

Mobile computing interview questions

Q.1 Describe the types of wireless applications.

Now a day mobile application is used in every field in real life. Some of them are.

- In Vehicles
- In Hospitals
- In Business
- In Entertainment
- In Location dependent services
- In Mobile and wireless devices

- Sensor
- Embedded controllers
- Pager
- Mobile phones
- Personal digital assistant
- Laptop

Q.2 What are the limitation of mobile computing?

Range and Bandwidth: In general direct cable connection is faster than mobile internet connection. 2G, 3G, 4G networks are fast but these networks are usually available within range of cell phone towers. The main problem with wireless networks is that it works within limited range.

Security standards: When working mobile, user will use virtual private network (VPN). VPN should be carefully used. One can easily attack the VPN through a huge number of networks interconnected through the line.

Power consumption: if a power supply fails or portable generator is not available then mobile devices are relying on battery power. These batteries are more expensive.

Transmission interferences: The geographical area is not same everywhere. So the terrain can interfere with signal reception. The range from the nearest signal point may also interfere with signal reception. Signals in tunnels, some buildings, and rural areas are often poor.

Health problem due to Cell Phone: Mobile phone users may use phone while driving so it may cause accident. Cell phones may interfere with sensitive medical devices.

Q.3 Describe cell in detail.

The geographic area or cellular service area is divided into small hexagonal region called cells. It is the basic unit of a cellular system. These cells collectively provide coverage over larger geographical areas. That is why a user can communicate through mobile phones even if the equipment is moving through cells during transmission. Each cell served by its own antenna. In cellular network adjacent cells are assigned different frequencies to avoid interference.

Advantages of cellular systems with small cells are the following:

- Higher Capacity
- Less transmission power
- Local interference only
- Robust

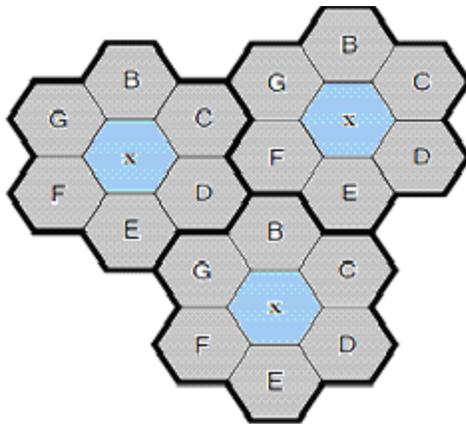


Fig: Hexagonal Cells

Q. 4 Describe Handoff in cellular networks.

When a user talks on the mobile phone to other user it may happen that the mobile station moves from one cell to another. During this conversation signal may become weak. To solve this problem, the Mobile Switching Center (MSC) checks the level of the signal every few seconds. If the strength of the signal is weak then the MSC searches a new cell that can provide better communication.

Handoff is the process by which a mobile telephone call is transferred from one base station to another base station. There are two types of handoff.

- Hard Handoff
- Soft Handoff

Hard Handoff: In this process a mobile station only communicates with one base station. When the mobile user moves from one cell to another, communication must first be broken with the previous base station before communication can be established with the new one.

Soft Handoff: In this process a mobile station can communicate with two base stations at the same time. This means that a mobile station may continue communicate with the new base station before link is break off from the old one.

Q. 5 What is mobile agent?

A mobile agent is a software that can move across the network and represent various tasks. It is a distributed computing paradigm. So you can think agent is an independent software program that runs on behalf of a network user. When mobile agent program is launched by a user then it can travel from node to node autonomously, and can continue to function even if the user is disconnected from the network. Mobile agent works in different type of application and area such as: Internet, Electronic commerce, Mobile Computing, Networking.

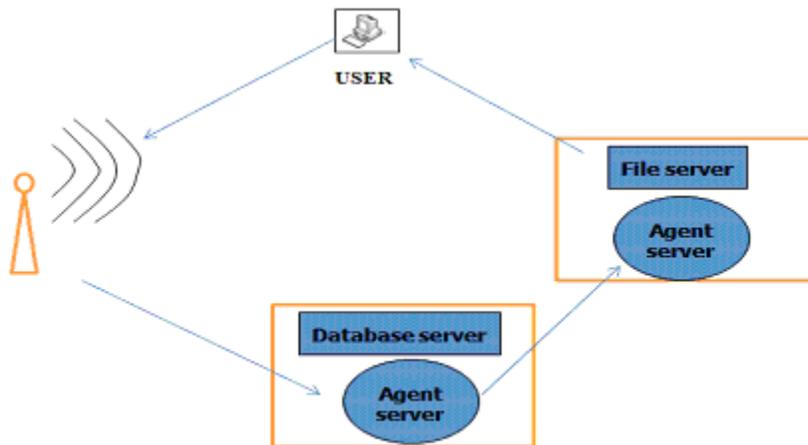


Fig: Working of Mobile Agent

Q. 6 What are the different services provided by GSM.

GSM provides the following types of services.

- Bearer services:

- Tele Service:

- i. Encrypted voice transmission
- ii. Short message service
- iii. Emergency number
- iv. Data Communication

-Supplementary services:

- i. User identification
- ii. call redirection
- iii. Closed user groups

Bearer services permit transparent and non-transparent, synchronous or asynchronous data transmission.

Q.7 Explain GSM architecture in detail.

A GSM system consists of three subsystems, the radio sub system (RSS), the network and switching subsystem (NSS), and the operation subsystem (OSS).

1. Radio subsystem

The radio subsystem (RSS) contains all radio specific entities such as the mobile stations (MS) and the base station subsystem (BSS). It also contains BTS and BSC.

Mobile Station

The MS comprises all user equipment (Cell Phone) and software required for communication with a GSM network. Cell Phone contains the subscriber identity module (SIM), which stores all user-specific data that is relevant to GSM network.

Base station subsystem (BSS): A GSM network contains many BSSs, each controlled by a base station controller (BSC). The main function of BSS are as follows:

- Establishing connection to MS
- Coding/decoding of voice

Base transceiver station (BTS): A BTS comprises of antennas, signal processing, and amplifiers necessary for radio transmission.

Base station controller (BSC): The BSC controls all the BTS. The main function of BSC are as follows:

- Reserves radio frequencies.
- Handles the handover.
- Performs paging of the MS.

2. Network and switching subsystem (NSS).

The NSS comprises MSC, HLR and VLR.

Mobile services switching center (MSC): These are high performance digital switches. An MSC manages several BSCs and provide connections to other MSCs and to the BSCs via the A interface. Home location register (HLR): It contains all the user related data such as the mobile subscriber ISDN number (MSISDN), subscribed services (e.g., call forwarding, roaming restrictions, GPRS), and the international mobile subscriber identity (IMSI).

Visitor location register (VLR): It is a dynamic database which stores all important data needed for the Mobile Station users currently in the (location area) LA that is associated to the Mobile Switching Center.

3. Operation subsystem.

It provides the necessary functions for network operation and maintenance. The OSS contains the following interties.

- Operation and maintenance center (OMC):
- Authentication Centre (AuC):
- Equipment identity register (EIR):

Q.8 Describe Localization and calling in GSM

Worldwide localization of users and roaming are the main service provided by the GSM network system. The system always knows where a user currently is, and the same phone number is valid worldwide. For providing this service GSM updates the user location periodically. The HLR always contains information about the current location. VLR responsible for the MS informs the HLR about location changes. As soon as an MS moves into the new location area (range of new VLR), the HLR sends all user information needed to the new VLR.

To locate an MS and to address the MS, following numbers are needed:

- Mobile station international ISDN number (MSISDN).
- International mobile subscriber identity (IMSI).
- Temporary mobile subscriber identity (TMSI).
- Mobile station7 roaming number (MSRN).

Q.9 Describe Mobile IP.

Mobile IP is an open standard that allows users to keep the same IP address and stay connected while roaming between IP networks. Mobile IP provides the facility to users to keep the same IP address while traveling to a different network. This ensures that roaming of users could continue communication without sessions or connections being terminated.

Components of a Mobile IP Network

Mobile IP has the following three components:

- Mobile Node
- Home Agent
- Foreign Agent

The Mobile Node is a device such as a cell phone or laptop. These devices have software that enables network roaming capabilities.

The Home Agent is a router on the home network that maintains information about the device's current location. It uses tunneling mechanism to forward packets from a device on the Internet called a Correspondent Node.

The Foreign Agent is a router that works as the connection point for the Mobile Node when it roams to a foreign network, delivering packets from the Home Agent to the Mobile Node.

Q.10 What is Hidden terminals problem?

Suppose that there are three mobile A, B, and C. The transmission range of A reaches B, but not C. The transmission range of C reaches B, but not A. Finally the transmission range of B reaches A and C.

A starts sending signal to B, C does not receive this transmission. C also wants to send data to B and senses the medium. The medium appears to be free, the carrier sense fails. C also starts sending data. It will create a collision at B. But A cannot detect this collision at B and continues with its transmission. A is hidden for C and vice versa.

