CMPE 321 - Assignment III
Project Management System

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Spring Term, 2018

Contents

1 Introduction

This application is about Project Management System. We have two types of logged in users: Admin and Project Manager. Admin can CRUD (create-read-update-delete) operations of Project Managers, Projects and Employees. In addition to this, admin can assign a project to a project manager. On the other hand, Project Manager can CRUD (create-read-update-delete) operations of Tasks. In addition to this, Project Manager can assign a task to a project and a task to an employee. You can register as an Admin, but you cannot register as a Project Manager. A project manager can be only created by an Admin.

I implemented this assignment with PHP Laravel Framework and MySQL. Also, I used some useful packages for frontend ui such as Admin LTE and table. For easy deployment, I used Docker. For using Docker, I wrote some configuration files and etc. Now, if you run '$ bash deploy.sh', you can reach the system in your localhost with the port 8000. My project has a lot of directories, but with this design we can separate each module easily. I used generally ORM (Object Relational Model) in my project. However, in some parts like stored procedures, triggers and some additional parts, I used pure SQL queries. Laravel has SQL injection protection but I did not use this built-in functions, and customized login function. Then, I added my SQL injection protection to the project.

2 Interface

This project has three parts: Front End (for regular users or employees), Admin Panel and Project Manager Panel. I added screen shots for each part.

2.1 Guest User or Employee

This part of the project for guest, regular users or employees. This screens are only read-only. No one can change any entity in these pages.

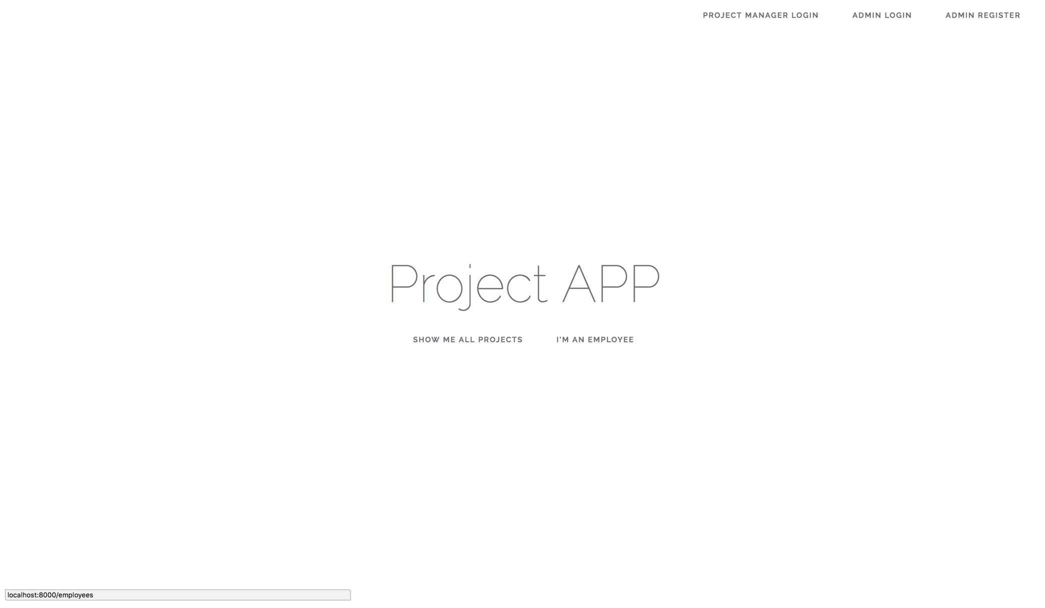
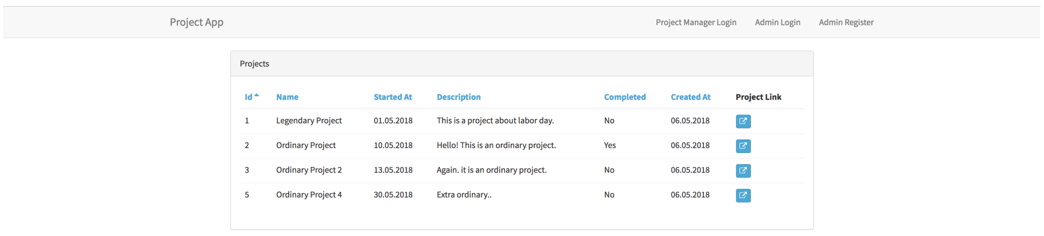


Figure 1: Home Page

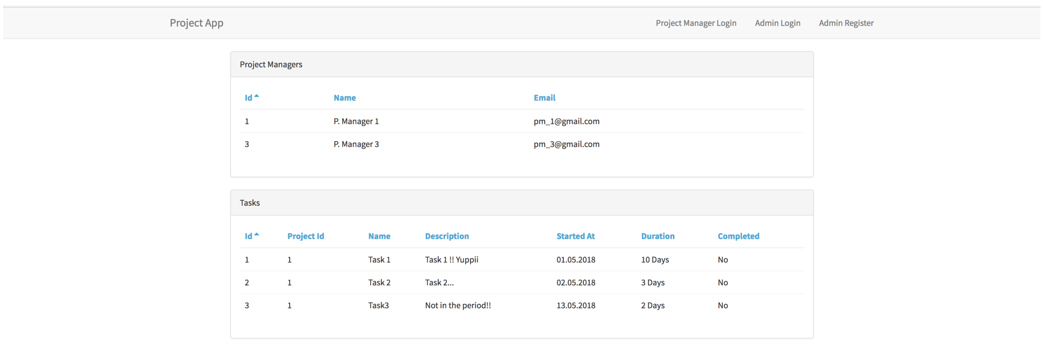

Project App

Project Manager Login Admin Login Admin Register

Projects

Id	Name	Started At	Description	Completed	Created At	Project Link
1	Legendary Project	01.05.2018	This is a project about labor day.	No	06.05.2018	↗
2	Ordinary Project	10.05.2018	Hello! This is an ordinary project.	Yes	06.05.2018	↗
3	Ordinary Project 2	13.05.2018	Again. it is an ordinary project.	No	06.05.2018	↗
5	Ordinary Project 4	30.05.2018	Extra ordinary..	No	06.05.2018	↗

Figure 2: Projects Page


Project App

Project Manager Login Admin Login Admin Register

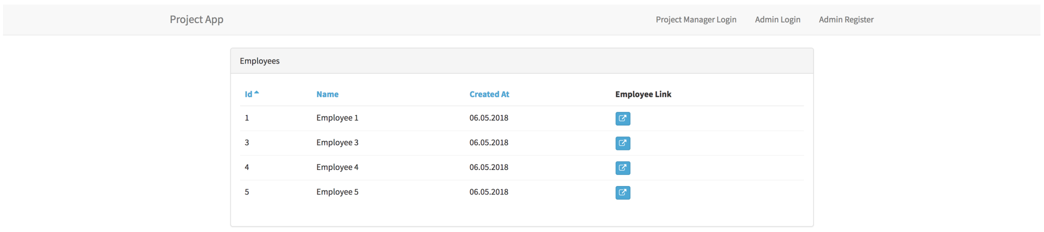
Project Managers

Id	Name	Email
1	P. Manager 1	pm_1@gmail.com
3	P. Manager 3	pm_3@gmail.com

Tasks

Id	Project Id	Name	Description	Started At	Duration	Completed
1	1	Task 1	Task 1 !! Yuppii	01.05.2018	10 Days	No
2	1	Task 2	Task 2...	02.05.2018	3 Days	No
3	1	Task3	Not in the period!!	13.05.2018	2 Days	No

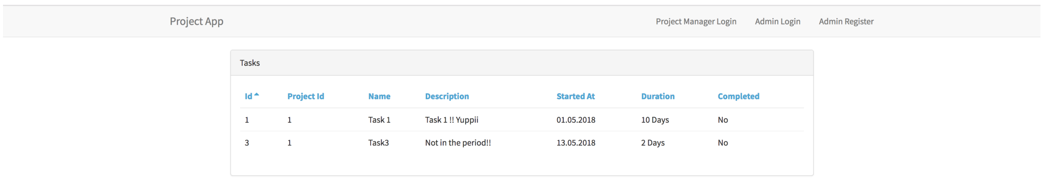
Figure 3: Project Page



Employees

Id	Name	Created At	Employee Link
1	Employee 1	06.05.2018	
3	Employee 3	06.05.2018	
4	Employee 4	06.05.2018	
5	Employee 5	06.05.2018	

Figure 4: Employees Page



Tasks

Id	Project Id	Name	Description	Started At	Duration	Completed
1	1	Task 1	Task 1 !! Yuppii	01.05.2018	10 Days	No
3	1	Task3	Not in the period!!	13.05.2018	2 Days	No

Figure 5: Employee Page

2.2 Admin

This part of the project for admin users. This screens can only be reached by a logged in admin.

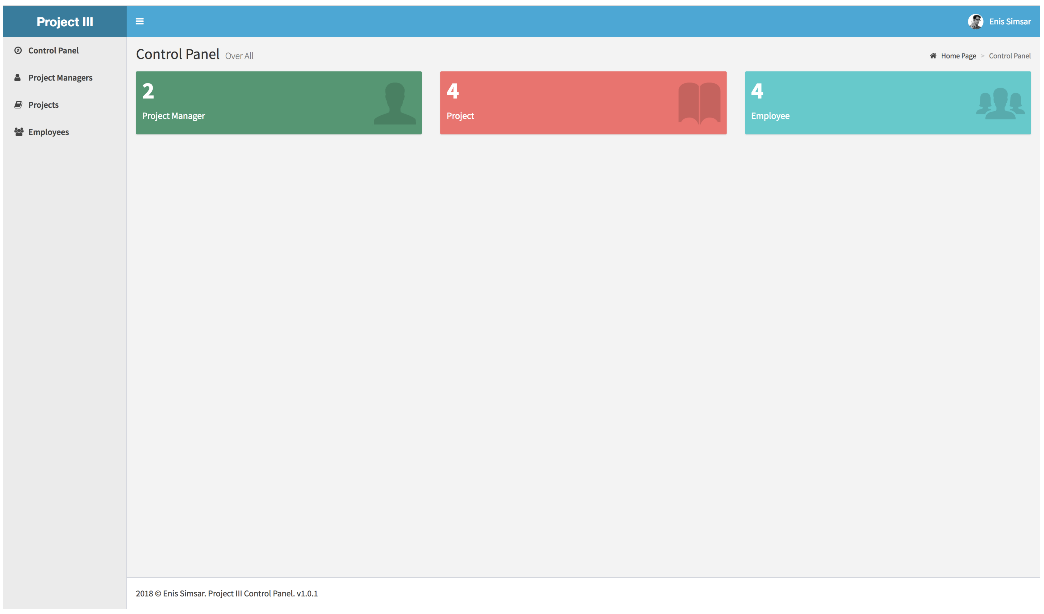
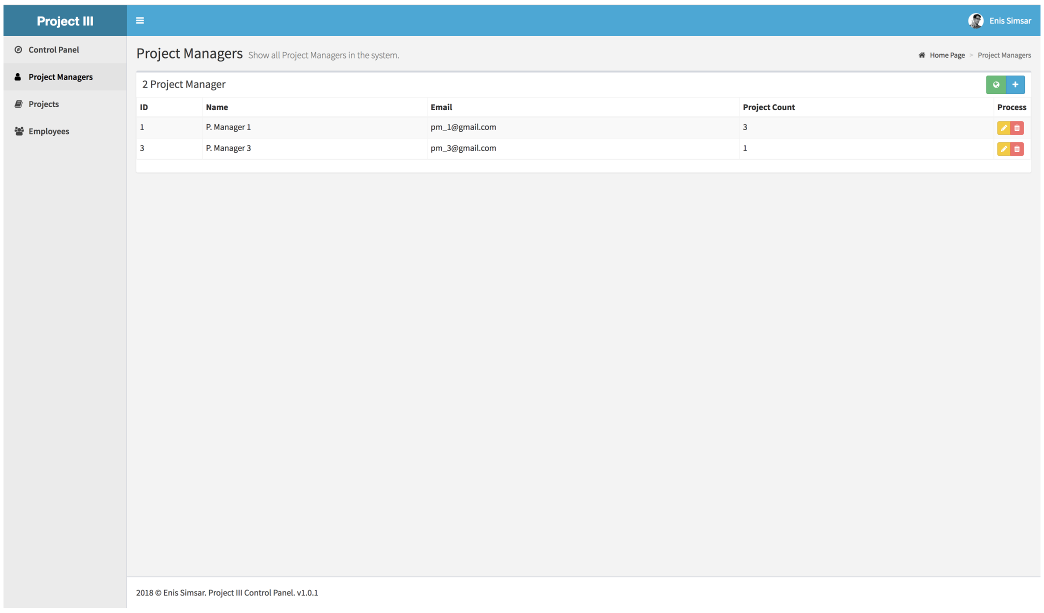


Figure 6: Admin Dashboard Page



Project Managers Show all Project Managers in the system.

2 Project Manager

ID	Name	Email	Project Count	Process
1	P. Manager 1	pm_1@gmail.com	3	
3	P. Manager 3	pm_3@gmail.com	1	

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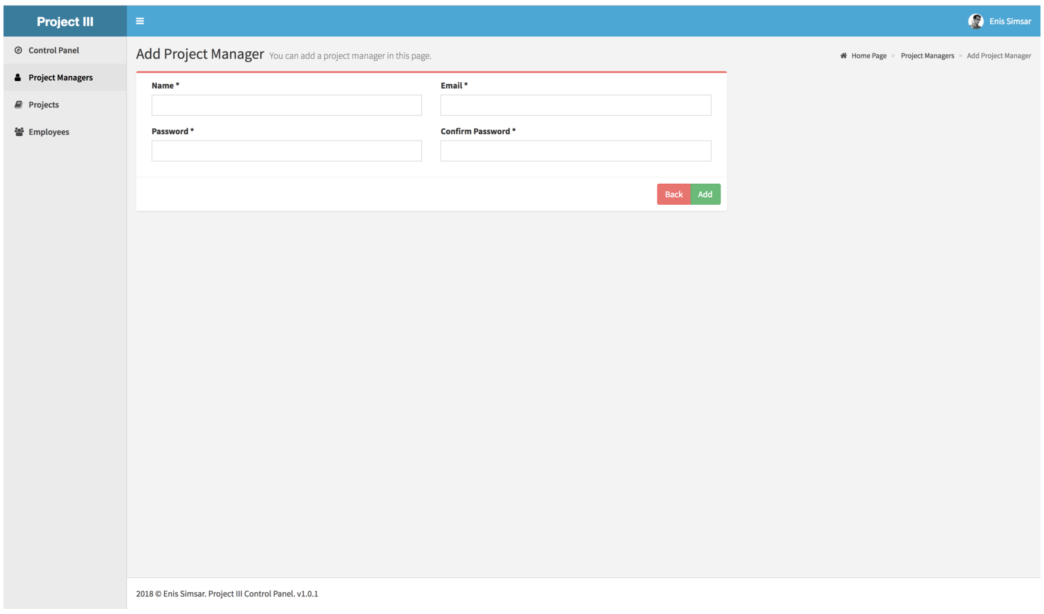
Figure 7: Project Manager Index Page



Add Project Manager You can add a project manager in this page.

Name *	Email *
Password *	Confirm Password *

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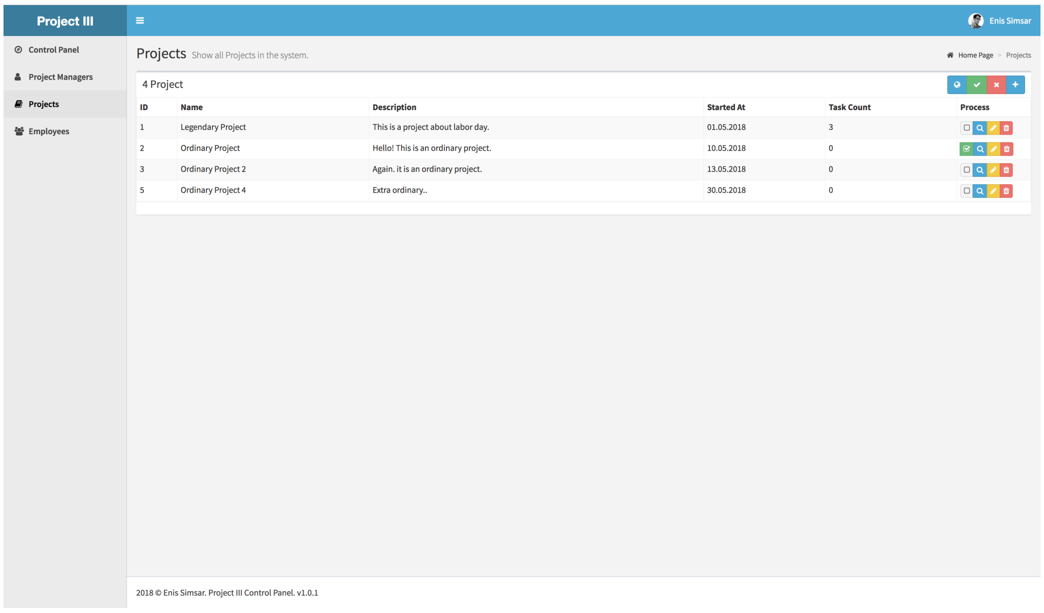
Figure 8: Project Manager Create Page



Projects Show all Projects in the system.

Home Page > Projects

4 Project

ID	Name	Description	Started At	Task Count	Process
1	Legendary Project	This is a project about labor day.	01.05.2018	3	
2	Ordinary Project	Hello! This is an ordinary project.	10.05.2018	0	
3	Ordinary Project 2	Again. it is an ordinary project.	13.05.2018	0	
5	Ordinary Project 4	Extra ordinary..	30.05.2018	0	

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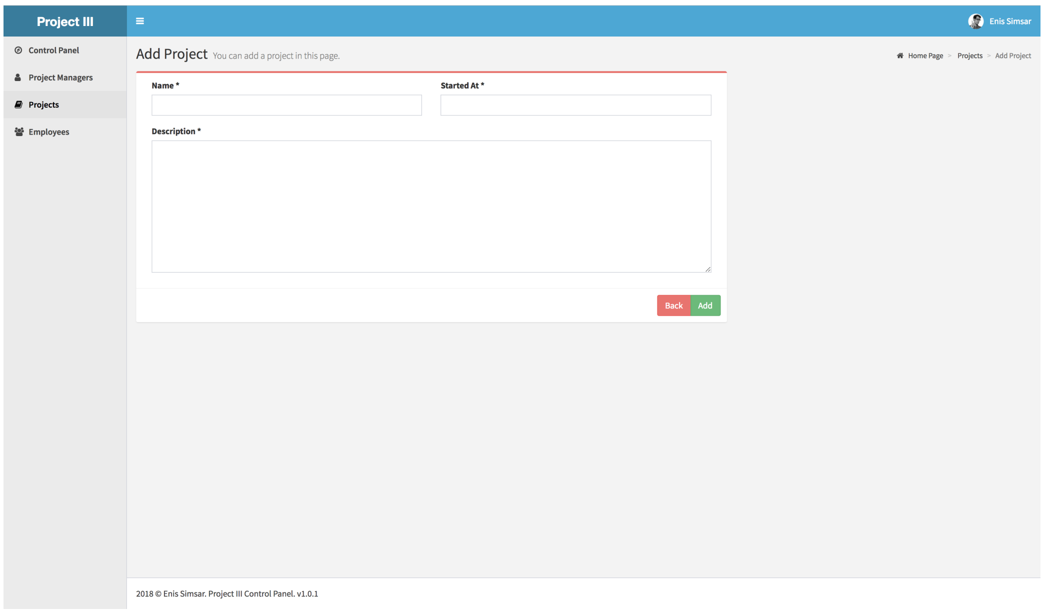
Figure 9: Project Index Page



Add Project You can add a project in this page.

Home Page > Projects > Add Project

Name *

Started At *

Description *

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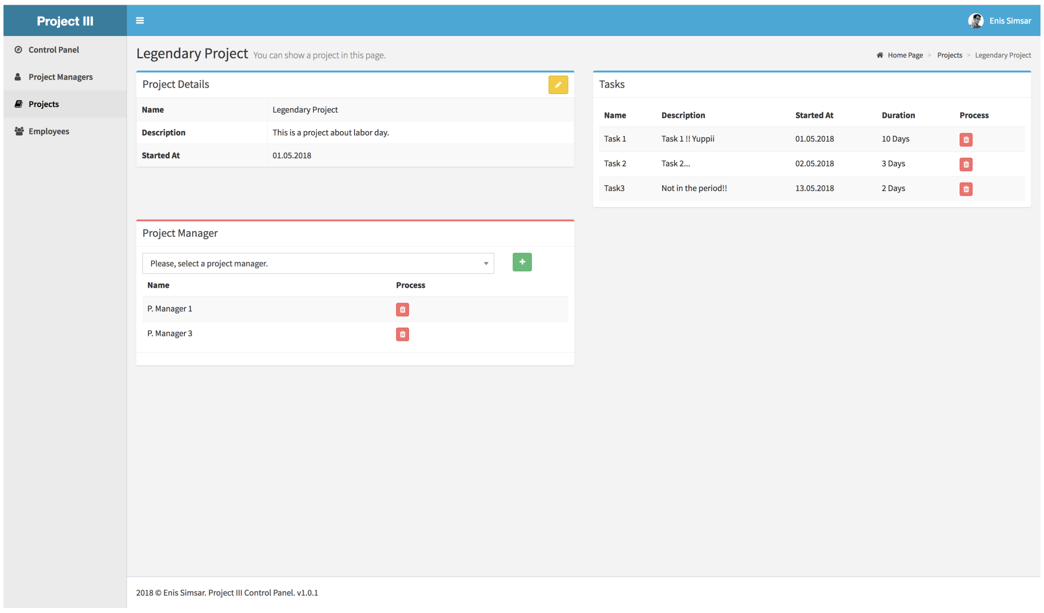
Figure 10: Project Create Page



Legendary Project You can show a project in this page.

Project Details

Name	Legendary Project
Description	This is a project about labor day.
Started At	01.05.2018

Tasks

Name	Description	Started At	Duration	Process
Task 1	Task 1 !! Yuppii	01.05.2018	10 Days	🟥
Task 2	Task 2...	02.05.2018	3 Days	🟥
Task3	Not in the period!!	13.05.2018	2 Days	🟥

Project Manager

Please, select a project manager.

Name	Process
P. Manager 1	🟥
P. Manager 3	🟥

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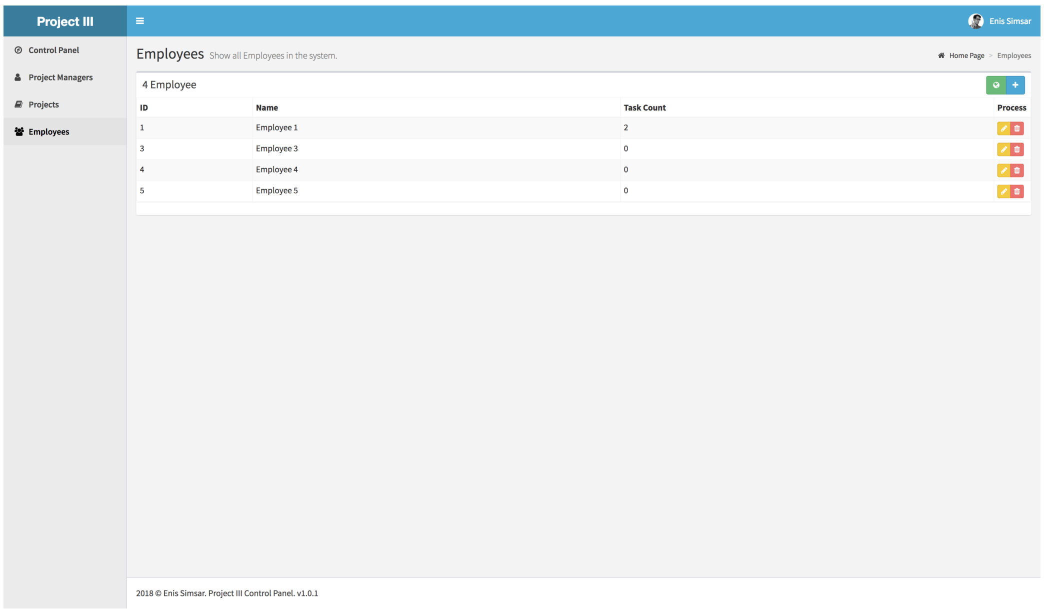
Figure 11: Project Manager Show Page



Employees Show all Employees in the system.

4 Employee

ID	Name	Task Count	Process
1	Employee 1	2	🟨🟥
3	Employee 3	0	🟨🟥
4	Employee 4	0	🟨🟥
5	Employee 5	0	🟨🟥

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Figure 12: Employee Index Page

2.3 Project Manager

This part of the project for project manager users. This screens can only be reached by a logged in project manager.

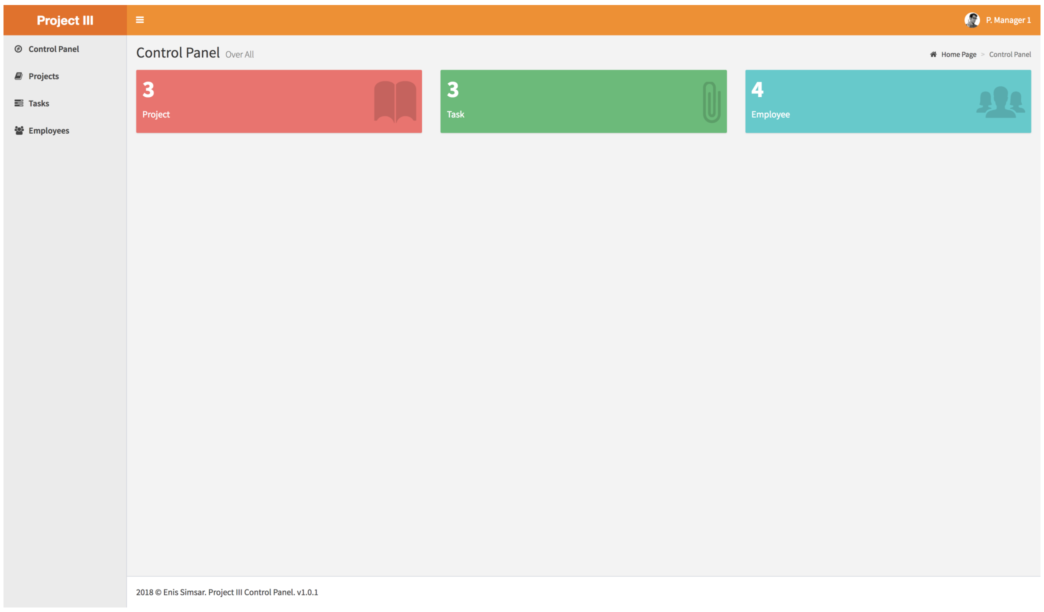
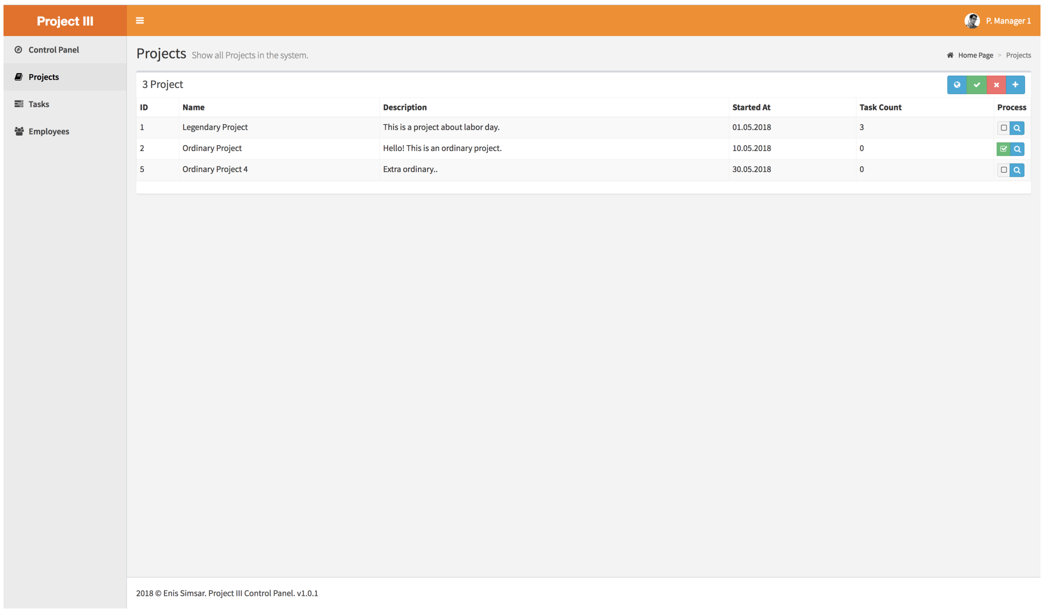


Figure 13: Project Manager Dashboard Page



Projects Show all Projects in the system.

3 Project

ID	Name	Description	Started At	Task Count	Process
1	Legendary Project	This is a project about labor day.	01.05.2018	3	
2	Ordinary Project	Hello! This is an ordinary project.	10.05.2018	0	
5	Ordinary Project 4	Extra ordinary..	30.05.2018	0	

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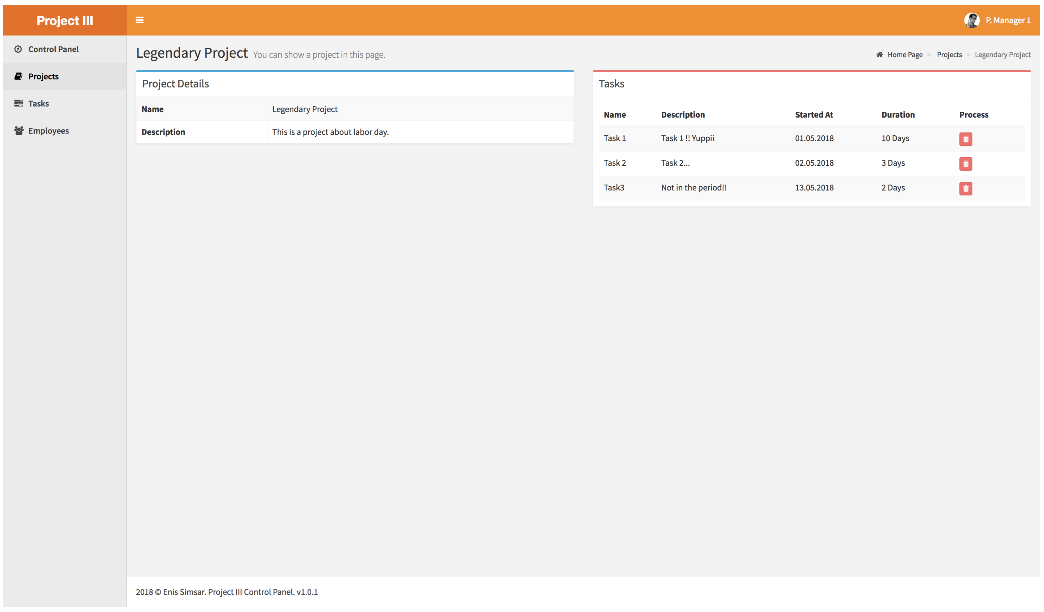
Figure 14: Project Index Page



Legendary Project You can show a project in this page.

Project Details

Name	Legendary Project
Description	This is a project about labor day.

Tasks

Name	Description	Started At	Duration	Process
Task 1	Task 1 !! Yuppii	01.05.2018	10 Days	
Task 2	Task 2...	02.05.2018	3 Days	
Task3	Not in the period!!	13.05.2018	2 Days	

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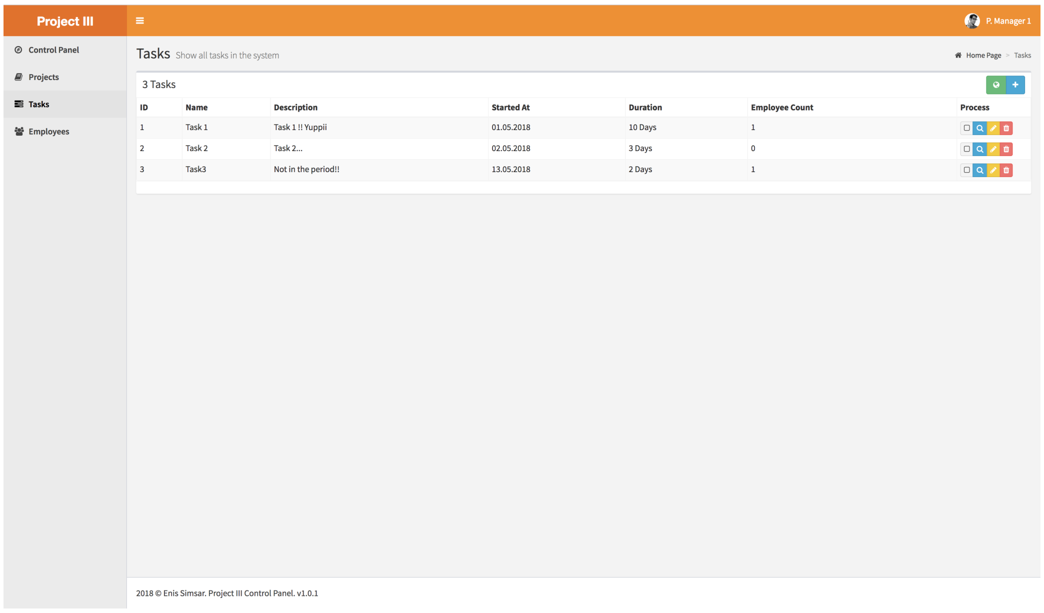
Figure 15: Project Show Page



Tasks Show all tasks in the system

Home Page > Tasks

3 Tasks

ID	Name	Description	Started At	Duration	Employee Count	Process
1	Task 1	Task 1 !! Yuppii	01.05.2018	10 Days	1	
2	Task 2	Task 2...	02.05.2018	3 Days	0	
3	Task3	Not in the period!!	13.05.2018	2 Days	1	

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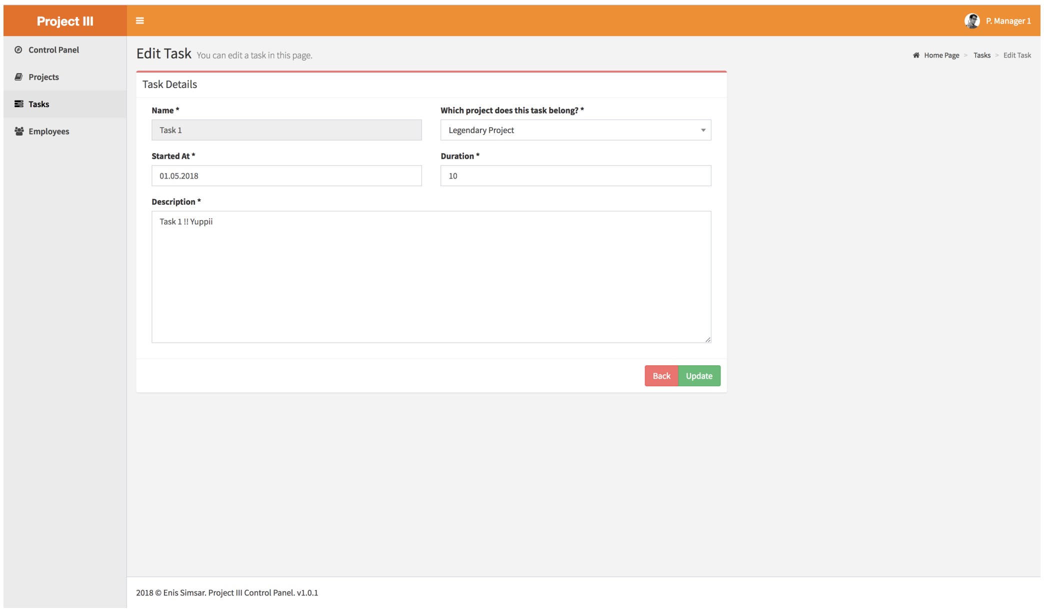
Figure 16: Task Index Page



Edit Task You can edit a task in this page.

Home Page > Tasks > Edit Task

Task Details

Name *: Task 1

Which project does this task belong? *: Legendary Project

Started At *: 01.05.2018

Duration *: 10

Description *: Task 1 !! Yuppii

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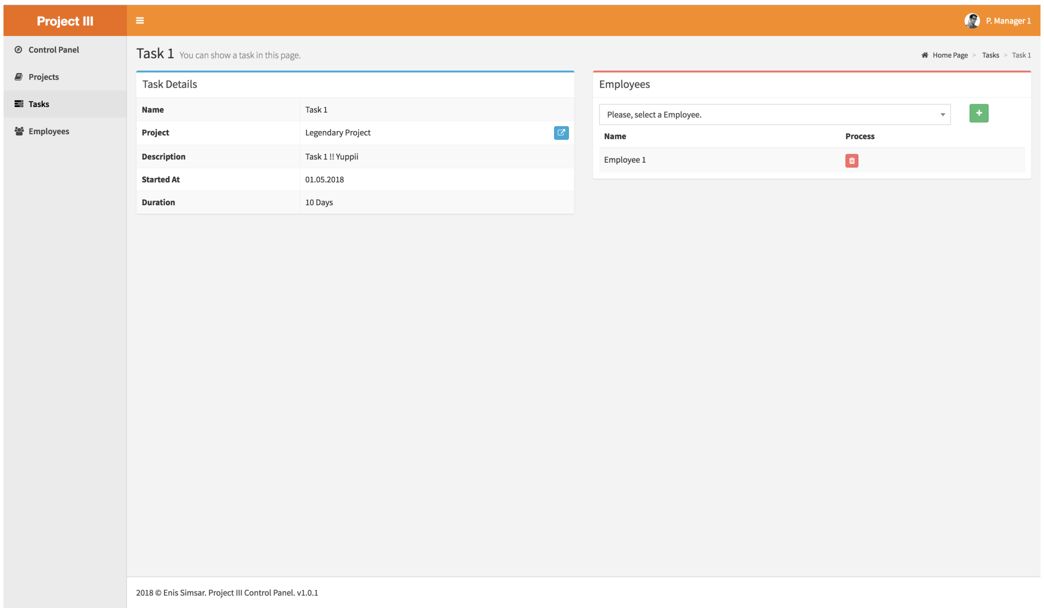
Figure 17: Task Edit Page



Task 1 You can show a task in this page.

Task Details

Name	Task 1
Project	Legendary Project
Description	Task 1 !! Yuppii
Started At	01.05.2018
Duration	10 Days

Employees

Please, select a Employee.

Name	Process
Employee 1	

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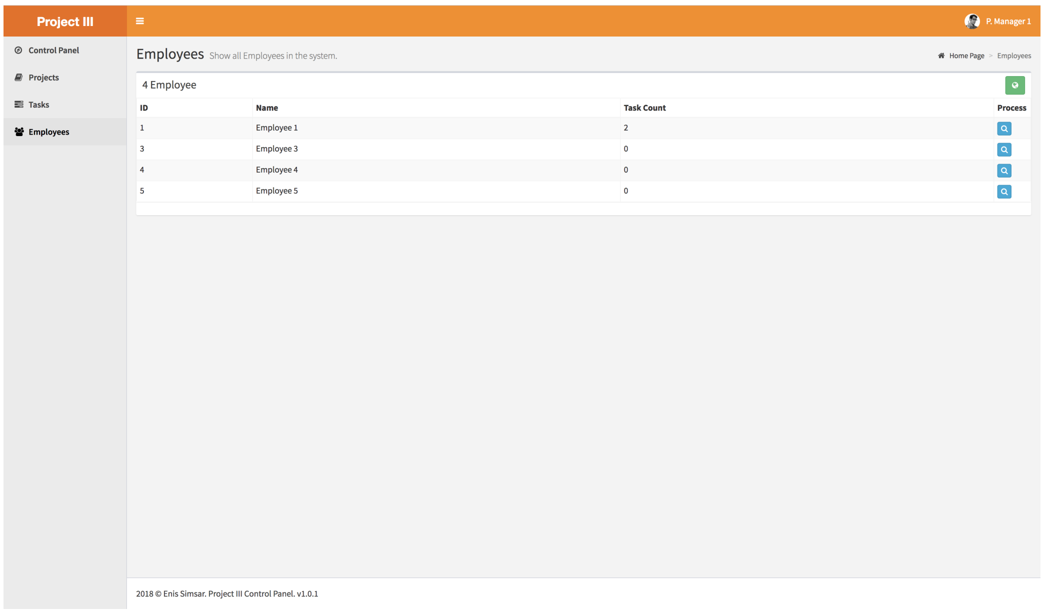
Figure 18: Task Show Page



Employees Show all Employees in the system.

4 Employee

ID	Name	Task Count	Process
1	Employee 1	2	
3	Employee 3	0	
4	Employee 4	0	
5	Employee 5	0	

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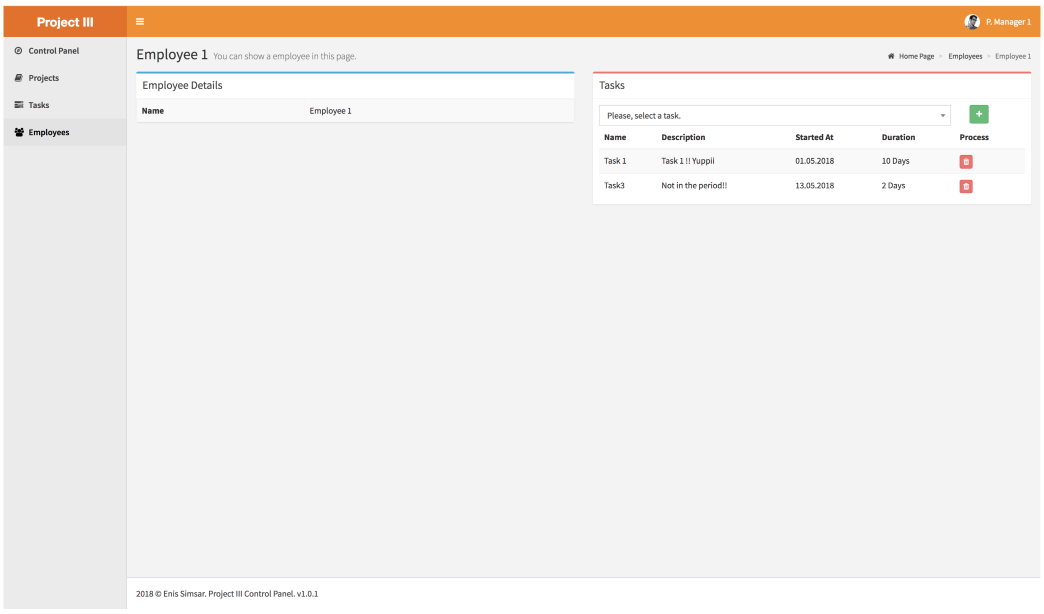
Figure 19: Employee Index Page



Employee 1 You can show a employee in this page.

Employee Details

Name	Employee 1

Tasks

Please, select a task.

Name	Description	Started At	Duration	Process
Task 1	Task 1 !! Yuppii	01.05.2018	10 Days	
Task3	Not in the period!!	13.05.2018	2 Days	

2018 © Enis Simsar. Project III Control Panel. v1.0.1

Figure 20: Employee Show Page

3 Database

3.1 ER Model

I added two ER models as follows.

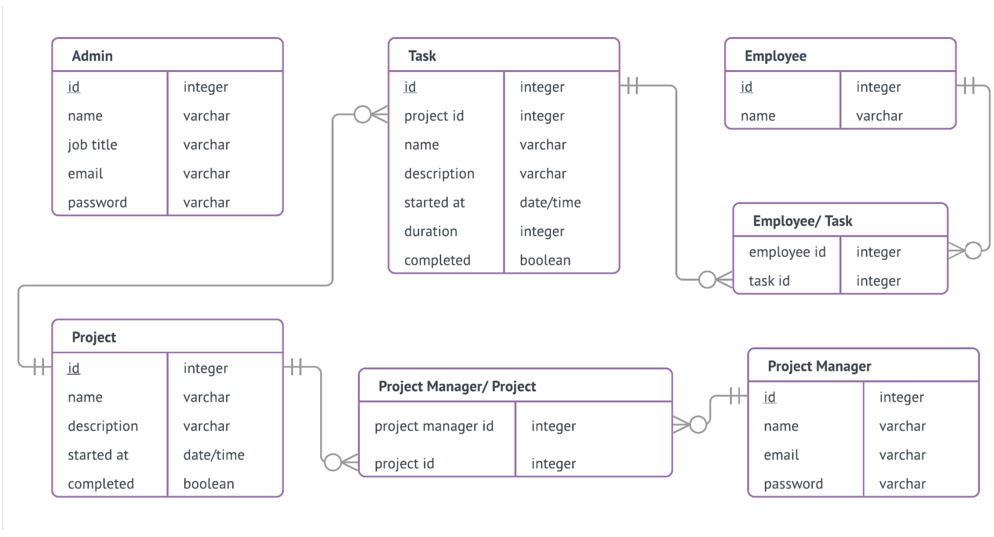


Figure 21: Database ER Diagram

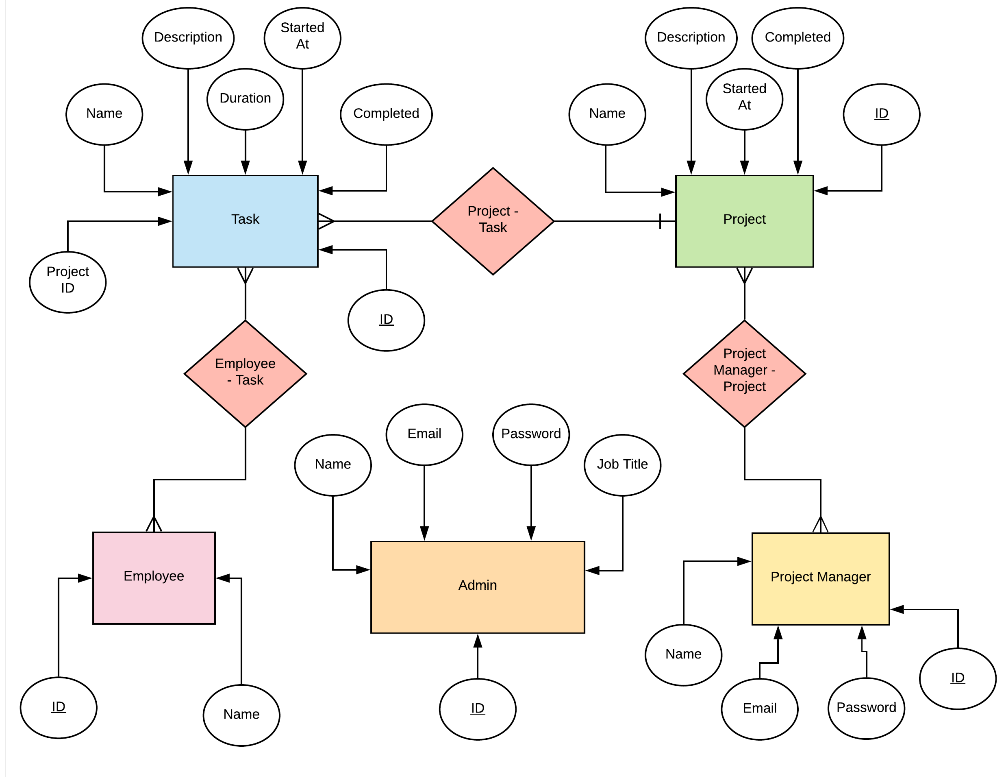
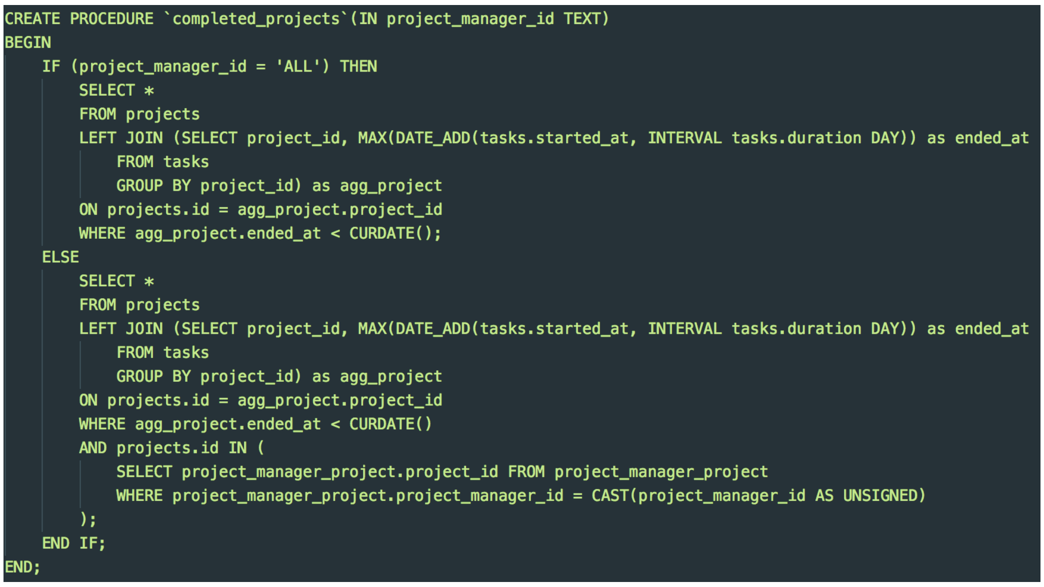


Figure 22: ER Diagram

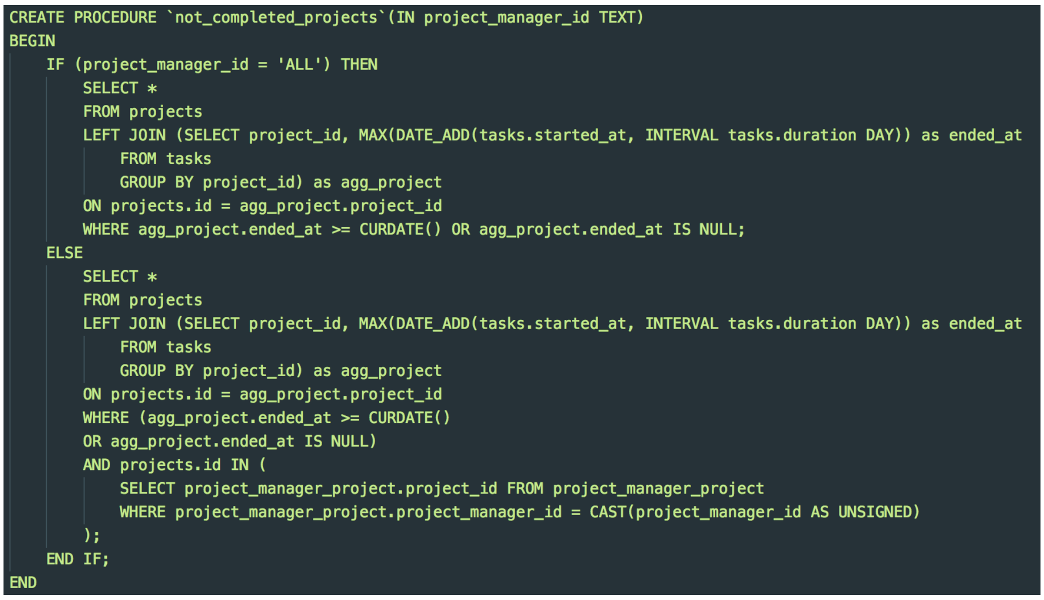
3.2 Stored Procedures

We have two stored procedures as follows.



```
CREATE PROCEDURE `completed_projects`(IN project_manager_id TEXT)
BEGIN
    IF (project_manager_id = 'ALL') THEN
        SELECT *
        FROM projects
        LEFT JOIN (SELECT project_id, MAX(DATE_ADD(tasks.started_at, INTERVAL tasks.duration DAY)) as ended_at
            FROM tasks
            GROUP BY project_id) as agg_project
        ON projects.id = agg_project.project_id
        WHERE agg_project.ended_at < CURDATE();
    ELSE
        SELECT *
        FROM projects
        LEFT JOIN (SELECT project_id, MAX(DATE_ADD(tasks.started_at, INTERVAL tasks.duration DAY)) as ended_at
            FROM tasks
            GROUP BY project_id) as agg_project
        ON projects.id = agg_project.project_id
        WHERE agg_project.ended_at < CURDATE()
        AND projects.id IN (
            SELECT project_manager_project.project_id FROM project_manager_project
            WHERE project_manager_project.project_manager_id = CAST(project_manager_id AS UNSIGNED)
        );
    END IF;
END;
```

Figure 23: Completed Projects Stored Procedure

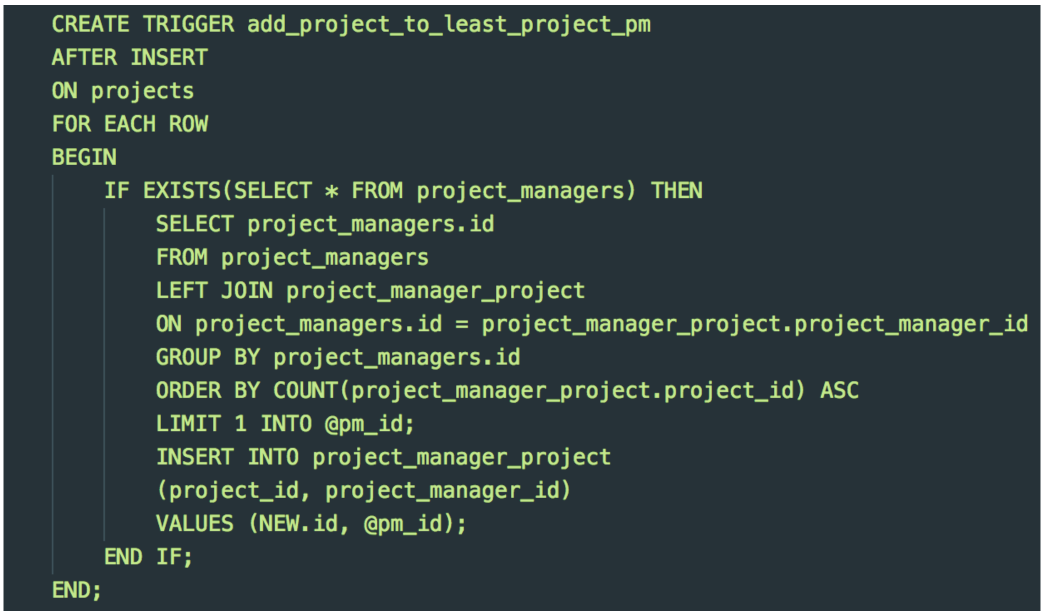


```
CREATE PROCEDURE `not_completed_projects`(IN project_manager_id TEXT)
BEGIN
    IF (project_manager_id = 'ALL') THEN
        SELECT *
        FROM projects
        LEFT JOIN (SELECT project_id, MAX(DATE_ADD(tasks.started_at, INTERVAL tasks.duration DAY)) as ended_at
            FROM tasks
            GROUP BY project_id) as agg_project
        ON projects.id = agg_project.project_id
        WHERE agg_project.ended_at >= CURDATE() OR agg_project.ended_at IS NULL;
    ELSE
        SELECT *
        FROM projects
        LEFT JOIN (SELECT project_id, MAX(DATE_ADD(tasks.started_at, INTERVAL tasks.duration DAY)) as ended_at
            FROM tasks
            GROUP BY project_id) as agg_project
        ON projects.id = agg_project.project_id
        WHERE (agg_project.ended_at >= CURDATE()
        OR agg_project.ended_at IS NULL)
        AND projects.id IN (
            SELECT project_manager_project.project_id FROM project_manager_project
            WHERE project_manager_project.project_manager_id = CAST(project_manager_id AS UNSIGNED)
        );
    END IF;
END
```

Figure 24: Not Completed Projects Stored Procedure

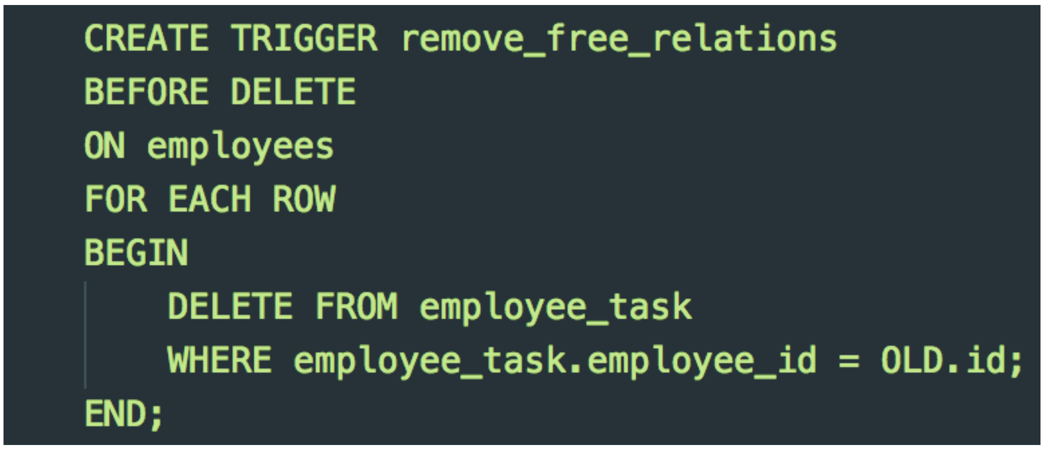
3.3 Triggers

We have two triggers as follows.



```sql
CREATE TRIGGER add_project_to_least_project_pm
AFTER INSERT
ON projects
FOR EACH ROW
BEGIN
    IF EXISTS(SELECT * FROM project_managers) THEN
        SELECT project_managers.id
        FROM project_managers
        LEFT JOIN project_manager_project
        ON project_managers.id = project_manager_project.project_manager_id
        GROUP BY project_managers.id
        ORDER BY COUNT(project_manager_project.project_id) ASC
        LIMIT 1 INTO @pm_id;
        INSERT INTO project_manager_project
        (project_id, project_manager_id)
        VALUES (NEW.id, @pm_id);
    END IF;
END;
```

Figure 25: Add New Project to PM with Least Projects Trigger



```
CREATE TRIGGER remove_free_relations
BEFORE DELETE
ON employees
FOR EACH ROW
BEGIN
    DELETE FROM employee_task
    WHERE employee_task.employee_id = OLD.id;
END;
```

Figure 26: Delete Employee-Task Relation When Employee is deleted

4 Conclusions & Assessment

In this assignment, I implemented a project management system. It has three main components: Front End which serves information to guest users or employees, Admin Dashboard which serves information to admin users and Project Manager Dashboard which serves information to project manager users.

I implemented this project with PHP Laravel and MySQL. I used some useful packages. In addition to these, I used Docker to easily deploy my project.

Before this assignment, I have not known the stored procedure and trigger concepts in SQL. I researched this concepts on the web and gained some useful information. I learned these concepts and liked them. Actually, in the past, I have been worked on big projects with Laravel, MySQL, PostGreSQL, MongoDB (NoSQL), Python Tornado and etc. However, with this project, I improved my SQL abilities.

I enjoyed while I was implementing this project. However, I was bored while I was implementing some parts because I worked on big projects that include Front End and Back End as I mentioned before. Overall, I liked this project because I learned different concepts that are related with SQL, stored procedures and trigger.

In conclusion, this is a good implementation for Project Management System because it has all functionality and addition to this, simple UI design. I mean it has some pros and cons just like other application, but I am happy to construct an application like this.