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: _____Saeeda naz_____ Student ID#:____14332_____

Class and Section:___BS(cs) 5th semester_____

Q1: Provide the names of 4 challenges that exist in Adhoc Networks. (4)

ANSWER: The main four challanges exist in adhoc are as follow:

Infrastructure-less design: Infrastructure-less design adds difficulty in fault detection and management

Dynamic topology: Dynamic topology results in route changes and packet loss

Scalability: Scalability is still unsolved, challenges include addressing, routing, configuration management, interoperability, etc.

Varied link/node capabilities: Varied link/node capabilities cause variable processing capabilities

Energy constraints: Energy constraints limit processing power; ad-hoc networks rely on each node being a "router"

Q2: How the nodes in the Adhoc Network know about the changing network topology. (2)

ANSWER:

Nodes are not familiar with the topology of their networks therefore have to discover it as follow:

- A new node announces its presence and listens for announcements broadcast (beacon or "alive" messages) by its neighbors.
- Each node learns about others nearby and how to reach them, and may announce that it too can reach them

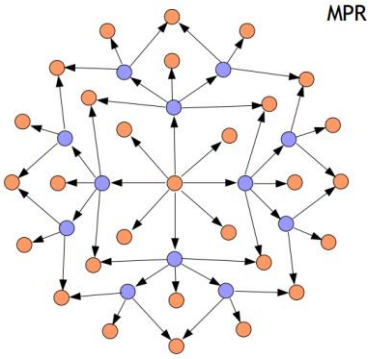
Further, MANET hubs are allowed to move arbitrarily as the system topology changes much of the time .Every hub carry on as a switch as they forward traffic to other determined hub in the system.

Q3: Why is it important to minimize flooding of control packets in Adhoc Networks and how MPR achieves it? (4)

Answer: Minimiza flooding of control packets in Adhoc Networks can prevent the Ad hoc Flooding attack and provide efficient, valid and smooth network communication. MPRs is the set of selected neighbor nodes and it is used to minimize the flooding of broadcast packets in the network by reducing duplicate re-transmission in the same region.

Steps of MPR:

- It expolre the neighbour branches/links.
- Eliminate the repeated nodes t avoid re-transmission.



Therfore, the multipoint relays improve routing performance in two aspects: first it significantly reduces the number of retransmissions in a flooding or broadcast procedure; second it reduces the size of the control packets since OLSR nodes only broadcast its multipoint relay list.

Q4: Explain briefly how Mobile Cloud Computing is different than simple mobile computing and simple cloud computing? (4)

Answer: Mobile Cloud Computing is the Infrastructure where both the data storage and data processing occurred outside of the mobile device. In simple words it relocate the computing power and data storage away from the mobile devices and transfer it to powerful and centralized computing platforms located in clouds,then they can access by wireless connections based on thin native client.

MOBILE CLOUD COMPUTING = MOBILE COMPUTING + CLOUD COMPUTING

However, Simple Mobile computing and simple cloud computing are slightly the same in concept. Mobile computing uses the concept of cloud computing. Cloud

computing provides users the data which they required while in mobile computing, applications run on the remote server and give a user the access for storage and management.

Q5: Explain the term MBaas in your own words? (4)

Answer: MBaas normally refer to Mobile as a service, using as a hosted colud computing architecture for web applications and mobile applications. It provides the ability to developers for model applications cloud storage and APIs. It reduced the requirements of development team to construct complex backend infrastructure. These products are highly scalable as the growth occures the companies/ogernations used MBaas were not need to change their host abilities. MBaas are just like Platform solution as a service(PaaS) however MBaas provide more utilization and native features for mobile devices. The common features provided by MBaas are:

- user management
- push notifications
- social networking integration
- and other features according to mobile users demand.

Q6: Imaging you visit a completely new city. What kind of services a modern LBS can provide you at your location automatically? (6)

Answer:

Whenever we visit a completely new city the kind of services provided by LSB based on our provided location are following:

- Restaurants information
- Filling stations
- ATMs
- Integration of location data into social network services
- Location based mobile gaming
- Travel arrangements

These all services can be provided in response to manual input of our location to track the location of consumer automatically.

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:

Date/Time

- The context used in mobile computing environment regarding time are time of the day, week, month, season, year and time zone.

Environment

- Provide information regarding hardware/software characteristics, network connectivity, communication bandwidth, nearby resources like printer scanners, season/weather, temperature, lightning, location and noise level etc.

Emotional state

- Includes characteristics, phycology, habits, history, etc.

Focus of attention

- Focus of attention includes notifications, keywords, deliveries, mobile sensing that can be used by context aware application.

Orientation

- Orientation events provide access to the device's current position, built-in accelerometer, gyroscope, and compass in mobile devices.

User preferences

- Settings for color, font type, font size, focus cursor, brightness, general settings, privacy settings etc. can be used by context aware applications in mobile computing environment.

Calendar (events)

- Contain User's time schedule information based on events and time e.g. a user is schedule to attend meeting, events, parties, assignment, and different reminders include birthdays, festival, holidays etc.

Browsing history

- Mobile computing environment enable us to personalize web search using browsing history, domain knowledge, user accounts and passwords.

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

Answer: An Efficient energy is required in Bluetooth and ZIgbee technologies because traditional they are connection oriented. When a device is connected, a link is maintained, even if there is no data flowing occurred.

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)

Answer:

Answer: Yes we can use the passive ones, Passive RFID transponders receive their energy for the data transmission merely from the electromagnetic field of the RFID-writer-reader. These tags are used to received and transmitted by a RFID tag with following information:

- It recognized the system data and store it. Hence they trigger exercises.
- Gathering device passes on and get radio signs.

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

Answer: Different type of wearable computing devices are used to play computer gaming. Such as Myo. Headphones, wearable cameras etc. Myo is wear on arm, that control actions with gestures and allows user to take control of phone, PC, laptop or other device with a simple flick of the wrist. We can use the wearable computer camera to enhance the visualization of game environment of figures. We can use the wearable sensors to sense the pressure and give input to online computing game. These can also detect the direction and location of players in game. Gestures can also used to input. Wearable computing make surety to perform well and won the game.

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

Internet of things(IoT) through which we can control all appliances at one point, we can also use Zigbee module to control all home appliances wirellessly like AC, lights, curtons, electer heater, fans, refrigerators, water pump motor, genrators/ ups etc. Blootooth can also be used to control different devices at home lies in specific range. The appliances at home can be activated/ON only when they are required. Curtons can be closed automatically when the sun light appears, the Ac can be ON when the temperature of room is higher than specific range, the heater can be ON when the room temperature is lower than the specific range. The lights can be ON only when the sensor senses a person inside room, the water motor can be start if the water at tank can reach the lowest point where the sensor is inserted and so on…therefore By installing these technologies at home, we can reduced the power consumption. These technologies have Simple Design and have low costs.

We can also insert the piezoelectric sensors on the floor to make it Smart Floor so that it can detect the pressure on floor, smart toilet can also be design that urinary salts and sends the results to a computer through LAN and ECG Chair. These smart homes are generally design for high age people like above 75 years.