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M.Sc TE 1st Semester 4 March 2019 (Afternoon)

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
Department of Computer Science and Engineering (CSE)

MID SEMESTER EXAMINATION **WINTER SEMESTER, 2018-2019**

DURATION: 1 Hour 30 Minutes **FULL MARKS: 75**

CSE 6197: Parallel and Distributed Computing

Programmable calculators are not allowed. Do not write anything on the question paper.

There are **4 (four)** questions. Answer any **3 (three)** of them.

Figures in the right margin indicate marks.

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1. a) Transparency is an important aspect of distributed systems. However, sometimes it is not feasible to hide transparency in a system. Show how transparency or hiding distribution is not applicable for the following cases: 5×3
   i. A wide- area distributed system that connects two processes in geographically far places.
   ii. Distributed systems for devices that people carry around. [e.g. cellphones]
   iii. A case where there has to be several replicas of the same data.

   b) Consider a Body Area Network (BAN) with two possible configurations. For the first configuration, there is a central hub that collects data as needed and does periodic updates as necessary. The other configuration guarantees a continuous wireless connection to a data server. What are the advantages and disadvantages of both of these configurations ? 10

2. a) With the help of figures show how the Beowulf clusters are a typical example of cluster computing systems. Also briefly describe the functionalities of each of the nodes in the cluster and also how jobs are handled. 15

   b) Write short notes on the following: 2×5
   i. Centralized architecture
   ii. Object based Architectural Style

3. a) Using the figure that shows the simplified organization of an internet search engine, explain application layering. 12

   b) With the help of figures show the two extremes that exist in the organization of sensor networks as distributed databases. 7

   c) How can you reduce the overall communication in asynchronous communications between server and client? Use the example of checking forms in both the server and the client side to explain this concept. 6

4 a) What is a TP monitor? With the help of figures explain the functionality of a TP monitor in distributed systems. 8

   b) Consider a website that lets its users book trips to various destinations around the world. The system has two subsystems, a hotel booking subsystem and airline ticket booking subsystem. Since, the entire trip booking has to be a transaction, the entire trip has to be booked entirely or not at all. This leads to a problem in the sub-transactions. What is that problem and what property of transactions is violated in the sub-transactions? 10

   c) Consider a case where there is a server that contains the medical records of all the employees of an organization. What are the problems of replicating this information in multiple servers? What are the problems of having centralized algorithms? 3+4