helps in the management of files,- copying, deleting, moving of files from one storage location to the other. It encourages the memory for its efficient usage and thus adding the speed of the computer. It manages the activities of the processor in terms of job execution according to the priority of arrival , of jobs. It informs the user of nay hardware or software error. It makes communication between computer and the user or the operator possible.

2) What are the constraints of mobile device OS?

Limited memory Limited screen size Miniature keyboard Limited processing power Limited battery power

3) What are the types of mobile operating system?

Symbian, Android, Windows mobile, Palm OS, Blackberry,iOS

4) What is palm OS?

Palm OS is the computer operating system that provides a software platform for the Palm series of handheld personal digital assistants (PDAs) made by Palm Inc. According to Palm, Palm OS was designed from the beginning to fit into a palm-size device of a specific size and with a specific display size. Microsoft's Windows CE and Symbian'sEPOC (originated by Psion) are also operating systems for handheld devices, but are designed to serve a broader range of devices.

5) What is the function of IOS?

Integrated search support enables simultaneous search through files, media, applications and email. Gesture recognition supports, for example, shaking the device to undo the most recent action. Google Maps direction services. Push email. Safari mobile browser. Integrated camera and video

6) What is an android?

Android was developed by Google and the Open Handset Alliance (OHA), a coalition of hardware, software and telecommunications companies. More than 30 companies were involved in the OHA, including Qualcomm, Broadcom, HTC, Intel, Samsung, Motorola, Sprint, Texas Instruments and Japanese wireless carriers KDDI and NTT DoCoMo.

7) What are the four layers of android structure?

Application layer Application Frameworks Libraries and runtimes KERNEL

8)What is a blackberry OS ?

BlackBerry OS is a proprietary mobile operating system designed specifically for Research In Motion's (RIM) BlackBerry devices. The BlackBerry OS runs on Blackberry variant phones like the BlackBerry Bold, Curve, and

Pearl and Storm series. The BlackBerry OS is designed for smart phone environments and is best known for its robust support for push Internet email. This push email functionality is carried out through the dedicated BlackBerry Enterprise Server (BES), which has versions for Microsoft Exchange, Lotus Domino and Novell Group wise.

9) What is M-Commerce? Give two advantage?

"M-Commerce is the use of mobile devices to communicate, inform transact and entertain using text and data via a connection to public and private networks." (Lehman Brothers) "The core of mobile e-commerce is the use of a terminal (telephone, PDA, PC device, or custom terminal) and public mobile network (necessary but not sufficient) to access information and conduct transactions that result in the transfer of value in exchange for information, services or goods." (Ovum) Advantages:

- o **Completely Customization:** the service provider has access to data about the user's preferences and status which facilitates better, personalized service.
- o **More Convenience:** the small size and ease of use of mobile receivers, coupled with freedom from problems caused by infrastructure, makes for a higher degree of user convenience.
- o **Expanded reach:** the presence of a wireless link between the customer and the service provider eliminates the need for a fixed interface such as a computer for communication.
- o **Quicker access:** connecting through a mobile is faster than dial-up connections using wire line modems.
- o **Electronic wallet:** Analysts believe that easy mobile payment is one of the main prerequisites for the success of m-commerce.

10) What is a mobile payment system?

Mobile payment, also referred to as mobile money, mobile money transfer, and mobile wallet generally refer to payment services operated under financial regulation and performed from or via a mobile device. Instead of paying with cash, cheque, or credit cards, a consumer can use a mobile phone to pay for a wide range of services and digital or hard goods. Although the concept of using non-coin-based currency systems has a long history, it is only recently that the technology to support such systems has become widely available.

11) What is microkernel OS?

In computer science, a microkernel (also known as μ -kernel) is the near-minimum amount of software that can provide the mechanisms needed to implement an operating system (OS). These mechanisms include lowlevel address space management, thread management, and inter-process communication (IPC).

12) What are the features of SYMBIAN?

Multitasking real time,32 bit OS and it runs on the ARM based processors design and also the design of symbian OS is microkernel based.

13) What are the advantages of android?

It has open platform and suitable for many mobile phones. It needs lower footprint of 250 kB. It supports libraries and robust in nature. It has an integrated web browsing.

14) What are the two features of windows phone?

for security cryptography library is available. virtual memory management is provided. the GWE can handle input and output an improved version of windows mobile os support multitasking.

15) What are the disadvantages of mobile OS?

If any problems affected in OS, you may lose all the contents which have been stored already Unwanted user can use your own system

16) What are the advantages m-commerce?

Mobile handheld devices can be personalized. Advantages of using M-Commerce in business organization includes, cost savings, business opportunities. M-Commerce is user friendly, providing light weight, flexibility etc.

17) What are the disadvantages of m-commerce?

The mobile devices has small screen which might limit user's menu choice, text typing capabilities. Mobile devices usually do not provide processing power or graphics of personal computers. Restricted bandwidth limits reach of M-Commerce everywhere in practical scenario.

18) What is mobile payment system?

Mobile payments are a natural evolution of E-Payment schemes. It may be defined as initiation, authorization and confirmation of a financial transaction using a mobile device. Types of mobile payment schemes: Bank account based Credit card based Micro payment

19) What are the desirable properties of a mobile payment system?

Easy to use General purpose Interoperability Trust Cost Swiftiness Global payments

20) What are the security issues of mobile payment system?

Users of mobile devices can be difficult to trace because of roaming of the user. Also the mobile devices go online and offline frequently. Thus attackers would be very difficult to trace. A major is the lack of any satisfactory mechanism available at present to authenticate a particular user.