1. What is the difference between 802.11a and 802.11b

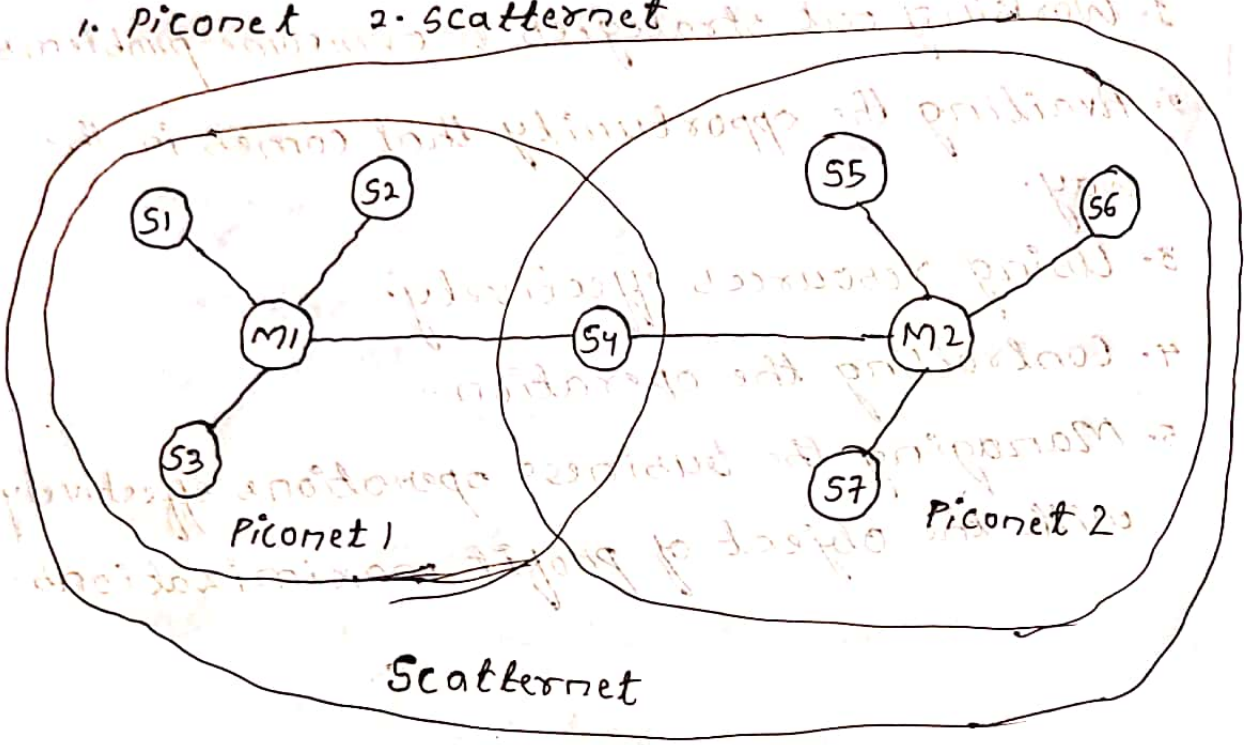
A.

| 802.11a | 802.11b |
| --- | --- |
| → Operates on the less crowded 5-GHz band and runs at up to 54M bit/sec. | → Operates at 2-GHz with a maximum transmission rate of 11M bit/sec. |
| → Fast speed | → Slow speed |
| → Not compatible with 802.11b/g standards | → Compatible with 802.11g standard |
| → Short distance coverage | → Long distance coverage |
| → Poor signal strength due to penetrating obstacles | → Lower signal strength |
| → Suitable application: Nearby building-to-building connection. | → Suitable application: rarely implemented today. |

2. Explain the architecture and layers of Bluetooth.

A. The architecture of Bluetooth defines two types of networks:

1. Piconet 2. Scatternet




Piconet:

Piconet is a type of bluetooth n/w that contains one primary node called master node and seven active secondary nodes called slave nodes. Thus, we can say that there are total of 8 active nodes which are present at a distance of 10 meters. The communication b/w the primary & secondary node can be one-to-one or one-to-many. Possible communication is only b/w the master & slaves. Slave-slave communication is not possible. It also have 255 parked nodes, these are secondary nodes and cannot take participation in communication unless it gets covered to the active state.

Scatternet:-

It is formed by using various piconets. A slave that is present in one piconet can act as master or we can say primary in another piconet. This kind of node can receive message from master in one piconet and deliver the message to its slave into the other piconet where it is acting as a slave. This type of node is refer as bridge node. A station cannot be master in 2 piconets.

Layers:-

1. Radio (RF) layer:-
It performs modulation/demodulation of the data into RF signals. It defines the physical characteristics of bluetooth transceivers. It defines two types of physical link: connectionless and connection-oriented.

2. Baseband link layer:-
It performs the connection establishment within a piconet.

3. Link manager protocol layer:-
It performs the mgmt of the already established links. It also includes authentication & encryption processes.

4. Logical link control & adaptation protocol layer:-
Adaptation of higher layers to the baseband.

5. Service discovery protocol layer:-
Device discovery in close proximity plus querying of service characteristics.

3. What is mobile IP and DHCP?

A. Mobile IP is an Internet Engineering ~~Protocol that~~ Task Force (IETF) standard communications protocol that is designed to allow mobile device users to move from one n/w to another while maintaining a permanent IP address. Mobile IP for IPv4 is described in IETF RFC 5944 and extensions are defined in IETF RFC 4721. Mobile IPv6, the IP mobility implementation for the next generation of the Internet protocol, IPv6 is described in RFC 6275.

The mobile IP allows for location-independent routing of IP datagrams on the internet.

In many applications (e.g. VPN, VoIP), sudden changes in network connectivity & IP address can cause problems. Mobile IP was designed to support seamless & continuous Internet connectivity.

DHCP:-

Dynamic Host Configuration Protocol (DHCP) is a network mgmt protocol used to automate the process of configuring devices on IP networks, thus allowing them to use network services such as DNS, NTP and any communication protocol based on UDP or TCP. A DHCP server dynamically assigns an IP address and other n/w configuration parameters to each device on a n/w so they can communicate with other IP networks. DHCP is an important part of the DPI solution.

4. Write a short note on DSR and AODV routing algorithms.

A. DSR:-

Dynamic source routing is an on-demand routing protocol where the route is calculated only when it is required. Application of DSR is in multi hop ad hoc networks of mobile nodes. DSR's main feature is self-organized and self-configured network without any central administration & nlw setup. It uses periodic routing messages. Thus it reduces bandwidth overhead & conserved battery power and also huge routing updates.

AODV:-

Ad-hoc On-Demand Distance Vector (AODV) is a reactive routing protocol where routes are created only when they are required. main application of AODV is mobile network. It uses routing table setup follows one entry for each destination. Sequence numbers are used to determine an up-to-date path to a destination. Every entry in the routing table having a sequence number. The sequence number act as a route time stamp, ensuring freshness of the route. Upon receiving a RREQ packet, a node compares its sequence number with the sequence number in the RREQ packet. If the sequence no. already greater than that in the packet, the existing route is more up-to-date.

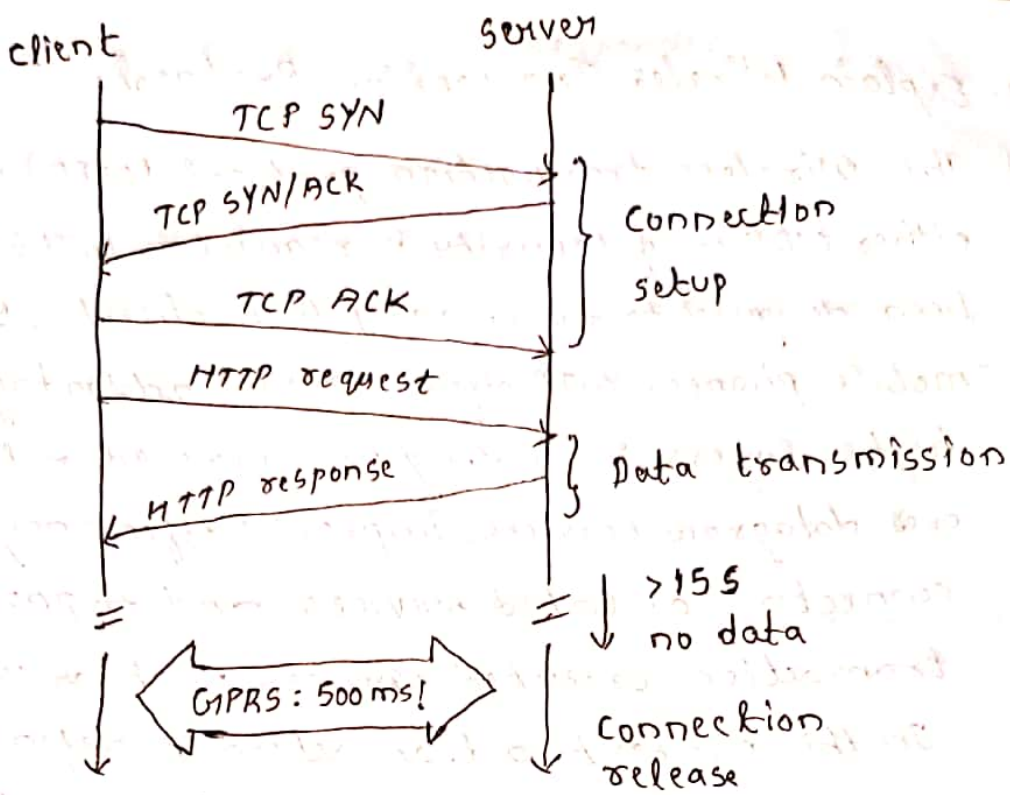
5. Write about Mobile TCP and Transaction oriented TCP

A. Mobile TCP:-

The M-TCP (mobile TCP) approach has the same goals as I-TCP and snooping TCP: to prevent the sender window from shrinking if bit errors or disconnection but not congestion cause current problems. M-TCP wants to improve overall throughput, to lower the delay, to maintain end-to-end semantics of TCP, and to provide a more efficient handover. Additionally, M-TCP is especially adapted to the problems arising from lengthy or frequent disconnections. M-TCP splits the TCP connection into two parts as I-TCP does. An unmodified TCP is used on the standard host-supervisory host (SH) connection, while an optimized TCP is used on the SH-MH connection

Transaction Oriented TCP:-

TCP for transactions (T/TCP) is a possible successor to both TCP & UDP. It is a transaction oriented protocol based on a minimum transfer of segments. So, it does not have the speed problems associated with TCP. By building on TCP, it does not have the unreliability problems associated with UDP.




6- Write a short notes on HIPERLAN

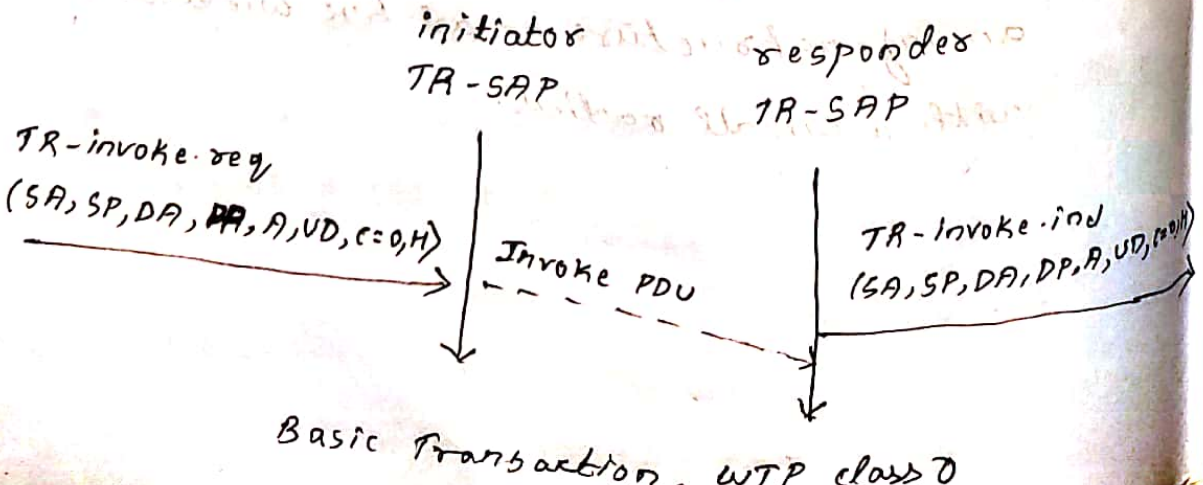
A. A high-performance local area network (HIPERLAN) is an alternative wireless LAN standard to the IEEE 802.11. It is one of four standards (HIPERLAN 1 through 4) specified by the European telecommunications standards institute (ETSI) to link interoperable technologies from different locations instead of cable. HIPERLAN uses cellular-based data n/w's to connect to an ATM backbone. The main idea behind HIPERLAN is to provide an infrastructure or ad-hoc wireless system with a small radius.

7. Explain Wireless Transaction Protocol.

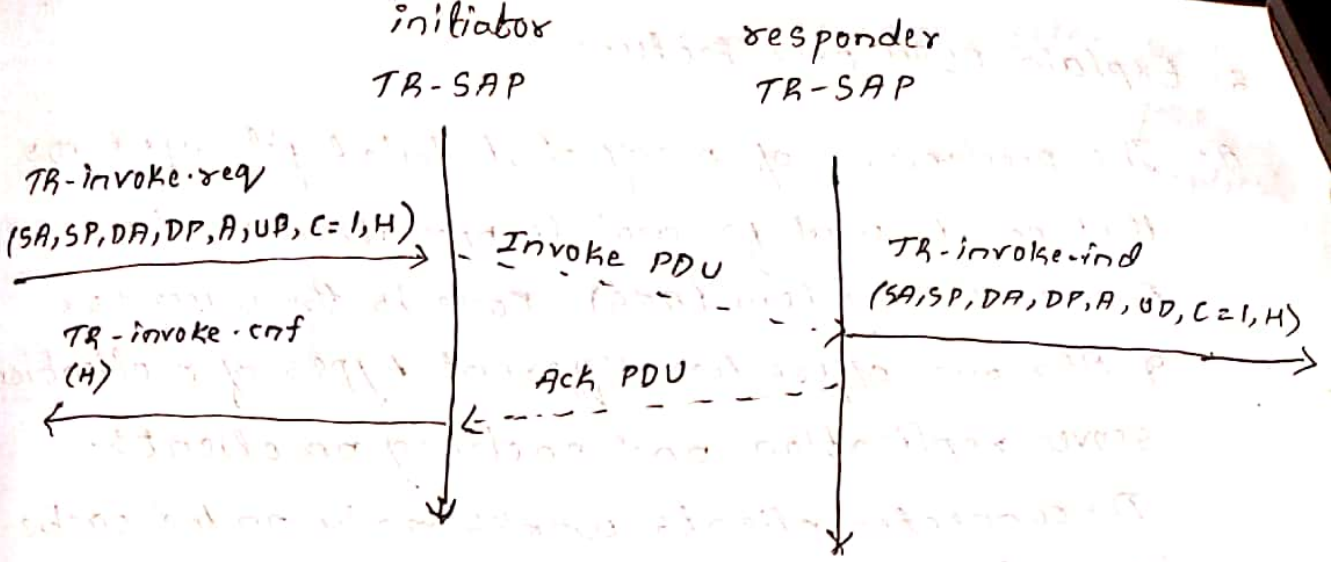
A. The Wireless transaction protocol (WTP) is on top of either WDP or, if security is required, WTLS. WTP has been designed to run on very thin clients, such as mobile phones. WTP offers several advantages to higher layers, including an improved reliability over datagram services, improved efficiency over connection-oriented services, and support for transaction-oriented services such as web browsing. In this context, a transaction is defined as a request with its response, e.g for a web page. WTP offers many features to the higher layers. The basis is form three classes of transaction service as explained in the following paragraph:

Class 0 provides unreliable message transfer without any result message. Classes 1 and 2 provide reliable message transfer, class 1 without, class 2 with, exactly one reliable result message (the typical request/response case).

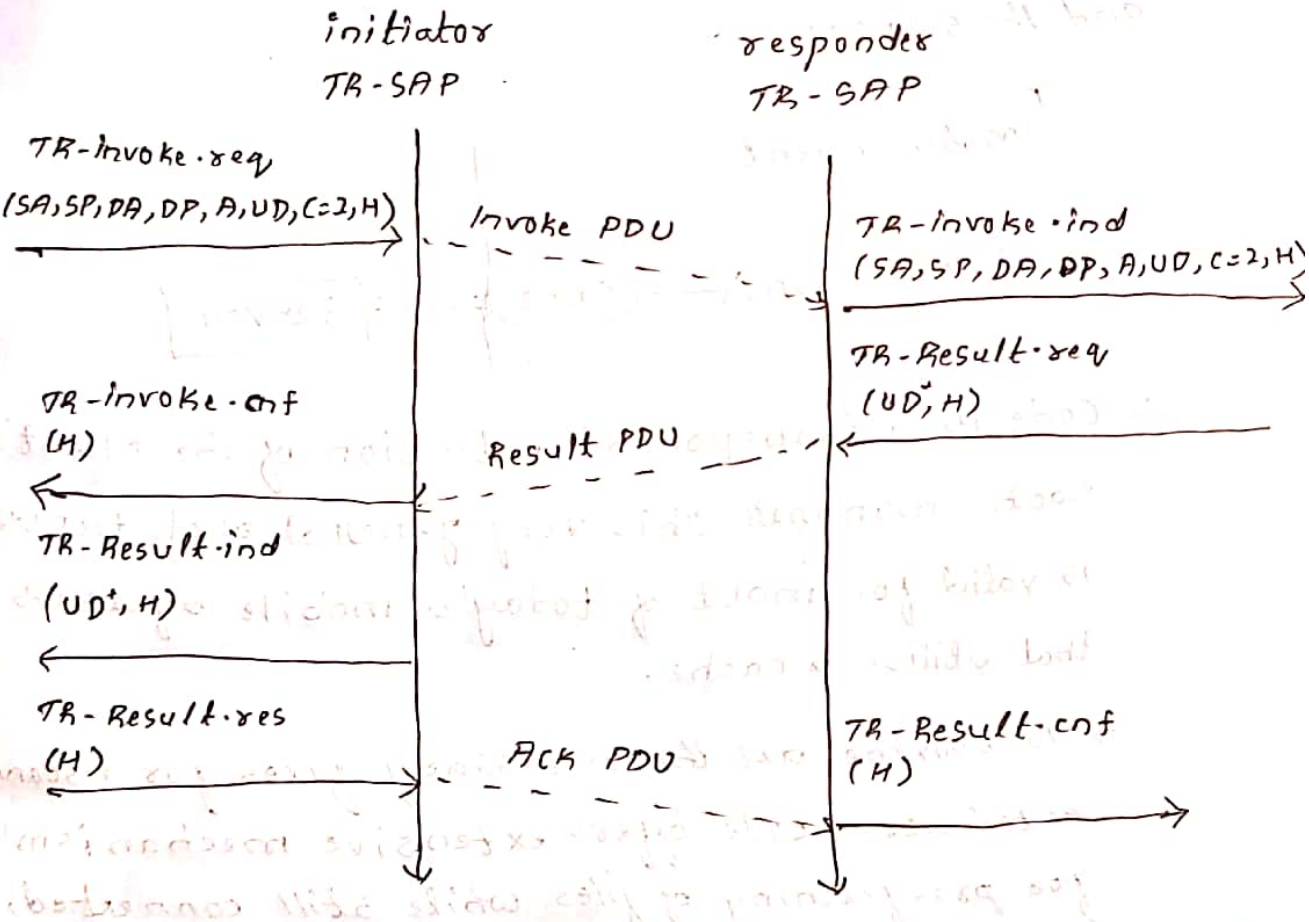
A special feature of WTP is its ability to provide a user acknowledgement or, alternatively,




Basic Transaction, WTP class 0




Basic Transaction, WTP class 1, no user Acknowledgement



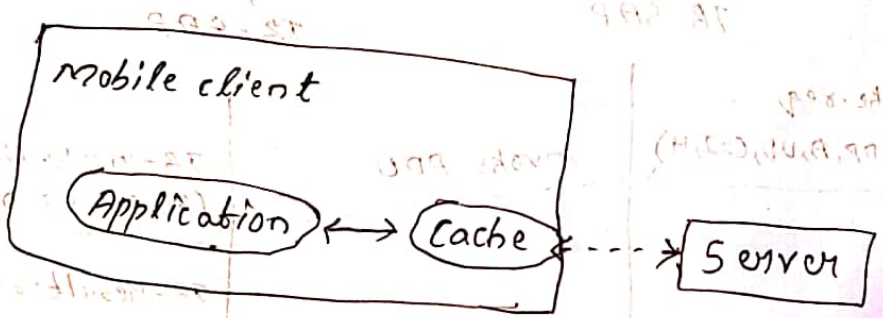

Basic Transaction, WTP class 2, no user Acknowledgement

8. Explain CODA architecture

A. The predecessor of many distributed file systems that can be used for mobile operation is the Andrew file system (AFS). Code is the successor of AFS and offers two different types of replication: server replication and caching on clients.

Disconnected clients works only on the cache i.e applications use only cached replicated files.

Figure shows the cache b/w an application and the server.




→ Code is a transparent extension of the client's cache manager. This very general architecture is valid for most of today's mobile systems that utilise a cache.

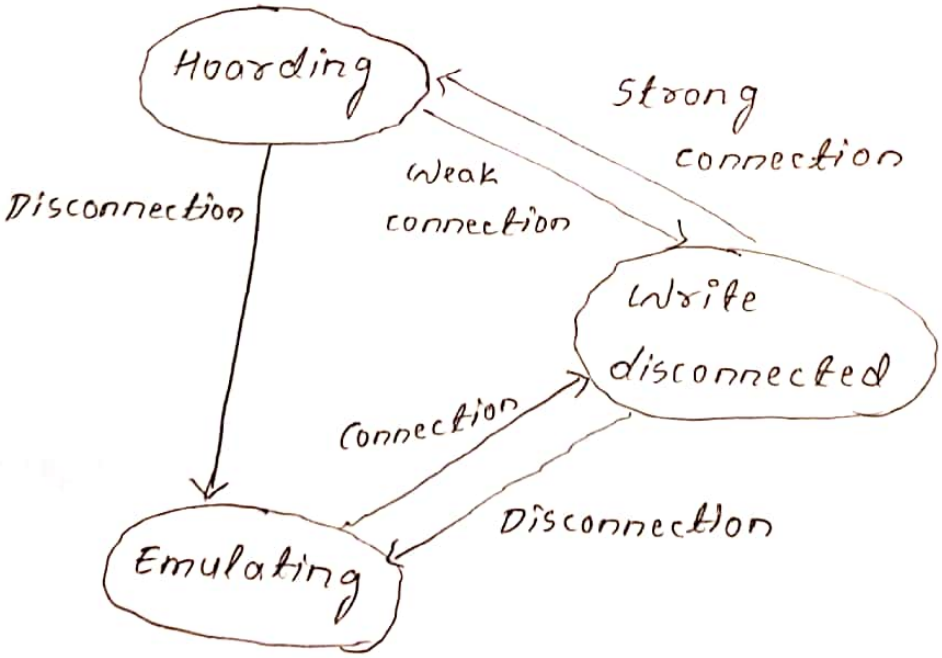
→ To provide all the necessary files for disconnected work, code offers extensive mechanisms for pre-fetching of files while still connected, called hoarding.

→ As soon as the client is disconnected, applications work on the replicates (emulating). Coda follows an optimistic approach & allows read & write access to all files.

→ The system keeps a record of changed files, but does not maintain a history of changes for each file. The cache always has only one replicate.

→ After reconnection, coda compare the replicates with the files on the server as described in Kistler. If coda notices that two different users have changed a file, reintegration of this file fails and coda saves the changed file as a copy on the server to allow for manual reintegration.

→ While in the beginning coda simply distinguished the two states "hoarding" while connected and "emulating" while disconnected, the loosely connected state write disconnected was later integrated. The weak connection, however, is not used for reintegration of files.



9. Differentiate b/w WPA and WPA 2.0

A.

| WPA | WPA 2 |
| --- | --- |
| → A security protocol developed by Wi-fi Alliance to secure wireless computer networks. | → A new security protocol which is better than WPA. |
| → Does not require more powerful hardware. | → Requires powerful hardware to avoid lower network performance. |
| → Provides comparatively weaker authentication & encryption. | → Provides stronger authentication and encryption. |
| → Slower encryption speed. | → Fast encryption speed. |
| → Less secure | → more secure |
| → old version | → new version |