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   **Dated: 24 June 2020**

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Class and Section: BSSE -8 (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

Four Challenges in Adhock:

- **Dynamic topology is** the challenge where nodes are free to move randomly and results in route changes and packet loss

- **Clustering (Scalability)** is still unsolved, challenges include addressing, routing, configuration management, interoperability, etc.

- **Physical Layer limitations** in which limited wireless range, and packet lose during transmission contain.

- **Restricted Bandwidth** Wireless links have significantly lower capacity than there hardwired counterparts.

Q2:
Answer:

They contain set of mobile nodes connected wireless in a very self-designed, self-healing network while not having a hard and fast infrastructure. Manet nodes are absolve to move at random because the configuration changes often. Every node behave as a router as they forward traffic to different 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 refers to associate infrastructure wherever each the information storage, and also the processing happen outside the mobile device. Mobile cloud applications move the computing power and information storage far from mobile phones and into the cloud, transfer applications and mobile computing to not simply smartphone users.
Similar with Cloud Computing, there are plenty however, no accordant definitions on what mobile cloud computing is.
In mobile cloud computing, the previous mobile device-based intensive computing, information storage and mass informatics are transferred to cloud and so the necessities of mobile devices in computing capability and resources are reduced, therefore the developing, running, deploying and victimization mode of mobile applications are completely modified..

Mobile Computing:

Mobile computing is Human-computer interaction by that a pc is predicted to be transported throughout traditional usage. Mobile computing relies on a group of 3 major concepts: hardware, software system and communication.
Software of mobile computing is that the various mobile applications within the devices, like the mobile browser, anti-virus software system and games.

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.
It introduces that the main operate of a cloud computer system processing system is storing data on the cloud servers, and uses of cache memory technology within the consumer to fetch the information. It provides a definition from the attitude of marking that cloud computing may be a parallel and distributed computer system, that is combined by a bunch of virtual machines with internal links.
The framework of cloud computing is split into four layers, that are information centers layer, infrastructure layer, platform layer, and application layer

Q5:
Answer

Mobile Back-end as a Service:

Mbaas indicate Mobile bank end as a service. In easy words, it's the simplest way of empowering mobile developers with prepared rear mobile resources, APIs, and cloud storage in order that the mobile application development method may be fast-tracked.

mBaaS supplier will build things behind the curtain to provide your app the facility and suppleness it wants. Mobile Backend as a Service supplier is serving up API at their finish, they'll have access to any or all the traffic analytics. mBaas give social media integration, information management, database, file storage, genus API and infrastructure

Q6:
Answer:

Some of the services a modern LBS can provide you is given below:

• Location-based mobile advertising.
• Requesting the closest business or service, like ATM, eating place or a sales outlet.
• Assistive health care systems.
• Turn-by-turn navigation to any address
• Recommending social events in a very city.
• Contextualizing learning and analysis.
• Receiving alerts, like notification of procurement on gas or warning of traffic congestion.
• 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.
• Sending a mobile caller's location throughout emergency call using Advanced Mobile Location.
• Real-time Q&A revolving around restaurants, services, and different venues.

Question #7:

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 s 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.

Q 9:
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, that 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 a very accurate signal strength. Its range is Finite, and it works when it is swept on the RFID reader.

Q 10:
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 consist 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 provides 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

Smart Home Facilities:
- Smart Lock Security (To keep safe from intruders, check doors ad locks etc.)
- Health. (Tracking health routine, measuring BMI, medication reminders etc.)
- Google Assistant. (Controlling devices, connection with neighbors, updates via SMS, Emails etc.)
- Control Electric things on phone. (Controlling electrical devices, updates about defects which are incoming etc.)

Smart Home Technologies:
- Internet connectivity (LAN, WAN, GSM etc.)
- Sensors. (Motion sensors, PIR sensors, vibration sensors, temperature sensors etc.)
- Scanners. (Magnet scanners, steel scanners etc.)
- Sanitizer Shower.
- Cameras. (Night vision camera, thermal camera etc.)