## CM1603-Database Systems
## Assignment Specification (Year)

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| **Module Leader** | Theja Nadeeshani Perera |
| **Stage** | Year 1 |
| **Unit (Group/Individual)** | Individual |
| **Weighing** | 40% |
| **Qualifying Mark** | 40 |
| **Learning Outcomes Covered in this Assignment:** | Implement and test a relational database using a query language with a suitable interface. |
| **Handed Out Date** | 2nd Week 5th October 2020 |
| **Due Date** | 11th Week 8th December 2020 |
| **Expected Deliverable** | Report [No word count] |
| **Method of Submission** | Soft copy of the report and SQL file with coding should be submitted to the Moodle |
| **Method of Feedback and Due Date** | Rubric based feedback |
| **BCS Criteria(Pending) Met by this Assignment** | |

**Assessment Regulations**

Refer to the "How you are assessed section" in the Student Handbook for undergraduate students for a clarification of how you are assessed, penalties and late submissions, what constitutes plagiarism etc.

**Penalty for Late Submission**

Coursework received late without valid reason shall not be accepted and shall receive no grade, but shall count as one of the assessment opportunities prescribed in paragraph 9 of **RGU Academic Regulation A4 section 4.3.**

It is recognized that on occasion, illness, personal crisis or other valid circumstances can mean that you fail to submit and/or attend an assessment on time. In such cases you must inform the School of any extenuating circumstances through a *Coursework Extension Form* or a *Deferral Request Form*, with valid evidence for non-submission of an assessment up to a maximum of five working days after the assessment submission date. This information will be reported to the relevant Assessment Board that will decide whether a student should be allowed to reattempt without penalty (a deferral). For more detailed information regarding University Assessment Regulations and accessing forms, please refer to the following website: www.rgu.ac.uk/academicregulations www.rgu.ac.uk/academicregulations

# Coursework Specification

Consider the given scenario as a hypothetical situation.

Amazon's transactional A.I. is something that's been in existence for quite some time, allowing it to make astronomical amounts of money online. The company has gotten acutely smart at predicting just what customers are interested in purchasing based on their online behavior. This advanced AI based system keep track on customer online buying pattern, not only the buying pattern but also the next purchase and their interest patterns can be predicted by the company. This predictions can support to improve the business performance and customer satisfaction levels. To achieve these Amazon uses a database management system to store data, Sellers and customers can register to the site by providing necessary details to the web site. When seller registering to Amazon he has to provide company name, address with country, email address, contact number, password and seller will get a registration number which he can use when he logs in each time. Customers and sellers are both considered as members

Customer also can create his own account by registering, only registered customers can make purchases. Non registered customers can just view products. Customer will have to provide name, address with country, email address, contact number and password when registering. System will generate a customer id .They can use their email address and password for login purposes. During the registration time customers can pay additional 60$ and get premium membership these customers will get free shipping for any product, they can earn loyalty points and if they earn 100 point per year they can use those points to renew their premium membership or else they can pay 50$ and renew. Therefore there will be 2 customer categories premium customers and general.

Sellers can upload their product details to the website, one dealer can add many product to the system. Each product should have a unique id which will be generated by the system, product name, stock quantity, short description, long description, image of the product and price.
Each product may have many reviews given by different customers. Product owner and the

other buyers will be able to see which customer has given review on which product/each review can be identified by unique id, description and the rating.

Customer makes orders each order contains order id, order date, and shipped date and product amount. Orders contain many products.AI system will uses order details for predicting purposes. Customers make payment for order. Payment should contain payment id, method and total

Amount to be paid. Amazon page admins will be able to see which customer made which Payment by using customer id and payment id.

You have been hired by Amazon as an AI database architect to undertake a database project to support the data needs required by the business processes of the organization. Your goal in here is to produce a high-quality CONCEPTUAL RELATIONAL DATA MODEL, LOGICAL -RELATIONSHIP SCHEMA, AND IMPLEMENT relevant tables using an appropriate DBMS tool. An executive report should be provided to justify your decisions.

1) Produce a complete Conceptual Entity-Relationship Diagram for Amazon. This needs to include all the entity types, relationship types, multiplicity constraints, attributes and primary keys .This needs to fit on one page of the report.
   If you have made any assumptions mention all near the ER diagram.

   5- Marks (1 for Identification of each correct Entity)

   5 – Marks (1 Mark for Identification of each correct relationship)

   5- Marks (1 Mark for Identification of each correct primary key among other attributes)

   5 – Marks (Drawing correct ER diagram with identified entities, relationships, attributes and multiplicities)

2) Produce a complete Logical Schema Diagram for Amazon AI. This needs to include all the correct relations, relationships, multiplicity constraints, attributes, primary keys and foreign keys. This needs to fit on one page of the report.

   4 – Marks (Correct identification of all relations)

   4- Marks (Correct identification and mapping of primary keys /multi valued attributes /composite attributes)

   4- Marks (Correct mapping of multiplicities)

   4-Marks (Correct mapping of foreign keys)

3) Normalization – If any issues occurred in the relational schema/ logical schema solve them using normalization. Provide justifications for UNF, 1NF, 2NF, 3NF and BCNF.Explain how you achieve each step in normalization. -10 Marks (2 marks for each correct step)

4) After finalized the normalized logical schema implement relations in MySQL database. Each table should contain primary key and attributes. Appropriate foreign key constraints should be used.(SQL code and generated table screenshots should be included)

   10- Marks (Identification and proper SQL code for table creation in the MySQL database)

   10 Marks (Application of foreign key constraints and primary key constraints)

5) Insert sample data to created tables. Each table should contain 5 sample data.
   (SQL code and inserted data to tables' screenshots should be included) (10 – Marks, each correct table will get 3 Marks)

6) Perform below given questions with SQL codes and their output (code and output screenshots should be provided.)

   I.    Write select query to find out product details where price is less than or equal to 15$ - 5 Marks
   II.   Write a select query to find out customer details who belongs to premium customers  - 5 Marks
   III.  Write a SQL for left outer join and right outer join for customer and order table. 2.5 marks for each query - Total 5 Marks
   IV.   Make all products in to descending and ascending order according to the product Price 2.5 marks for each query and output Total 5 Marks