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.

Deadline: - Mentioned on SIC   **Marks: - 50**

Program: - BS (CS), BS-SE   **Dated: 24 June 2020**

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Class and Section: semester 8th   section 'B'

Q1: Provide the names of 4 challenges that exist in Adhoc Networks.   (4)
Answer:
1. **Infrastructure-less design** adds difficulty in fault detection and management
2. **Dynamic topology** results in route changes and packet loss
3. **Scalability** is still unsolved; challenges include addressing, routing, configuration management, interoperability, etc.
4. **Varied link/node capabilities** cause variable processing capabilities

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

> **Ad hoc network** 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.

Q3: Why is it important to minimize flooding of control packets in Adhoc Networks and how MPR achieves it?   (4)
Answer:
.   In an Optimized Link State Routing (OLSR)-based mobile wireless network, optimizing the flooding of broadcast messages is a challenging task due to node's mobility and bandwidth resource consumption. To complement existing solutions to this problem, the Multi-Point Relays (MPR) selection has recently been advocated as a promising technique that has an additional feature of reducing the number of redundant re-transmission occurring in the network.
So, Multipoint Relay minimizes the flooding of broadcast packets in the network by reducing duplicate Re transmission in the same region.

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

Answer:

- **Mobile Computing** is using a computer (of one kind or another) while on the move
  Cloud computing is a model for enabling available, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.
  Mobile Cloud Computing (MCC)
  Infrastructure where both the data storage and data processing happen outside of the mobile device
  Mobile Cloud Computing (MCC) is the combination of cloud computing and mobile computing to bring rich computational resources to mobile users, network operators, as well as cloud computing providers.
- MCC allows for dynamic provisioning
    - Resources always available; no need for reservation
    - Mobile applications can be scaled to meet user demands
    - Services can be added and expanded easily
    - Multiple services can be integrated through cloud

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

Answer:

- Provide web and mobile app developers with a way to connect their applications to backend cloud storage and processing while also providing common features such as user management, push notifications, social networking integration, and other features that mobile users demand from their apps these days
  Example: amazon web service, firebase, back4app
  Choosing a MBaaS: Ease of Use (Parse, Back4app), Automated updates (Firebase), Analytics (User data, Crashes), Authentication (including social media integration)
  App/Database management, Push notifications, Cloud code, background jobs
  System emails (password reset, verification), Variety of APIs (iOS, Android, REST)

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

Answer:

Location based service (LBS) can provide the following services to us:

- recommending social events in a city
- requesting the nearest business or service, such as an ATM, restaurant or a retail store
- turn-by-turn navigation to any address
- assistive healthcare systems
- locating people on a map displayed on the mobile phone
- receiving alerts, such as notification of a sale on gas or warning of a traffic jam
- location-based mobile advertising
- asset recovery combined with active RF to find, for example, stolen assets in containers where GPS would not work
- contextualizing learning and research

- Games where your location is part of the game play, for example your movements during your day make your avatar move in the game or your position unlocks content.
- Real-time Q&A revolving around restaurants, services, and other venues.
- sending a mobile caller's location during an emergency call using Advanced Mobile Location

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
Context date and time should be use by the user they are automatically update on the bases of GMT where they are located in different countries they have different time

Environment
Environment is dependent on technology for activity logs in mobile computing environment changes without user intervention

Emotional state
Emotions in general can overwhelm the human body which responds through various signals that are manifested in physical and physiological forms

Focus of attention
This context we should need to provide and renew the old version with latest update version to remove unlike features or make them more efficient in the application

Orientation
This context focus on the movement of the phones like screen rotation

User preferences
This context should be used to save data

Calendar (events)
This context is used by mobile app even for events

Browsing history
This context is used in recent information to save important websites

Q8: Explain why energy efficiency is important in technologies like Bluetooth and ZigBEE? (4)
Answer:
Ultra low power communication mechanisms are essential for future Internet of Things deployments. Bluetooth Low Energy (BLE) is one promising candidate for such deployments. We study the energy consumption of BLE by measuring real devices with a power monitor and derive models of the basic energy consumption behavior observed from the measurement results. We investigate also the overhead of Ipv6-based communication over BLE, which is relevant for future IoT scenarios. We contrast our results by performing similar measurements with ZigBee/802.15.4 devices. Our results show that when compared to ZigBee, BLE is indeed very energy efficient in terms of number of bytes transferred per Joule spent. In addition, IPv6 communication energy overhead remains reasonable. We also point out a few specific limitations with current stack implementations and explain that removing those limitations could improve energy utility significantly.

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:

We use RFID technology at INU on a daily basis when present on the campus. Firstly when we enter the campus we swipe the RFID card at the entrance to confirm our identity then when we attend the class so the teacher take attendance by RFID. Similarly when we want to check I-wiz machine we also swipe our RFID card their also.

Secondly we use a passive tag for our RFID because it relies on the RFID reader's propagation signal to power the tag.

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

Wearable computing is employed in computer gaming for example:

- Cybershoes VR Accessory Lets You Walk Through Your Favorite Virtual Reality Game
- Razer Nari Ultimate Gaming Headset with Haptics Feedback Will Let You Feel the Groove
- Acer Introduces OJO 500 Detachable Windows Mixed Reality Headset
- HP's New Gaming Headset Cools You Down

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

Smart home is a residential-based platform which must have the following facilities and technologies:

- Internet of thing (IoT)
- Computer technology
- Control technology
- Image display technology
- Communication technology
- Etc.

To connect various facilities through the network to meet the automation requirements of the entire system and provide more convenient control and management.

Also have the following sensors: smart floors, smart toilet, ball body check, full body sensor, ECG chair, Piezoelectric transducer, sleep studies, medication reminder and many more.