# Final Assignment

## Problem Statement 1:

A small IT firm designing business software for its clients wants to store and manage its data. It has identified following entities or which, it will maintain data.

1. C l i e n t s
2. E m p l o y e e s
3. D e p a r t m e n t s
4. P r o j e c t s
5. EmpProjectTasks

This will hold data of employees working on projects. You are required to create the tables using the information provided below. Once tables are ready, fill in the given data in each table. The tables below describe attributes for each entity.

**Clients**

| Attribute Name | Attribute Type | Constraint | Remarks |
|---|---|---|---|
| Client_ID | NUMBER(4) | Primary Key | |
| Cname | VARCHAR2(40) | Not Null | |
| Address | VARCHAR2(30) | | |
| Email | VARCHAR2(30) | Unique | |
| Phone | NUMBER(10) | | |
| Business | VARCHAR2(20) | Not Null | Business type of client like Manufacturer, Reseller, Consultant, Professional etc. |

**Employees**

| Attribute Name | Attribute Type | Constraint | Remarks |
|---|---|---|---|
| Empno | NUMBER(4) | Primary Key | |
| Ename | VARCHAR2(20) | Not Null | |
| Job | VARCHAR2(15) | | |
| Salary | NUMBER(7) | Must be positive | Use CHECK constraint to ensure salary is > 0 |
| Deptno | NUMBER(2) | Foreign Key | Deptno as per Departments table |

**Departments**

| Attribute Name | Attribute Type | Constraint | Remarks |
|---|---|---|---|
| Deptno | NUMBER(2) | Primary Key | |
| Dname | VARCHAR2(15) | Not Null | |
| Loc | VARCHAR2(20) | | |

**Projects**

| Attribute Name | Attribute Type | Constraint | Remarks |
|---|---|---|---|
| Project_ID | NUMBER(3) | Primary Key | |
| Descr | VARCHAR2(30) | Not Null | Description of project like 'Accounting' , 'Inventory', 'Payroll' etc. |
| Start_Date | DATE | | Start date of project |
| Planned_End_Date | DATE | | Planned End date of project |
| Actual_End_date | DATE | Must be later than Planned_End_Date | Actual End date of project (Use CHECK constraint) |
| Budget | NUMBER(10) | Must be positive | Use CHECK constraint to ensure budget is > 0 |
| Client_ID | NUMBER(4) | Foreign Key | Client ID from Clients table |

**EmpProjectTasks**

| Attribute Name | Attribute Type | Constraint | Remarks |
|---|---|---|---|
| Project_ID | NUMBER(3) | Primary Key, Foreign Key | Composite primary key and foreign keys referring Projects and Employees table |
| Empno | NUMBER(4) | Primary Key, Foreign Key | |
| Start_Date | DATE | | Start date when employee begins task on this project |
| End_Date | DATE | | End date when employee finishes task on this project |
| Task | VARCHAR2(25) | Not Null | Task performed by employee like designing, coding, review, testing etc. |
| Status | VARCHAR2(15) | Not Null | Status of task like 'in progress', 'complete','cancelled' |

**Clients**

| Client ID | Cname | Address | Email | Phone | Business |
|---|---|---|---|---|---|
| 1001 | ACME Utilities | Noida | contact@acmeutil.com | 9567880032 | Manufacturing |
| 1002 | Trackon Consultants | Mumbai | consult@trackon.com | 8734210090 | Consultant |
| 1003 | MoneySaver Distributors | Kolkata | save@moneysaver.com | 7799886655 | Reseller |
| 1004 | Lawful Corp | Chennai | justice@lawful.com | 9210342219 | Professional |

**Employees**

| Emp no | Ename | Job | Salary | Dept no |
|---|---|---|---|---|
| 7001 | Sandeep | Analyst | 25000 | 10 |
| 7002 | Rajesh | Designer | 30000 | 10 |
| 7003 | Madhav | Developer | 40000 | 20 |
| 7004 | Manoj | Developer | 40000 | 20 |
| 7005 | Abhay | Designer | 35000 | 10 |
| 7006 | Uma | Tester | 30000 | 30 |
| 7007 | Gita | Tech. Writer | 30000 | 40 |
| 7008 | Priya | Tester | 35000 | 30 |
| 7009 | Nutan | Developer | 45000 | 20 |
| 7010 | Smita | Analyst | 20000 | 10 |
| 7011 | Anand | Project Mgr | 65000 | 10 |

## Departments

| Deptno | Dname | Loc |
|--------|-------|-----|
| 10 | Design | Pune |
| 20 | Development | Pune |
| 30 | Testing | Mumbai |
| 40 | Document | Mumbai |

**Projects**

| Project_ID | Descr | Start_Date | Planned_End_Date | Actual_End_date | Budget | Client_ID |
|------------|-------|------------|------------------|-----------------|--------|-----------|
| 401 | Inventory | 01-Apr-11 | 01-Oct-11 | 31-Oct-11 | 150000 | 1001 |
| 402 | Accounting | 01-Aug-11 | 01-Jan-12 | | 500000 | 1002 |
| 403 | Payroll | 01-Oct-11 | 31-Dec-11 | | 75000 | 1003 |
| 404 | Contact Mgmt | 01-Nov-11 | 31-Dec-11 | | 50000 | 1004 |

**EmpProjectTasks**

| Project_ID | Empno | Start_Date | End_Date | Task | Status |
|---|---|---|---|---|---|
| 401 | 7001 | 01-Apr-11 | 20-Apr-11 | System Analysis | Completed |
| 401 | 7002 | 21-Apr-11 | 30-May-11 | System Design | Completed |
| 401 | 7003 | 01-Jun-11 | 15-Jul-11 | Coding | Completed |
| 401 | 7004 | 18-Jul-11 | 01-Sep-11 | Coding | Completed |
| 401 | 7006 | 03-Sep-11 | 15-Sep-11 | Testing | Completed |
| 401 | 7009 | 18-Sep-11 | 05-Oct-11 | Code Change | Completed |
| 401 | 7008 | 06-Oct-11 | 16-Oct-11 | Testing | Completed |
| 401 | 7007 | 06-Oct-11 | 22-Oct-11 | Documentation | Completed |
| 401 | 7011 | 22-Oct-11 | 31-Oct-11 | Sign off | Completed |
| 402 | 7010 | 01-Aug-11 | 20-Aug-11 | System Analysis | Completed |
| 402 | 7002 | 22-Aug-11 | 30-Sep-11 | System Design | Completed |
| 402 | 7004 | 01-Oct-11 | | Coding | In Progress |

**Note: Submit the CREATE TABLE, INSERT AND SELECT Commands as answer to the above Assignment #1**

Given the tables created in Assignment #1, find solutions for the following.
1. Display customer details with business as 'Consultant'
2. Display employee details who are not 'Developers'

3. Display project details with budget > 100000
4. Display details of project that are already finished
5. Display employee names beginning with 'M'
6. Display employee names ending with 'a'
7. Display the number of months project 'Inventory' took for completion
8. Display the task that is 'In Progress'
9. Display details of departments located in Pune
10. Display employee name and salary in descending order of salary
11. Display tasks in ascending order of end date
12. Display distinct jobs from Employees table
13. Display employee names in all uppercase
14. Display employee name, salary and bonus calculated as 25% of salary
15. Display concatenated string 'Employee works as Job' (e.g. Manoj works as Developer) for all employees
16. Display day of week (e.g. Friday) for each start date of projects
17. Display position number of '@' symbol in each email id of clients
18. Display first 3 characters of each client name
19. Display project budget values formatted as '$150,000'
20. Display planned end date and review date as 3 months after planned end date for each project

Given the tables created in Assignment #1, find solutions for the following.
1. Display count of clients
2. Display count of employees and sum of their salaries
3. Display max salary per department
4. Display min salary per job
5. Display average salary
6. Display sum of budget
7. Display count of 'Coding' task
8. Display department wise count and sum of salary of employees
9. Display client names and their project desc, start date and budget
10. Display department name, employee name and job
11. Display names of employees doing 'System Analysis' along with project name
12. Display job wise count
13. Display employee numbers not present in EmpProjectTasks table using necessary set operator
14. Display employee numbers present in both Employees and EmpProjectTasks table using necessary set operator
15. Display all employee numbers present in both Employees and EmpProjectTasks table using necessary set operator

Given the tables created in Assignment #1, find solutions for the following.
1. Display the project name with highest budget
2. Display employee names who have same job as 'Madhav'
3. Display employee's name and job who worked on 'Code Change' task of project 401
4. Display client name whose project's 'Coding' task is 'In Progress'
5. Display department number, names and salaries of employees who are earning max salary in their departments
6. Display name of department with highest SUM of salary
7. Create a table named 'CLIENT_PROJECTS' using CTAS method that includes CLIENT_ID, CNAME, ADDRESS,BUSINESS,DESCR,BUDGET columns from CLIENTS and PROJECTS tables
8. Increase salary of employees by 15% who have performed task of 'Testing' on projects
9. Create a view named DEPT_EMP with DEPTNO,DNAME,LOC,ENAME,JOB, and SALARY columns

CTAS is a more customizable version of the SELECT...INTO statement.

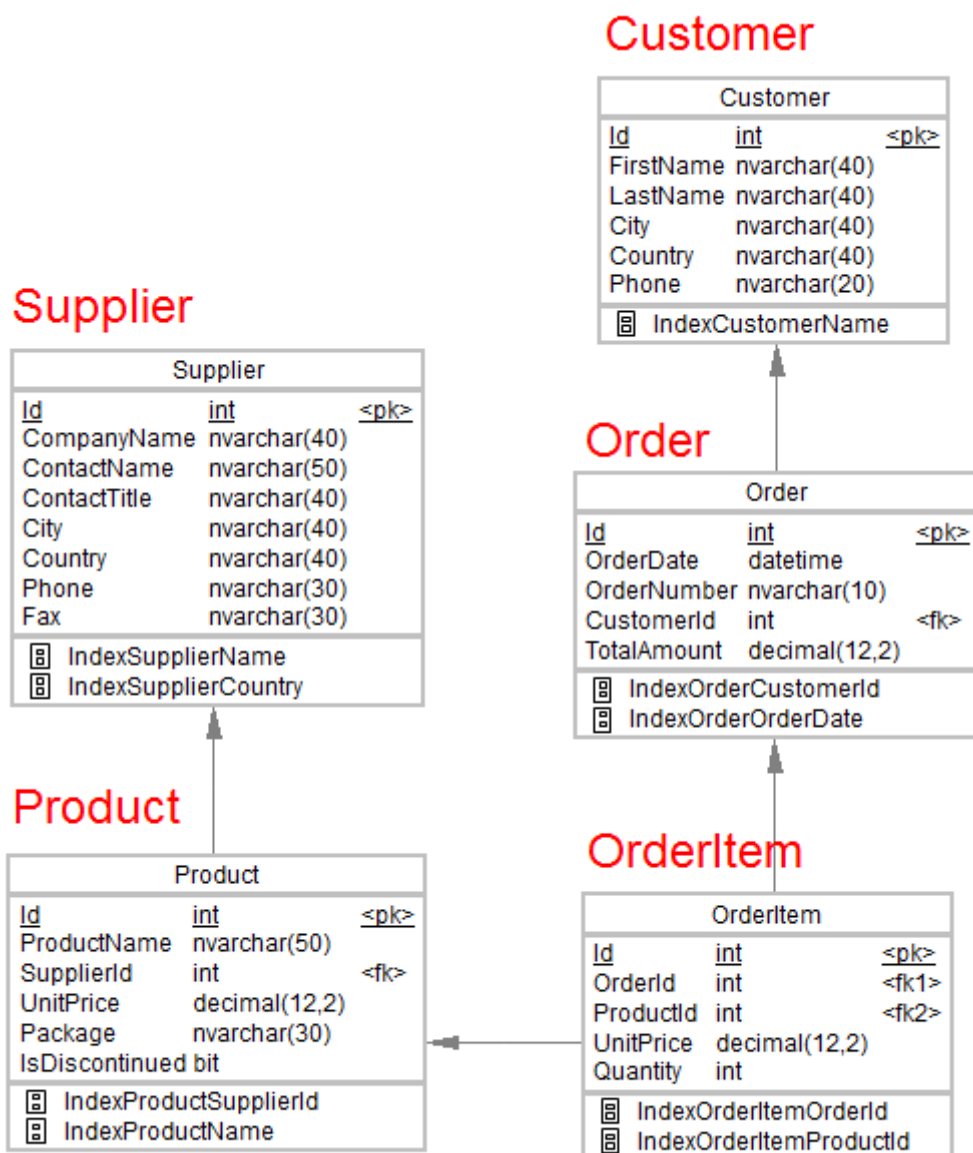## Problem Statement 2:

You have newly joined as a Data Engineer for Company. You have been tasked with the setup of the database for Company. The following tasks need to be executed. The ER Diagram for the proposed database has already been designed. The data to be entered to the designed tables are provided as an SQL script. Please download the provided *'data.sql'* file for inserting values

into the database.  Note: Submit the Create table, insert, and Select commands as answer to this assignment.

data.sql

You are required to do the following:

1. Write an SQL script to create the tables and set constraints based on the given ER diagram. Also define the indexes as specified in the ER Diagram.

## Customer

| Customer | | |
|---|---|---|
| Id | int | <pk> |
| FirstName | nvarchar(40) | |
| LastName | nvarchar(40) | |
| City | nvarchar(40) | |
| Country | nvarchar(40) | |
| Phone | nvarchar(20) | |
| ▤ IndexCustomerName | | |

## Supplier

| Supplier | | |
|---|---|---|
| Id | int | <pk> |
| CompanyName | nvarchar(40) | |
| ContactName | nvarchar(50) | |
| ContactTitle | nvarchar(40) | |
| City | nvarchar(40) | |
| Country | nvarchar(40) | |
| Phone | nvarchar(30) | |
| Fax | nvarchar(30) | |
| ▤ IndexSupplierName | | |
| ▤ IndexSupplierCountry | | |

## Order

| Order | | |
|---|---|---|
| Id | int | <pk> |
| OrderDate | datetime | |
| OrderNumber | nvarchar(10) | |
| CustomerId | int | <fk> |
| TotalAmount | decimal(12,2) | |
| ▤ IndexOrderCustomerId | | |
| ▤ IndexOrderOrderDate | | |

## Product

| Product | | |
|---|---|---|
| Id | int | <pk> |
| ProductName | nvarchar(50) | |
| SupplierId | int | <fk> |
| UnitPrice | decimal(12,2) | |
| Package | nvarchar(30) | |
| IsDiscontinued | bit | |
| ▤ IndexProductSupplierId | | |
| ▤ IndexProductName | | |

## OrderItem

| OrderItem | | |
|---|---|---|
| Id | int | <pk> |
| OrderId | int | <fk1> |
| ProductId | int | <fk2> |
| UnitPrice | decimal(12,2) | |
| Quantity | int | |
| ▤ IndexOrderItemOrderId | | |
| ▤ IndexOrderItemProductId | | |

2. The company wants to identify suppliers who are responsible for the highest revenue. This data would have to be regularly accessed. Create a view which has the following columns.

| SupplierId | ProductId | Revenue |
| --- | --- | --- |

3. Write SQL transactions for the following activities:
   a. Adding a new customer to the database.
   b. Updating a new order into the database.

4. Company also intends to send out promotional offers to customers who have placed orders amounting to more than 5000. Identify the names of these customers.

The output table should be:

| Customer Name | No of Orders | Total order Value |
| --- | --- | --- |

5. Identify those customers who are responsible for at least 10 orders with the 'average order value' being greater than 1000. The output table should contain the following columns:

| Customer Name | No of Orders | Total order value | Average order value |
| --- | --- | --- | --- |