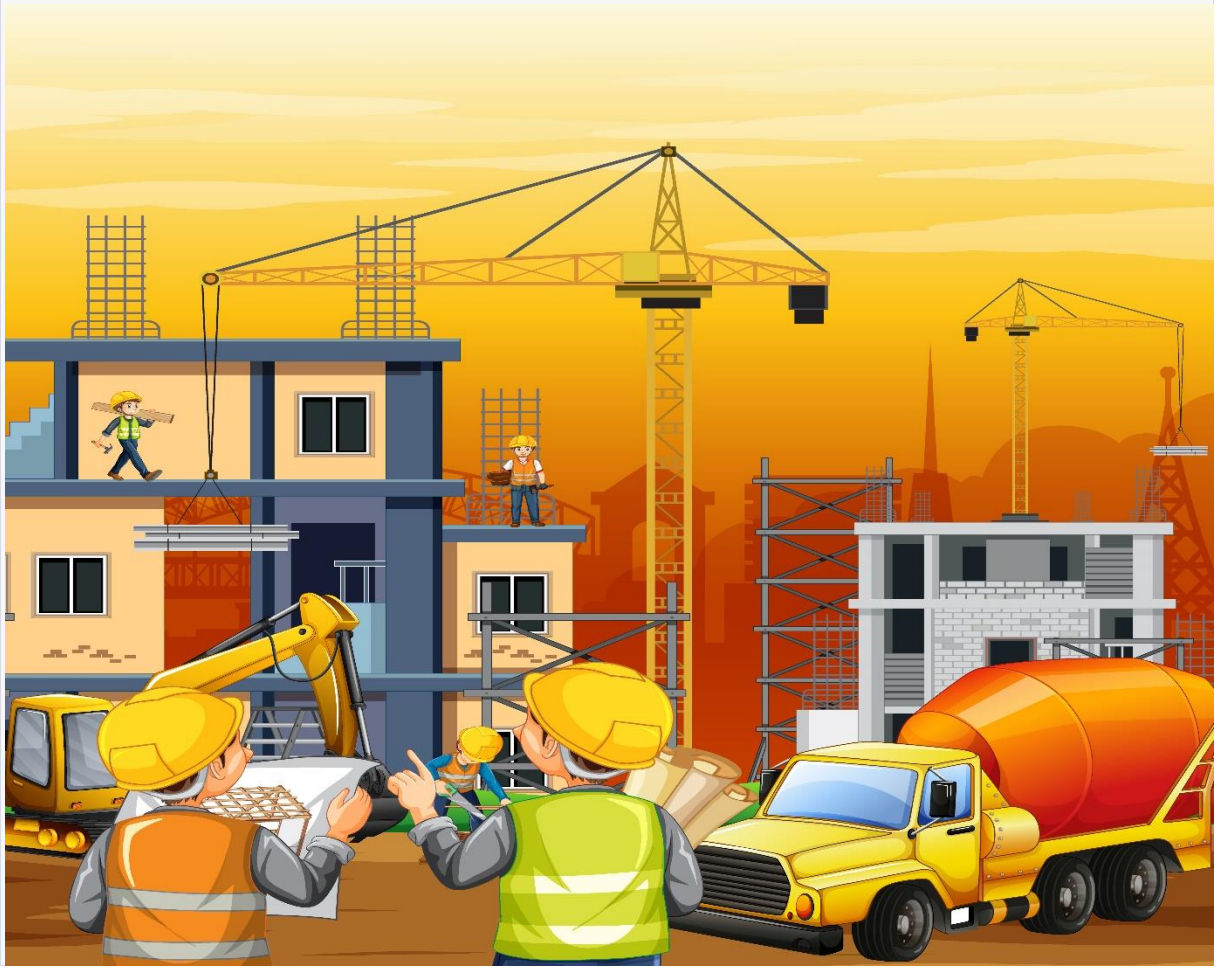
MY SQL MODULE

BUILDING CONSTRUCTION AND MANAGEMENT SYSTEM



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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.

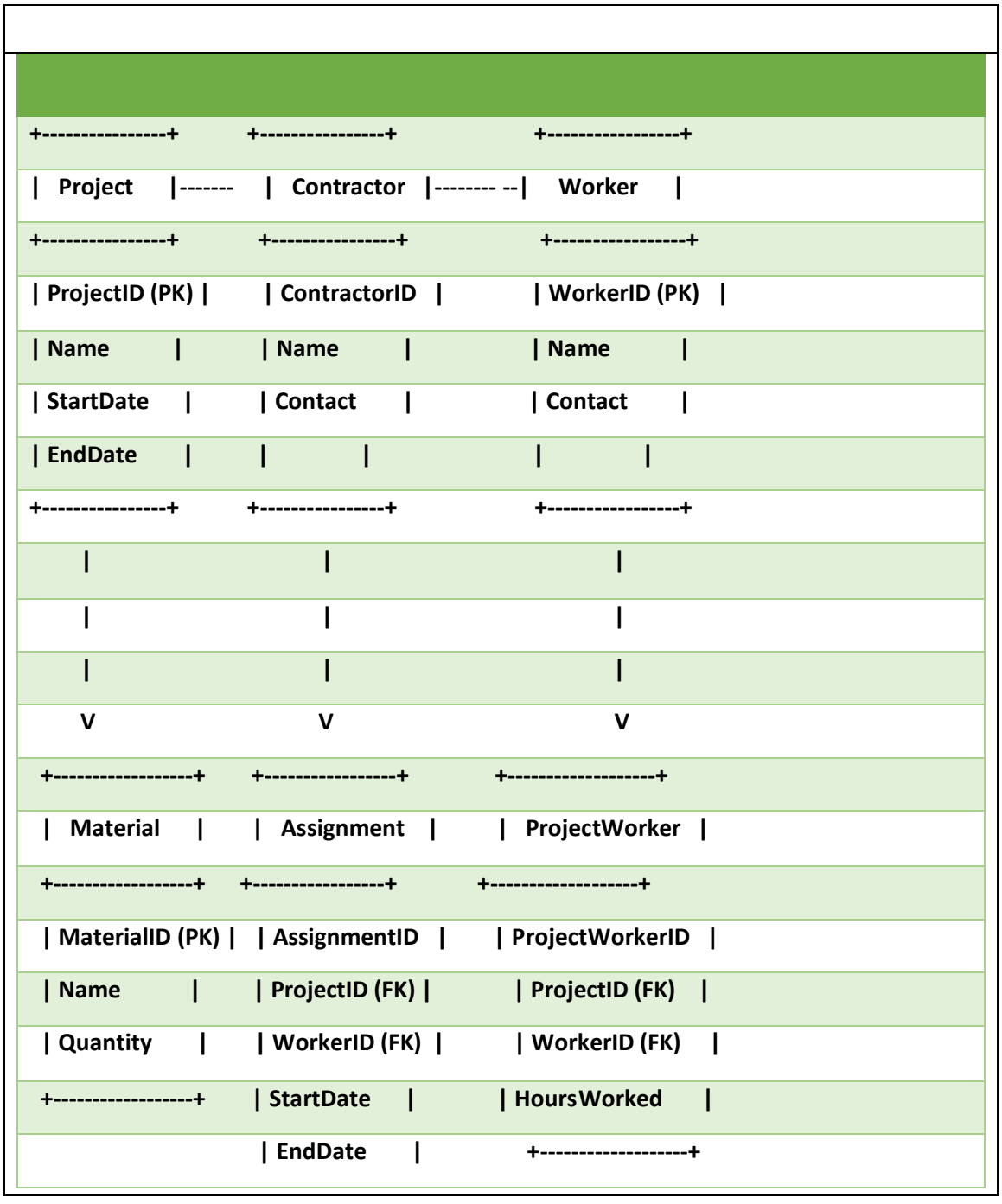
Functionality: Associates workers with specific projects and records the start and end dates of their assignments.

- **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)



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

1. 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…