UNIVERSITY OF WESTMINSTER

ELECTRONICS AND COMPUTER SCIENCE

2013-2014

Code: EBSY505

Title: Database Design and Practice 1

Date: 30 April 2014

Time: 10:00

Duration: 2 Hours

Module Leader: Francois ROUBERT

INSTRUCTIONS TO CANDIDATES

This paper contains 2 sections.

SECTION 1 IS COMPULSORY, ANSWER ALL QUESTIONS

SECTION 2 IS COMPULSORY, ANSWER ALL QUESTIONS

SECTION 1: CARRIES 75 MARKS

SECTION 2: CARRIES 25 MARKS

SECTION 1: [75 marks]

APPTARTICA is a network of companies which are specialised in the development of smart phone apps. They employ a certain number of members of staff – developers, managers and project managers – who work on development projects to design and create innovative apps for the smart phone market, as commissioned by a variety of clients.

APPTARTICA is seeking to design and develop a database-driven project management system to be used internally by the various members of staff to help them organise the app development process more efficiently. They should be able to use the system to search and view information about the companies involved in the network, the employees who work in these companies, the various development projects undertaken by APPTARTICA, the clients who commission these projects and the apps that are built as the result of these projects.

The Conceptual Entity-Relationship Diagram (ERD) for the APPTARTICA project management system is given in Appendix A (page 7). Carefully consider the conceptual ERD on appendix A.

Question 1

(a) Write three system requirements to allow the viewing of available members of staff working in a specific company.

[3 Marks]

(b) Explain which part of the conceptual ERD supports the design of the data needs for this requirement.

[2 Marks]

(c) Write three system requirements to allow the viewing of the apps produced as the result of a specific project.

[3 Marks]

(d) Explain which part of the conceptual ERD supports the design of the data needs for this requirement.

[2 Marks]

Question 2

(a) Explain in detail the multiplicity of the relationship *'is allocated to'* (between the entities Staff and Project).

[8 Marks]

(b) Explain how you would map the relationship *'is allocated to'* to a Logical ERD. Provide a diagram to support your answer.

[8 Marks]

Question 3

(a) Explain in detail the multiplicity of the relationship '*produces'* (between the entities Project and App).

[8 Marks]

(b) Explain how you would map the relationship '*produces'* to a Logical ERD. Provide a diagram to support your answer.

[8 Marks]

Question 4

(a) Explain what the '*agrees'* relationship between the entities Company, Project and Client is and what it is used for.

[2 Marks]

(b) Explain in detail the multiplicity of the relationship '*agrees'* (between the entities Company, Project and Client).

[6 Marks]

(c) Explain how you would map the relationship '*agrees'* to a Logical ERD. Provide a diagram to support your answer.

[8 Marks]

Question 5

(a) Explain what the connection is between the entity App and the entities Game, News and Entertainment, how it works and what the value of using this modelling technique is.

[7 Marks]

(b) Explain how you would map the relationship between the entity App and the entities Game, News and Entertainment to a Logical ERD. Provide a diagram to support your answer.

[10 Marks]

SECTION 2: [25 marks]

Consider the Conceptual Entity-Relationship Diagram (ERD) for the APPTARTICA project management system which is given in Appendix A (page 7).

For each of the questions below, select the SQL query which best represents the statement given in English. Clearly **write your answer a), b), c), d) or e) on your examination answer booklet** for every question.

Question 6

Display a list of companies and cities that host these companies for companies in the following cities: London, Bath, Hull. Order the results in alphabetic order for the company name and rename the headers of the resulting fields as Company and City.

a)
```
SELECT companyName as "Company", companyCity as "City"
FROM Company
WHERE (companyCity = 'London' AND companyCity = 'Bath') OR companyCity = 'Hull'
ORDER BY companyName;
```

b)
```
SELECT companyName as "Company", companyCity as "City"
FROM Company
WHERE companyCity = 'London' AND companyCity = 'Bath' AND companyCity = 'Hull'
ORDER BY companyName;
```

c)
```
SELECT companyName as "Company", companyCity as "City"
FROM Company
WHERE companyCity IN (London, Bath, Hull)
ORDER BY companyName;
```

d)
```
SELECT companyName as "Company", companyCity as "City"
FROM Company
WHERE companyCity = 'London' OR companyCity = 'Bath' OR companyCity = 'Hull'
ORDER BY companyName;
```

e)
```
SELECT companyName as "Company", companyCity as "City"
FROM Company
WHERE companyCity = ('London', 'Bath', 'Hull')
ORDER BY companyName;
```

[5 Marks]

Question 7

Display a list of company names, addresses and cities for those companies located on a High Street in London.

a)
```
SELECT companyName, companyAddress, companyCity
FROM Company
WHERE companyTown LIKE '%London%'
AND companyAddress LIKE '%High%';
```

b)
```
SELECT companyName, companyAddress, companyCity
FROM Company
WHERE companyCity = 'London'
AND companyAddress LIKE '%High%';
```

c)
```
SELECT companyName, companyAddress, companyCity
FROM Company
WHERE companyCity = 'London'
OR companyAddress LIKE '%High%';
```

d)
```
SELECT companyName, companyAddress, companyCity
FROM Company
WHERE companyCity = 'London'
AND companyStreet LIKE '%High%';
```

e)
```
SELECT companyName, companyAddress, companyCity
FROM Company
WHERE companyCity LIKE '_London_'
AND companyAddress = 'High';
```

[5 Marks]

Question 8

Display a list of staff full names and salaries for the employees who were hired in 2007 as well as for the employees for whom the surname has the letter 'a' as the one before last. Order the result in alphabetic order for the name of the staff.

a)
```
SELECT staffFName, staffSName, staffSalary
FROM Staff
WHERE staffSName LIKE '%a_'
OR staffStartDate = '2007'
ORDER BY staffSName;
```

b)
```
SELECT staffFName, staffSName, staffSalary
FROM Staff
WHERE staffSName LIKE '_a_'
AND staffStartDate LIKE '%007'
ORDER BY staffSName;
```

c)
```
SELECT staffFName, staffSName, staffSalary
FROM Staff
WHERE staffSName LIKE '%a_'
OR staffStartDate >= '01-JAN-2007'
ORDER BY staffSName;
```

d)
```
SELECT staffFName, staffSName, staffSalary
FROM Staff
WHERE staffSName LIKE '%a_'
OR staffStartDate LIKE '%007'
ORDER BY staffSName;
```

e)
```
SELECT staffFName, staffSName, staffSalary
FROM Staff
WHERE staffSName LIKE '%a_'
AND staffStartDate LIKE '%007'
ORDER BY staffSName;
```

[5 Marks]

Question 9

Display the details of the staff who speak French as well as the details of the staff hired after the 2/11/2013 who earn less than £32000. For each selected staff, display the surname, salary, skills, and starting date.

a)
```
SELECT staffSName, staffSalary, staffSkills, staffStartDate
FROM Staff
WHERE staffSkills LIKE '%French%'
OR staffSalary < 32000
AND staffStartDate >= '02-NOV-2013';
```

b)
```
SELECT staffSName, staffSalary, staffSkills, staffStartDate
FROM Staff
WHERE staffSkills LIKE '%French%'
AND staffSalary < 32000
AND staffStartDate >= '02-NOV-2013';
```

c)
```
SELECT staffSName, staffSalary, staffSkills, staffStartDate
FROM Staff
WHERE (staffSkills LIKE '%French%'
OR staffSalary < 32000)
AND staffStartDate >= '02-NOV-2013';
```

d)
```
SELECT staffSName, staffSalary, staffSkills, staffStartDate
FROM Staff
WHERE staffSkills LIKE '%French%'
OR staffSalary < 32000
OR staffStartDate >= '02-NOV-2013';
```

e)
```
SELECT staffSName, staffSalary, staffSkills, staffStartDate
FROM Staff
WHERE staffSkills LIKE '%French%'
AND (staffSalary < 32000
OR staffStartDate >= '02-NOV-2013');
```

[5 Marks]

Question 10

Display a list of staff full names, salaries and company names for those staff who work in companies located in Brighton.

a)
```
SELECT S.staffFName, S.staffSName, C.companyName
FROM Company C JOIN Staff S
ON C.staffNo = S.staffNo
AND C.companyCity= 'Brighton';
```

b)
```
SELECT S.staffFName, S.staffSName, C.companyName
FROM Company C JOIN Staff S
ON C.companyNo = S.staffNo
AND C.companyCity= 'Brighton';
```

c)
```
SELECT S.staffFName, S.staffSName, C.companyName
FROM Company C JOIN Staff S
ON C.companyNo = S.companyNo
AND C.companyCity= 'Brighton';
```

d)
```
SELECT S.staffFName, S.staffSName, C.companyName
FROM Company C JOIN Staff S
ON C.staffNo = S.companyNo
AND C.companyCity= 'Brighton';
```

e)
```
SELECT S.staffFName, S.staffSName, C.companyName
FROM Company C JOIN Staff S
ON C.companyName = S.companyName
AND C.companyCity= 'Brighton';
```

[5 Marks]