



**FACULTY OF COMPUTING AND INFORMATION TECHNOLOGY**

**BACS1053 DATABASE MANAGEMENT**

**Assignment**

Semester [REDACTED]

|                          |   |                  |
|--------------------------|---|------------------|
| Programme (Year & Group) | : | RSDG1 Semester 3 |
| Tutorial Group           | : | Group1           |
| Date Submitted           | : | 24/04/2023       |

Team members:

| No | Name (Block Letters) | Registration No. | Signature  | Marks |
|----|----------------------|------------------|------------|-------|
| 1  | [REDACTED]           | [REDACTED]       | [REDACTED] |       |
| 2  | [REDACTED]           | [REDACTED]       | [REDACTED] |       |
| 3  | [REDACTED]           | [REDACTED]       | [REDACTED] |       |
| 4  | [REDACTED]           | [REDACTED]       | [REDACTED] |       |





**FACULTY OF COMPUTING AND INFORMATION TECHNOLOGY**

**Plagiarism Statement and Guideline for Late Submission of Coursework**

Read, complete, and sign this statement to be submitted with the written report.

**We confirm that we have read and shall comply with all the terms and conditions of TAR University College's plagiarism policy.**

**We declare that this assignment is free from all forms of plagiarism and for all intents and purposes is my own properly derived work.**

Declaration Statement Acknowledged by

| No | Name (Block Letters) | Registration No. | Signature  | Date      |
|----|----------------------|------------------|------------|-----------|
| 1  | [REDACTED]           | [REDACTED]       | [REDACTED] | 24/4/2023 |
| 2  | [REDACTED]           | [REDACTED]       | [REDACTED] | 24/4/2023 |
| 3  | [REDACTED]           | [REDACTED]       | [REDACTED] | 24/4/2023 |
| 4  | [REDACTED]           | [REDACTED]       | [REDACTED] | 24/4/2023 |

**Assignment Assessment Form (Rating for Task 1 to Task 7 = 1: Very Poor, 2-3: Poor, 4-5: Average, 6-7: Good, 8-10: Excellent)****Programme (Year-Semester-Group):****Member Name (Alphabetical order):**

| RSD Year 1 Semester 3 Group 1 |            |
|-------------------------------|------------|
| [REDACTED]                    | [REDACTED] |

| Task No.     | Task Descriptions      | Weightage | Criteria  | Comment |   |   |   |   |
|--------------|------------------------|-----------|---|---------|---|---|---|---|
|              |                        |           |   | 1       | 2 | 3 | 4 | 5 |
| 1<br>(CLO 3) | Develop Business rules | 10%       | <ul style="list-style-type: none"> <li>Include the required and relevant pairs of business rules.</li> <li>All business rules must be clearly defined, precise, and reflect the policies and procedures of the organization's operational environment.</li> </ul> |         |   |   |   |   |
| 2<br>(CLO 3) | Develop ERD            | 10%       | <ul style="list-style-type: none"> <li>Transform business rules to a relational database model correctly.</li> <li>Correct use of Crow's Foot notations.</li> <li>Include all necessary entities, attributes &amp; relationships.</li> </ul>                      |         |   |   |   |   |
| 3<br>(CLO 3) | Develop DBDL           | 10%       | <ul style="list-style-type: none"> <li>Correct use of DBDL format as required.</li> <li>All required entities, attributes and relationships correctly shown.</li> <li>Indicate Primary key and Foreign key clearly.</li> </ul>                                    |         |   |   |   |   |
| 4<br>(CLO 2) | Database Design<br>20% | 10%       | <ul style="list-style-type: none"> <li>Correct tables, records and fields designed according to the ERD developed.</li> </ul>   |         |   |   |   |   |
| 5<br>(CLO 2) | Records (Entries)      | 10%       | <ul style="list-style-type: none"> <li>Enforcement of entity integrity rule &amp; referential integrity rule.</li> <li>Appropriate data types, default values and check constraints.</li> <li>CREATE TABLE statements.</li> </ul>                                 |         |   |   |   |   |
|              |                        |           | <ul style="list-style-type: none"> <li>Provide sufficient and quality data records.</li> <li>Well-designed records for adequate and logical choices of queries to be performed.</li> </ul>  |         |   |   |   |   |

BACS1053 Database Management – Assignment

|                               |                |     |   |  |  |  |  |
|-------------------------------|----------------|-----|---|--|--|--|--|
| 6<br>(CLO 2)                  | Queries Design | 10% | <ul style="list-style-type: none"> <li>• Flexible query for a variety of inputs. Clear &amp; proper identification of information needs.</li> <li>• Apply Accept, Prompt and variable substitution in queries. Flexible query to cater for a variety of inputs, use of multiple tables.</li> <li>• Apply Report Formatting features. Meaningful report handlings. Data values formatted accordingly.</li> <li>• <b>Only SELECT statements.</b></li> </ul> |  |  |  |  |
|                               |                | 10% |   |  |  |  |  |
|                               |                | 10% |   |  |  |  |  |
| <b>Assignment Marks / 100</b> |                |     |   |  |  |  |  |

\*CLO 2: Demonstrate the appropriate Structured Query Language (SQL) statement to query and manipulate data from a database. (P4, PLO3).

\*CLO 3: Design a normalized database system for a business scenario using relational database management software (RDBMS). (C4, PLO2).

|  |  |
|--|--|
| <b>Programme (Year-Semester-Group):</b>  | RSD Year 1 Semester 3 Group 1                                |
| <b>Member Name (Alphabetical order):</b> | 1 [REDACTED]<br>2 [REDACTED]<br>3 [REDACTED]<br>4 [REDACTED] |
|  |  |
|  |  |
|  |  |

**Task Allocations for Group Work (Task 1 to Task 5):**

| Task No.     | Task Descriptions                           | In-charge Person (1, 2, 3, 4, 5): Explain in details about task done  |
|--------------|---|---|
| 1<br>(CLO 3) | Develop Business rules                      | Person 2: Wrote Rules and Constraints regarding the Entities Relationship as well as the Constraints that the Hotel must abide by such as the Room must not be < 0\$.   |
| 2<br>(CLO 3) | Develop ERD                                 | Person 4: Was Completed Together in Conjunction to the Business Rule. Basically, we figured out the entities which are Staff, Cancellation, Customers, Room List, Schedule, Room Type, Reservation and Service and their relation to one another. |
| 3<br>(CLO 3) | Develop DBDL                                | Person 3: Was completed based on the completed ERD and was assigned Attribute accordingly as well as determining the Primary Key and Foreign Keys for the attributes.   |
| 4<br>(CLO 2) | Database Design:<br>CREATE TABLE Statements | <ol style="list-style-type: none"> <li>1. Table Name(s):Staff , Cancel</li> <li>2. Table Name(s):Customer , Room_List</li> <li>3. Table Name(s):Schedule , Room_Type</li> <li>4. Table Name(s): Reservation, Service</li> </ol>                   |
| 5<br>(CLO 2) | Records (Entries):<br>INSERT Statements     | <ol style="list-style-type: none"> <li>1. Table Name(s):Staff , Cancel</li> <li>2. Table Name(s):Customer , Room_List</li> <li>3. Table Name(s):Schedule , Room_Type</li> <li>4. Table Name(s): Reservation, Service</li> </ol>                   |

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| <b>Task 3: Normalization</b>   | x           |
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| <b>Task 6: SQL Queries and Reports</b>                                     |             |
| 6.1 [REDACTED]   | x           |
| 6.1.1 Query/Report 1: Most Popular   |             |
| 6.1.2 Query/Report 2: Top ???  |             |
| 6.1.3 Query/Report 3: Average  |             |
| .....  |             |
| .....  |             |
| .....  |             |
| .....  |             |
| <b>Task 7: Extra Effort Highlights (List individual efforts)</b>           |             |
| 7.1 (Name of Student 1)  | x           |
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| 7.1.2 Sequence/procedure/trigger/function or others                        |             |
| 7.2 (Name of Student 2)  | x           |
| 7.1.1 Views  |             |
| 7.1.2 Sequence/procedure/trigger/function or others                        |             |
| 7.3 (Name of Student 3)  | x           |
| 7.1.1 Views  |             |
| 7.1.2 Sequence/procedure/trigger/function or others                        |             |
| <b>Individual References (if any)</b>                                      | x           |
| <b>Appendices (if any)</b>   | x           |

**Task 1: Business Rules of the System**

1.1 Entities of System

| Base (Parent) Table                           | Transaction (Child) Table | Associative (Bridge) Table |
|---|---------------------------|----------------------------|
| Customer<br>[REDACTED]<br>Staff<br>[REDACTED] | Reservation<br>[REDACTED] | Room List                  |
|   |                           |                            |

1.2 Business rules of entities:

- A Customer can have one or many reservations but Each Reservation can only be related to One and Only one Customer.
- Each Reservation can only correlate to One and Only One Schedule but A Schedule can relate to One or Many Reservation
- Each Reservation can only be Cancelled Once or Zero Times but a Cancellation can be done to One or Many Reservations.
- A Schedule can be assigned with Zero or One or Many Service from Service List and Each Service from Service be assigned to One or Many Schedules.
- A Service From Service List can be One or Many Staff Assigned to it but Each Staff can only be Assigned to One and Only One Service.
- A Schedule can only relate to One and Only One Room in Room List but Room List can have a Relation with One or Many Schedule
- A Room from Room List can only have One and Only One Room Type but a Room Type can relate to One or Many Room from the Room List.

**Task 2: Entity-Relationship Modelling**

2.1 Entity-Relationship Diagram

Put Your **ERD** here

## 2.2 Assumptions

- Reservations can be made by customers directly on the hotel's website or through third-party booking platforms.
- Customers can make reservations multiple times.
- Each reservation must include at least one room.
- Customers can choose their preferred room type and room rate, including room amenities, bed type, and view.
- The hotel has a policy to ensure the security and privacy of customers' personal information, including credit card data and booking details.
- The hotel offers various payment methods, such as cash, credit card, and online payment platforms.
- The reservation system allows customers to make additional service requests.
- The reservation system generates confirmation emails to customers upon successful bookings, which include booking details, check-in and check-out procedures, and contact information for the hotel.
- The hotel has a set of policies and fees to be paid for cancellation, customers must agree to them before making a reservation.

**SAMPLE FOR REFERENCE ONLY**

**Task 3: Normalization**

3.1 Attributes of entities with keys

- CUSTOMERS (.....)
- STAFF (.....)

SAMPLE FOR REFERENCE ONLY

**Task 4: Create Databases in Oracle**

**4.1 Customer Table**

```
CREATE TABLE customers (
    cust_id VARCHAR(10) PRIMARY KEY,
    cust_name VARCHAR(50),
    email VARCHAR(50),
    phone_num VARCHAR(20)
);
```

SAMPLE FOR REFERENCE ONLY

**Task 5: Sample Data Records (10 sample records for each table)**

**5.1 Customer table:**

```
insert into customers (.....);
```

**5.2 Staff Table**

```
insert into staff values (.....);
```

SAMPLE FOR REFERENCE ONLY

**Task 6: SQL Queries and Reports**

6.1 [REDACTED]

**6.1.1 Query/Report 1: Most Popular Services**

Purpose: The purpose of this query is to show the user the most popular services.

**SQL statement:**

```
SET LINESIZE 120
SET PAGESIZE 35

COLUMN service_info FORMAT A40
COLUMN num_reservations HEADING 'Number of Reservations'
COLUMN total_revenue FORMAT $999,999.99 HEADING 'Total Revenue'

ACCEPT checkin_year NUMBER FORMAT '9999'-
PROMPT 'Enter the check-in year (2022 or 0-3): '
ACCEPT checkin_month NUMBER FORMAT '99'-
PROMPT 'Enter the check-in month (1-12): '
ACCEPT max_rows NUMBER FORMAT '999'-
PROMPT 'Enter the maximum number of rows to display: '

TTITLE LEFT 'Top ' &max_rows ' Most Popular Services for ' &checkin_month '//'
&checkin_year SKIP 2

SELECT
    service_info,
    num_reservations,
    total_revenue
FROM (
    SELECT
        service_info,
        num_reservations,
        service_price * num_reservations AS total_revenue,
        ROW_NUMBER() OVER (ORDER BY service_price * num_reservations DESC) AS rn
    FROM (
        SELECT
            service_type || '(' || service_list.service_price || ')' AS service_info,
            COUNT(reservation.reservation_id) AS num_reservations,
            service_list.service_price
        FROM
            service_list
            INNER JOIN schedule ON service_list.service_id = schedule.service_id
            INNER JOIN reservation ON schedule.schedule_id = reservation.schedule_id
        WHERE
            EXTRACT(YEAR FROM reservation.check_in_date) = &checkin_year
            AND EXTRACT(MONTH FROM reservation.check_in_date) = &checkin_month
        GROUP BY
            service_type, service_list.service_price
    )
)
WHERE
    rn <= &max_rows
ORDER BY
    total_revenue DESC;
```

**Sample Output:**

Enter the check-in year (2022 or 2023) : 2022  
Enter the check-in month (1-12) : 3  
Enter the maximum number of rows to display: 4

Top 4 Most Popular Services for 3/2022

| SERVICE_INFO     | Number of Reservations | Total Revenue |
|------------------|------------------------|---------------|
| Breakfast (\$30) | 3                      | \$90.00       |
| Lunch (\$40)     | 1                      | \$40.00       |
| Spa (\$35)       | 1                      | \$35.00       |
| Extra bed (\$10) | 1                      | \$10.00       |

6.1.2 Query/Report 2: Top [REDACTED]

Purpose: The purpose of this report is to show [REDACTED]

**SQL Statement:**

```
SET LINESIZE 120
SET PAGESIZE 120

COLUMN staff_name FORMAT A20
COLUMN staff_id FORMAT A10
COLUMN staff_department FORMAT A20
COLUMN total_sales FORMAT $999,999.99
COLUMN num_reservations FORMAT 999

ACCEPT checkin_year PROMPT 'Enter the check-in year (2022 or 2023):'
ACCEPT checkin_month PROMPT 'Enter the check-in month (1-12):'
ACCEPT max_rows PROMPT 'Enter the maximum number of rows to display:'

TTITLE LEFT 'Top ' &max_rows' Staff with Highest Sale in ' &checkin_month '/'
&checkin_year SKIP 2

WITH ranked_data AS (
    SELECT
        stv.staff_name,
        staff.staff_id,
        staff.staff_department,
        SUM(service_list.service_price) AS total_sales,
        COUNT(DISTINCT reservation.reservation_id) AS num_reservations,
        RANK() OVER (ORDER BY SUM(service_list.service_price) DESC) AS
sales_rank
    FROM
        staff
    JOIN service_list ON service_list.staff_id = staff.staff_id
    JOIN schedule ON service_list.service_id = schedule.service_id
    JOIN reservation ON schedule.schedule_id = reservation.schedule_id
    WHERE
        EXTRACT(YEAR FROM reservation.check_in_date) = &checkin_year
        AND EXTRACT(MONTH FROM reservation.check_in_date) = &checkin_month
    GROUP BY
        staff.staff_name,
        staff.staff_id,
        staff.staff_department
)
SELECT
    staff_name,
    staff_id,
    SUBSTR(staff_department, 1, 20) AS staff_department,
    total_sales,
    num_reservations
FROM
    ranked_data
WHERE
    sales_rank <= &max_rows;
```

**Task 7: Extra Effort Highlights**

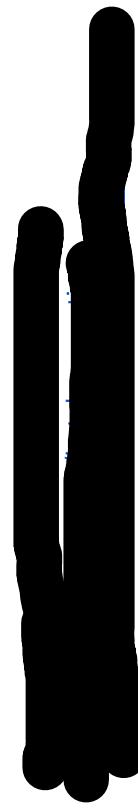
For each of the extra efforts that you have defined, provide a description and its application in your work.

SAMPLE FOR REFERENCE ONLY

**Individual References (if any)**

For each of the references that you have referred to, provide URL if possible.

- A Database Model for a Hotel Reservation Booking App and Channel Manager  
<https://vertabelo.com/blog/a-database-model-for-a-hotel-reservation-booking-app-and-channel-manager>



- W3School SQL Exercises  
[https://www.w3schools.com/sql/sql\\_exercises.asp](https://www.w3schools.com/sql/sql_exercises.asp)



**Appendices (if any)**