

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

Student Name: _____ Yahya Riaz_____

Student ID#: _____ 12280_____

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: Imagine 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)

Question #1

The challenges in Adhoc network are as following:

- Infrastructure less design.
- Dynamic topology.
- Scalability.
- Energy constraints.

Infrastructure less design:

This network is complicated in fault detection.

It adds difficulties in managing the problem with in the network.

Dynamic topology:

Dynamic topology changes the route of the information and packets are lost, through which the information is dispersed and incomplete.

Scalability:

Scalability is still an issue and yet it is not solved. Addressing the nodes, routing nodes, configuration management and interoperability are challenges in scalability.

Energy constraints:

Power processing is limited and ad-hoc networks rely on nodes, which are known to be routers.

Question #2:

Nodes in Ad-hoc moves freely and randomly throughout the network topology changes frequently. Nodes in Ad-hoc behave as a router as the traffic is put forward to other specified nodes in the network.

Question #3:

Minimizing flooding in Ad-hoc network is important to control packets because flooding can be expensive in terms of bandwidth wastage. A message might have only one destination which is to be sent to every host. Incase of ping flooding or denial of service attack, it may be harmful for the computer network and its reliability. Messages can be duplicated with in the network which cause more load on the network and makes processing more complex regarding to message. Multipoint Relay (MPR) minimize flooding of broadcasting packets in the network by reducing the duplication in the same region.

Question #4:

Mobile Cloud Computing:

Mobile Cloud Computing refers to associate infrastructure where ever each the information storage, and also the processing happens 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:

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.

Question #5:

MBaaS consumes a lot of time. Customized backend does not need any setting because the developer already has implemented it that keep the user focused on the essential matters. MBaaS provides an easy scalability and controlling things in the background to optimize and provide flexibility of the application.

Question #6:

- LBS recommends social events going around or will happen I future the city.
- It can request to the nearest services, businesses, ATMs, restaurants etc.
- It shows mobile guides.
- Fitness monitoring and healthcare.
- Transportation details within the area.
- Assistive healthcare system.
- Social networking and details regarding area.
- Other emerging applications.
- Turn by turn navigation to any address.
- Receiving notifications of procurement on gas or warnings of traffic congestion.
- Location based mobile advertising.

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.

Question #8:

The ability of devices to connect quickly to each other, the energy of devices or higher in the initial stage because of battery charged fully. It was found that the ZigBee 26 channel was not interrupted by other communications, while Bluetooth, with the frequency hopping approach might face a stuck condition, this delaying the first step of the communication process. For ZigBee only channel 26 is used. Bluetooth, because of its specific protocol cannot avoid interfaces by default scale energy saving sensor networks. So, the energy efficiency is important in the technologies to perform the better performance.

Question #9:

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 consist of any battery tag.
It requires a very strong signal strength.
Its range is limited which is up to 3-5m, and it works when the card is swept on the RFID reader.
The data storage it consists is limited up to 16 bits to 1KB.
Multi-tag reading is limited to recognize few hundred tags within 3m of reader. And takes almost 3 seconds per read at the speed of 3 mph.

Question #10:

Wearable computing can be employed in computer gaming as Prio VR gaming.
Prio VR gaming consist of different equipment which includes sensors, mediating reality, virtual reality etc. A user puts that equipment on his/her body as a kit for playing different games.
It is a virtual platform in computer gaming.
Kit includes VR glasses, that provides an experience to the user as if he/she is actually inside that game.
It includes sensors to extract out the gesture information of user.

Question #11:

The 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. (google assistance, 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.)

And the technologies which facilitate a Smart Home:

- Sensors. (motion sensors, PIR sensors, Heat sensors, pressure sensors, vibration sensors, temperature sensors etc.)
- Cameras. (night vision camera, thermal camera, CCTV cameras etc.)
- Internet connectivity / devices interconnectivity. (LAN, WAN, GSM etc.)
- Scanners. (body scanners, magnet scanners, steel scanners etc.)

