MY SQL MODULE

Building Construction and Management System

****

Institute name : IT Vedant Education Pvt.Ltd.

Name : Uday Prakash Dhande.

Project name : Building Construction and Management System.

Project Guide : Sameer Sir.

DESCRIPTION:

The Building Construction Management System aims to efficiently organize and manage information related to construction projects, contractors, workers, materials, and work assignments. This system provides a centralized database to streamline the tracking of construction activities, ensuring better coordination and effective management.

### **Key Features:**

* Project Management:

Attributes: ProjectID (Primary Key), Name, StartDate, EndDate.

Functionality: Allows the addition and retrieval of project details, including start and end dates.

* Contractor Management:

Attributes: ContractorID (Primary Key), Name, Contact.

Functionality: Records information about contractors involved in various projects, including their contact details.

* Worker Management:

Attributes: WorkerID (Primary Key), Name, Contact.

Functionality: Manages details of workers, such as names and contact information, to keep track of the workforce.

* Material Inventory:

Attributes: MaterialID (Primary Key), Name, Quantity.

Functionality: Tracks the availability of construction materials with their respective quantities.

* Assignment Tracking:

Attributes: AssignmentID (Primary Key), ProjectID (Foreign Key), WorkerID (Foreign Key), StartDate, EndDate.

Functionality: Associates workers with specific projects and records the start and end dates of their assignments.

* Project-Worker Relationship:

Attributes: ProjectWorkerID (Primary Key), ProjectID (Foreign Key), WorkerID (Foreign Key), HoursWorked.

Functionality: Records the hours worked by each worker on a particular project.

### ## ER- DIAGRAM ##: (Entity relation- Diagram)

|  |
| --- |
|  |
| |  | | --- | |  | | +----------------+ +----------------+ +-----------------+ | | | Project |------- | Contractor |-------- --| Worker | | | +----------------+ +----------------+ +-----------------+ | | | ProjectID (PK) | | ContractorID | | WorkerID (PK) | | | | Name | | Name | | Name | | | | StartDate | | Contact | | Contact | | | | EndDate | | | | | | | +----------------+ +----------------+ +-----------------+ | | | | | | | | | | | | | | | | | V V V | | +------------------+ +-----------------+ +-------------------+ | | | Material | | Assignment | | ProjectWorker | | | +------------------+ +-----------------+ +-------------------+ | | | MaterialID (PK) | | AssignmentID | | ProjectWorkerID | | | | Name | | ProjectID (FK) | | ProjectID (FK) | | | | Quantity | | WorkerID (FK) | | WorkerID (FK) | | | +------------------+ | StartDate | | HoursWorked | | | | EndDate | +-------------------+ | |

# COMMANDS #:

* CREATE TABLE PROJECT(

1. Project\_ID int primary key,
2. Name varchar(255),
3. StartDate date,
4. EndDate date );

* CREATE TABLE CONTRACTOR (

1. Contractor\_ID int primary key,
2. Name varchar(255),
3. Contact varchar(255) );

* CREATE TABLE WORKER (

1. Worker\_ID int primary key,
2. Name varchar(255),
3. Contact varchar(255) );

* CREATE TABLE MATERIALS (

1. Material\_ID int primary key,
2. Name varchar(255),
3. Quantity int );

* CREATE TABLE ASSIGNMENT (

1. Assignment\_ID int primary key,
2. Project\_ID int,
3. Worker\_ID int,
4. StartDate DATE,
5. EndDate DATE,
6. Foreign key (ProjectID) References Project(ProjectID),
7. Foreign key(WorkerID) references Worker(WorkerID) );

* CREATE TABLE PROJECT WORKER (

1. ProjectWorker\_id primary key,
2. ProjectID int,
3. WorkerID int,
4. HoursWorked int,
5. Foreign key (ProjectID) references Project(ProjectID),
6. Foreign key (WorkerID) references Worker(WorkerID) );

### # Table Description #:

### Project Table:

| Column | Data Type | Description |
| --- | --- | --- |
| ProjectID | INT | Primary Key for the project |
| Name | VARCHAR | Name of the project |
| StartDate | DATE | Start date of the project |
| EndDate | DATE | End date of the project |

### Contractor Table:

| Column | Data Type | Description |
| --- | --- | --- |
| ContractorID | INT | Primary Key for the contractor |
| Name | VARCHAR | Name of the contractor |
| Contact | VARCHAR | Contact information of contractor |

Worker Table:

| **Column** | **Data Type** | **Description** |
| --- | --- | --- |
| WorkerID | INT | Primary Key for the worker |
| Name | VARCHAR | Name of the worker |
| Contact | VARCHAR | Contact information of worker |

Material Table:

| **Column** | **Data Type** | **Description** |
| --- | --- | --- |
| MaterialID | INT | Primary Key for the material |
| Name | VARCHAR | Name of the material |
| Quantity | INT | Quantity of the material |

### Assignment table

| **Column** | **Data Type** | **Description** |
| --- | --- | --- |
| AssignmentID | INT | Primary Key for the assignment |
| ProjectID | INT | Foreign Key referencing ProjectID |
| WorkerID | INT | Foreign Key referencing WorkerID |
| StartDate | DATE | Start date of the assignment |
| EndDate | DATE | End date of the assignment |

### ****Project Worker Table:****

|  |  |  |
| --- | --- | --- |
| ProjectWorkerID | INT | Primary Key for the project worker |
| ProjectID | INT | Foreign Key referencing ProjectID |
| WorkerID | INT | Foreign Key referencing WorkerID |
| HoursWorked | INT | Number of hours worked on the project |

## Insert value for project :

**Insert into Project (Project\_id,Name,Start\_date,end\_date )values**

**(1, 'Office Building A', '2023-01-01', '2023-12-31'),**

**(2, 'Residential Complex B', '2023-02-15', '2024-06-30'),**

**(3, 'Shopping Mall C', '2023-03-10', '2023-11-30'),**

**(4, 'Hospital D', '2023-04-20', '2024-03-15'),**

**(5, 'School E', '2023-06-01', '2024-01-31'),**

**(6, 'Apartment Building F', '2023-07-15', '2024-08-31'),**

**(7, 'Hotel G', '2023-08-10', '2024-05-20'),**

**(8, 'Industrial Plant H', '2023-09-25', '2024-04-15'),**

**(9, 'Sports Complex I', '2023-11-01', '2024-10-31'),**

**(10, 'Community Center J', '2023-12-05', '2024-09-15');**

Inserting values for Contractor:

**Insert into Contractor (contractor\_id, name, contact)values**

**(1, 'ABC Construction', '123-456-7890'),**

**(2, 'XYZ Builders', '987-654-3210'),**

**(3, 'LMN Contractors', '555-555-5555'),**

**(4, 'PQR Construction', '888-888-8888'),**

**(5, 'EFG Builders', '777-777-7777');**

### Inserting values for Worker table:

**Insert into Worker(worker\_id,name,contact) values**

**(1, 'John Doe', '987-654-3210'),**

**(2, 'Jane Smith', '555-123-4567'),**

**(3, 'Robert Johnson', '777-888-9999'),**

**(4, 'Emily Davis', '123-456-7890'),**

**(5, 'Michael Brown', '555-987-6543'),**

**(6, 'Samantha White', '888-777-6666'),**

**(7, 'Daniel Lee', '333-222-1111'),**

**(8, 'Olivia Moore', '111-222-3333'),**

**(9, 'William Taylor', '444-555-6666'),**

**(10, 'Emma Anderson', '666-555-4444'),**

**(11, 'Christopher Hall', '999-888-7777'),**

**(12, 'Sophia Martinez', '222-333-4444'),**

**(13, 'Matthew Wilson', '444-333-2222'),**

**(14, 'Ava Rodriguez', '777-666-5555'),**

**(15, 'James Garcia', '111-000-9999');**

### Inserting value for material table:

**Insert into material(material\_id,name,quantity) values**

**(1, 'Bricks', 5000),**

**(2, 'Steel Beams', 100),**

**(3, 'Wood Planks', 2000),**

**(4, 'Cement Bags', 800),**

**(5, 'Roofing Shingles', 300),**

**(6, 'Electrical Wiring', 500),**

**(7, 'Plumbing Pipes', 400),**

**(8, 'Paint Cans', 30),**

**(9, 'Insulation Rolls', 150),**

**(10, 'Windows', 50);**

### Inserting values for Assignment table:

**Insert into Assignment(assignment\_id,worker\_id,project\_id,start\_date,end\_date) values**

**(2, 1, 1, '2023-03-01', '2023-04-01'),**

**(3, 1, 2, '2023-02-15', '2023-03-15'),**

**(4, 1, 3, '2023-03-10', '2023-04-10'),**

**(5, 1, 4, '2023-04-01', '2023-05-01'),**

**(6, 1, 5, '2023-03-15', '2023-04-15'),**

**(7, 1, 6, '2023-04-10', '2023-05-10'),**

**(8, 1, 7, '2023-05-01', '2023-06-01'),**

**(9, 1, 8, '2023-04-15', '2023-05-15'),**

**(10, 1, 9, '2023-05-10', '2023-06-10'),**

**(11, 1, 10, '2023-06-01', '2023-07-01');**

### Inserting values into Project Worker table

**Insert into ProjectWorker (projectworker\_id,project\_id,worker\_id,hours\_work)values**

**(1, 1, 1, 80),**

**(2, 1, 2, 60),**

**(3, 1, 3, 40),**

**(4, 2, 1, 50),**

**(5, 2, 2, 70),**

**(6, 2, 3, 30),**

**(7, 3, 1, 45),**

**(8, 3, 2, 55),**

**(9, 3, 3, 65),**

**(10, 4, 1, 75);**

### **\*JOIN QUERIES\***

### INNER JOIN:

### 1 Retrieve project details with assigned workers:

SELECT Project.Project\_ID, Project.Name AS Project\_Name, Worker.Name AS Worker\_Name

FROM Project

INNER JOIN Assignment ON Project.Project\_ID = Assignment.Project\_ID

INNER JOIN Worker ON Assignment.Worker\_ID = Worker.Worker\_ID;

|  |  |  |  |
| --- | --- | --- | --- |
| Project\_ID | Project\_Name | Worker\_Name | |
| 1 | Office Building A | John Doe |  |
| 1 | Office Building A | Jane Smith | |
| 1 | Office Building A | Robert Johnson | |
| 1 | Office Building A | Emily Davis | |
| 1 | Office Building A | Michael Brown | |
| 1 | Office Building A | Samantha White | |
| 1 | Office Building A | Daniel Lee | |
| 1 | Office Building A | Olivia Moore | |
| 1 | Office Building A | William Taylor | |
| 1 | Office Building A | Emma Anderson | |

### ****2 List contractors and their assigned projects:****

SELECT Contractor.Name AS Contractor\_Name, Project.Name AS Project\_Name

FROM Contractor

INNER JOIN Project ON Contractor.Contractor\_ID = Project.Project\_ID;

|  |  |  |  |
| --- | --- | --- | --- |
| ABC Construction | Office Building A | |  |
| XYZ Builders | Residential Complex B | | |
| LMN Contractors | Shopping Mall C | |  |
| PQR Construction | Hospital D | |  |
| EFG Builders | School E |  |  |

### LEFT JOIN:

### 3 Retrieve the names of materials and their quantities, including materials with no assigned quantity.

SELECT material.Name, COALESCE(material.quantity, 'Not Specified') AS Quantity

FROM material

LEFT JOIN assignment ON material.material\_ID = assignment.Assignment\_ID;

|  |  |  |
| --- | --- | --- |
| Name | Quantity |  |
| Bricks | 5000 |  |
| Steel Beams | 100 |  |
| Wood Planks | 2000 |  |
| Cement Bags | 800 |  |
| Roofing Shingles | 300 |  |
| Electrical Wiring | 500 |  |
| Plumbing Pipes | 400 |  |
| Paint Cans | 30 |  |
| Insulation Rolls | 150 |  |
| Windows | 50 |  |

### RIGHT JOIN:

### 4 Retrieve the names of contractors and the projects they are associated with, including those without any assigned projects.

SELECT contractor.Name, COALESCE(project.Name, 'No Project') AS Project\_Name

FROM contractor

RIGHT JOIN project ON contractor.Contractor\_ID = project.Project\_ID;

|  |  |  |
| --- | --- | --- |
| Name | Project\_Name | |
| ABC Construction | Office Building A | |
| XYZ Builders | Residential Complex B | |
| LMN Contractors | Shopping Mall C | |
| PQR Construction | Hospital D | |
| EFG Builders | School E |  |
| NULL | Apartment Building F | |
| NULL | Hotel G |  |
| NULL | Industrial Plant H | |
| NULL | Sports Complex I | |
| NULL | Community Center J | |
|  |  |  |

### ****5 List workers assigned to a specific project:****

SELECT Project.Name AS Project\_Name, Worker.Name AS Worker\_Name, Assignment.Start\_Date, Assignment.End\_Date

FROM Project

INNER JOIN Assignment ON Project.Project\_ID = Assignment.Project\_ID

INNER JOIN Worker ON Assignment.Worker\_ID = Worker.Worker\_ID

WHERE Project.Project\_ID = 1;

|  |  |  |  |
| --- | --- | --- | --- |
| Project\_Name | Worker\_Name | Start\_Date | End\_Date |
| Office Building A | John Doe | 01-03-2023 | 01-04-2023 |
| Office Building A | Jane Smith | 15-02-2023 | 15-03-2023 |
| Office Building A | Robert Johnson | 10-03-2023 | 10-04-2023 |
| Office Building A | Emily Davis | 01-04-2023 | 01-05-2023 |
| Office Building A | Michael Brown | 15-03-2023 | 15-04-2023 |
| Office Building A | Samantha White | 10-04-2023 | 10-05-2023 |
| Office Building A | Daniel Lee | 01-05-2023 | 01-06-2023 |
| Office Building A | Olivia Moore | 15-04-2023 | 15-05-2023 |
| Office Building A | William Taylor | 10-05-2023 | 10-06-2023 |
| Office Building A | Emma Anderson | 01-06-2023 | 01-07-2023 |
|  |  |  |  |

### **\*SUB QURIES\***

### ****1 Find the names of workers assigned to 'Office Building A' project:****

SELECT Name

FROM worker

WHERE Worker\_ID IN (SELECT Worker\_ID FROM assignment WHERE Project\_ID = 1);

|  |  |
| --- | --- |
| Name |  |
| John Doe |  |
| Jane Smith | |
| Robert Johnson | |
| Emily Davis | |
| Michael Brown | |
| Samantha White | |
| Daniel Lee | |
| Olivia Moore | |
| William Taylor | |
| Emma Anderson | |
|  |  |

### ****2 List the projects where 'John Doe' is assigned:****

SELECT Name

FROM project

WHERE Project\_ID IN (SELECT Project\_ID FROM assignment WHERE Worker\_ID = 1);

|  |  |  |
| --- | --- | --- |
| Name |  |  |
|  | Office Building A | |
|  |  |  |

### ****3 Retrieve the total number of hours worked by 'Jane Smith' on all projects:****

**SELECT SUM(Hours\_Worked) AS TotalHours**

**FROM project\_worker**

**WHERE Worker\_ID = (SELECT Worker\_ID FROM worker WHERE Name = 'Jane Smith');**

|  |
| --- |
| ****Total hours**** |
| ****185**** |

### ****4 Retrieve the workers who have not been assigned to any project:****

**SELECT Name**

**FROM worker**

**WHERE Worker\_ID NOT IN (SELECT DISTINCT Worker\_ID FROM assignment);**

|  |  |
| --- | --- |
| Name |  |
| Christopher Hall | |
| Sophia Martinez | |
| Matthew Wilson | |
| Ava Rodriguez | |
| James Garcia | |
|  |  |

### ****5 List the materials with a quantity greater than the average quantity:****

**SELECT Name**

**FROM material**

**WHERE quantity > (SELECT AVG(quantity) FROM material);**

|  |
| --- |
| ****Name**** |
| ****Brick**** |
| ****Wood planks**** |

**Conclusion:**

**In this basic construction management system, you can track projects, contractors, workers, materials, and work assignments. The relationships between tables help maintain data integrity, and foreign key constraints ensure that data in related tables stays consistent. You can expand this schema and queries based on the specific needs of your construction project management system.**

Thank you…