I590 SQL AND NOSQL

Fall Semester 2019

MIDTERM EXAM

1) Multiple choice questions:

i) NoSQL databases are used mainly for handling large volumes of _____ data.

a) Unstructured
b) Structured
c) Semi-structured
d) All of the mentioned

ii) The _____ operation, denoted by −, allows us to find tuples that are in one relation but are not in another.

a) Union
b) Set-difference
c) Difference
d) Intersection

iii) In which of the following can many entity instances of one type be related to many entity instances of another type?

a) One-to-One Relationship
b) One-to-Many Relationship
c) Many-to-Many Relationship
d) Composite Relationship

iv) Relational Algebra does not have

a) Selection operator
b) Projection operator
c) Aggregation operators
d) Division operator

v) Normal form which only includes indivisible values or single atomic values is classified as

a) Third normal form
b) First normal form
c) Second normal form
d) Fourth normal form

vi) Which of the SQL statements is correct?

a) SELECT Username AND Password FROM Users
b) SELECT Username, Password FROM Users
c) SELECT Username, Password WHERE Username = 'user1'
d) None of these

vii) A UNION query is which of the following?

a) Combines the output from no more than two queries and must include the same number of columns.
b) Combines the output from no more than two queries and does not include the same number of columns.
c) Combines the output from multiple queries and must include the same number of columns.
d) Combines the output from multiple queries and does not include the same number of columns.

viii) Disadvantages of DTD are
(i) DTDs are not extensible
(ii)DTDs are not in to support for namespaces
(iii)There is no provision for inheritance from one DTDs to another

a) (i) is correct
b) (i),(ii) are correct
c) (ii),(iii) are correct
d) (i),(ii),(iii) are correct

ix) Which of the following XML documents are well-formed?
a) <firstElement>some text goes here
<secondElement>another text goes here</secondElement>
</firstElement>
b) <firstElement>some text goes here</firstElement>
<secondElement> another text goes here</secondElement>
c) <firstElement>some text goes here
<secondElement> another text goes here</firstElement>
</secondElement>
d) </firstElement>some text goes here
</secondElement>another text goes here
<firstElement>

x) Why do we use exist method in Xquery?
a) To determine if the XML data contains a certain node
b) To examine the XML and return back a scalar value
c) To Shred the XML nodes of the XML data into relational columns
d) To search inside xml data types

2) Consider the following two tables:
Table Name: Employee
Attributes: Employee_id, First_name, Last_name, Salary, Joining_date, Department

Table Name: Incentives
Attributes: Employee_id, Incentive_date, Incentive_amount

Write SQLs for the following scenarios:
a) Get First_Name from employee table in upper case
b) Get unique DEPARTMENT from employee table
c) Select first 3 characters of FIRST_NAME from EMPLOYEE
d) Get length of FIRST_NAME from employee table
e) Get FIRST_NAME, Joining year, Joining Month and Joining Date from employee table
f) Get all employee details from the employee table order by First_Name Ascending and Salary descending
g) Get employee details from employee table whose employee name are not “John” and “Roy”
h) Get employee details from employee table whose Salary between 500000 and 800000
i) Get employee details from employee table whose joining month is “January”
j) Get department, total salary with respect to a department from employee table order by total salary descending

3) Write the DTD for the following xml file:

```
<?xml version="1.0"?>
<!DOCTYPE DatabaseInventory SYSTEM "DatabaseInventory.dtd">

<DatabaseInventory>

  <DatabaseName>
    <GlobalDatabaseName>production.iDevelopment.info</GlobalDatabaseName>
    <OracleSID>production</OracleSID>
    <DatabaseDomain>iDevelopment.info</DatabaseDomain>
    <Administrator EmailAlias="jhunter" Extension="6007">Jeffrey Hunter</Administrator>
    <DatabaseAttributes Type="Production" Version="9i"/>
    <Comments>
      The following database should be considered the most stable for
      up-to-date data. The backup strategy includes running the database
      in Archive Log Mode and performing nightly backups. All new accounts
      need to be approved by the DBA Group before being created.
    </Comments>
  </DatabaseName>

  <DatabaseName>
    <GlobalDatabaseName>development.iDevelopment.info</GlobalDatabaseName>
    <OracleSID>development</OracleSID>
    <DatabaseDomain>iDevelopment.info</DatabaseDomain>
    <Administrator EmailAlias="jhunter" Extension="6007">Jeffrey Hunter</Administrator>
    <Administrator EmailAlias="mhunter" Extension="6008">Melody Hunter</Administrator>
    <DatabaseAttributes Type="Development" Version="9i"/>
    <Comments>
      The following database should contain all hosted applications. Production
      data will be exported on a weekly basis to ensure all development environments
      have stable and current data.
    </Comments>
  </DatabaseName>

  <DatabaseName>
    <GlobalDatabaseName>testing.iDevelopment.info</GlobalDatabaseName>
    <OracleSID>testing</OracleSID>
    <DatabaseDomain>iDevelopment.info</DatabaseDomain>
    <Administrator EmailAlias="jhunter" Extension="6007">Jeffrey Hunter</Administrator>
    <Administrator EmailAlias="mhunter" Extension="6008">Melody Hunter</Administrator>
    <Administrator EmailAlias="ahunter">Alex Hunter</Administrator>
    <DatabaseAttributes Type="Testing" Version="9i"/>
    <Comments>
      The following database will host more than half of the testing
      for our hosting environment.
    </Comments>
  </DatabaseName>

</DatabaseInventory>
```

4) Write XML schema for the following XML file:

```xml
<?xml version="1.0"?>
<x:books xmlns:x="urn:books">
   <book id="bk001">
      <author>Writer</author>
      <title>The First Book</title>
      <genre>Fiction</genre>
      <price>44.95</price>
      <pub_date>2000-10-01</pub_date>
      <review>An amazing story of nothing.</review>
   </book>

   <book id="bk002">
      <author>Poet</author>
      <title>The Poet's First Poem</title>
      <genre>Poem</genre>
      <price>24.95</price>
      <review>Least poetic poems.</review>
   </book>
</x:books>
```

5) Write XML tree for the following XML file:

```xml
<?xml version="1.0" encoding="UTF-8"?>
<bookstore>
  <book category="cooking">
    <title lang="en">Everyday Italian</title>
    <author>Giada De Laurentiis</author>
    <year>2005</year>
    <price>30.00</price>
  </book>
  <book category="children">
    <title lang="en">Harry Potter</title>
    <author>J K. Rowling</author>
    <year>2005</year>
    <price>29.99</price>
  </book>
  <book category="web">
    <title lang="en">Learning XML</title>
    <author>Erik T. Ray</author>
    <year>2003</year>
    <price>39.95</price>
  </book>
</bookstore>
```

6) For the xml below, answer the questions:

```xml
<?xml version="1.0" encoding="UTF-8"?>

<bookstore>

<book category="cooking">
  <title lang="en">Everyday Italian</title>
  <author>Giada De Laurentiis</author>
  <year>2005</year>
  <price>30.00</price>
</book>

<book category="children">
  <title lang="en">Harry Potter</title>
  <author>J K. Rowling</author>
  <year>2005</year>
  <price>29.99</price>
</book>

<book category="web">
  <title lang="en">XQuery Kick Start</title>
  <author>James McGovern</author>
  <author>Per Bothner</author>
  <author>Kurt Cagle</author>
  <author>James Linn</author>
  <author>Vaidyanathan Nagarajan</author>
  <year>2003</year>
  <price>49.99</price>
</book>

<book category="web">
  <title lang="en">Learning XML</title>
  <author>Erik T. Ray</author>
  <year>2003</year>
  <price>39.95</price>
</book>

</bookstore>
```

Write XPaths for the following scenarios:

a) Select the first book element that is the child of the bookstore element
b) Selects the last but one book element that is the child of the bookstore element
c) Select the first two book elements that are children of the bookstore element
d) Select all the title elements that have a "lang" attribute with a value of "en"
e) Select all the title elements of the book elements of the bookstore element that have a price element with a value greater than 35.00

7) General SQL and NoSQL questions:

   a) What is the difference between JOIN and UNION?

   b) What are aggregate and scalar functions? Give some examples

   c) What is the difference between NoSQL & Mysql DBs'?

   d) When should a NoSQL database be used instead of a relational database?