MOBILE COMPUTING – ASSIGNMENT PRESENTATION

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Location Management for Mobile Cellular Systems

Cellular Systems:

A cellular system is a wireless network that is divided into small geographic areas called cells. Each cell is served by a base station, which is responsible for transmitting and receiving signals to and from mobile devices within the cell.

Location management for mobile cellular systems:

Location management is a crucial aspect of mobile cellular systems. It involves the management of the location information of mobile devices within the network, which is used to route calls and data to the appropriate location.

Two major components:

- ➔ Location Update
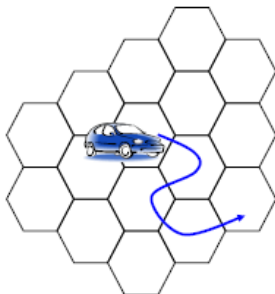- ➔ Paging

Location Update:

Location update is the process by which a mobile device informs the network of its current location. This is typically done by periodically sending a location update message to the network, which includes information such as the cell ID and tracking area or location area of the device. The network updates its records with the new location information, allowing it to route calls and messages to the correct cell when the device is called or receives a message.

Paging:

Paging is the process by which the network attempts to locate a mobile device when an incoming call or message arrives. Paging is necessary because the network may not know the current location of a device if it has not recently sent a location update message. When a call or message arrives, the network sends a paging message to all cells in the tracking area or location area where the device may be located. The mobile device receives the paging message and responds with a location update message that includes its current location. The network can then route the call or message to the correct cell.

Two Extreme Cases:

Location never update (no cost).
Need to page every cells (high cost).

Location updates for every cell crossing (high cost).
Need to page only one cell (low cost).

Location update

Location Area:

A location area is a geographic area that is defined by the cellular network operator. It consists of a group of cells that are served by the same base station or base station controller. When a mobile device moves from one location area to another, it sends a location update message to the network to inform it of its new location. When a call or data session is initiated, the network uses the location area of the mobile device to determine which base station or base station controller to use to connect the call or data session.

Partition the region into different location areas.