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: BS(SE) 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: Provide the names of 4 challenges that exist in Ad hoc Networks.

Answer:

The following is four challenges in ad hoc network:

(1): Medium access scheme:

They are based on the addressing scheme used in early Ethernet implementation.

- MAC is responsible for shared use of the transmission medium;
- performance depends on MAC protocol (e.g. Token Ring vs. Ethernet).

(2): Transport layer protocol:

This is an end-to-end layer used to deliver messages to the host. This is called the end-to-end layer because it provides a point-to-point connection instead of a hop-to-hop connection.

There are following major function of connection-based transport layer protocol:

- setting up and maintaining end-to-end connection;
- reliable end-to-end delivery of data packets;
- flow control;

(3): Security;

Therefore, the ad hoc radio network is exposed to various threats that jeopardize the basic functions of the network such as routing and packet forwarding. Layer 2 wireless security mechanisms, often

considered part of the solution domain, do not meet the specific requirements of the wireless ad hoc network.

What makes ad hoc more vulnerable to attacks:

- lack of central coordination;
- shared wireless medium.

(4) :Scalability:

scalability in ad-hoc networks cannot scale infinitely, thus rendering scalability as an experimental issue. Scalability, is one of the main challenges in protocol design and is required to achieve ad hoc networks with high deploy ability.

- contain only a limited number of nodes.
- may not be good examples of ad hoc performance

Q2: How the nodes in the Adhoc Network know about the changing network topology.

Answer:

Wireless ad hoc networks are collections of wireless nodes, that communicate directly over a common wireless channel.The nodes are equipped with wireless transceiver. They don't need any additional infrastructure, such as base station or wired access point, etc. Therefore, each node doesn’t only play the role of an end system, but also acts as a router, that sends packets to desired nodes.

A wireless ad hoc network (WANET) or Mobile ad hoc network (MANET) is a decentralized type of wireless network. The network is ad hoc because it does not rely on a pre-existing infrastructure, such as routers in wired networks or access points in

managed (infrastructure) wireless networks Instead, each node participates in routing by forwarding data for other nodes, so the determination of which nodes forward data is made dynamically on the basis of network connectivity and the routing algorithm in use

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Q3: Why is it important to minimize flooding of control packets in Ad hoc Networks and how MPR achieves it?

Answer:

Using a flooding mechanism a control message for MPR selection . MRP also proposed a way to manage mob intelligent mobility to manage multicast mesh. In other words, the recipient compares routes and decides which one is better. The source is then informed of this fact for future routing. This intelligent method can maintain and improve multicast mesh by monitoring traffic = engagement and learning mesh highlights. Therefore, the message of flood control can be greatly reduced. Using such a method, the 10D-MRP cm ensures that there is always a path (usually stable and maximal) between the sender and the multicast recipient. In [Wang 2001], it has been shown that 10D-MRP can often provide better results than CAMP.

Q4: Explain briefly how Mobile Cloud Computing is different than simple mobile computing and simple cloud computing?

Answer:

Cloud computing

Cloud computing is the practice of using a network of remote servers to provide hosted services over the Internet (public or private) rather than

providing services on a local site. Cloud services are now used to store, handle and process a wide range of data applications. relates to the specific design of new technologies and services that allow data to be sent over distributed networks, through wireless connections, to a remote secure location that is usually maintained by a vendor. Cloud service providers usually serve multiple clients. They arrange access between the client's local or closed networks, and their own data storage and data backup systems. That means that the vendor can intake data that is sent to them and store it securely, while delivering services back to a client through these carefully maintained connections.

Mobile computing

The word „mobility" has become very popular in the world of computing. There has also been a rise in development and sales of mobile devices like smartphones, tablets etc. supporting different kinds of mobile computing and networking technologies. People are choosing these devices as their first preference for work and entertainment activities. relates to the emergence of new devices and interfaces. Smartphones and tablets are mobile devices that can do a lot of what traditional desktop and laptop computers do. Mobile computing functions include accessing the Internet through browsers, supporting multiple software applications with a core operating system, and sending and receiving different types of data. The mobile operating system, as an interface, supports users by providing intuitive icons, familiar search technologies and easy touch-screen commands.

Q5: Explain the term MBaas in your own words?

Answer: MBAS means mobile backend as a service. Simply put, it's a model that provides web app and mobile app developers with a way to link their app to backup cloud storage. (Cloud storage) is a data storage

model that stores digital data in a logical pool. Mobile Backend as a Service (MBAS) is a cloud computing platform that integrates the company's mobile app with relevant databases and servers through software development kits (SDKs) and application program interfaces (APIs). MBAS acts as a mediator that manages all cellular back-end connections so that developers can offer the best user experience.

MBAS supports mobile apps by offering various backend services such as push notifications, cloud database storage, social network integration and much more. From

"While this is a fairly modern industry, trends show that these services are gaining ground with corporate customers."

Q6: Imaging you visit a completely new city. What kind of services a modern LBS can provide you at your location automatically?

Answer:

If a new city is visited, state-of-the-art location services provide them with existing, navigation technology in consumer devices such as cell phones. With permission. Identify your status in relation to services, services and other people.

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.

Answer:

Context-Aware Application: Context-aware computing is a mobile computing paradigm in which applications can discover and take advantage of contextual information such as user location, time of day, neighboring users and devices, and user activity.

- **Date/Time:** by pushing notification/reminder of a daily used application.
- **Environment:** by showing notification or news related weather.
- **Emotional state:** by showing help and support.
- **Focus of attention:** featuring thing by mostly used (contacts, apps etc.)
- **Orientation:** by guiding and helping the user to use.
- **User preferences:** by keeping tracks of user's preferences.
- **Calendar (events):** by showing reminders of an upcoming event.
- **Browsing history:** by showing news and ads related to search history.

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

Answer:

The main feature of this technology is its very efficient use of energy are important in a dynamic environment, in which vehicles are moving at road sensor networks, using similar conditions ZigBee, as opposed to Bluetooth, may communicate on a specific

channel Energy efficiency is especially important for end sensory devices with limited energy sources, which are connected by means of so-called wireless sensor networks (WSN). ... The reason may be the production of unnecessary communication or periodic transmission of data from sensory IoT devices at very short intervals.

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?

Answer:

Using RFID technology, my card itself works like a passive tag like a card. The power does not see and to activate the tag the reader has to respond to the power supply of the reader. Present the information to read. The UHF RFID readers are installed at the entrance of the school, at the stairs, and at the entrance of the classroom to realize real-time positioning and identification of students.

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

Answer:

The computer port can be used in computer games using a VR headset, knuckle strap, VR remote control, tactical play vest and more. all of

theseThis helps you to feel the game environment at a better level, some allow youTo enter the virtual reality of the gaming world.

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

Answer:

- Cleaning. Clothes dryer. Broom.
- Electric lighting. Fluorescent light bulb.
- Food preparation. Barbecue.
- Food storage. Can.
- Home maintenance. Groundskeeping equipment.
- HVAC. Air conditioner.
- ICT. Data storage device.
- Knitting machine.
- Smart Home hubs and Controllers.
- Smart Lighting.
- Smart Door Locks and Security Systems.
- Smart Home Surveillance Cameras.
- Smart Kitchen appliances.
- Smart Heating and Cooling devices.
- Smart Health and Fitness devices.