Student Name: Joe Kirkup Student Number: 29026253

TASK 2 (REFERRAL)
(Weight: 40% OF THE OVERALL MODULE GRADE)

55-500998 DATABASE SYSTEMS FOR SOFTWARE APPLICATIONS
Module Leader: Kostas Domdouzis
Academic Year 2020/21

SUBMISSION DATE: 8 JULY 2021 (by 15:00pm)
Submission Type: ELECTRONIC (through BLACKBOARD)

•TASK 1 – Normalize the following table using the three Rules of Normalization and showing each of the three stages of their implementation. (Weight: 12.5% of the Assignment)

SESSION ID	2224	**COURSE NO**	257
NAME	Databases	**COURSE NAME**	Computing's Fun
INSTR NAME	R. Edelweiss	**COURSE AUTHOR**	C. Dale
INSTR ID	A34		
HOTEL	London Hilton		
SESSION DATE	25 October 2020		
Attendee Details			
Name	**Address**	**Telephone**	**Paid**
P. Jones	17 River View	061-1624-1212	
J. Lomas	2 Main Street	081-1212-4723	✓
P. Thomson	6 Abbey Avenue	086-2333-4769	✓
A. Simons	35 Ecclesfield Road	061-1600-1000	
H. Lexis	100 Wordsworth Avenue	025-1799-2102	✓

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0NF: SessionID, Name, InstrName, InstrID, Hotel, SessionDate, CourseNo, CourseName, CourseAuthor, AttName, AttAddress, AttTelephone, AttPaid

1NF:
(Duplicate Data): SessionID, Name, InstrName, InstrID, Hotel, SessionDate, SessionTime, CourseNo, CourseName, CourseAuthor
(Repeating Attributes): SessionID*, AttName, AttAddress, AttTelephone, AttPaid

2NF:
SessionID*, Name, InstrName*, Hotel, SessionDate, SessionTime, CourseNo*, AttName, AttAddress, AttTelephone, AttPaid
InstrID, InstrName
CourseNo, CourseName, CourseAuthor

3NF:
SessionID*, AttID*, Name, InstrName*, Hotel, CourseNo*, AttPaid, SessionDate, SessionTime
InstrID, InstrName
CourseNo, CourseName, CourseAuthor
AttID, AttName, AttAddress, AttTelephone

•**TASK 2 – Normalize the following table using the three Rules of Normalization and showing each of the three stages of their implementation. (Weight: 12.5% of the Assignment)**

Company Code	Student No	Company Name	Company Specialty	Student Name	Appointment Date/Time	Session Code	Time Alloc.
231	1414	Stevens	Construction	Johnson	12-10-2020 12:00pm	D	50
231	1513	Stevens	Construction	Patel	14-10-2020 13:00pm	B	75
231	1567	Stevens	Construction	Jamal	15-10-2020 13:30pm	F	20
231	2010	Stevens	Construction	Hope	15-10-2020 16:00pm	A	75
456	1414	Vidal	Surveying	Johnson	17-10-2020 08:00am	D	75
456	1567	Vidal	Surveying	Jamal	15-10-2020	F	10

					16:00pm		
456	1785	Vidal	Surveying	Michaels	17-10-2020 08:30am	A	10
363	1863	Matthews	Surveying	Wong	20-01-2020 15:00pm	A	30
363	1975	Matthews	Geotechnics	Holmes	21-02-2020 15:00pm	C	30
356	1414	Parsons	Geotechnics	Jones	22-02-2020 16:00pm	D	10
356	1513	Parsons	Architectural Management	Patel	06-06-2020 13:00pm	B	75
356	1634	Parsons	Architectural Management	Peterson	15-10-2020 16:00pm	C	30
356	2011	Parsons	Architectural Management	Siddiqi	17-10-2020 09:00am	A	30
356	2160	Parsons	Architectural Management	King	20-12-2020 10:00am	A	30

0NF:
CompCode, StudentNo, ApptDT, CompName, CompSpecial, StudentName, SessionCode, TimeAlloc

1NF:
CompCode*, StudentNo, ApptDate, ApptTime, StudentName, SessionCode, TimeAlloc
CompCode, CompName, CompSpecial

2NF:
CompCode*, StudentNo*, ApptDate, ApptTime, SessionCode, TimeAlloc
CompCode, CompName, CompSpecial
StudentNo, StudentName

3NF:
CompCode*, StudentNo*, ApptID*
CompCode, CompName, CompSpecial
StudentNo, StudentName
ApptID, ApptDate, ApptTime, SessionCode, TimeAlloc

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•TASK 3 - Produce an Entity-Relationship Diagram (ERD) for the entire system presented in the following scenario. The ERD will be used by job recruiters in order to show to potential applicants for Amazon posts how the company operates. (45% of the Assignment)

Amazon is a multi-national, Technology & E-Commerce company based on Seattle, State of Washington, United States. The company is responsible for the Amazon website which is a shopping website. A number of different items are sold through the website. When a bargain happens, the buyer needs to submit his/her credit card information together with his/her full name and address so that he/she will be able to receive the item he/she bought.

Amazon has a number of administrators that are responsible for the monitoring of the electronic bargains. There are administrators responsible for the bargain of technological items (eg. laptops, mobile phones, etc.), administrators responsible for the monitoring of bargains related to clothes, administrators responsible for the monitoring of bargains related to gardening items, etc. Every administrator has a specific registration number and a role assigned to him/her.

Administrators are classified based on the geographical area to which they belong. For example, there are the Latin America administrators and these include administrators from each Latin American country. There are the North American administrators and these include administrators only from the United States and Canada. There are the European administrators and these include administrators from each European country, the Asian administrators that include administrators from each Asian country and so on. Administrators of every geographical group may supervise different teams of employees of Amazon. This supervision is realised online and the location of the administrator can be different from the location of the Amazon employees. For example, an administrator from the UK may supervise employees who work as computer programmers in Amazon or they work in Amazon Logistics and they can be based in countries other than the UK, even in different geographical areas. The management of different teams of employees requires the dedication of specific hours from an administrator in the monitoring the employees' activities and the making of decisions from the administrator in relation to these activities. For example, if a computer programmer in Amazon is focused on many different activities, his/her administrator may take the decision to hire more programmers so that the work schedule will become more flexible.

Administrators are supervised by managers. Specifically, the Latin America administrators have one manager, the North American administrators have one manager, the European administrators have one manager and so on. A manager of a group of administrators of a specific geographical area can exchange data with the administrators he/she supervises, monitor their activities on a daily basis and he/she can ask a progress report from his/her team of administrators every six-month. The data exchange between a manager and the administrators (he/she supervises) can take place unlimited times and also the administrators of the same geographical area can exchange data unlimited times with each other. For example, an administrator from Japan can communicate with an administrator from China multiple times as they both belong to the same

geographical area. However, an administrator from Asia can communicate with an administrator from Latin America only twice every year and in order for these two data exchanges to happen, permissions from the managers of the two geographical areas are required. If one of the two managers does not give his/her permission, then the data exchange cannot happen. All the data that are exchanged between managers and administrators or between administrators in any communication are related to the quality of the products, whether their conform to specific standards and whether they pose any health and safety risk for customers.

The manager of each geographical group is required to attend an annual meeting together with the other managers. This meeting takes place in Seattle. During this meeting, the performance of each geographical area is analysed through the presentation of statistical data, suggestions for improvement are made while the annual award of best manager is awarded to the manager who showed more dedication and produced the best results in comparison to the other managers. It is possible that a manager that has won the award for three consecutive years to be promoted and join the senior executive team in Seattle. In this case, he/she will take the place of a senior executive who has either decided to leave the company, has become pensioner or he/she has not shown the required performance in his/her work. In the latter case, the senior executive becomes again manager in the geographical group where his/her country of origin belongs to.

Shown below (next page) is the ERD I have designed as a solution to this problem.

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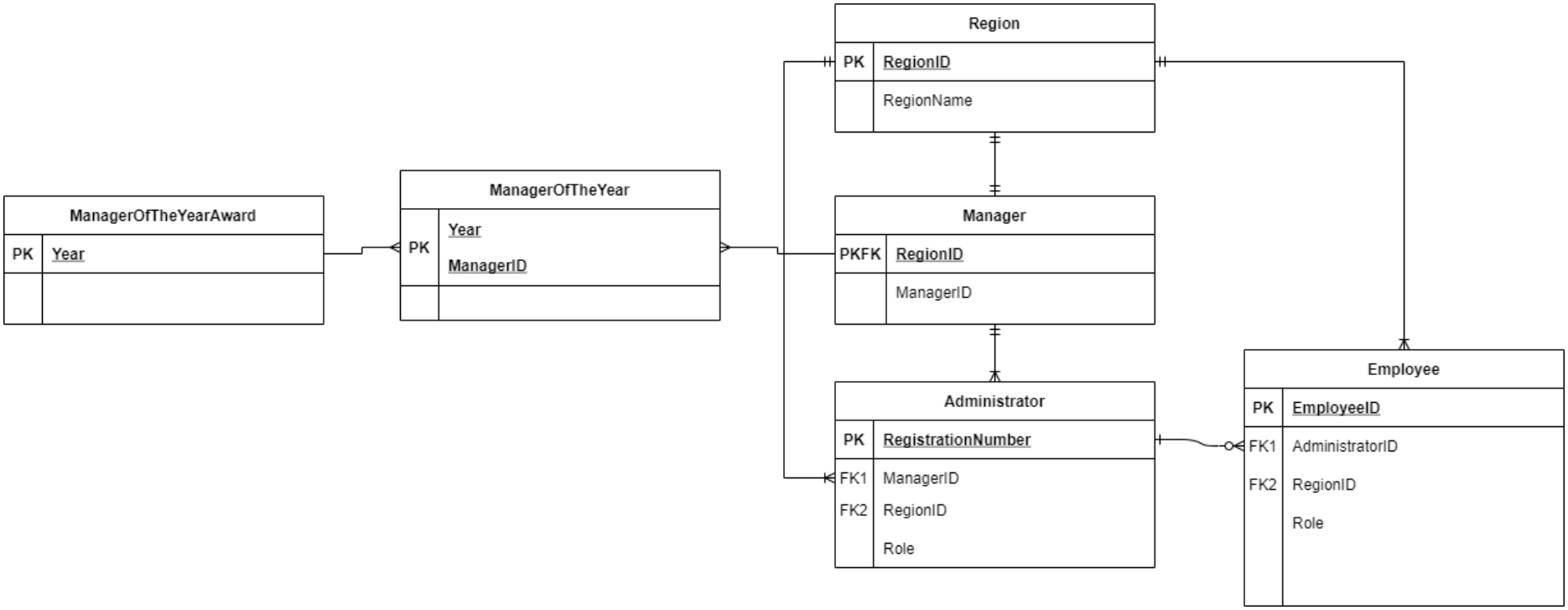

•TASK 4

For each of the following questions, provide one PL/SQL procedure, one function or one cursor that will check the following:

4A) Calculate the total number of administrators that are either from Latin America or North America.
SELECT COUNT(*) FROM ADMINISTRATORS WHERE REGION = 'Latin America' OR REGION = 'North America'
[Weight: 10%]

4B) Calculate the number of Amazon employees who work as computer programmers, they are based in Japan and they are supervised by an administrator from Austria.
SELECT COUNT(*)
FROM Employee E

```
INNER JOIN Region ER
        ON E.RegionID = ER.RegionID
INNER JOIN Administrator A
        ON E.AdministratorID = A.RegistrationNumber
INNER JOIN Region AR
        ON A.RegionID = AR.RegionID
WHERE (E.Role = 'Computer Programmer')
AND (ER.RegionName = 'Japan')
AND (AR.RegionName = 'Austria')
```

[Weight: 10%]

4C) Calculate the number of managers that have won the award of the best manager for three consecutive years but they have not been promoted to senior executives.

```
SELECT COUNT(*)
FROM Manager M
WHERE
```

[Weight: 10%]

LEARNING OUTCOMES

LO Ref	Learning Outcome
1	Design databases for non-complex scenarios using appropriate notations and theories, including underlying set notations.
2	Implement, manipulate and query these databases using standard approaches.
3	Identify and discuss issues relating to databases, such as query optimisation, data integrity, security, reliability, data protection and curation.

MARKING OF THE INDIVIDUAL ASSIGNMENT

TASKS 1 & 2 Marking

Student Name: Joe Kirkup Student Number: 29026253

Tasks 1 & 2 are Normalization exercises that show the level of comprehension by the students of the Normalization Rules. The distribution of the marks for each of Tasks 1 and 2 is the following:

The marker should consider even small things that the student does when he/she normalizes the table and should also consider the overall logic.

	0-19%	20-33%	34-49%	50-59%	60-69%	70-79%	80-89%	90-100%
Tasks 1 & 2 (25% of the Assignment Grade) **Normalization Marking Grid**	Very little or no understanding at all.	Many important attributes missing. Many incorrect relationships as expressed by using keys.	Some important attributes appearing. Some correct dependencies both in terms of logic (that corresponds to the requirements of the given problem). Some correct use of keys.	Most important attributes present. Dependencies mostly correct and corresponding at a substantial degree to the logic of the problem. Most PKs and FKs indicated.	Some minor discrepancies in keys and dependencies.	All attributes and relationships shown correctly and supported by all correct PKs and FKs.	A 'perfect' Normalization solution with exactly the correct attributes; primary and foreign keys will be indicated in an unambiguous, easily read way.	All the requirements set in the range (80-89) satisfied plus provision of alternative solutions with appropriate explanation for the provision of these solutions. This range of grades shows that the student examined the tasks in a more-in-depth manner and provided more work than what the assignment was asking for.

TASK 3 Marking

	0-19%	20-39%	40-49%	50-59%	60-69%	70-79%	80-89%	90-100%
Task 3 (45% of the Assignment Grade) **Entity-Relationship Diagram Marking Grid**	Very little or no understanding at all.	Many important entities missing or poorly described in terms of attributes. Many incorrect	Some important entities appearing. Some correct relationships both in terms of logic (that corresponds to the requirements of the given	Most important entities present. Sensible and adequate attributes shown. Relationships (Cardinality & Optionality)	Even more important entities present. Even more sensible and adequate attributes shown. Even more correct relationships shown and	All entities and relationships shown correctly and supported by all correct PKs and FKs. All annotations present in relationships. All the aspects and	A 'perfect' ERD with exactly the correct attributes; primary and foreign keys will be indicated in an unambiguous, easily read way;	All the requirements set in the range (80-89) satisfied plus provision of alternative solutions with appropriate explanation for the provision of

		relationships. No annotations in relationships at all.	scenario) and Optionality & Cardinality. Some correct use of keys. Some annotations.	mostly correct and corresponding at a substantial degree to the logic of the scenario. Most PKs and FKs indicated.	corresponding even more to the logic of the scenario. Even more correct PKs and FKs. Possibly, some minor discrepancies between keys and relationships.	logic of the scenario presented in the ER diagram.	relationships (Cardinality and Optionality) correct. Perfect depiction of all the aspects and logic of the scenario. Thorough and clear annotations in every relationship.	these solutions. This range of grades shows that the student examined the task in a more-in-depth manner and provided more work than what the assignment was asking for.

TASK 4 Marking

Task 4 (30% of the Assignment Grade) **Distribution of Grades between Sub-Tasks:** **Task 4A (10%)**	Very little or no understanding at all.	A very basic SQL Script with many errors in the syntax of its statements.	A basic SQL Script in which the syntax is semantically flawed.	A more comprehensive SQL Script which may be semantically flawed.	Demonstrates clear understanding. May be some errors in the syntax.	A comprehensive solution, which closely models the problem domain.	A complete solution which models the problem domain.	A complete solution which models exactly the problem domain plus alternative solutions.

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Task 4B (10%) **Task 4C (10%)** **[*The comments exactly on the right of this box correspond to each sub-task of Task 4*]**								

INSTRUCTIONS

For marks equal or greater to 90% on each task, you will need to provide a perfect solution for the task plus any other alternative solution for it.

For the realisation of Task 3, you can use any ER Drawing software program. I personally use the Gliffy editor (https://www.gliffy.com/) which offers a free trial period during which you can complete the assignment. There is also the Flowchart Maker in this address: https://www.draw.io/. You are free of course to use any software you would like to. You can even draw the ERD on paper and scan it (as the assignment requires an electronic submission). In this case though, you need to make sure that your diagram is really clear.

GOOD LUCK!!!!