

Important Instructions:

- 1) Open this MS-Word document and start writing answers below each respective question given on page 2.**
- 2) Answers the question in the same sequence in which they appear.**
- 3) Provide to the point and concrete answers.**
- 4) First read the questions and understand what is required of you before writing the answer.**
- 5) Attempt the paper yourself and do not copy from your friends or the Internet. Students with exactly similar answers or copy paste from the Internet will not get any marks for their assignment.**
- 6) You can contact me for help if you have any doubt in the above instructions or the assignment questions.**
- 7) All questions must be attempted.**
- 8) Do not forget to write your name, university ID, class and section information.**
- 9) Rename you answer file with your university ID# before uploading to SIC.**
- 10) When you are finished with writing your answers and are ready to submit your answer, convert it to PDF (no MS Word) and upload it to SIC unzipped, before the deadline mentioned on SIC.**
- 11) Do not make any changes to the format provided.**
- 12) Failure in following the above instructions might result in deduction of marks.**

Final Exam, Course: - Mobile Computing

Deadline: - Mentioned on SIC

Marks: - 50

Program: - BS (CS), BS-SE

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Class and Section: BS (SE-8) Section A

- Q1: Provide the names of 4 challenges that exist in Adhoc Networks. (4)**
- Q2: How the nodes in the Adhoc Network know about the changing network topology. (2)**
- Q3: Why is it important to minimize flooding of control packets in Adhoc Networks and how MPR achieves it? (4)**
- Q4: Explain briefly how Mobile Cloud Computing is different than simple mobile computing and simple cloud computing? (4)**
- Q5: Explain the term MBAas in your own words? (4)**
- Q6: Imaging you visit a completely new city. What kind of services a modern LBS can provide you at your location automatically? (6)**
- Q7: Use your imagination as to how the following context can be used by a context aware application in mobile computing environment? (8)**

Date/Time

Environment

Emotional state

Focus of attention

Orientation

User preferences

Calendar (events)

Browsing history

Q8: Explain why energy efficiency is important in technologies like Bluetooth and ZigBEE? (4)

Q9: Explain briefly how you use RFID technology at INU on a daily basis when present on the campus? Do you use an active or passive tag? (4)

Q10: Explain how Wearable Computing can be employed in computer gaming? (5)

Q11: What kind of facilities and technologies must be present in order to call you own home a Smart Home? (5)

Q1

Answer:

Challenges in Adhoc Networks:

- Dynamic topology is the challenge where nodes are unengaged to move which ends up in route changes and packet loss.
- Scalability remains unsolved; challenges embody addressing, routing, configuration management, ability, etc.
- Ease of snooping on wireless transmission (security hazard).
- Energy constraints limit process power; ad-hoc networks rely on every node being a “router”.

Q2

Answer:

AD hoc incorporates set of mobile nodes connected wirelessly during a self-organized, self-healing network while not having a set infrastructure. Manet nodes are liberated to move indiscriminately because the network topology changes often. Every node behaves as a router as they forward traffic to other specific node within the network.

Q3

Answer:

It is necessary to reduce flooding of control packets in Adhoc Networks because flooding may be expensive in terms of wasted bandwidth. Whereas a message could only have one destination it's to be sent to each host. In the case of a ping flood or a denial of service attack, it may be harmful to the reliability of a network. Messages will duplicate within the network that will increase the load on the network as well as requiring a rise in process complexness to disregard duplicate messages. Multipoint Relay minimizes the flooding of broadcast packets within the network by reducing duplicate retransmission within the same region.

Q4

Answer:

Mobile Cloud Computing:

Mobile cloud computing may be a new platform combining the mobile devices and cloud computing to make a new infrastructure, whereby cloud performs the work of computing-intensive tasks and storing large amounts of information. In this new architecture, processing and information storage happen outside of mobile devices.

Mobile computing:

Mobile computing relates to the emergence of latest devices and interfaces. Smartphones and tablets are mobile devices which will do loads of what traditional desktop and portable computer

computers do. The mobile OS, as an interface, supports users by providing intuitive icons, acquainted search technologies and simple touch-screen commands.

Cloud computing:

Cloud computing is the availability of servers, storage, databases, networking, software, analytics, and intelligence over the web to supply quicker innovation, versatile resources, and economies of scale. Cloud service providers typically serve multiple purchasers. They organize access between the client's local or closed networks, and their own information storage and information backup systems. which means that the vendor will intake information that's sent to them and stores it firmly, whereas delivering services back to a client through these rigorously maintained connections.

Q5

Answer:

The purpose of associate MBaaS platform is to supply developers with a way to attach their frontend application with backend cloud storage and APIs exposed by a backend application. The meant outcome is that it frees developers from considering, worrying regarding, managing, or performing any tasks associated with servers. An MBaaS platform can generally give variety of basic operations, like user management, push notification support, and social network APIs for social login, posting, etc. MBaaS suppliers utilize custom software development kits (SDKs) to alter developers to attach their API endpoints to varied frontend purchasers like iOS and android applications engineered with any technology capable of manufacturing a mobile app, like ReactNative, Ionic, Flutter, Unity, etc. These SDKs also can contain access to the provider's pre-built APIs, like login APIs, push notification APIs, and knowledge service APIs.

Q6

Answer:

Services a Modern LBS can provide:

- Recommending social events in a very city.
- Requesting the closest business or service, like ATM, eating place or a sales outlet.
- Turn-by-turn navigation to any address.
- Assistive health care systems.
- Receiving alerts, like notification of procurement on gas or warning of traffic congestion.
- Location-based mobile advertising.
- Contextualizing learning and analysis.
- Games where your location is an element of the game play, for instance your movements throughout your day build your avatar move within the game or your position unlocks content.
- Real-time Q&A revolving around restaurants, services, and different venues.
- Sending a mobile caller's location throughout emergency call using Advanced Mobile Location.

Q7

Answer:

Date/ Time:

According to the context aware systems the date and time for the user should be provided by the system according to his current location and provide user an option to change date and time according to the area he is living in, date and time should be in the middle of the display, where it is user centric approach.

Environment:

The environment is key factor in the context aware systems; the system should extract the information about different environments. For example, in a noisy place, night time or day time, how will the system behave in those different conditions? To adjust all conditions there is an option available in the phone like adjusting the brightness of the phone, setting the screen timer, setting screen density to warm or cold etc.

Emotional state:

According to the context aware systems, emotional state of user can affect mobile computing environment for example a loud alert (alarm)) is not ideal for all situations, the same way language can change, colors should be according to the user.

Focus of attention:

The system should give importance to the attention of user through context aware system they can provide some services like avoiding phone calls, unnecessary interruption during busy schedule or when the message arrives on the phone, the phone continuously shows the led bulb flashing for 30 seconds.

Orientation:

Orientation means the context aware system have capability to provide user device to adjust the screen according to the user. For example, auto rotation of the screen, if the user wants the full view, he can simply flip his mobile phone upside down for a better view. Smart watches like apple watch, turns on the screen when the wrist is lifted up to face.

User preferences:

The context aware system maintains the user preferences by providing the user with certain option such as setting up the color density of the screen, day and dark modes, changing wallpapers and themes.

Calendar (events):

The context aware system focuses on the system time zones globally; the user can personalize his schedule throughout the year and can keep the information regarding specific date. And when it's time, the calendar will show and notify the user about the specific event.

Q8

Answer:

A large-scale detector network using detectors like Bluetooth and ZigBee on the bulk of vehicles would definitely be capable of providing helpful information, but has major impediments like the equipment put in the vehicles should be energy efficient enough and be capable of transferring the specified quantity of information in due time, as the vehicle passes by the road side unit that acts as interface with the traffic management system. The ability of devices to connect quickly to each other, the energy of device is higher in the initial stage because of full battery charge. It was found that the ZigBee 26 channel was not interrupted by other communication, while Bluetooth, with the frequency hopping approach, might face a stuck condition, thus delaying the first step of the communication process. For ZigBee only channel 26 is used.

Bluetooth, because of its specific protocol, cannot avoid interference by default. We can conclude that ZigBee technology can provide valuable support for large scale energy networks. So the energy efficiency is important in technologies to perform the better performance.

Q9

Answer:

We use RFID technology in our university through our student card. We use our card to mark entrance in university. We also use our RFID card to mark attendance in our classes.

The RFID card we use as a student of INU on daily basis is a passive RFID because:

- Tag power source is energy transferred using RF from reader. It does not involve of any battery tag.
- The data storage is limited up to 16 bits to 1KB. Multi-tag reading is limited to recognize few hundred tags within 3m of reader.
- It requires very accurate signal strength. Its range is Finite, and it works when it is swept on the RFID reader.

Q10

Answer:

Wearable computing is designing, building, and using computation device on the body or over body. Wearable computing can be employed in computer gaming as Prio VR gaming. Prio VR gaming consists of different equipment which includes sensors, 3-D Images and virtual reality etc.

A user puts that equipment on his/her body as a kit for watching and playing. Kit includes VR glasses that provide an experience to the user as if he/she is actually inside that game. It includes sensor information to read the gestures of user to play the game. VR equipment can also be used on different platforms for games such as PS4, PC and Nintendo.

Q11

Answer:

Facilities and technologies in smart home:

- Smart TVs connect with the web to access content through applications, like on-demand video and music. Some smart TVs conjointly embrace voice or gesture recognition.
- In addition to having the ability to be controlled remotely and customized, sensible lighting systems, will detect once occupants are within the room and alter lighting as required. Smart light bulbs may regulate themselves supported daylight accessibility.
- Smart thermostats, accompany integrated Wi-Fi, permitting users to schedule, monitor and remotely management home temperatures. These devices conjointly learn homeowners' behaviors and mechanically modify settings to produce residents with most comfort and potency. Smart thermostats may report energy use and inform users to vary filters, among different things.
- Using smart locks and garage-door openers, users will grant or deny access to guests. Smart locks may find once residents are close to and unlock the doors for them.
- With smart security cameras, residents will monitor their homes once they are away or on vacation. Smart motion sensors are able to establish the distinction between residents, visitors, pets and burglars, and may inform authorities if suspicious behavior is detected.
- Kitchen appliances of all kinds are available like smart coffee makers that can brew you a fresh cup as soon as your alarm goes off; smart refrigerators that keep track of expiration dates.

These facilities must be present in Smart Home:

Security (To keep safe from intruders, check doors ad locks etc.),

Health (Tracking health routine, measuring BMI, analyzing physical health, medication reminders etc),

Connectivity (Controlling devices; connection with neighbors, updates via SMS, Emails etc.)

Time to time update (Temperature of home, notifications about appliances, updates about the vulnerability of devices etc.)

Save money (Controlling electrical devices, updates about defects which are incoming etc.)