**CS 1104**

**Database Project**

### **1. Project Overview**

Provide a brief introduction to the project. Describe its purpose and objectives.

**Example:**  
"This database project aims to help students develop practical knowledge of database design, SQL querying, and implementation. Students are required to create an end-to-end database solution using Oracle 10g. The project involves entity-relationship diagramming, writing complex SQL queries, database normalization, generating reports, automating tasks with triggers/procedures, and creating views."

### **2. Project Requirements**

Organize the tasks into clear sections with explanations and expected outcomes.

#### **Task 1: Create ER Diagrams**

* Use any ER diagram tool (e.g., Oracle SQL Developer, dbForge, or Visio).
* Identify all entities, attributes, primary keys, and foreign keys.
* Show relationships with cardinality (1:1, 1:M, M:N).

**Deliverables:**

* Submit the ER diagram in the form of an image or PDF.
* Provide a brief description of each entity and its attributes.

#### **Task 2: Implement ER Diagram as Tables**

Convert the ER diagram into database tables using **SQL CREATE TABLE statements** in Oracle 10g. Ensure:

* Proper definition of primary keys and foreign keys.
* Use appropriate data types for each attribute.
* Implement constraints like NOT NULL, UNIQUE, or CHECK where needed.

**Deliverables:**

* Submit the SQL script with all CREATE TABLE statements.
* Include screenshots showing successful table creation in Oracle 10g.

#### **Task 3: Write Complex SQL Queries**

Write SQL queries to demonstrate the following:

1. **JOINS**: Combine data from two or more tables.
2. **Aggregate Functions**: Use SUM, COUNT, AVG, MAX, MIN, and GROUP BY.
3. **Subqueries**: Write nested queries using IN, EXISTS, or correlated subqueries.

**Example Queries to Write:**

* Retrieve all orders with customer names (JOIN).
* Calculate total sales per month (Aggregate).
* Find customers who placed orders above a certain amount (Subquery).

**Deliverables:**

* Submit all SQL queries in a .sql file or Word document.
* Include query outputs/screenshots.

#### **Task 4: Implement Normalization**

Normalize your database to **3rd Normal Form (3NF)**. Describe the process:

1. **1NF**: Eliminate repeating groups.
2. **2NF**: Ensure no partial dependency.
3. **3NF**: Eliminate transitive dependencies.

**Deliverables:**

* Submit a description of normalization steps applied.
* Include SQL scripts showing normalized table structures.

#### **Task 5: Generate Reports**

Write SQL queries to generate the following reports:

1. **Monthly Sales Report**: Total sales per month.
2. **Top Users**: Customers with the highest purchase amounts.
3. **Low Stock Items**: Products with stock levels below a threshold.

**Deliverables:**

* Submit SQL queries for reports.
* Provide screenshots of report outputs.

#### **Task 6: Use Stored Procedures and Triggers**

1. **Stored Procedures**: Write a procedure to automate a database task (e.g., updating stock after an order).
2. **Triggers**: Create a trigger to log changes in a table (e.g., after an INSERT or UPDATE).

Example (Trigger):

CREATE OR REPLACE TRIGGER trg\_log\_order

AFTER INSERT ON orders

FOR EACH ROW

BEGIN

INSERT INTO order\_logs (order\_id, change\_date, description)

VALUES (:NEW.order\_id, SYSDATE, 'New order inserted');

END;

**Deliverables:**

* Submit SQL scripts for stored procedures and triggers.
* Include screenshots showing their execution and results.

#### **Task 7: Implement Views**

Create views to simplify data retrieval for specific use cases. Examples:

1. View showing customer orders with their names and amounts.
2. View showing products with low stock.

**Deliverables:**

* Submit SQL scripts for creating views.
* Provide screenshots of queries executed on views.

### **3. Submission Guidelines**

* **Format**:
  + Include a Word document with explanations, screenshots, and query outputs.
* **ER Diagram**: Attach as a PDF or image file.
* **Tools**: Use Oracle 10g for database implementation.

Task Marks

|  |  |  |  |
| --- | --- | --- | --- |
| TASK | MARKS | Deadline | Submission  Platform |
| ER Diagram | 10 | 22/12/24 | Moelim |
| Implement ERD as Tables (CREATE TABLE) | 10 | 22/12/24 | Moelim |
| Complex SQL Queries (JOINs, Aggregates, Subqueries) | 10 | TBA |  |
| Normalization (1NF, 2NF, 3NF) | 10 | TBA |  |
| Report Generation | 10 | TBA |  |
| Stored Procedures and Triggers | 10 | TBA |  |
| Views | 10 | TBA |  |
| Documentation and Presentation | 10 | TBA |  |