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1 Introduction

LS Corporation experiences major project management issues due to splintered systems that produce subpar communication and insufficient monitoring of project status and operational inefficiencies. A web-based central project management system will be the focus of this coursework because it will solve the current problems. The solution provides a project data consolidation feature together with task management streamlining and team-wide data visibility. Both Oracle SQL Developer Data Modeler and ASP.NET form the foundation of the designed system which creates defined data connections among users and projects and their respective tasks and subtasks and milestones and resources. The combined approach leads to more effective project management because it enables LS Corporation to obtain real-time data updates and enhance coordination through better communication flow.

1.1 Aims

- The development of a centralized project management solution will provide LS Corporation with a scalable framework to resolve organizational inefficiencies while promoting team-wide cooperation.
- The development of a strong relational database system with workflow models which maintains data consistency and provides user access.
- We will develop a user-friendly web platform that combines advanced features to track projects effectively while allowing smooth user engagement.

1.2 Objectives

- Extract significant entities and attributes along with their essential relationships from the case study to define what systems should handle.
- Normalize the database model using techniques up to 3NF to reduce duplications and create structures with proper primary/foreign keys definitions as well as dependencies and constraints.
- The design process and cardinality information should be included when implementing the normalized schema model using Oracle SQL Developer Data Modeler.
- To develop and create DDL scripts to build database tables and load test data while testing the system's capacity through SQL query execution.
- To handle CRUD features for user management alongside interfaces for controlling projects and tasks alongside subtasks and milestones that also support dynamic display of user-project relations and project milestone overview while showing leaderboards per project.
- Make graphical homepage equipped with navigational menus to reach all system features easily.
- Test of CRUD operations and complex queries and error handling will be confirmed using screenshots in the execution of test cases.
- Create manual for users should include detailed instructions paired with pictures and specific guidance to fix potential issues.

2 Textual Analysis

Textual Analysis represents a qualitative research methodology which allows investigators to analyze written materials and verbal or pictorial texts to dissect their meaning patterns alongside contextual elements. This approach is widely used in disciplines such as literature, media studies, cultural studies, and sociology to explore how texts convey cultural, social, or political messages (Mckee, 2001).

2.1 User and Project

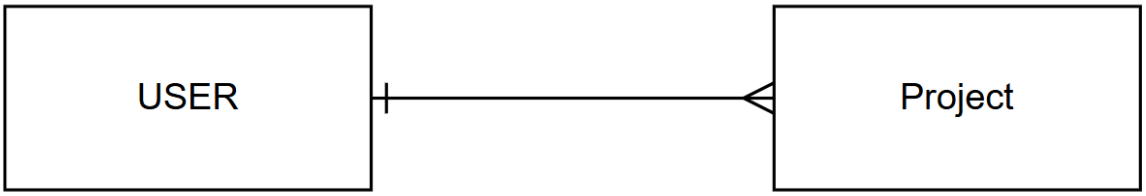


Figure 1: Textual Analysis User and Project

The relationship illustrates the connection between **Users** and **Projects**. The figure indicates that a single user can be associated with multiple projects, establishing a **one-to-many** relationship, which shows one user can participate in several projects simultaneously, each project is managed or worked on by multiple users.

2.2 User and Task

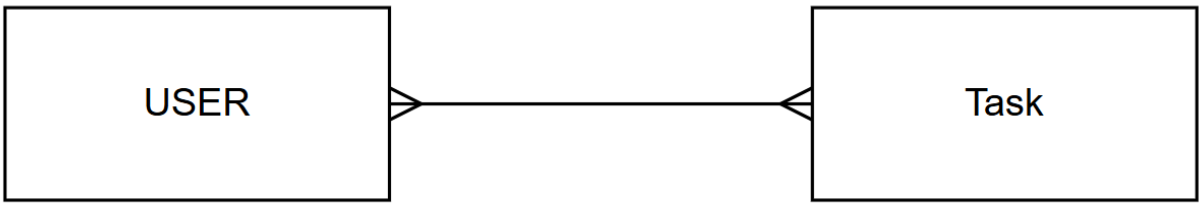


Figure 2: Textual Analysis: User and Task

The relationship illustrates the connection between **Users** and **Task**. The figure indicates that a multiple user can be assigned to multiple tasks, creating a **many-to-many relationship**, which shows while several users can handle several tasks, several tasks are assigned to several users at a time.

2.3 Task and Sub-Task

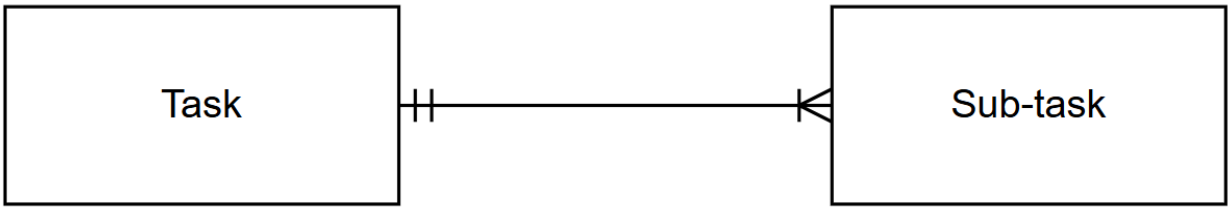


Figure 3: Textual Analysis Task and Sub-Task

The relationship illustrates the connection between **Task** and **Sub-Tasks**. The figure indicates that a single Task has multiple sub-tasks, establishing a **one-to-many** relationship, which shows one Task has several sub-tasks simultaneously, many sub-tasks form a task.

2.4 Task and Resources

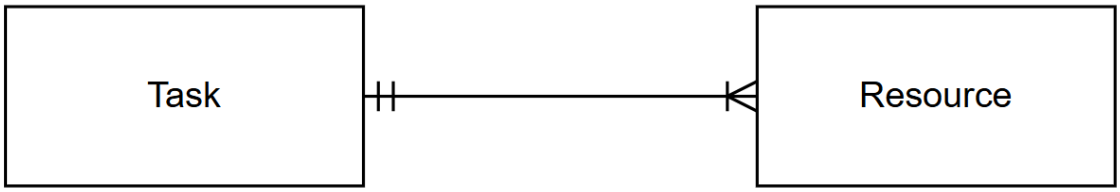


Figure 4: Textual Analysis Task and Resources

The relationship between **Tasks** and **Resources** is represented by a **one-to-many relationship**. This means that a single task can require multiple resources to be completed

2.5 Task and Comments

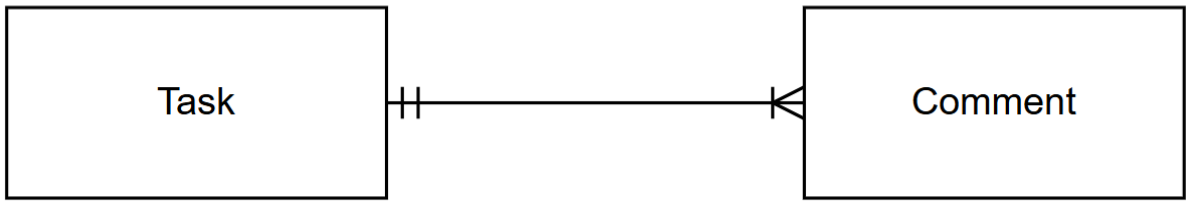


Figure 5: Textual Analysis Task and Comments

The relationship between **Tasks** and **Comments** is a **one-to-many relationship**. This means that a single task can have multiple comments associated with it.

2.6 Project and Milestone

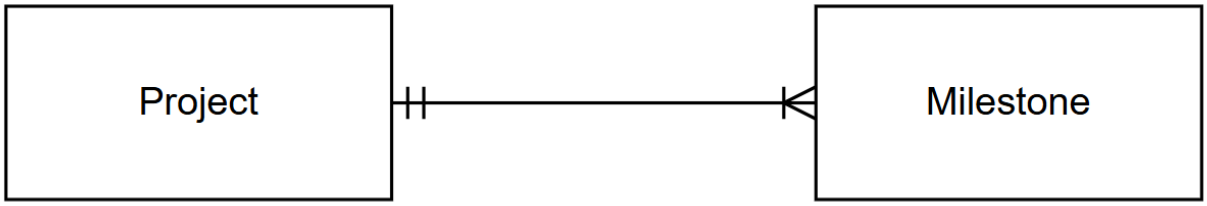


Figure 6: Textual Analysis Project and Milestone

The relationship between **Projects** and **Milestones** is a **one-to-many relationship**. This means that a single project can have multiple milestones associated with it. Each milestone represents a significant stage or achievement within the project.

3 Initial Entity Relationship Diagram

The Entity-Relationship Diagram (ERD) illustrates how the project management system fundamental structure operates. The system puts projects at its core through an implementation of multiple milestones tracking functions. A project management system enables users to work across multiple projects at once and contains Tasks which can be split into Subtasks for extensive control. Task-related comments enable user communication and users can assign project resources to tasks according to their requirements. The outlined model delivers an effective structure for project management efficiency.

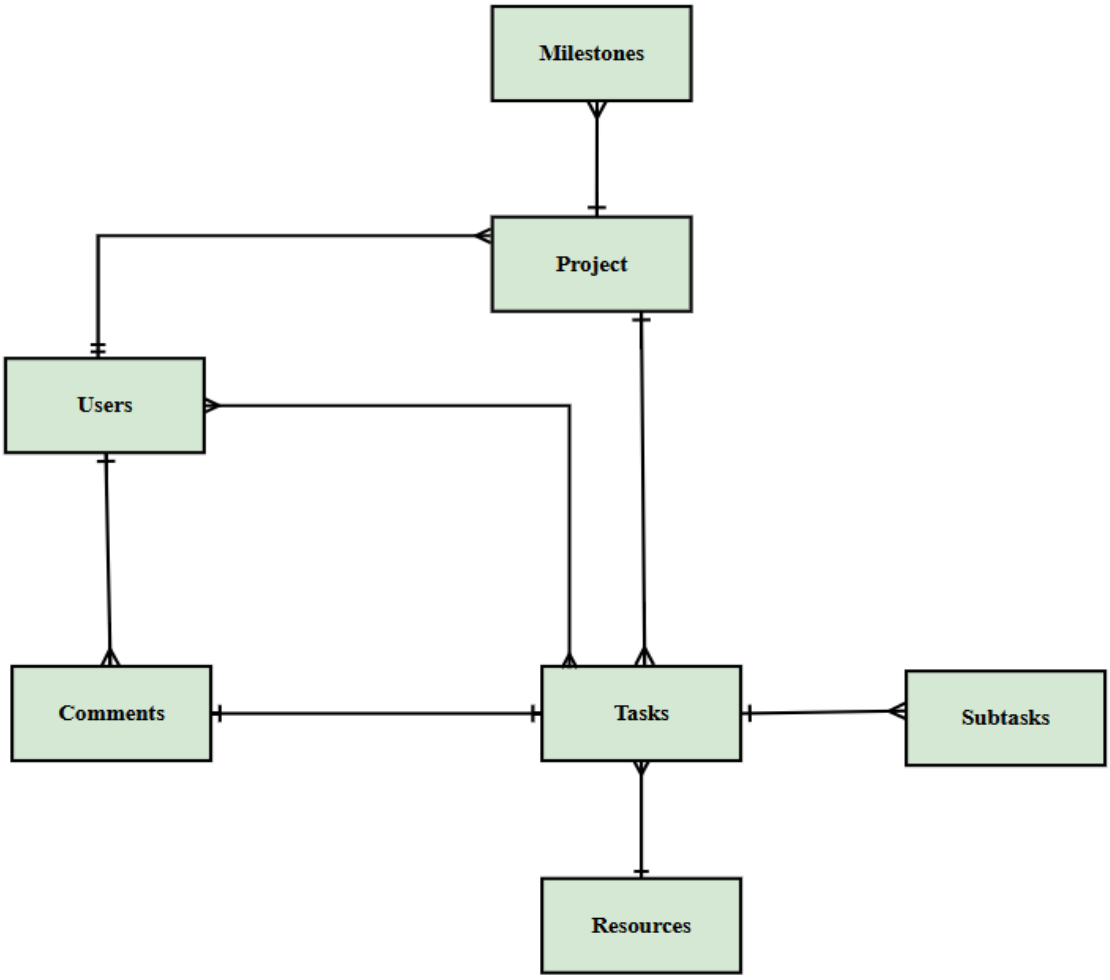


Figure 7: Initial ERD

4 Normalization

Normalization is a crucial process in database design that ensures data is logically stored to reduce redundancy and enhance data integrity (Ramez Elmasri, 2024). Normalization is a process of decomposing large tables into smaller, related tables with a view of removing data redundancy which could be a concern while inserting, deleting or updating records in a database. This practice not only corrects inaccuracies and inconsistencies in the information but also allows optimizing the functioning and increase the efficiency of the database system (Ramez Elmasri, pearson, 2024).

Key objectives of Normalization:

- **Eliminate Data Redundancy**
- **Ensure Data Integrity**
- **Simplify Maintenance**
- **Optimize Storage**

4.1 Normalization of Given Figure

4.1.1 UNF

UNF - (user_id, user_name, user_email, user_contact, {project_id, project_name, project_date, project_status, {task_id, task_name, start_date, due_date, task_status}}

4.1.2 1NF

We can separate repeating data and repeating group. After separating the repeating data, we need to separate it into 3 different tables and select the Primary Key and Foreign key in the table.

Table in 1NF:

User-1 => (**user_id**, user_name, user_email, user_contact)

Project-User-1 => (**project_id,** project_name, project_start_date, project_due_date, project_Status, user_id*)

User-Project-Task-1 => (**task_id,** task_name, start_date, due_date, task_status, user_id*, project_id*)

4.1.3 2NF

For converting 1NF to 2NF we have to we have to eliminate partial dependencies.

For User table, there is only one key, therefore there cannot be any partial dependencies. So, User table is already in 2NF

User-2

User-2 => (**user_id**, user_name, user_email, user_contact)

For User-Project table, there are two keys, so we need to check for partial dependencies in the User-Project table and remove it.

Project-User-2 => {

project_id -> project_name, project_start_date, project_due_date, project_status

user_id -> (non-key attribute of the project depends on this user)

}

Project-2 => (**project_id**, project_name, project_start_date, project_due_date, project_Status)

Project-User-2 => ((**user_id, project_id**) *)

Similarly, For User-Project-Task table, there are two keys, so we need to check for partial dependencies in the User-Project-Task table and remove it.

Project-User-Task-2{

task_id -> task_name, start_date, due_date, task_status

user_id,project_id -> (non-key attributes of the task table depends upon this table)

}

Task-2 => (**task_id,** task_name, start_date, due_date, task_status)

Project-User-Task-2 => ((**user_id, project_id, task_id**) *)

So, tables in 2NF are:

User-3 => (**user_id**, user_name, user_email, user_contact)

Project-3 => (**project_id**, project_name, project_start_date, project_due_date, project_Status)

Project-User-3 => ((**user_id, project_id) *)**

Task-3 => (**task_id**, task_name, start_date, due_date, task_status)

Project-User-Task-3 => **((user_id, project_id, task_id) *)**

4.1.4 3NF

For converting 2NF to 3NF we must remove transitive dependencies, i.e., when a non-key attribute gives another non-key attribute.

Since there are no transitive dependencies in these tables, the final tables are:

User-3 => (**user_id**, user_name, user_email, user_contact)

Project-3 => (**project_id**, project_name, project_start_date, project_due_date, project_Status)

Project-User-3 => ((**user_id, project_id) *)**

Task-3 => (**task_id**, task_name, start_date, due_date, task_status)

Project-User-Task-3 => **((user_id, project_id, task_id) *)**

5 Integration and Assumptions

6 Final Entity Relationship Diagram

An Entity-Relationship Diagram (ERD) represents a project management system that contains seven fundamental entities including Users, Projects, Tasks, Subtasks, Comments, Resources and Milestones. Users maintain links with multiple Projects and Tasks along with a delineation between Tasks that include Subtasks for specific management needs. Users can add Comments for task communication whereas Resources denote materials and tools necessary for task fulfillment. Project monitoring uses Milestones as organizational units to follow progress. The information system includes various entities that possess individual properties while maintaining distinct connections between them including the relationship between tasks and users along with tasks and projects and tasks and resources and milestones connecting to projects.

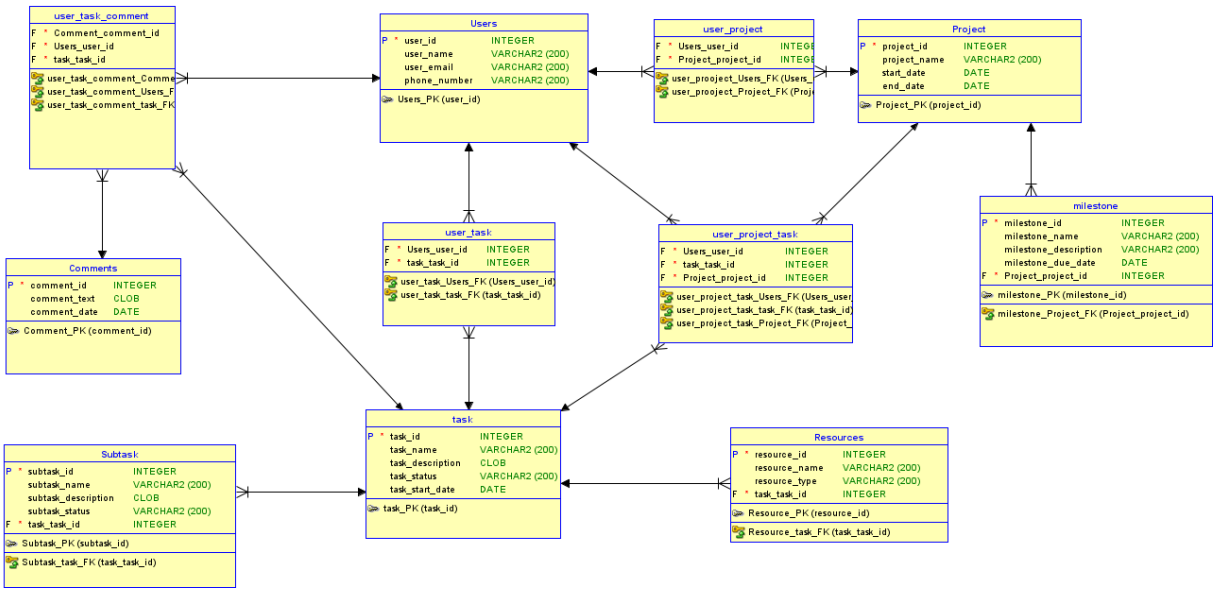


Figure 8: Final ERD

7 Data Dictionary

7.1 User Table

Attribute Name	Data Type	Description
User_ID	INTEGER	Unique identifier for the user (Primary Key)
User_Name	VARCHAR2(30)	Name of the user
User_Email	VARCHAR2(50)	Email of the user
Phone_number	VAECHAR (200)	Contact number of the user

Table 1: User Table 1

7.2 Project Table

Attribute Name	Data Type	Description
Project_ID	INTEGER	Unique identifier for the project (Primary Key)
Project_Name	VARCHAR2(200)	Name of the project
Start_Date	DATE	Project start date
Due_Date	DATE	Project due date

Table 2: Project Table

7.3 Milestone Table

Attribute Name	Data Type	Description
Milestone_ID	INTEGER	Unique identifier for the milestone (Primary Key)
Milestone_Name	VARCHAR2(200)	Name of the milestone
Milestone_Description	CLOB	Description of MileStone
Due_Date	DATE	Milestone completion due date
Project_ID	INTEGER	References Project_ID from Project table (Foreign Key)

Table 3: Milestone Table

7.4 Task Table

Attribute Name	Data Type	Description
Task_ID	INTEGER	Unique identifier for the task (Primary Key)
Task_Name	VARCHAR2(200)	Name of the task
Task_Status	VARCHAR2(200)	Status of the project!
Start_Date	DATE	Task start date
Due_Date	DATE	Task due date
Project_ID	INTEGER	References Project_ID from Project table (Foreign Key)

Table 4: Task Table

7.5 Comment Table

Attribute Name	Data Type	Description
Comment_ID	INTEGER	Unique identifier for the comment (Primary Key)
Comment_text	VARCHAR2(200)	Text content of the comment
Comment_date	DATE	Date when the comment was created

Table 5: Comment Table

7.6 Resource Table

Attribute Name	Data Type	Description
Resource_ID	INTEGER	Unique identifier for the resource (Primary Key)
Resource_Type	VARCHAR2(200)	Type of the resource
Resource_Name	VARCHAR2(100)	Name of the resource

Table 6: Resource Table

7.7 Sub-Task Table

Attribute Name	Data Type	Description
SubTask_ID	INTEGER	Unique identifier for the subtask (Primary Key)
Sub_task_name	VARCHAR2(200)	Name of the SubTask
Sub_Task_description	VARCHAR2(200	Substask Description
Task_ID	INTEGER	References Task_ID from Task table (Foreign Key)
Status	VARCHAR2(30)	Status of the subtask

Table 7: Subtask table

7.8 User Task Comment Table

Attribute Name	Data Type	Description
Task_ID	INTEGER	References Task_ID from Task table (Foreign Key)
Comment_ID	INTEGER	References Comment_ID from Comment table (Foreign Key)
User_ID	INTEGER	References User_ID from User table (Foreign Key)

Table 8: User Task Comment Table

7.9 User Project Table

Attribute Name	Data Type	Description
Project_ID	INTEGER	References Project_ID from Project table (Foreign Key)
User_ID	INTEGER	References User_ID from User table (Foreign Key)

Table 9: User Project Table

7.10 User Task Table

Attribute Name	Data Type	Description
Task_ID	INTEGER	References Task_ID from Task table (Foreign Key)
User_ID	INTEGER	References User_ID from User table (Foreign Key)

Table 10: User Task Table

7.11 User Project Task Table

Attribute Name	Data Type	Description
Task_ID	INTEGER	References Task_ID from Task table (Foreign Key)
Project_ID	INTEGER	References Project_ID from Project table (Foreign Key)
User_ID	INTEGER	References User_ID from User table (Foreign Key)

Table 11: User Project Task Table

8 Script

8.1 Create Statements

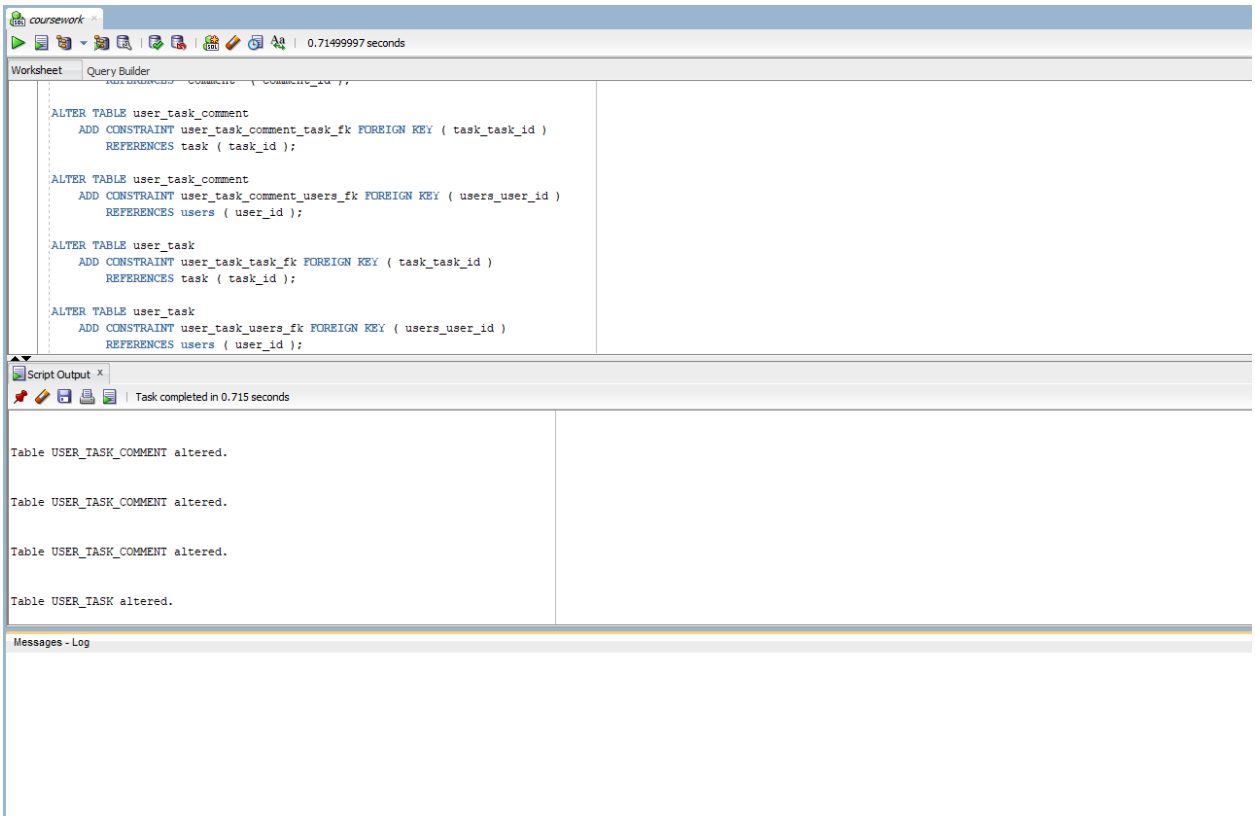
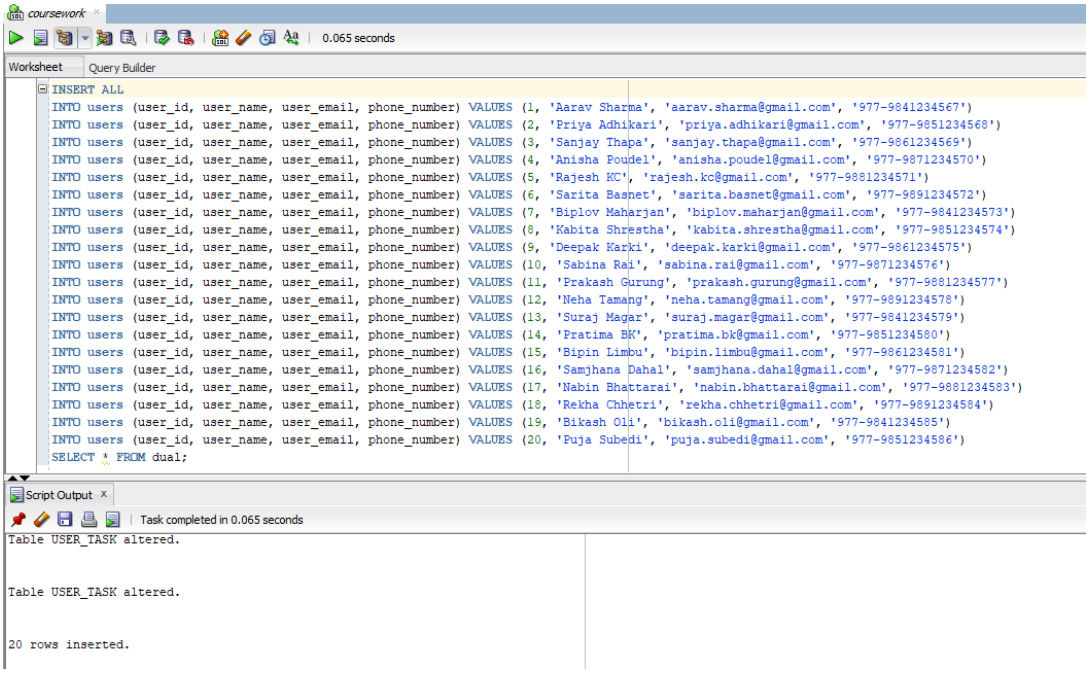


Table 12: Table Creation

8.2 Insert Statements

8.2.1 User Table



```
INSERT ALL
INTO users (user_id, user_name, user_email, phone_number) VALUES (1, 'Aarav Sharma', 'aarav.sharma@gmail.com', '977-9841234567')
INTO users (user_id, user_name, user_email, phone_number) VALUES (2, 'Priya Adhikari', 'priya.adhikari@gmail.com', '977-9851234568')
INTO users (user_id, user_name, user_email, phone_number) VALUES (3, 'Sanjay Thapa', 'sanjay.thapa@gmail.com', '977-9861234569')
INTO users (user_id, user_name, user_email, phone_number) VALUES (4, 'Anisha Poudel', 'anisha.poudel@gmail.com', '977-9871234570')
INTO users (user_id, user_name, user_email, phone_number) VALUES (5, 'Rajesh KC', 'rajesh.kc@gmail.com', '977-9881234571')
INTO users (user_id, user_name, user_email, phone_number) VALUES (6, 'Sarita Basnet', 'sarita.basnet@gmail.com', '977-9891234572')
INTO users (user_id, user_name, user_email, phone_number) VALUES (7, 'Biplov Maharjan', 'biplov.maharjan@gmail.com', '977-9841234573')
INTO users (user_id, user_name, user_email, phone_number) VALUES (8, 'Kabita Shrestha', 'kabita.shrestha@gmail.com', '977-9851234574')
INTO users (user_id, user_name, user_email, phone_number) VALUES (9, 'Deepak Karki', 'deepak.karki@gmail.com', '977-9861234575')
INTO users (user_id, user_name, user_email, phone_number) VALUES (10, 'Sabina Rai', 'sabina.rai@gmail.com', '977-9871234576')
INTO users (user_id, user_name, user_email, phone_number) VALUES (11, 'Prakash Gurung', 'prakash.gurung@gmail.com', '977-9881234577')
INTO users (user_id, user_name, user_email, phone_number) VALUES (12, 'Neha Tamang', 'neha.tamang@gmail.com', '977-9891234578')
INTO users (user_id, user_name, user_email, phone_number) VALUES (13, 'Suraj Magar', 'suraj.magar@gmail.com', '977-9841234579')
INTO users (user_id, user_name, user_email, phone_number) VALUES (14, 'Pratima BK', 'pratima.bk@gmail.com', '977-9851234580')
INTO users (user_id, user_name, user_email, phone_number) VALUES (15, 'Bipin Limbu', 'bipin.limbu@gmail.com', '977-9861234581')
INTO users (user_id, user_name, user_email, phone_number) VALUES (16, 'Samjhana Dahal', 'samjhana.dahal@gmail.com', '977-9871234582')
INTO users (user_id, user_name, user_email, phone_number) VALUES (17, 'Nabin Bhattarai', 'nabin.bhattarai@gmail.com', '977-9881234583')
INTO users (user_id, user_name, user_email, phone_number) VALUES (18, 'Rekha Chhetri', 'rekha.chhetri@gmail.com', '977-9891234584')
INTO users (user_id, user_name, user_email, phone_number) VALUES (19, 'Bikash Oli', 'bikash.oli@gmail.com', '977-9841234585')
INTO users (user_id, user_name, user_email, phone_number) VALUES (20, 'Puja Subedi', 'puja.subedi@gmail.com', '977-9851234586')
SELECT * FROM dual;
```

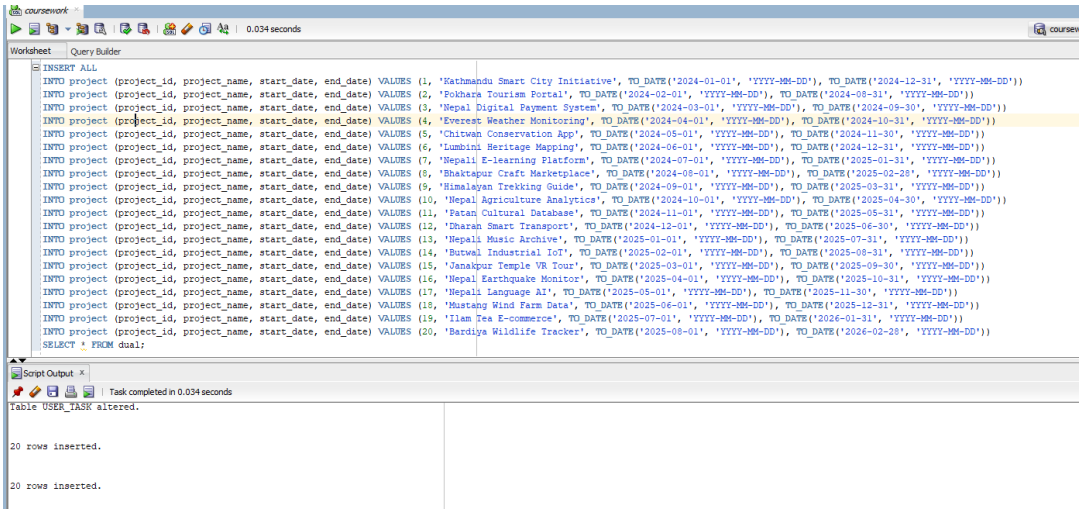
```
Table USER_TASK altered.


Table USER_TASK altered.


20 rows inserted.
```

Figure 9: User Table Insertion

8.2.2 Project Table



```
INSERT ALL
INTO project (project_id, project_name, start_date, end_date) VALUES (1, 'Kathmandu Smart City Initiative', TO_DATE('2024-01-01', 'YYYY-MM-DD'), TO_DATE('2024-12-31', 'YYYY-MM-DD'))
INTO project (project_id, project_name, start_date, end_date) VALUES (2, 'Pokhara Tourism Portal', TO_DATE('2024-02-01', 'YYYY-MM-DD'), TO_DATE('2024-08-31', 'YYYY-MM-DD'))
INTO project (project_id, project_name, start_date, end_date) VALUES (3, 'Nepal Digital Payment System', TO_DATE('2024-03-01', 'YYYY-MM-DD'), TO_DATE('2024-09-30', 'YYYY-MM-DD'))
INTO project (project_id, project_name, start_date, end_date) VALUES (4, 'Everest Weather Monitoring', TO_DATE('2024-04-01', 'YYYY-MM-DD'), TO_DATE('2024-10-31', 'YYYY-MM-DD'))
INTO project (project_id, project_name, start_date, end_date) VALUES (5, 'Chitwan Conservation App', TO_DATE('2024-05-01', 'YYYY-MM-DD'), TO_DATE('2024-11-30', 'YYYY-MM-DD'))
INTO project (project_id, project_name, start_date, end_date) VALUES (6, 'Lumbini Heritage Mapping', TO_DATE('2024-06-01', 'YYYY-MM-DD'), TO_DATE('2024-12-31', 'YYYY-MM-DD'))
INTO project (project_id, project_name, start_date, end_date) VALUES (7, 'Nepali E-learning Platform', TO_DATE('2024-07-01', 'YYYY-MM-DD'), TO_DATE('2025-01-31', 'YYYY-MM-DD'))
INTO project (project_id, project_name, start_date, end_date) VALUES (8, 'Bhaktapur Craft Marketplace', TO_DATE('2024-08-01', 'YYYY-MM-DD'), TO_DATE('2025-02-28', 'YYYY-MM-DD'))
INTO project (project_id, project_name, start_date, end_date) VALUES (9, 'Himalayan Trekking Guide', TO_DATE('2024-09-01', 'YYYY-MM-DD'), TO_DATE('2025-03-31', 'YYYY-MM-DD'))
INTO project (project_id, project_name, start_date, end_date) VALUES (10, 'Nepal Agriculture Analytics', TO_DATE('2024-10-01', 'YYYY-MM-DD'), TO_DATE('2025-04-30', 'YYYY-MM-DD'))
INTO project (project_id, project_name, start_date, end_date) VALUES (11, 'Patan Cultural Database', TO_DATE('2024-11-01', 'YYYY-MM-DD'), TO_DATE('2025-05-31', 'YYYY-MM-DD'))
INTO project (project_id, project_name, start_date, end_date) VALUES (12, 'Dharan Smart Transport', TO_DATE('2024-12-01', 'YYYY-MM-DD'), TO_DATE('2025-06-30', 'YYYY-MM-DD'))
INTO project (project_id, project_name, start_date, end_date) VALUES (13, 'Nepali Music Archive', TO_DATE('2025-01-01', 'YYYY-MM-DD'), TO_DATE('2025-07-31', 'YYYY-MM-DD'))
INTO project (project_id, project_name, start_date, end_date) VALUES (14, 'Butwal Industrial IoT', TO_DATE('2025-02-01', 'YYYY-MM-DD'), TO_DATE('2025-08-31', 'YYYY-MM-DD'))
INTO project (project_id, project_name, start_date, end_date) VALUES (15, 'Janakpur Temple VR Tour', TO_DATE('2025-03-01', 'YYYY-MM-DD'), TO_DATE('2025-09-30', 'YYYY-MM-DD'))
INTO project (project_id, project_name, start_date, end_date) VALUES (16, 'Nepal Earthquake Monitor', TO_DATE('2025-04-01', 'YYYY-MM-DD'), TO_DATE('2025-10-31', 'YYYY-MM-DD'))
INTO project (project_id, project_name, start_date, end_date) VALUES (17, 'Nepali Language AI', TO_DATE('2025-05-01', 'YYYY-MM-DD'), TO_DATE('2025-11-30', 'YYYY-MM-DD'))
INTO project (project_id, project_name, start_date, end_date) VALUES (18, 'Mustang Wind Farm Data', TO_DATE('2025-06-01', 'YYYY-MM-DD'), TO_DATE('2025-12-31', 'YYYY-MM-DD'))
INTO project (project_id, project_name, start_date, end_date) VALUES (19, 'Ilam Tea E-commerce', TO_DATE('2025-07-01', 'YYYY-MM-DD'), TO_DATE('2026-01-31', 'YYYY-MM-DD'))
INTO project (project_id, project_name, start_date, end_date) VALUES (20, 'Bardiya Wildlife Tracker', TO_DATE('2025-08-01', 'YYYY-MM-DD'), TO_DATE('2026-02-28', 'YYYY-MM-DD'))
SELECT * FROM dual;
```

```
Table USER_TASK altered.


20 rows inserted.


20 rows inserted.
```

Figure 10: Project Table Insertion

8.2.3 Task Table

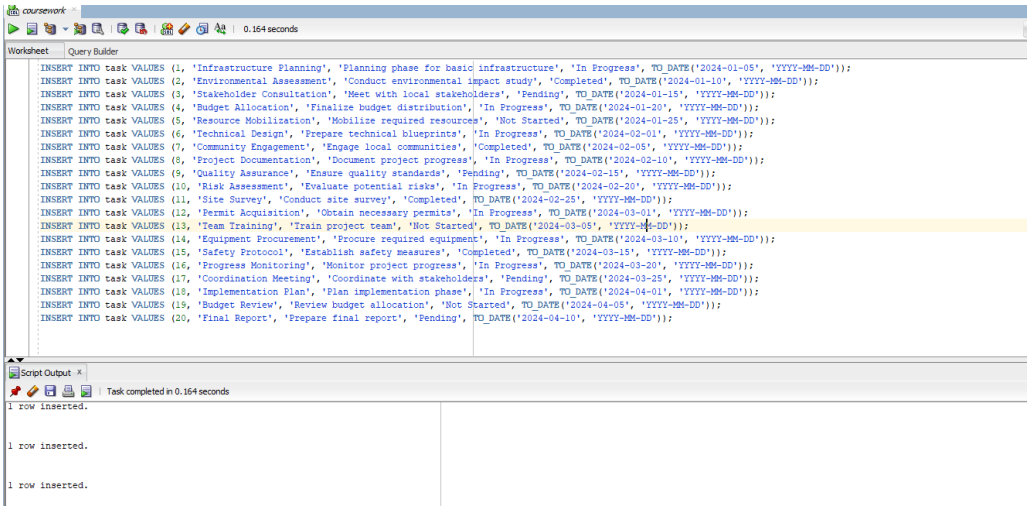


Figure 11: Task Table Insertion

8.2.4 Subtask

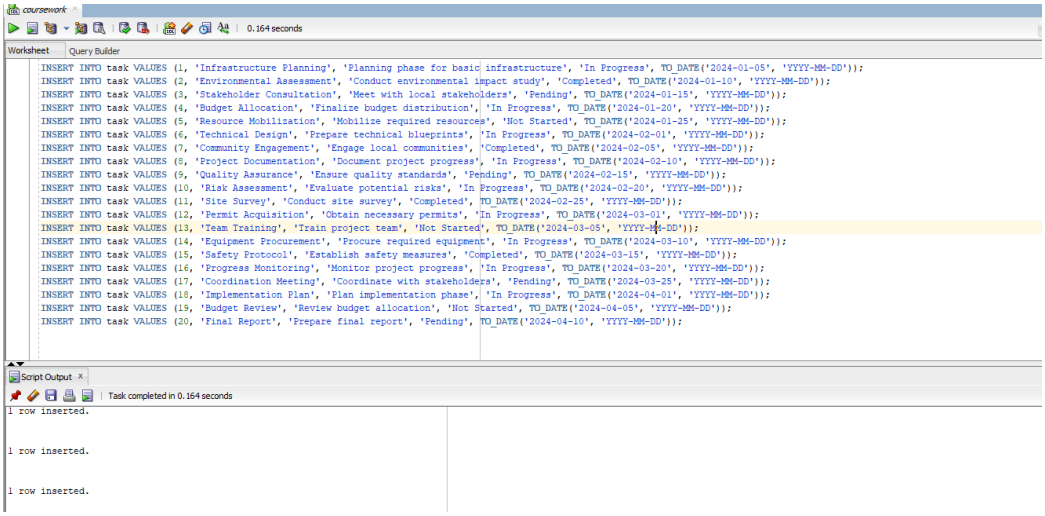


Figure 12: Subtask table insertion

8.2.5 Resource Table

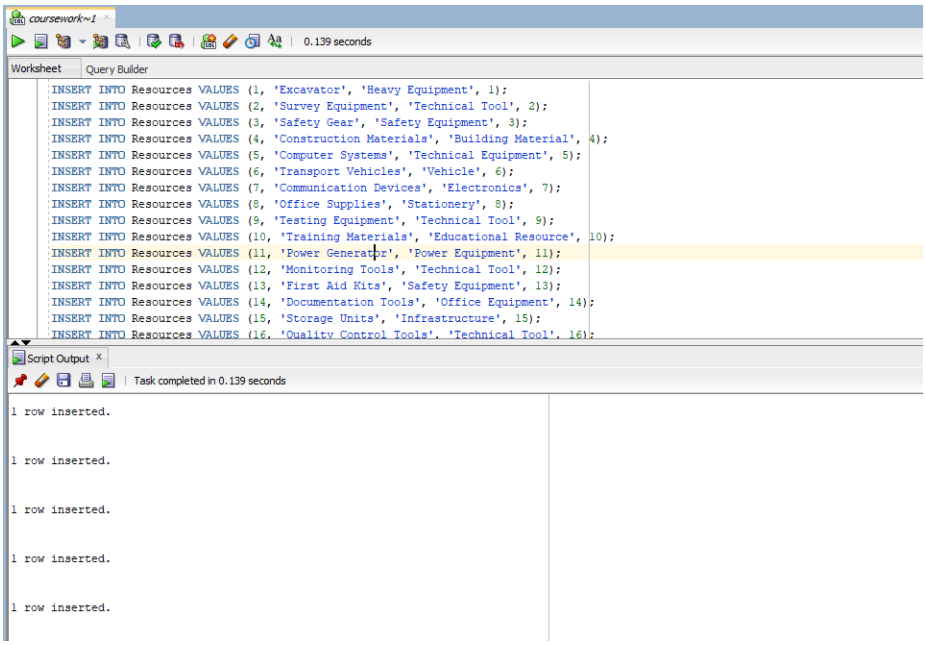


Figure 13: Resource Table insertion

8.2.6 Milestone Table

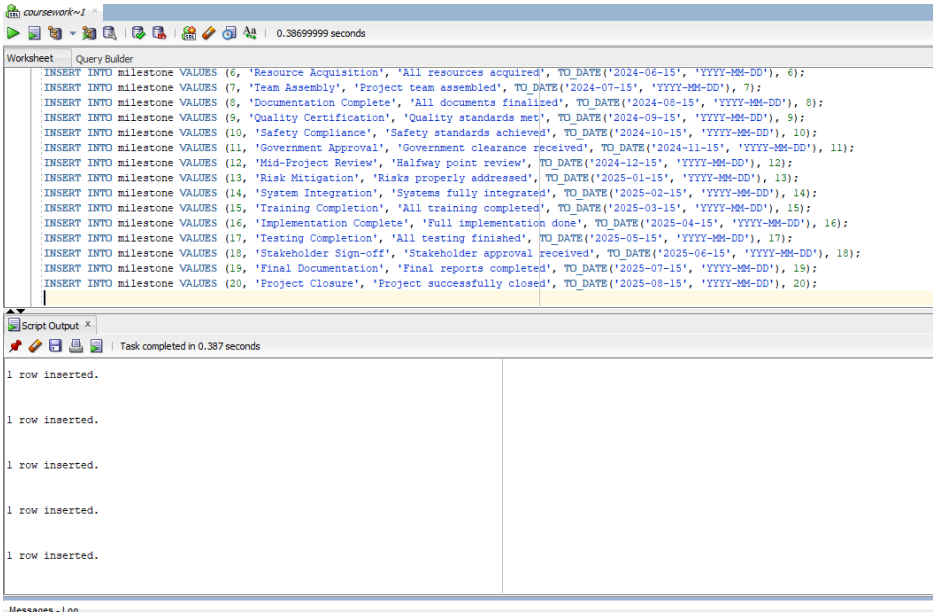


Figure 14: Milestone Table insertion

8.2.7 Comment Table

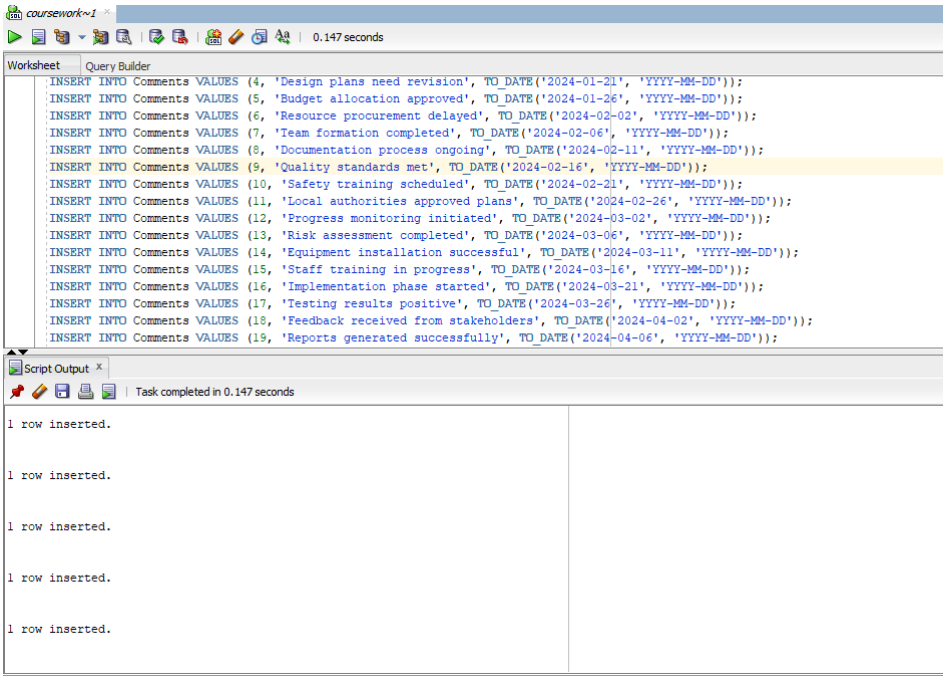


Figure 15: Comment Table insertion

8.2.8 User Project

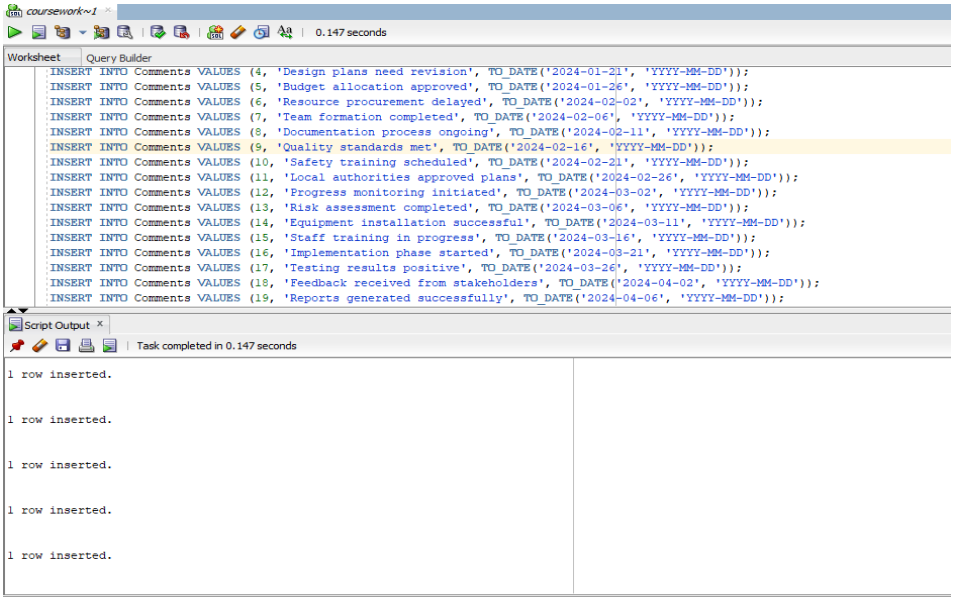


Figure 16: User project Table insertion

8.2.9 User Task

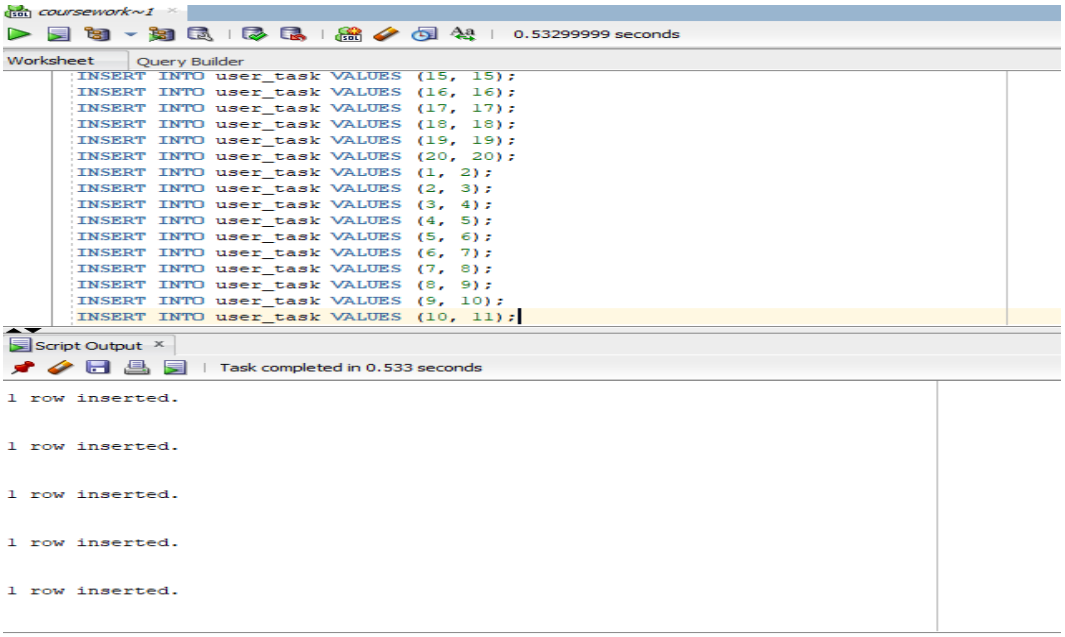


Figure 17: User Task Table insertion

8.2.10 User Project task

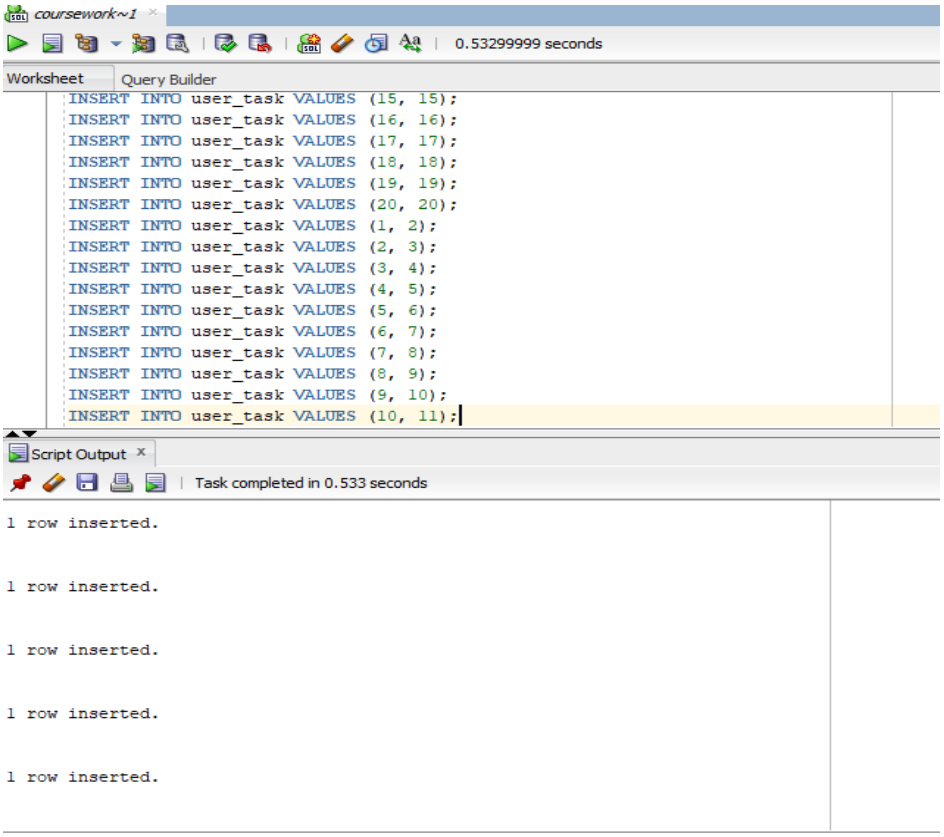


Figure 18: user task table insertion

8.2.11 User Task Comment

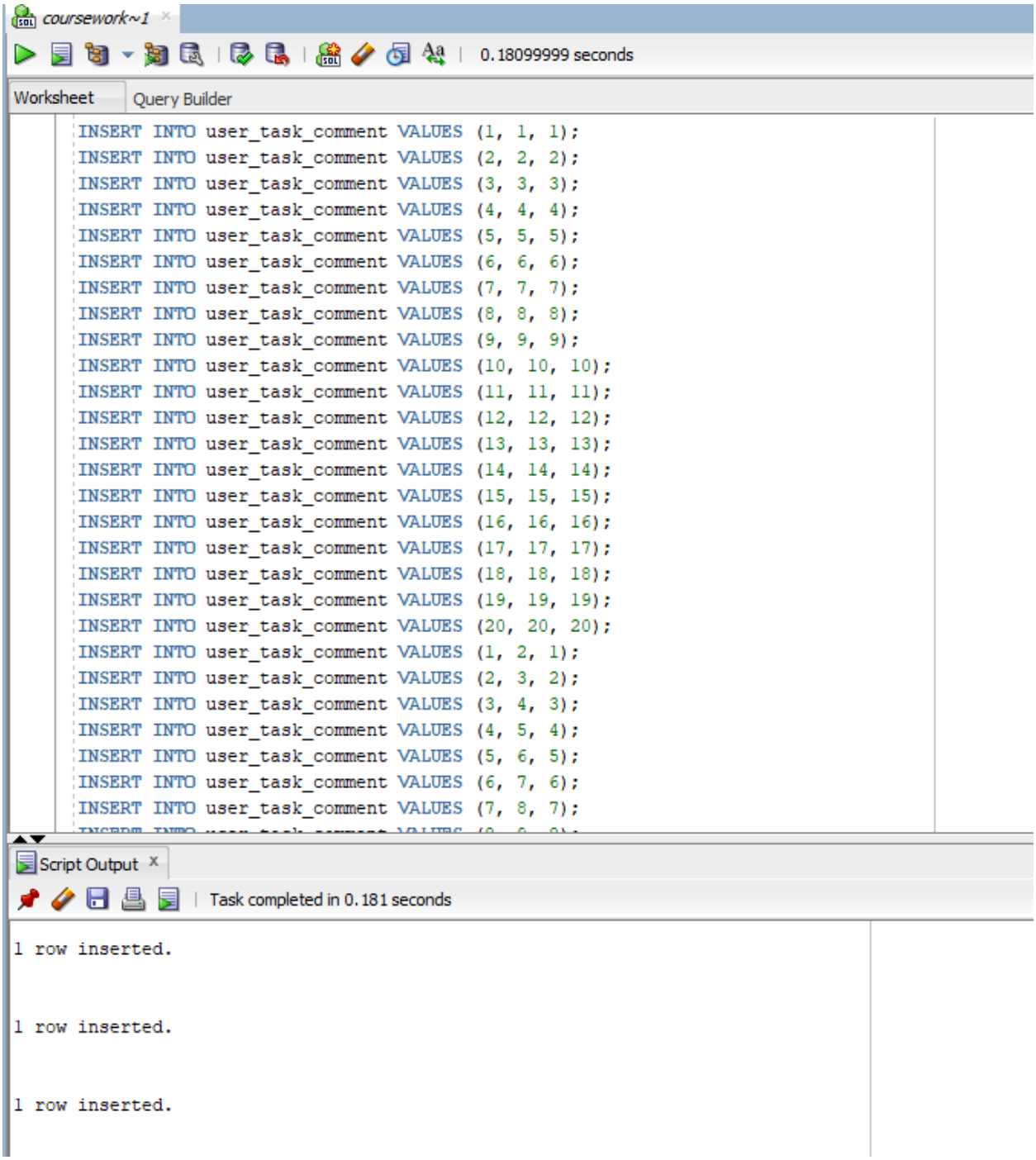


Figure 19: User Task Comment table insertion

8.3 Select Statements

8.3.1 User Table

```
select * from users;
```

Query Result

SQL | All Rows Fetched: 21 in 0.105 seconds

	USER_ID	USER_NAME	USER_EMAIL	PHONE_NUMBER
1	1	Aarav Sharma	aarav.sharma@gmail.com	977-9841234567
2	2	Priya Adhikari	priya.adhikari@gmail.com	977-9851234568
3	3	Rajesh Thapa	rajesh.thapa@gmail.com	977-9861234569
4	4	Sita Bhattarai	sita.bhattarai@gmail.com	977-9871234570
5	5	Bikash Poudel	bikash.poudel@gmail.com	977-9881234571
6	6	Anjali Karki	anjali.karki@gmail.com	977-9891234572
7	7	Dipesh Gurung	dipesh.gurung@gmail.com	977-9841234573
8	8	Sarita Tamang	sarita.tamang@gmail.com	977-9851234574
9	9	Mahesh Shrestha	mahesh.shrestha@gmail.com	977-9861234575
10	10	Nisha Rai	nisha.rai@gmail.com	977-9871234576
11	11	Sunil KC	sunil.kc@gmail.com	977-9881234577
12	12	Sabina Magar	sabina.magar@gmail.com	977-9891234578
13	13	Binod Regmi	binod.regmi@gmail.com	977-9841234579
14	14	Gita Neupane	gita.neupane@gmail.com	977-9851234580
15	15	Prakash Basnet	prakash.basnet@gmail.com	977-9861234581
16	16	Manisha Limbu	manisha.limbu@gmail.com	977-9871234582
17	17	Ramesh Dahal	ramesh.dahal@gmail.com	977-9881234583
18	18	Kabita Oli	kabita.oli@gmail.com	977-9891234584
19	19	Deepak Chhetri	deepak.chhetri@gmail.com	977-9841234585
20	20	Sunita Pun	sunita.pun@gmail.com	977-9851234586
21	21	Nisha Rai	nisha.rai@gmail.com	977-9871234576

Figure 20: User table select statement

8.3.2 Comment Table

Worksheet | Query Builder

```
select * from comments;
```

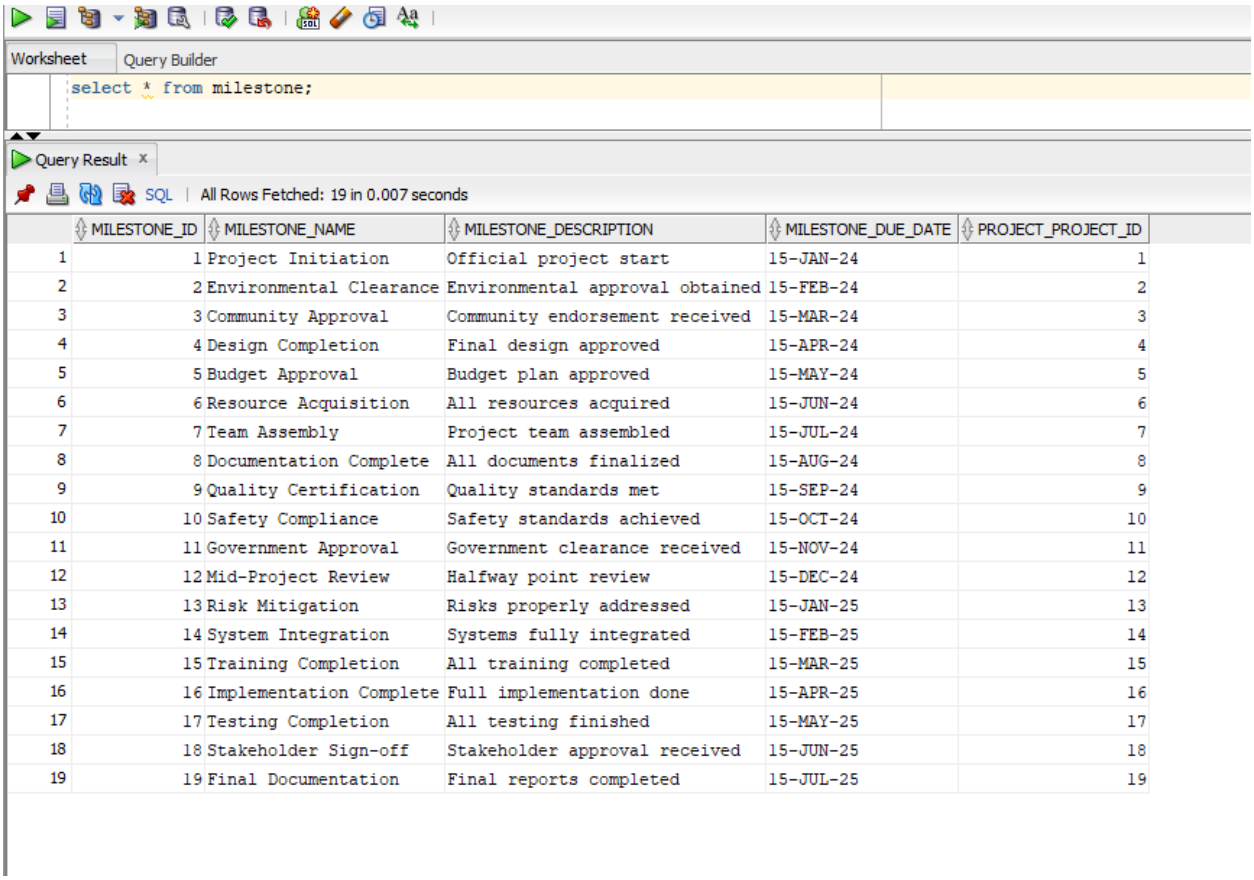
Query Result

SQL | All Rows Fetched: 20 in 0.045 seconds

	COMMENT_ID	COMMENT_TEXT	COMMENT_DATE
1	1	Site conditions are suitable for development	06-JAN-24
2	2	Environmental impact report completed	11-JAN-24
3	3	Local community showing positive response	16-JAN-24
4	4	Design plans need revision	21-JAN-24
5	5	Budget allocation approved	26-JAN-24
6	6	Resource procurement delayed	02-FEB-24
7	7	Team formation completed	06-FEB-24
8	8	Documentation process ongoing	11-FEB-24
9	9	Quality standards met	16-FEB-24
10	10	Safety training scheduled	21-FEB-24
11	11	Local authorities approved plans	26-FEB-24
12	12	Progress monitoring initiated	02-MAR-24
13	13	Risk assessment completed	06-MAR-24
14	14	Equipment installation successful	11-MAR-24
15	15	Staff training in progress	16-MAR-24
16	16	Implementation phase started	21-MAR-24
17	17	Testing results positive	26-MAR-24
18	18	Feedback received from stakeholders	02-APR-24
19	19	Reports generated successfully	06-APR-24
20	20	ui complete	06-APR-24

Figure 21: comment table select statement

8.3.3 Milestone Table



Worksheet | Query Builder

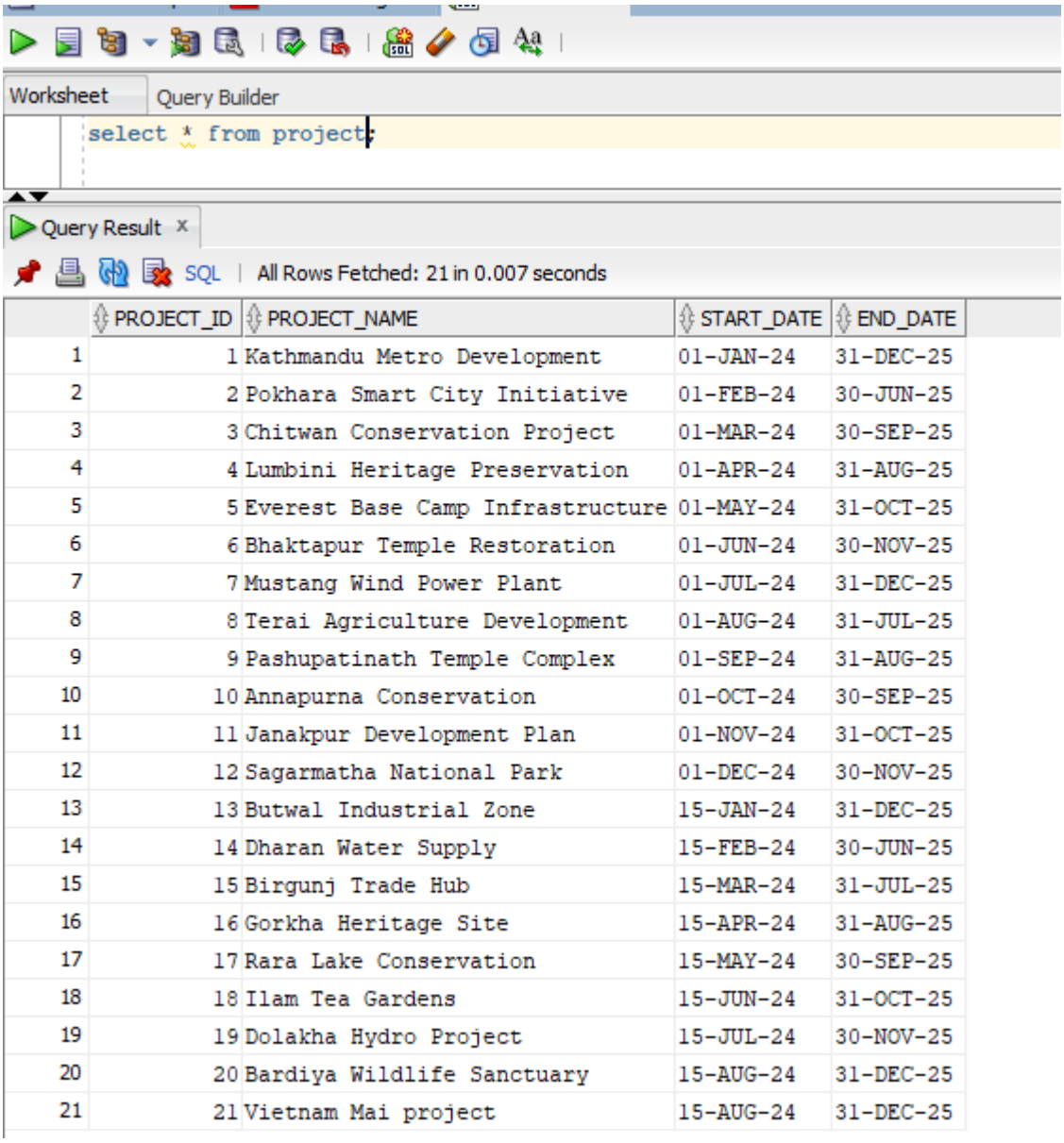
```
select * from milestone;
```

Query Result | SQL | All Rows Fetched: 19 in 0.007 seconds

	MILESTONE_ID	MILESTONE_NAME	MILESTONE_DESCRIPTION	MILESTONE_DUE_DATE	PROJECT_PROJECT_ID
1	1	Project Initiation	Official project start	15-JAN-24	1
2	2	Environmental Clearance	Environmental approval obtained	15-FEB-24	2
3	3	Community Approval	Community endorsement received	15-MAR-24	3
4	4	Design Completion	Final design approved	15-APR-24	4
5	5	Budget Approval	Budget plan approved	15-MAY-24	5
6	6	Resource Acquisition	All resources acquired	15-JUN-24	6
7	7	Team Assembly	Project team assembled	15-JUL-24	7
8	8	Documentation Complete	All documents finalized	15-AUG-24	8
9	9	Quality Certification	Quality standards met	15-SEP-24	9
10	10	Safety Compliance	Safety standards achieved	15-OCT-24	10
11	11	Government Approval	Government clearance received	15-NOV-24	11
12	12	Mid-Project Review	Halfway point review	15-DEC-24	12
13	13	Risk Mitigation	Risks properly addressed	15-JAN-25	13
14	14	System Integration	Systems fully integrated	15-FEB-25	14
15	15	Training Completion	All training completed	15-MAR-25	15
16	16	Implementation Complete	Full implementation done	15-APR-25	16
17	17	Testing Completion	All testing finished	15-MAY-25	17
18	18	Stakeholder Sign-off	Stakeholder approval received	15-JUN-25	18
19	19	Final Documentation	Final reports completed	15-JUL-25	19

Figure 22: Milestone table select statement

8.3.4 Project Table



	PROJECT_ID	PROJECT_NAME	START_DATE	END_DATE
1	1	Kathmandu Metro Development	01-JAN-24	31-DEC-25
2	2	Pokhara Smart City Initiative	01-FEB-24	30-JUN-25
3	3	Chitwan Conservation Project	01-MAR-24	30-SEP-25
4	4	Lumbini Heritage Preservation	01-APR-24	31-AUG-25
5	5	Everest Base Camp Infrastructure	01-MAY-24	31-OCT-25
6	6	Bhaktapur Temple Restoration	01-JUN-24	30-NOV-25
7	7	Mustang Wind Power Plant	01-JUL-24	31-DEC-25
8	8	Terai Agriculture Development	01-AUG-24	31-JUL-25
9	9	Pashupatinath Temple Complex	01-SEP-24	31-AUG-25
10	10	Annapurna Conservation	01-OCT-24	30-SEP-25
11	11	Janakpur Development Plan	01-NOV-24	31-OCT-25
12	12	Sagarmatha National Park	01-DEC-24	30-NOV-25
13	13	Butwal Industrial Zone	15-JAN-24	31-DEC-25
14	14	Dharan Water Supply	15-FEB-24	30-JUN-25
15	15	Birgunj Trade Hub	15-MAR-24	31-JUL-25
16	16	Gorkha Heritage Site	15-APR-24	31-AUG-25
17	17	Rara Lake Conservation	15-MAY-24	30-SEP-25
18	18	Ilam Tea Gardens	15-JUN-24	31-OCT-25
19	19	Dolakha Hydro Project	15-JUL-24	30-NOV-25
20	20	Bardiya Wildlife Sanctuary	15-AUG-24	31-DEC-25
21	21	Vietnam Mai project	15-AUG-24	31-DEC-25

Figure 23: Project Table select statements

8.3.5 Resources Table

Worksheet | Query Builder

```
select * from resources;
```

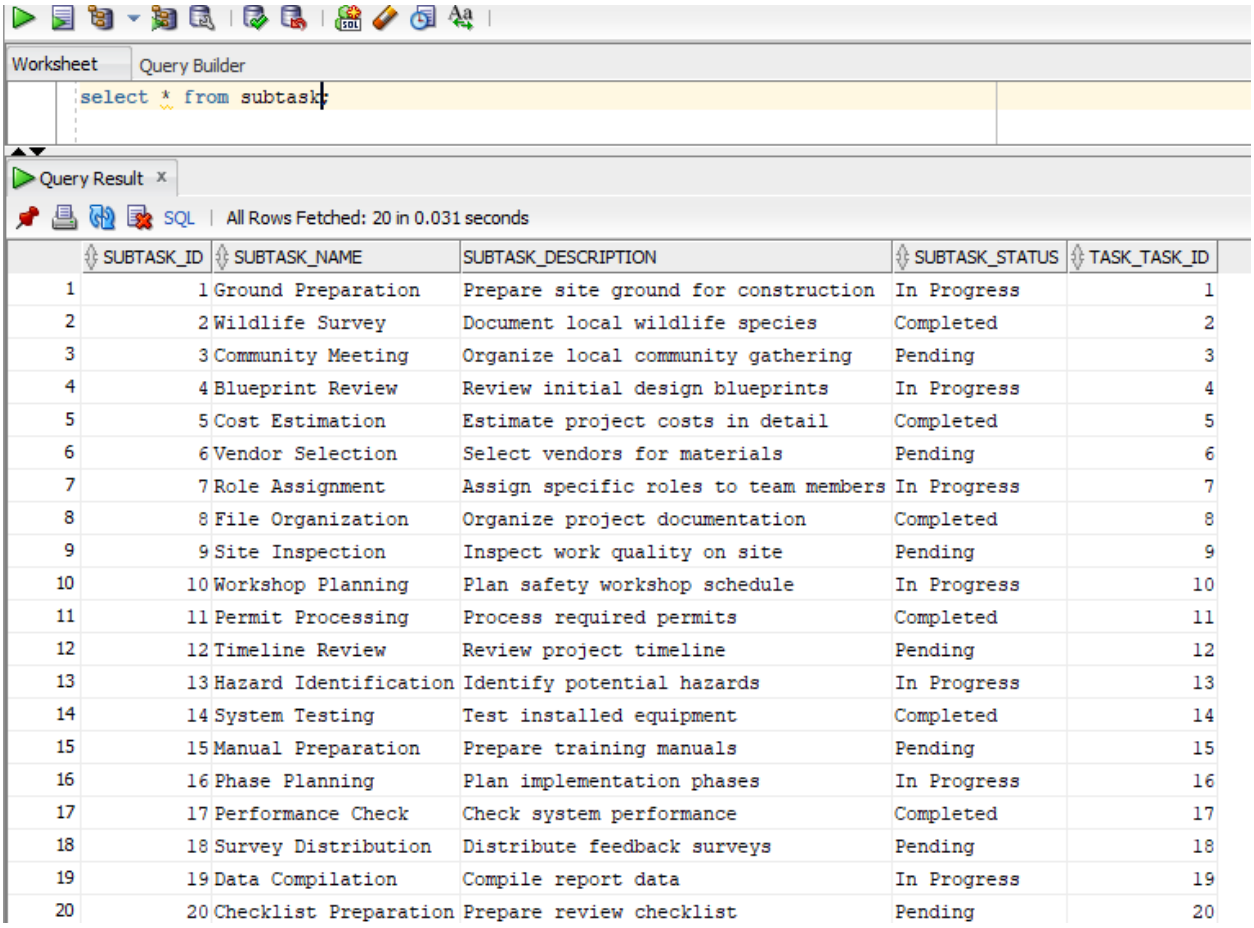
Query Result

SQL | All Rows Fetched: 20 in 0.031 seconds

	RESOURCE_ID	RESOURCE_NAME	RESOURCE_TYPE	TASK_TASK_ID
1	1	Excavator	Heavy Equipment	1
2	2	Survey Equipment	Technical Tool	2
3	3	Safety Gear	Safety Equipment	3
4	4	Construction Materials	Building Material	4
5	5	Computer Systems	Technical Equipment	5
6	6	Transport Vehicles	Vehicle	6
7	7	Communication Devices	Electronics	7
8	8	Office Supplies	Stationery	8
9	9	Testing Equipment	Technical Tool	9
10	10	Training Materials	Educational Resource	10
11	11	Power Generator	Power Equipment	11
12	12	Monitoring Tools	Technical Tool	12
13	13	First Aid Kits	Safety Equipment	13
14	14	Documentation Tools	Office Equipment	14
15	15	Storage Units	Infrastructure	15
16	16	Quality Control Tools	Technical Tool	16
17	17	Networking Equipment	Technical Equipment	17
18	18	Measurement Tools	Technical Tool	18
19	19	Presentation Equipment	Office Equipment	19
20	20	Maintenance Tools	Technical Tool	20

Figure 24: Resource table select statement

8.3.6 Subtask



Worksheet | Query Builder

```
select * from subtask;
```

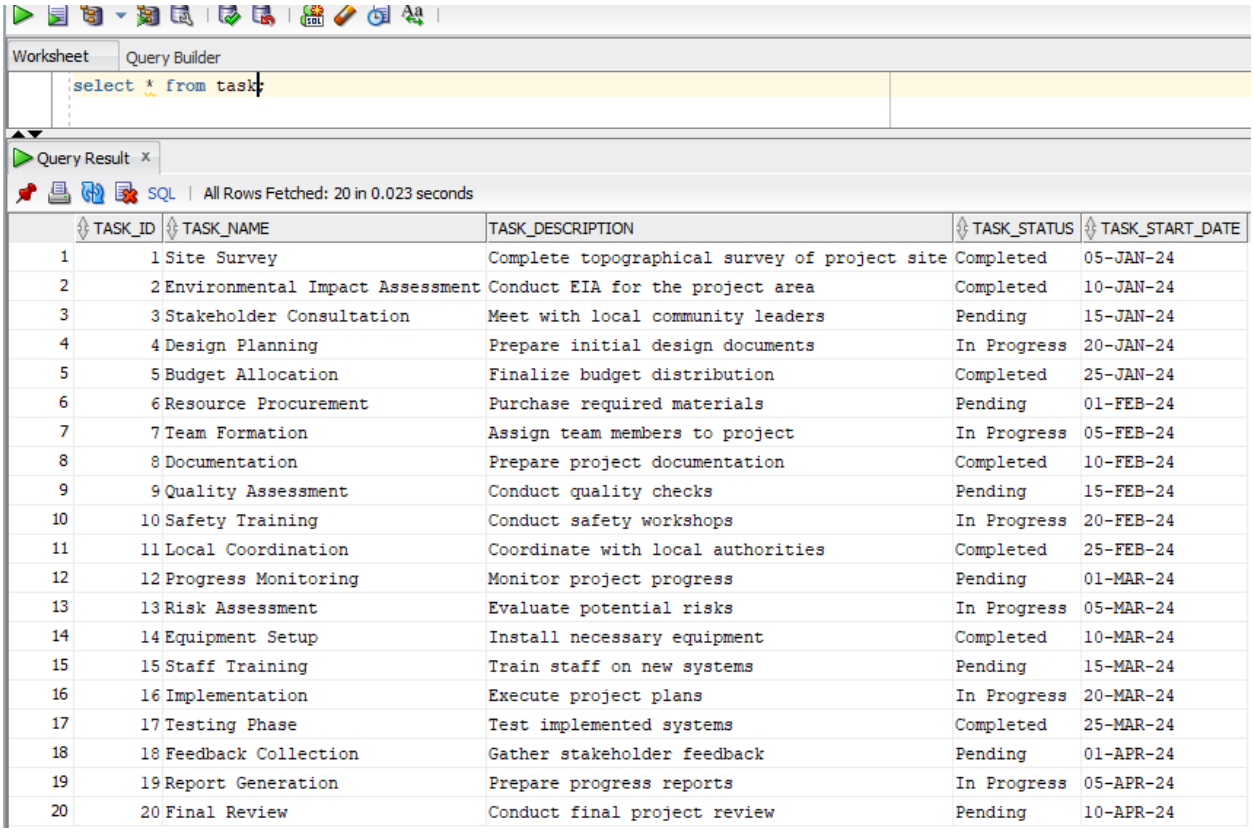
Query Result

SQL | All Rows Fetched: 20 in 0.031 seconds

	SUBTASK_ID	SUBTASK_NAME	SUBTASK_DESCRIPTION	SUBTASK_STATUS	TASK_TASK_ID
1	1	Ground Preparation	Prepare site ground for construction	In Progress	1
2	2	Wildlife Survey	Document local wildlife species	Completed	2
3	3	Community Meeting	Organize local community gathering	Pending	3
4	4	Blueprint Review	Review initial design blueprints	In Progress	4
5	5	Cost Estimation	Estimate project costs in detail	Completed	5
6	6	Vendor Selection	Select vendors for materials	Pending	6
7	7	Role Assignment	Assign specific roles to team members	In Progress	7
8	8	File Organization	Organize project documentation	Completed	8
9	9	Site Inspection	Inspect work quality on site	Pending	9
10	10	Workshop Planning	Plan safety workshop schedule	In Progress	10
11	11	Permit Processing	Process required permits	Completed	11
12	12	Timeline Review	Review project timeline	Pending	12
13	13	Hazard Identification	Identify potential hazards	In Progress	13
14	14	System Testing	Test installed equipment	Completed	14
15	15	Manual Preparation	Prepare training manuals	Pending	15
16	16	Phase Planning	Plan implementation phases	In Progress	16
17	17	Performance Check	Check system performance	Completed	17
18	18	Survey Distribution	Distribute feedback surveys	Pending	18
19	19	Data Compilation	Compile report data	In Progress	19
20	20	Checklist Preparation	Prepare review checklist	Pending	20

Figure 25: Subtask table select statements

8.3.7 Task Table



Worksheet | Query Builder

```
select * from task;
```

Query Result

SQL | All Rows Fetched: 20 in 0.023 seconds

	TASK_ID	TASK_NAME	TASK_DESCRIPTION	TASK_STATUS	TASK_START_DATE
1	1	Site Survey	Complete topographical survey of project site	Completed	05-JAN-24
2	2	Environmental Impact Assessment	Conduct EIA for the project area	Completed	10-JAN-24
3	3	Stakeholder Consultation	Meet with local community leaders	Pending	15-JAN-24
4	4	Design Planning	Prepare initial design documents	In Progress	20-JAN-24
5	5	Budget Allocation	Finalize budget distribution	Completed	25-JAN-24
6	6	Resource Procurement	Purchase required materials	Pending	01-FEB-24
7	7	Team Formation	Assign team members to project	In Progress	05-FEB-24
8	8	Documentation	Prepare project documentation	Completed	10-FEB-24
9	9	Quality Assessment	Conduct quality checks	Pending	15-FEB-24
10	10	Safety Training	Conduct safety workshops	In Progress	20-FEB-24
11	11	Local Coordination	Coordinate with local authorities	Completed	25-FEB-24
12	12	Progress Monitoring	Monitor project progress	Pending	01-MAR-24
13	13	Risk Assessment	Evaluate potential risks	In Progress	05-MAR-24
14	14	Equipment Setup	Install necessary equipment	Completed	10-MAR-24
15	15	Staff Training	Train staff on new systems	Pending	15-MAR-24
16	16	Implementation	Execute project plans	In Progress	20-MAR-24
17	17	Testing Phase	Test implemented systems	Completed	25-MAR-24
18	18	Feedback Collection	Gather stakeholder feedback	Pending	01-APR-24
19	19	Report Generation	Prepare progress reports	In Progress	05-APR-24
20	20	Final Review	Conduct final project review	Pending	10-APR-24

Figure 26: Task Table select statement

8.3.8 User Project Table

Worksheet | Query Builder

```
select * from user_project;
```

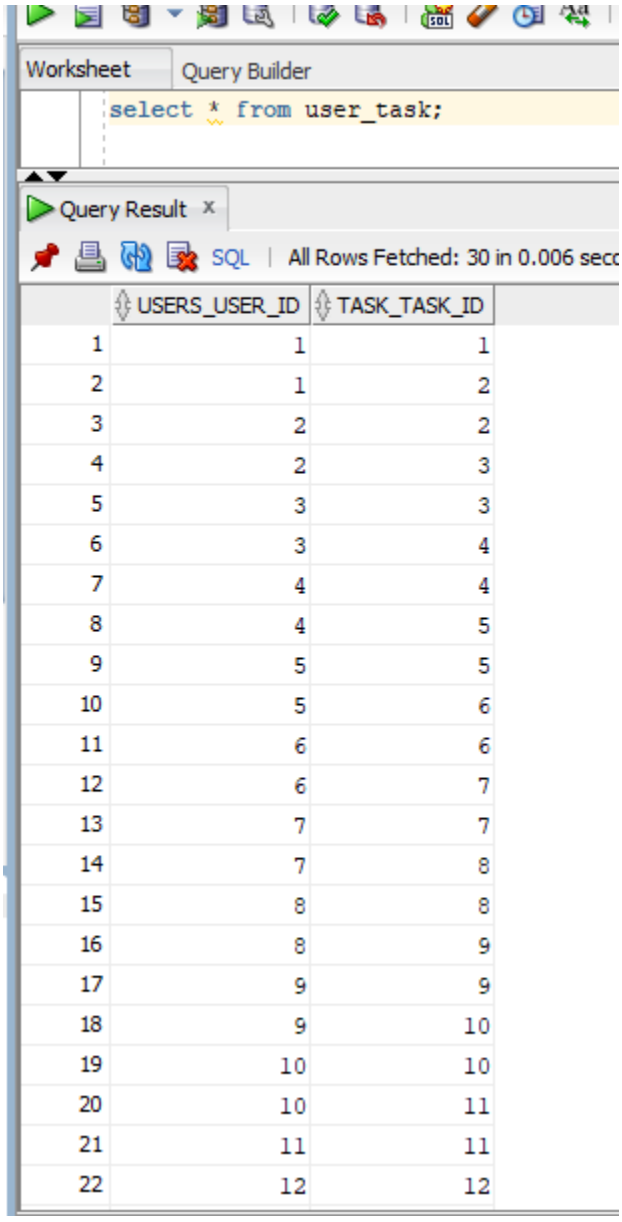
Query Result

SQL | All Rows Fetched: 31 in 0.019 seconc

	USERS_USER_ID	PROJECT_PROJECT_ID
1	1	1
2	1	11
3	2	1
4	2	12
5	3	2
6	3	4
7	3	13
8	4	2
9	4	14
10	5	3
11	5	15
12	6	3
13	6	12
14	6	16
15	7	4
16	7	17
17	8	4
18	8	5
19	8	18
20	9	19
21	10	5
22	10	20

Figure 27: User Project Table

8.3.9 User Task Table



	USERS_USER_ID	TASK_TASK_ID
1	1	1
2	1	2
3	2	2
4	2	3
5	3	3
6	3	4
7	4	4
8	4	5
9	5	5
10	5	6
11	6	6
12	6	7
13	7	7
14	7	8
15	8	8
16	8	9
17	9	9
18	9	10
19	10	10
20	10	11
21	11	11
22	12	12

Figure 28: User Task Table

8.3.10 User Project Task Table

Worksheet | Query Builder

```
select * from user_project_task;
```

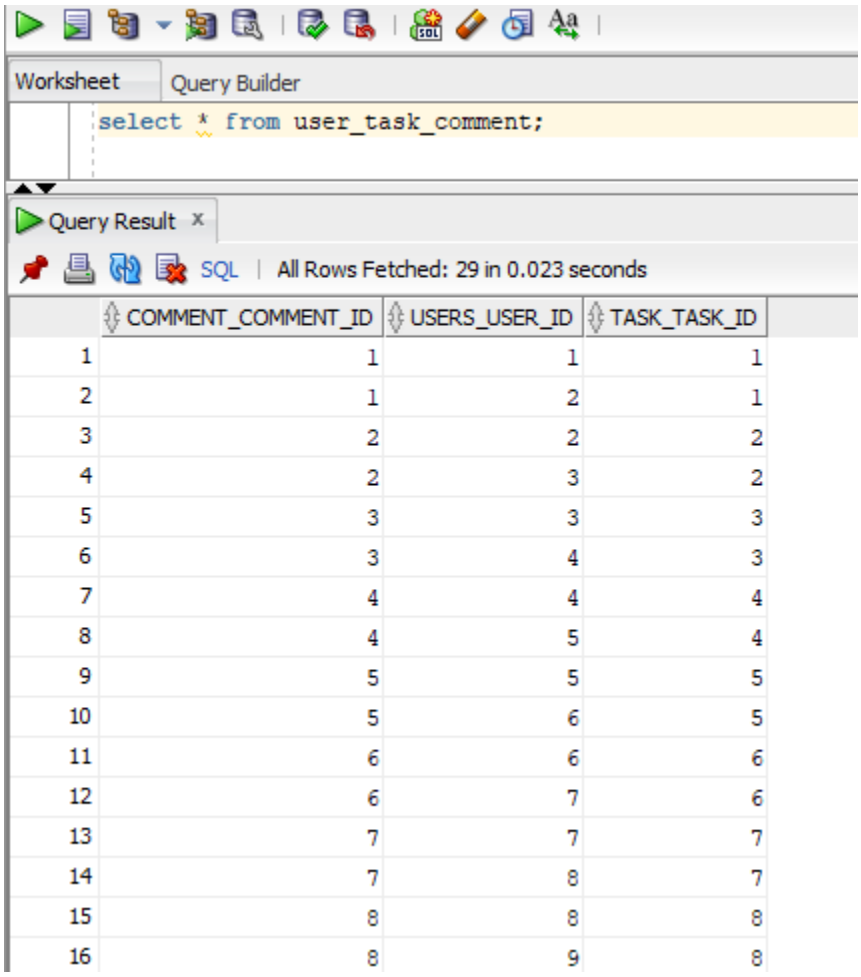
Query Result

SQL | All Rows Fetched: 30 in 0.028 seconds

	USERS_USER_ID	TASK_TASK_ID	PROJECT_PROJECT_ID
1	1	1	1
2	1	2	11
3	2	2	1
4	2	3	12
5	3	3	2
6	3	4	13
7	4	4	2
8	4	5	14
9	5	5	3
10	5	6	15
11	6	6	3
12	6	7	16
13	7	7	4
14	7	8	17
15	8	8	4

Figure 29: User Project Task Table

8.3.11 User Task Comment Table



Worksheet | Query Builder

```
select * from user_task_comment;
```

Query Result

SQL | All Rows Fetched: 29 in 0.023 seconds

	COMMENT_COMMENT_ID	USERS_USER_ID	TASK_TASK_ID
1	1	1	1
2	1	2	1
3	2	2	2
4	2	3	2
5	3	3	3
6	3	4	3
7	4	4	4
8	4	5	4
9	5	5	5
10	5	6	5
11	6	6	6
12	6	7	6
13	7	7	7
14	7	8	7
15	8	8	8
16	8	9	8

Figure 30: User Task Comment Table

9 Form

9.1 Home Page

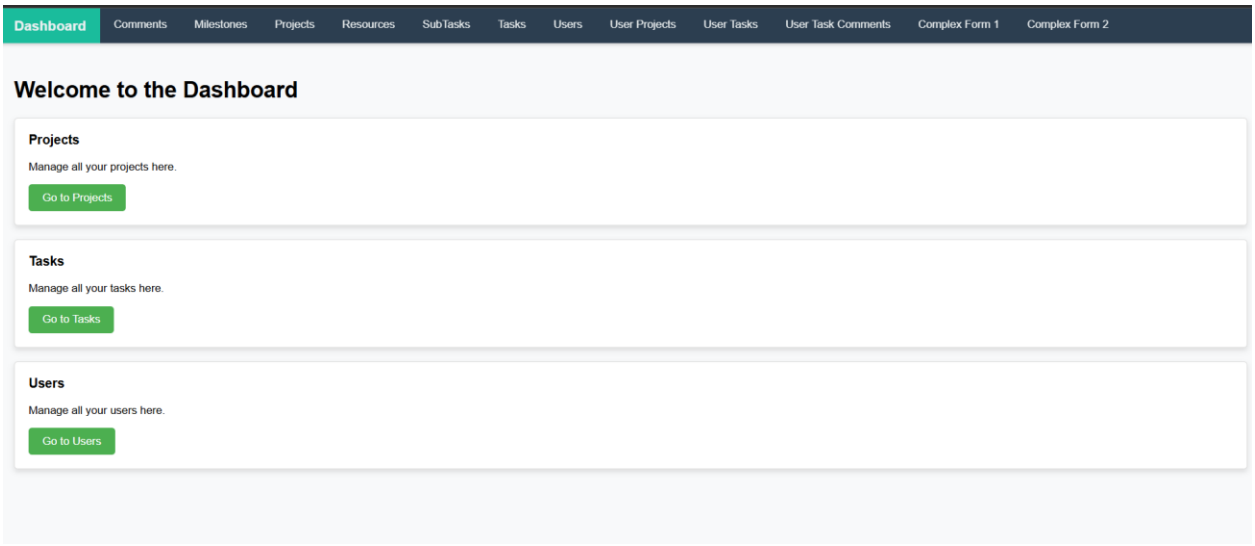


Figure 31: Home Page

9.2 Basic Web Forms

9.2.1 Users Page

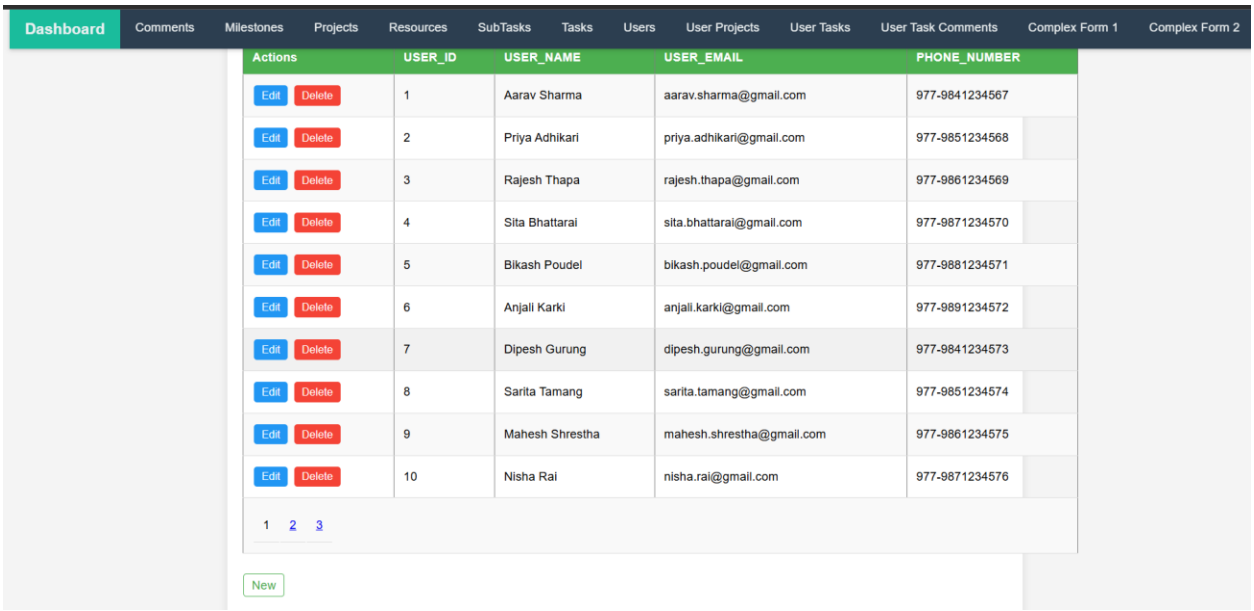


Figure 32: User web form

9.2.2 Project Page

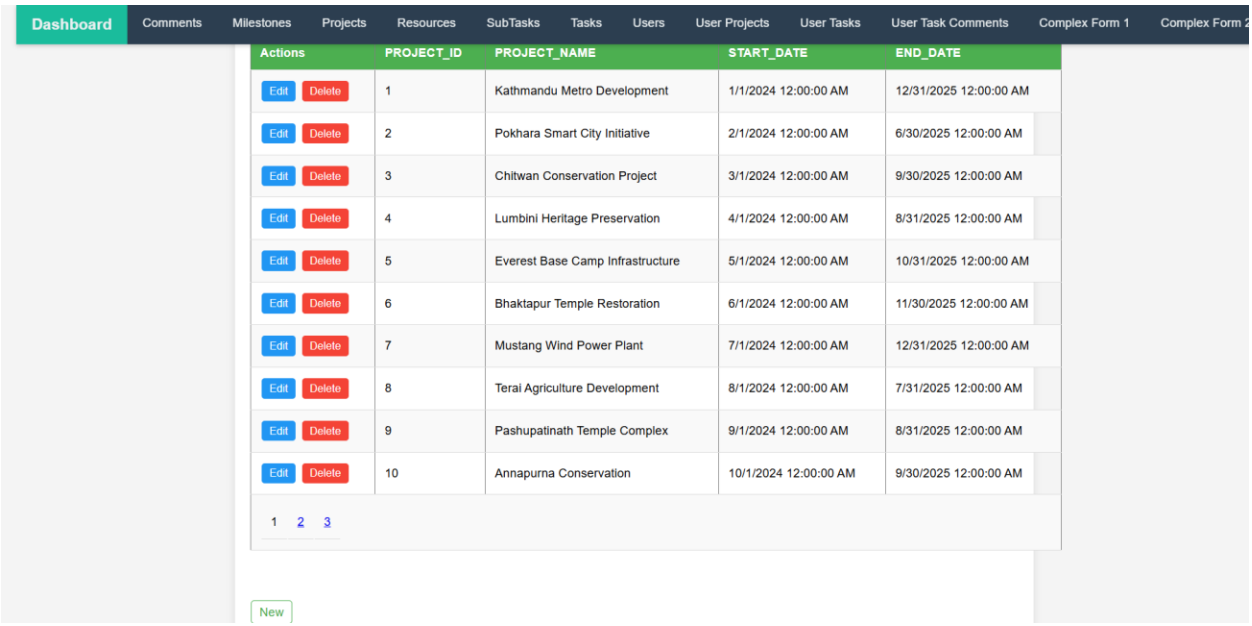
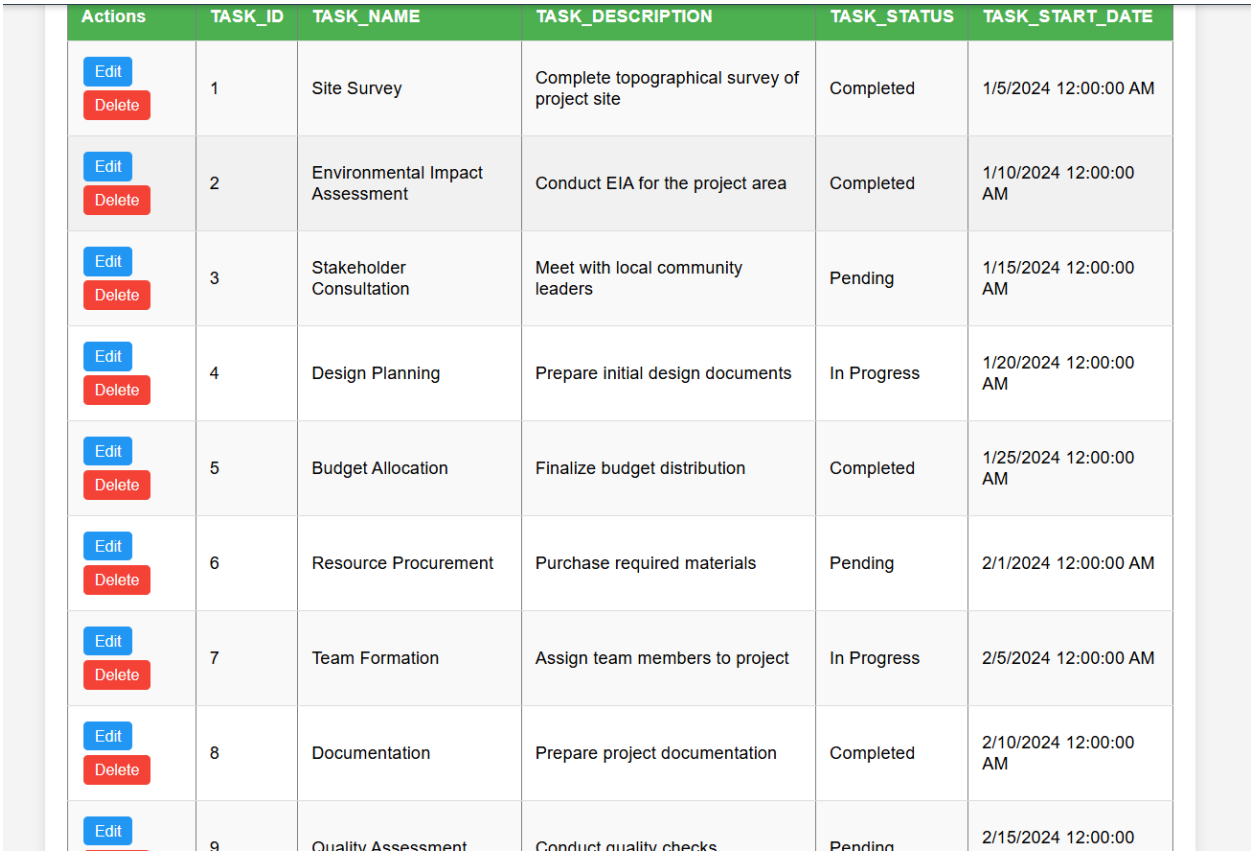


Figure 33: Project web from

9.2.3 Task Page



Actions	TASK_ID	TASK_NAME	TASK_DESCRIPTION	TASK_STATUS	TASK_START_DATE
Edit Delete	1	Site Survey	Complete topographical survey of project site	Completed	1/5/2024 12:00:00 AM
Edit Delete	2	Environmental Impact Assessment	Conduct EIA for the project area	Completed	1/10/2024 12:00:00 AM
Edit Delete	3	Stakeholder Consultation	Meet with local community leaders	Pending	1/15/2024 12:00:00 AM
Edit Delete	4	Design Planning	Prepare initial design documents	In Progress	1/20/2024 12:00:00 AM
Edit Delete	5	Budget Allocation	Finalize budget distribution	Completed	1/25/2024 12:00:00 AM
Edit Delete	6	Resource Procurement	Purchase required materials	Pending	2/1/2024 12:00:00 AM
Edit Delete	7	Team Formation	Assign team members to project	In Progress	2/5/2024 12:00:00 AM
Edit Delete	8	Documentation	Prepare project documentation	Completed	2/10/2024 12:00:00 AM
Edit	9	Quality Assessment	Conduct quality checks	Pending	2/15/2024 12:00:00

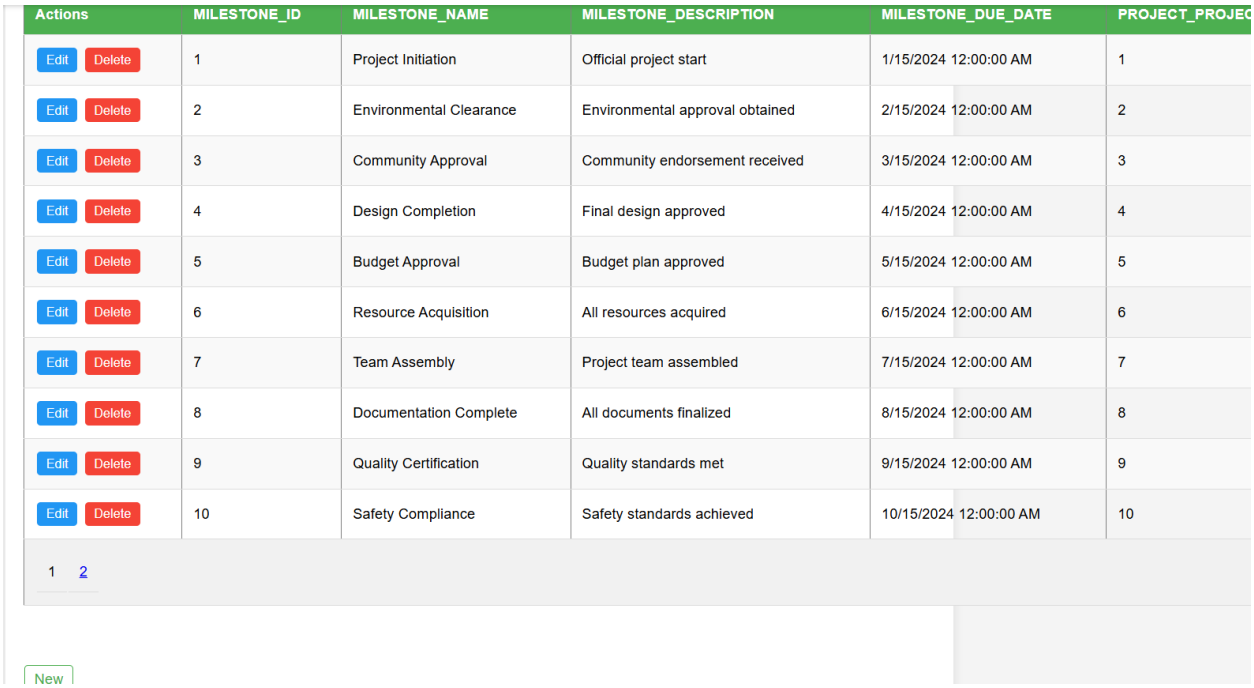
Figure 34: Task web form

9.2.4 Sub task Page

Actions	SUBTASK_ID	SUBTASK_NAME	SUBTASK_DESCRIPTION	SUBTASK_STATUS	TASK_TASK_ID
Edit Delete	1	Ground Preparation	Prepare site ground for construction	In Progress	1
Edit Delete	2	Wildlife Survey	Document local wildlife species	Completed	2
Edit Delete	3	Community Meeting	Organize local community gathering	Pending	3
Edit Delete	4	Blueprint Review	Review initial design blueprints	In Progress	4
Edit Delete	5	Cost Estimation	Estimate project costs in detail	Completed	5
Edit Delete	6	Vendor Selection	Select vendors for materials	Pending	6
Edit Delete	7	Role Assignment	Assign specific roles to team members	In Progress	7
Edit Delete	8	File Organization	Organize project documentation	Completed	8
Edit	9	Site Inspection	Inspect work quality on site	Pending	9

Figure 35: Subtask webform

9.2.5 Milestone Page



Actions	MILESTONE_ID	MILESTONE_NAME	MILESTONE_DESCRIPTION	MILESTONE_DUE_DATE	PROJECT_PROJEC
Edit Delete	1	Project Initiation	Official project start	1/15/2024 12:00:00 AM	1
Edit Delete	2	Environmental Clearance	Environmental approval obtained	2/15/2024 12:00:00 AM	2
Edit Delete	3	Community Approval	Community endorsement received	3/15/2024 12:00:00 AM	3
Edit Delete	4	Design Completion	Final design approved	4/15/2024 12:00:00 AM	4
Edit Delete	5	Budget Approval	Budget plan approved	5/15/2024 12:00:00 AM	5
Edit Delete	6	Resource Acquisition	All resources acquired	6/15/2024 12:00:00 AM	6
Edit Delete	7	Team Assembly	Project team assembled	7/15/2024 12:00:00 AM	7
Edit Delete	8	Documentation Complete	All documents finalized	8/15/2024 12:00:00 AM	8
Edit Delete	9	Quality Certification	Quality standards met	9/15/2024 12:00:00 AM	9
Edit Delete	10	Safety Compliance	Safety standards achieved	10/15/2024 12:00:00 AM	10

1 2

New

Figure 36: Milestone page

9.3 Complex web Form and Queries

9.3.1 User Project

- **Query**

SELECT p.PROJECT_ID, p.PROJECT_NAME, p.START_DATE, p.END_DATE, u.USER_ID, u.USER_NAME, u.USER_EMAIL, u.PHONE_NUMBER FROM PROJECT p, USER_PROJECT up, USERS u WHERE p.PROJECT_ID = up.PROJECT_PROJECT_ID AND up.USERS_USER_ID = u.USER_ID AND (u.USER_ID = :users)

- **Complex Form**

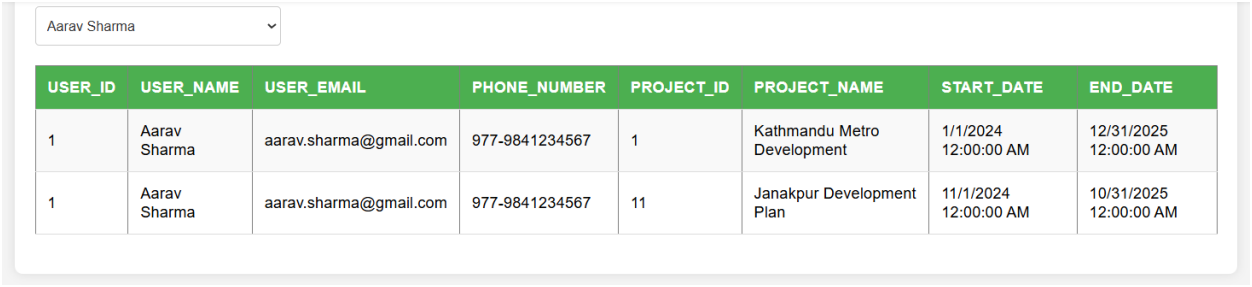


Figure 37: Complex form User Project

9.3.2 Project Milestone

- **Query**

SELECT p.PROJECT_ID, p.PROJECT_NAME, m.MILESTONE_ID, m.MILESTONE_NAME, m.MILESTONE_DESCRIPTION, m.MILESTONE_DUE_DATE FROM PROJECT p, MILESTONE m WHERE p.PROJECT_ID = m.PROJECT_PROJECT_ID AND (p.PROJECT_ID = :product)

- **Complex Form**

Figure 38: Complex form User Milestone

10 Further Discussion

10.1 Tools and Technology

- ASP.NET – For developing the web-based database application
- C# Primary backend programming language.
- Oracle SQL Developer Data Modeler – Used for designing and modelling the database schema
- Oracle SQL Developer – For database management and execution of SQL queries.
- Microsoft Visual Studio – Integrated Development Environment (IDE) for coding and debugging the application.
- Microsoft Word – For documentation and report preparation.

11 Conclusion

The project required creating a web-based database application through combination of ASP.NET Complete and C programming language with Oracle SQL Developer technology. The project task involved creating an Entity-Relationship Diagram (ERD) alongside normalization steps and system development for controlling project task management efficiently. Hands-on work delivered practical abilities to model databases and perform SQL queries in addition to building entire web applications.

The project results proved that standardized database planning systems lead to better data security and integrity as well as system performance in actual business implementations. The opportunity to work with ASP.NET alongside C enabled us to discover important aspects of current web application creation methods. Our education has refined our capacity to create software properly while resolving problems effectively and handling databases proficiently which readies us for future workplace requirements in the field.

12 Bibliography

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