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CSE-B

Assignment No. 02 Unit No. 02 Date :

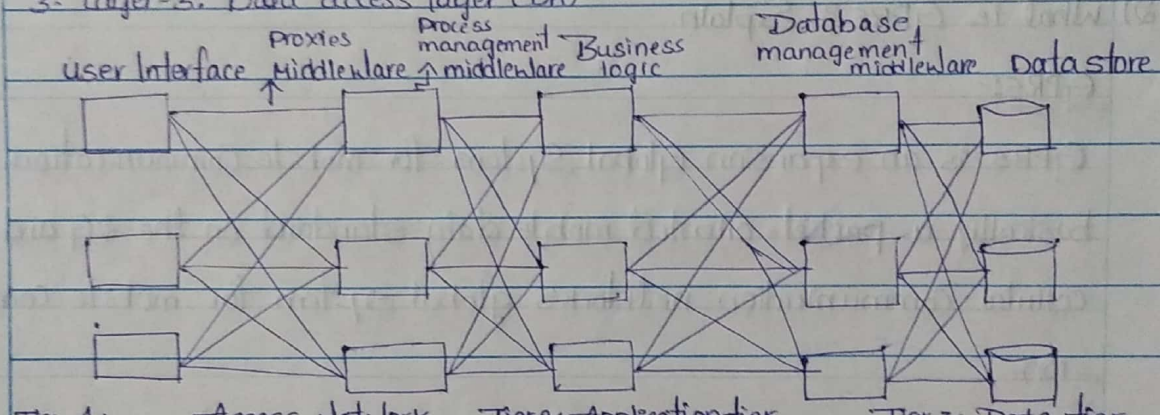
1. Explain Architecture of mobile Computing?

Architecture of mobile Computing:-

Mobile Computing architecture refers to the definition of multiple layers between user application interfaces, devices, and network hardware.

* A well defined architecture is necessary for systematic calculations and access to data and software objects.
* Mobile Computing usually implies wireless transmission but, wireless does not imply mobile Computing.

1. Layer-1: presentation layer (UI)
2. layer-2: Application layer (AL)
3. Layer-3: Data access layer (DA)



3-Tier Architecture Mobile Computing.

* Each tier is distributed in to a different place (or) places in a network.

1. Presentation layer (UI):-

* This layer presents data to the user and optionally, permits data manipulation and data entry. also this layer requests the data form Business layer.
* This layer accomplished through use of Dynamic HTML and client-side data sources and data cursors.

2. Application Layer (AL):-

* The business logic acts as the Server of client requests from workstations.

* It acts according Business rules fetch or insert data through the Data layer
* Because these middle-tier components are not tied to a specific client, they can be used by all applications and can be moved to different locations, as response time and other rules require.

3. Data Access Layer (DAL):-
* The third tier of the 3-tier System is made up of the DBMS that provides all the data for the above two layers.
* This is the actual DBMS access layer.

2) What is GPRS? Explain.

GPRS:-

GPRS is an expansion Global System for mobile Communication. It is basically a packet-oriented mobile data standard on the 2G and 3G cellular communication network's global system for mobile communication.
* GPRS was built up by European telecommunications standards Institute because of the prior CDPD, and I-mode packet switched cell advances.
* GPRS overrides the wired associations, as this framework has streamlined access to the packet informations network like the web.
* The packet radio standard is utilized by GPRS to transport client information packets in a structured route between GSM versatile stations and external packet information networks.
* These packets can be straightforwardly directed to the packet changed systems from the GPRS portable stations.
* GPRS was one of the main advances that empowered a cell System to interface with Internet protocol Systems, accomplishing across

the board reception in the mid-2000s.

* The Capacity to peruse the web from a telephone whenever through "dependably on" data networking, while underestimated in a great part of the world today, was as yet an oddity when it was introduced.

Goals of GPRS:-

* Consistent IP Services.
* Open Architecture.
* Leverage industry investment in IP.

Benefits of GPRS:-

Mobility:-

The Capacity to keep up consistent voice and information inter changes while moving.

Cost efficient:-

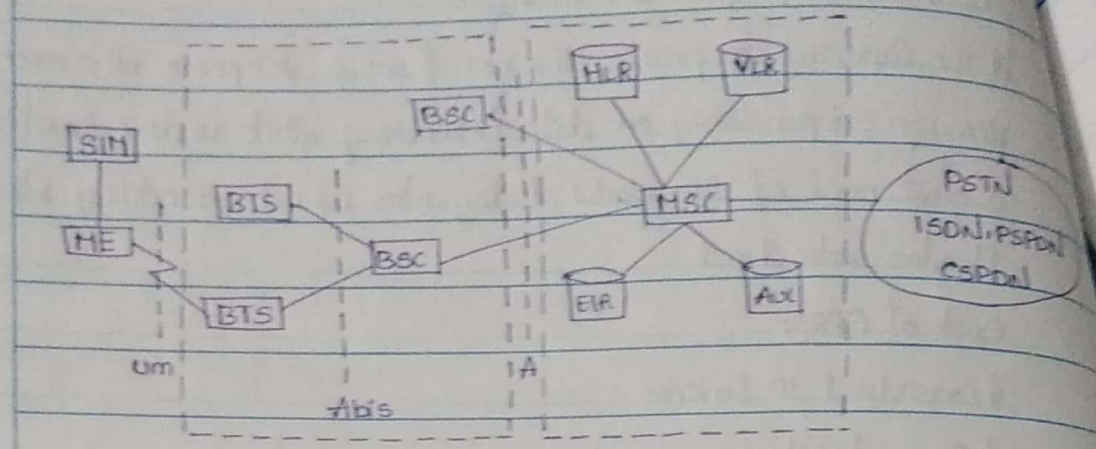
Communication via GPRS is cheaper than through the regular GSM network.

Immediacy:-

Allowls customers to obtain connectivity when needed, regardless of location and without a lengthy login Session.

3) With a neat sketch explain GSM Architecture?

GSM Architecture:-



1. MS:-

MS stands for mobile System ms Comprises user equipment ~~user~~ and software and needed for communication with a mobile Network.

* Mobile station (MS) = Mobile Equipment (ME) + Subscriber Identity module (SIM)

* Now, these mobile stations are connected to tower and that tower Connected with BTS through TRX.

2. BTS:-

BTS stands for Base transceiver station which facilitates wireless communication between user equipment and a network.

3. BSC:-

Bsc stands for base station controller

* Bsc has multiple BTS.

4. MSC:-

* MSC stands for mobile Switching Center.

* MSC is associated with communication switching functions Such as call setup, call release and routing.

* MSC is having further components like VLR, HLR, AUC, EIR and PSTN.

VLR:-

VLR stands for visitor location register.

Assignment No. Unit No. Date :

*VLR is a database which contains the exact location of all mobile subscribers currently present in the service area of MSC.

HLR:-

HLR stands for home location register.

*HLR is a database containing pertinent data regarding subscribers authorized to use a GSM network.

OMC:-

OMC stands for operation maintainence Center. OMC monitor and maintain the performance of each MS, BSC and MSC with in a GSM System.

AUC:-

Auc stands for Authentication Center. Auc authenticates to mobile subscriber that wants to connect in the network.

EIR (Equipment Identity register):-

EIR is a database that keeps the record of all allowed (or) banned in the network.

PSTN (Public switched telephone Network):-

PSTN originally a network of fixed line analog telephone Systems

*PSTN connects with MSC.

Abis Interface:-

It is a BSS internal interface linking with BTS and BSC.

A Interface:-

It provides communication between BSS and MSC.

4) Explain how Security is provided in GSM?

GSM Security:-

GSM offers several Security services using confidential information stored in the AUC and in the individual SIM.

(i) Access control and authentication.

(ii) confidentiality (Encryption)

(iii) Anonymity.

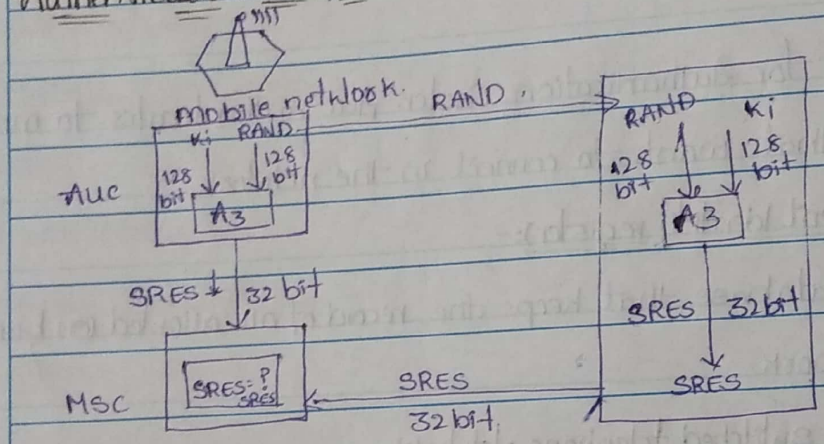
(i) Authentication:-

Authentication is based on the SIM, which stores the individual authentication key Ki, the user identification IMSI.

Access Control:-

Ac generates a random number RAND as challenge, and SIM within the MS as response.

Authentication in GSM:-



Ki: individual subscriber authentication key.

SRES: Signed response.

(ii) Confidentiality:-

* To ensure privacy.
* All user-related data is empty.
* After Authentication, BTS (base transceiver station) and MS apply encryption to voice data, and Signaling by applying the Cipher key Kc.
* Kc is generated using the individual key Ki and a random value by applying the algorithm A8.

Assignment No. Unit No. Date :

Encryption:-

* Note that the SIM in the MS and the network both calculate the same k_c based on the random value RAND.
* The key k_c itself is not transmitted over the air interface
* MS and BTS can now encrypt and decrypt data using the algorithm A5 and the cipher key k_c.

(ii) Anonymity:-

* To provide user anonymity, all data is encrypted before transmission and user identifiers are not used over the air.
* Instead GSM transmits a temporary identifier (TSMI), which is newly assigned by the VLR after each location update.
* Additionally, the VLR can change the TMSI at any time.