

APJ Abdul Kalam Technological University
Second Semester M.Tech Degree Examination May 2016
Ernakulam II Cluster

COMPUTER SCIENCE AND ENGINEERING

Specialization: COMPUTER SCIENCE AND ENGINEERING

05CS 6002 - MODERN DATABASES

Time : 3 hrs

Max. Marks: 60

I. a) Write a DTD for bank.xml satisfying the following requirements: (6 marks)

- There are two account types: checking and savings accounts
- The account id is unique in 'accounts'
- The customer id is unique in 'customers'
- 'c_id' refers to customers and 'ac_id' refers to accounts
- The account balance must be greater than -5000
- Use inheritance for checking and savings accounts by deriving from a common account type

bank.xml

```
<bank>
  <accounts>
    <savings_accounts>
      <savings_account id="a1" interest="0.03">
        <balance>2500</balance>
      </savings_account>
      <savings_account id="a2" interest="0.03">
        <balance>15075</balance>
      </savings_account>
    </savings_accounts>
    <checking_accounts>
      <checking_account id="a3">
        <balance>4025</balance>
      </checking_account>
      <checking_account id="a4">
        <balance>-125</balance>
      </checking_account>
      <checking_account id="a5">
```

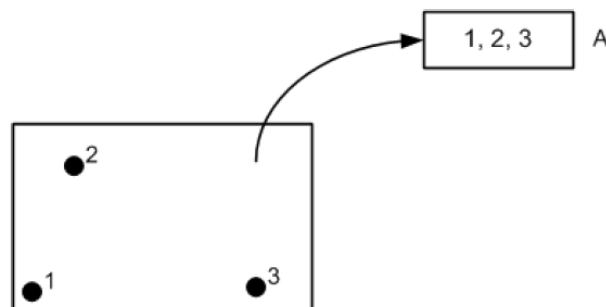
```

        <balance>325</balance>
    </checking_account>
</checking_accounts>
</accounts>
<customers>
    <customer id="c1">
        <name>Ben Richerdson</name>
        <address>Park Drive 2</address>
    </customer>
    <customer id="c2">
        <name>Marc Wretcher</name>
        <address>Mill Drive 75</address>
    </customer>
    <customer id="c3">
        <name>Angel Steady</name>
        <address>Lake Sight 15</address>
    </customer>
</customers>
<customer_accounts>
    <customer_account c_id="c1" ac_id="a2"/>
    <customer_account c_id="c1" ac_id="a3"/>
    <customer_account c_id="c2" ac_id="a4"/>
    <customer_account c_id="c3" ac_id="a1"/>
    <customer_account c_id="c3" ac_id="a5"/>
</customer_accounts>
</bank>

```

b) Highlight the architecture description of SQLite (6 marks)

II. a) Consider the following Grid file instance: (5 marks)



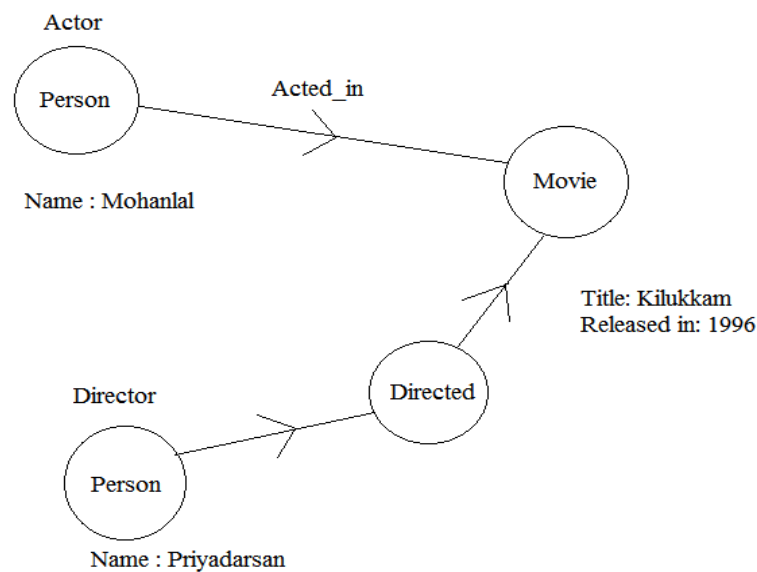
Show the Grid file after inserting each of these points in the order they are listed: 6, 9, 10, 7, 8, 4, 5. Assume that the capacity of a data page is three points.

b) Explain types of fragmentation and replication? (7 marks)

- III. a) Present architecture and data management with DynamoDB (9 marks)
- b) Illustrate the architecture of HBase and explain the communication flow? (9 marks)

OR

- IV. a) What are the advantages of column stores. With an example demonstrate the use of super column. Describe the use of time stamps in Cassandra (8 marks)
- b) Explain about architecture and data management with Hbase. (10 marks)
- V. a) For the Neo4J graphdatabase with the following structure, write Cypher queries for the following.



- i. List the movies directed by Priyadarsan (8 marks)
- ii. List person names along with the movie names they have acted_in
- b) What is Neo4j? Write its advantages. (4 marks)
- c) With an example describe MATCH clause in Cypher query (6 marks)

OR

- VI. a) What is Location dependent query ? How it is executed in a mobile environment (8 marks)
- b) What are the two schemes used in a mobile database system during transaction processing to maintain the link when the MU crosses the current cell boundary and enter a different cell? (6 marks)
- Draw the figure to depict the two schemes.
- c) What are the different types of processing nodes in a mobile database system? Identify the nodes that can serve as a coordinator? If not, specify the reason. (4 marks)