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**University Examinations 2016/2017**

FOURTH YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF

BACHELOR OF SCIENCE IN COMPUTER TECHNOLOGY

**CIC 3425: CLIENT/SERVER SYSTEMS AND COMPUTING**

**DATE: DECEMBER 2016 TIME: 2 HOURS**

**INSTRUCTIONS:** *Answer question* ***one*** *and any other* ***two***questions.

**QUESTION ONE (30 MARKS)**

1. Briefly describe the following concepts as used with client/server systems
2. Smart client
3. Partitioning
4. Replication
5. Transparency
6. Fault tolerance (10 marks)
7. Describe the driving force behind the implementation of client/server systems (4 marks)
8. Distinguish between the following client/server computing concepts
9. Stateful server and stateless server
10. Cloud computing and grid computing
11. Synchronous communication and asynchronous communication (6 marks)
12. During connection-oriented communication using TCP, the client and server must create a logical connection before communication, use this connection and terminate the connection. Assuming a case where a client has two requests to send to the server, and each request will require a reply
13. Give the sockets interface necessary to create the server and client instances of this communication (4 marks)
14. Using a diagram, describe the sequence of socket functions required to ensure complete communication in this case (6 marks)

**QUESTION TWO (20 MARKS)**

1. With the help of a diagram in each case, describe the three types of client server/systems

(9 marks)

1. Database systems are a classical example of an environment where client/server computing is applied. Using appropriate examples to illustrate
2. Describe the database architecture (6 marks)
3. Describe how the database architecture conforms to the client/server architecture

(3 marks)

1. Outline two roles played by the server in client/server computing (2 marks)

**QUESTION THREE (20 MARKS)**

1. Describe the five main computing environments where client/server architecture is used, giving the unique characteristic of each. (10 marks)
2. Uniform semantics and Marchalling of arguments are key design issues in RPC based client/server systems
3. Describe why uniformity of semantics is a concern (2 marks)
4. Define marchalling of arguments (2 marks)
5. Describe two options for passing arguments in RPC implementation (4 marks)
6. Differentiate between mainframe architecture and standalone architecture (2 marks)

**QUESTION FOUR (20 MARKS)**

1. With the help of a diagram, describe the Remote Procedure Call (RPC) model for communication in client server systems (10 marks)
2. In the client server system, the client may be thin or fat. Describe these tow client implementations giving one advantage and one disadvantage for each (6 marks)
3. Describe the Remote method invocation(RMI) API for client/server computing and give two method used for reliable communication (4 marks)

**QUESTION FIVE (20 MARKS)**

1. Client server system is both a software engineering architecture and a networking architecture. Using an appropriate example to illustrate, describe the two perspectives of client/server systems and give the difference between them (6 marks)
2. With the help of a diagram, describe the cloud computing architecture (10 marks)
3. Describe two challenges faced in the implementation of client/server systems (4 marks)