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| 1.jpg  **Assessment Cover Sheet** |

**Due Date**

23-May-2024

**Course Code**

IT6005

**Assessment Title**

Database 1 (group project)

**Course Title**

Database Systems 1

**Internal Moderator’s Name**

Faustino Reyes

**External Examiner’s Name**

Must-pass

Individual

Controlled

**Assessment Type**

**Instructions:**

1. This cover sheet must be completed (section in red below) and attached to your assessment before submission in hard copy/soft copy.
2. The time allowed for this assessment is 85 days.
3. This assessment carries 155 marks distributed to a total of 4 questions assessing CILO 1,2,3,4,5.
4. The materials allowed for use in this assessment are course material and research material.
5. The **use of generative AI tools is strictly prohibited**.
6. References consulted (if any) must be properly acknowledged and cited.
7. The assessment has a total of 8 pages.

**Programme Title**

**Learner ID**

**Date Submitted**

**Learner Name**

**Programme Code**

**Lecturer’s Name**

***By submitting this assessment for marking, I affirm that this assessment is my own work.***

**Learner Signature**

Do not write beyond this line. For assessor use only.

**Assessor’s Name**

**Marking Date**

**Maks Obtained**

**Comments:**

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Database Systems Project Overview

The project is divided into three tasks:

* Task 1: Context ERD
* Task 2: Physical ERD
* Task 3: Research Question
* Task 4: SQL Statements

Due Dates:

* **Thursday 23-May-2024 at 11:55 p.m**.

Assessment Type:

* Group Project (5 members per group maximum)
* Achievement based

Weighting:

|  |  |  |
| --- | --- | --- |
| **Section** | **Marks** | **LO** |
| Task 1: Context ERD | 41 | 1, 2 |
| Task 2: Physical ERD | 38 | 1, 2, 3 |
| Task 3: Research Question | 9 | 5 |
| Task 4: SQL Statements | 67 | 3,4 |
| **Total** | **155** |  |

Late Rule:

The maximum grade granted for late submission is 60% for up to 3 calendar days. A grade of 0 will be allocated for submissions after 3 days.

Deliverables

Report

The report should include 4 sections:

* **Section 1**: a screenshot of the Context ERD (clear Diagram)
* **Section 2**:
  + screenshot of the Physical ERD (clear Diagram)
  + database implementation code
  + a description of Many to Many relationship resolutions
* **Section 3**: Research Question
* **Section 4**:
* Insert statements to add sample rows
* Clearly numbered SQL statements
* Screenshot of the output from each of the SQL statements.
* Report name: **studentID1\_studentID2\_studentID3\_studentID4\_report.pdf**
* Report format: PDF

Models Folder

* This folder should include the context ERD and Physical ERD Power Architect files.
* Individual SQL files labeled as statement1.sql, statment2.sql, etc...
* Folder name: **studentID1\_studentID2\_studentID3\_studentID4\_models**

Submission

* When submitting the deliverables of the project, you must upload ***only one ZIP file***, containing the report and Models Folder.
* Note, only (.zip) compressed files will be accepted. (.rar) files will not be accepted
* Zipped file name: “**studentID1\_studentID2\_studentID3\_studentID4\_dbProject**”
* For example: “2020XXXXX\_2020XXXXX \_2020XXXXX \_2020XXXXX \_dbProject.zip”

Case Study: Database System – CityWheelsBH App

In a lively city like those in Bahrain, there's a popular app called "CityWheelsBH" that's making it easier for people to travel around. This app is a bridge between people who need a ride and those who can offer one.

Let's explore a typical day with CityWheelsBH through the experiences of some local Bahrainis:

Ali has recently begun his journey as a CityWheelsBH driver. He carefully entered his details into the app, including his name, contact number, and preferred method for receiving payments. Ali also had to show his driving license and insurance documents, important for proving he's a safe and legal driver. After each day of driving, Ali eagerly checks his rating in the app. This rating, given by the passengers he drives, tells him how well he is doing and helps him get more rides. Depending on the availability of vehicles, CityWheelsBH assigns Ali to any of the available vehicles in its inventory. Management at CityWheelsBH also keeps detailed records which of each vehicle’s maintenance to prevent any unforeseen event. CityWheelsBH also keeps records of each of its drivers schedule for efficient ride assignment and vehicle utilization.

On the other side of the app is Fatima, who regularly uses CityWheelsBH for her daily trips. She's known for being a respectful and punctual passenger, which is reflected in her high passenger rating. Each morning, Fatima opens the app, selects her location and where she wants to go, often choosing a comfortable car type like a sedan for her ride.

The system then automatically assigns drivers based on availability, proximity, and preferences using its database, updating both parties with the ride details for confirmation or cancellation. When Fatima reaches her destination, the payment for the ride is automatically made through her stored credit card details in the app. It's convenient and quick. Later, she leaves a rating and some feedback about her ride experience, which helps Ali and CityWheelsBH know about their service quality. In the evenings, Fatima sometimes browses through her past rides in the app's history section. She fondly remembers various journeys she's made, like a special trip to a friend's wedding, all facilitated by CityWheelsBH.

Hassan, another user of the app, recently had a problem with a ride. To resolve this, he used CityWheelsBH to submit a support request, describing his issue in hopes of getting it fixed. This feature is crucial in maintaining a trustworthy and reliable service for everyone.

CityWheelsBH also knows how to keep its users happy. They often release special promotions and discounts. For example, Mariam, who just started using the app, was delighted to find a promo code for a discount on her first ride.

Then there's the Al Mashaq family, who planned a family outing to a popular park. They needed more space and a child seat for their youngest member, so they chose to book a larger vehicle through CityWheelsBH. The pricing for their ride was dynamically calculated, considering factors like the larger vehicle type and the additional requirement of a child seat. This approach ensured that the Al Masherq family was charged a fair and accurate rate, tailored to their specific needs, enhancing their overall experience with both comfort and cost-effectiveness.

At the end of each day, the CityWheelsBH team diligently examines all the ride-specific feedback and ratings, as well as the general user feedback gathered throughout the day. This includes insights from the day's journeys, addressing both the performance of individual rides and the overall user experience with the app. They utilize this comprehensive feedback to enhance the service continually, ensuring it remains attuned to the evolving needs and expectations of its users.

In this vibrant city, each trip, each user's feedback, and every interaction on CityWheelsBH contributes to a larger picture. The app brings together drivers, passengers, their journeys, the payments, and the feedback in a well-organized system. This scenario showcases how everything works together to provide a reliable and convenient service for people in Bahrain.

Problem Statement:

You will need to design a database to be used for the back end of the above-mentioned mobile app. CityWheelsBH is a new startup company and do not have any infrastructure in place yet. When you design your model take into consideration the growth of the company and produce a model that is normalized.

If you discover that the data in the case study is incomplete, you are expected to add necessary assumptions. You are also expected to include suggestions that would improve the system and justify your assumptions. Decide on relevant attributes for your tables.

Task 1 and 2 ERD Modelling

In these tasks, you must create a Context ERD (Task 1) and Physical ERD (Task 2) for CityWheelsBH. The designs should be presented in a report and the respective Power Architect files should also be attached.

Task 1

* Design Context ERD
* Identify at least **10 entities**
* Identify all the **relationships** between the entities. This should include at least **one M:N relationship**
* Identify the correct **cardinalities** for each entity

Task 2

* Design Physical ERD
* Include relevant key and non-key attributes for each entity
* Include data type and size for each attribute
* Resolve the M:N relationships and add a description of them in the report (at least one)
* **Generate database implementation script**. This should include code to implement at least 10 entities along with relevant attributes and key constraints.

Task 3 Research Scenario (400 to 450 words):

Consider the scenario where CityWheelsBH, after experiencing substantial growth, plans to expand its operations to other GCC countries and eventually globally. As part of this expansion, the company contemplates sharing the extensive personal data it has accumulated about its passengers with its new international branches. Analyze the legal and ethical implications of CityWheelsBH sharing this data across borders.

In your discussion, reference specific data protection laws both in Bahrain and from an international perspective. For instance, how would Bahrain’s Personal Data Protection Law (PDPL) influence such a decision? Compare this with international regulations like the General Data Protection Regulation (GDPR) or The Uniform Personal Data Protection Act.

Examine the nuances of legal compliance, including the necessity for consent and the ethical considerations of protecting passenger privacy. What are the responsibilities of CityWheelsBH in ensuring data security and privacy in this context?

Support your analysis with at least two references, adhering to the APA referencing format. Make sure to include at least one law from Bahrain and one international law in your discussion.

Task 4 SQL Statements

In this section you will need to take the code you generated from your design and run it on SQL developer to create all of your tables. You will then need to populate all of these tables with sample data. To each table you will need to add at least 5 sample rows of data. After doing so, you will need to write a single SQL statement for each of the given tasks below. In your report you will need to include all of your insert statements and all of the SQL statements you have written numbered correctly. You will also provide screenshots of the output from each query.

1. List drivers and the total number of rides they have completed.

2. Find the average rating of drivers who have completed more than 50 rides.

3. List the names of passengers who have used CityWheelsBH more than 20 times.

4. Identify drivers who have never received a rating below 4.

5. Find the total number of rides completed in each month of the current year.

6. Show drivers who have completed rides with at least three different passengers.

7. Determine the most popular destination among all rides.

8. Identify the most common issue reported in support tickets.

9. Show the total earnings for each driver in the current year.

10. Get a list of all promotions that are currently active and expire within the next 30 days.