# Software Requirements Specification

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## Employee Management System (EMS)

### v1.0

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### Created By: Syed Mohammad Ibrahim

### Email: [iamibi@umd.edu](mailto:iamibi@umd.edu)

### UMD ID: iamibi

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## 1. Introduction

### 1.1 Purpose

The purpose of this document is to build the Employee Management System or EMS for short. It will describe the purpose and features of the application, the interfaces involved, the functionality, the system constraints in which it will operate and how the application will respond with respect to the external inputs. This document is intended for stakeholders, product managers and the developers who are directly involved with this project.

### 1.2 Intended Audience

The EMS application is intended to be used by the people of the organization who have requested this application and is only accessible inside the company network by the employees, managers and their IT Department.

### 1.3 Scope

The EMS system is designed to help the employees of the organization keep track of their work and for managers to keep track of the employees and their respective task status. It has an IT Department actor who has the highest level of access to manage the whole application and people who are registered with the application. The roles will be assigned by the IT department and based on that they will have the access accordingly.

The following users will be interacting with the application along with their respective use cases:

| **Audience** | **Intended Use** |
| --- | --- |
| Existing Employee / New Joinee | The EMS application can assist an employee view their task, select status of the task and mark the task as complete after reauthentication. For any new joinee, the user has to sign up on the application by providing in the email address, their current role and wait for approval from the IT department. |
| Managers | The application will help them view the number of employees assigned under them and the number of tasks that they have marked as complete. |
| IT Department | The IT department will be having the administrator role privileges and they can view all the activities on the application like total number of employees (inclusive of managers), currently active sessions of employees, logs (successful sign in, failed requests), approving a new employee that signed up or removing an employee, assign/remove an employee to a manager. |

## 2. Overall Description

### 2.1 System Environment

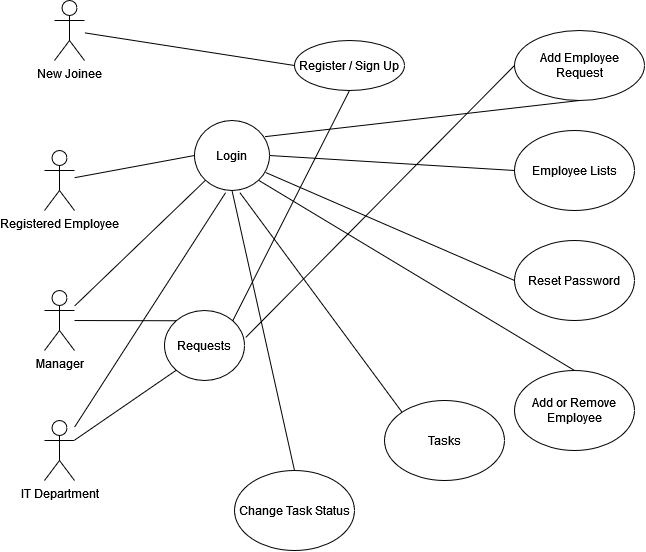


Figure 1 - System Environment

The EMS has three active actors and three cooperating systems. Employees (Existing/New) can access the Employee Tasks through the EMS web portal over the internet. The managers can access the employee list and their tasks in the same way. The IT Department has access to the full system. The communication between the actors and system happens via email based authentication. The system is confined within the company network and is unusable outside.

The EMS system is going to be implemented in C# and ASP.NET with MongoDB as the database.

### 2.2 Assumptions and Dependencies

The following assumptions are made with respect to EMS:

* It is a web based application.
* A new joinee can sign up using their organization generated email id.
* An existing employee can access their tasks after successful authentication.
* An existing employee can change the status of the task.
* An existing employee can see the name of their manager.
* A manager can view all the employees under them.
* A manager can view the number of tasks an employee under him has completed.
* The IT department can view the list of all employees in the organization (including managers).
* The IT department can approve a new joinee with the information that they have provided or can reject them.
* The IT department can view the count of currently active sessions of employees.
* The IT department can remove any employee from the application.
* The IT department can change the role of any employee registered on the application.
* The IT department cannot add a new employee unless the employee signs up.
* The IT department can assign a manager to an employee only upon a request created by the manager.
* A default IT person exists with a default id and password.
* A manager can’t add a new employee under them.
* No employee can have more than one manager.
* No functionality can be accessed if the user is logged out.

## 3. System Features and Requirements

### 3.1 Functional Requirements

#### 3.1.1 Login

| User Story | As a registered user, I am able to login to the EMS application successfully. |
| --- | --- |
| Prerequisite | * User has a valid organization email id and role. * User is already registered and approved by the IT department. |
| Functional Requirements | * User clicks on the Sign in button. * User is shown the login page with email id and password input fields present. * After entering a valid email id and password, the user should be logged in successfully. |

#### 3.1.2 Register/Sign up

| User Story | As a new user, I am able to register to the EMS application successfully. |
| --- | --- |
| Prerequisite | * User has a valid organization email id and role. * User is not currently in the EMS system. |
| Functional Requirements | * User clicks on the Register button. * The user is displayed the Register page with first name, last name, date of birth, email id, password, role dropdown menu and contact number inputs field present. * After entering a valid organization email and other details, the user is shown a “successful register request raised” alert. |

#### 3.1.3 View Task

| User Story | As a registered employee, I am able to view my tasks after logging in. |
| --- | --- |
| Prerequisite | * User has a valid organization email id and role. * User is registered with the EMS application. * User has an employee role assigned to them by the IT department. |
| Functional Requirements | * User logs in to the EMS application with the valid credentials. * They should see the list of tasks screen in front of them. |

#### 3.1.4 Change Task Status

| User Story | As a registered employee, I am able to change my task status after logging in. |
| --- | --- |
| Prerequisite | * User has a valid organization email id and role. * User is registered with the EMS application. * User has an employee role assigned to them by the IT department. |
| Functional Requirements | * User logs in to the EMS application with the valid credentials. * They should see the list of tasks screen in front of them. * They should see the task status dropdown against all the tasks assigned to them. * The user is able to select any of the options from the drop down successfully. * Available options are Open, In Progress and Completed. |

#### 3.1.5 View Employees

| User Story | As a registered manager, I am able to view the list of employees assigned to me after logging in. |
| --- | --- |
| Prerequisite | * User has a valid organization email id and role. * User is registered with the EMS application. * User has a manager role assigned to them by the IT department. |
| Functional Requirements | * User logs in to the EMS application with the valid credentials. * They should see the list of employees assigned to them. |

#### 3.1.6 View Task of Employees

| User Story | As a registered manager, I am able to view the number of tasks of each employee assigned to me after logging in. |
| --- | --- |
| Prerequisite | * User has a valid organization email id and role. * User is registered with the EMS application. * User has a manager role assigned to them by the IT department. |
| Functional Requirements | * User logs in to the EMS application with the valid credentials. * They should see the list of employees assigned to them. * The number of tasks for every employee is visible against their name in the format <completed task>/<total tasks>. |

#### 3.1.7 Add Employee Request

| User Story | As a registered manager, I am able to request for the addition of a new employee by raising a request after logging in. |
| --- | --- |
| Prerequisite | * User has a valid organization email id and role. * User is registered with the EMS application. * User has a manager role assigned to them by the IT department. |
| Functional Requirements | * User logs in to the EMS application with the valid credentials. * The user is able to view the “Add Employee” button. * Upon clicking, a new form will be presented with the email id of the employee to be entered and a submit button. * The user needs to provide the user’s valid corporate email address. * After entering the email, the user clicks on submit button and is shown a success if the email was valid and applicable else it will throw an error message. |

#### 3.1.8 Approve Employee Request

| User Story | As a registered manager, I am able to request for the addition of a new employee by raising a request after logging in. |
| --- | --- |
| Prerequisite | * User has a valid organization email id and role. * User is registered with the EMS application. * User has a manager role assigned to them by the IT department. |
| Functional Requirements | * User logs in to the EMS application with the valid credentials. * The user is able to view the “Add Employee” button. * Upon clicking, a new form will be presented with the email id of the employee to be entered and a submit button. * The user needs to provide the user’s valid corporate email address. * After entering the email, the user clicks on submit button and is shown a success if the email was valid and applicable else it will throw an error message. |

#### 3.1.9 View All Employees

| User Story | As an IT department member, I am able to view all the employees and managers that are currently registered in the system after logging in. |
| --- | --- |
| Prerequisite | * User is a valid member of the IT department. * User has a role of the “IT department”. |
| Functional Requirements | * User logs in to the EMS application with the valid credentials. * User is shown the list of all the employees. |

#### 3.1.12 Add/Remove Employees

| User Story | As an IT department member, I am able to add a new employee upon request from the manager to be added under them or a new joinee that has registered with EMS and is waiting for approval. I can also remove any employee from the EMS system. These requests are performed only after logging in. |
| --- | --- |
| Prerequisite | * User is a valid member of the IT department. * User has a role of the “IT department”. |
| Functional Requirements | * User logs in to the EMS application with the valid credentials. * User is shown the list of all the employees. * User can see any new request for addition of employee either as a new joinee or under a manager. * To add an employee under a manager, the employee should first exist in the EMS system. * User can see remove any employee from the EMS system. |

#### 3.1.13 Reset Password

| User Story | As a registered person on EMS, I can reset my password by clicking on the Reset Password button after I have logged in. |
| --- | --- |
| Prerequisite | * User is a valid member of the EMS system. * User is part of the organization. |
| Functional Requirements | * User has to login in the EMS first. * There will be an option called Reset Password. * Upon clicking it, a new form will appear which will have three fields. Old Password, New Password and Re-enter New Password and a button to submit the entries. * Once the old password is verified, the new password that was entered will be stored in the database and the user will be logged out of the current session. |

#### 3.1.14 Logout

| User Story | As a logged in user on EMS, I can logout from the system. |
| --- | --- |
| Prerequisite | * User is a valid member of the EMS system. * User is part of the organization. * User is logged in to the EMS system. |
| Functional Requirements | * User clicks on the logout button. * The webpage is redirected to the homepage of the EMS system. * The session is cleared from the browser. |

### 3.2 Use Cases

| Use Case | Register/Sign Up |
| --- | --- |
| Description | A new joinee registers with the EMS application by providing their first name, last name, date of birth, corporate email, creating a new password, entering their current role and phone number. |
|  | |

| Use Case | Login |
| --- | --- |
| Description | An existing employee/manager/IT department can login through the EMS portal by using their email id and password. Any action that has to be performed will require logging in. After logging in, each actor will have their own dedicated view that is different from other actors. |
|  | |

| Use Case | Logout |
| --- | --- |
| Description | The user can log out of the EMS web portal after which they cannot access any functionality of EMS. |
|  | |

#### Logged In Scenarios

| Use Case | View Tasks |
| --- | --- |
| Description | An employee can view their tasks assigned. |
|  | |

| Use Case | Change Task Status |
| --- | --- |
| Description | An employee can change the status of the task from the given set - Open, In Progress, Completed. |
|  | |

| Use Case | View Employees |
| --- | --- |
| Description | A manager can view the employees that are working under them. |
|  | |

| Use Case | Add Employee Request |
| --- | --- |
| Description | A manager can request for a new employee to be added under them by selecting “Add Employee”. The employee will be added after the IT department has approved the request. The employee should be first registered on the EMS application. |
|  | |

| Use Case | View Employee Tasks |
| --- | --- |
| Description | A manager can view the number of tasks an employee under them has been assigned and how many tasks have been completed. |
|  | |

| Use Case | View Employee Details |
| --- | --- |
| Description | A manager can view the employee details like their corporate email address and phone number. |
|  | |

| Use Case | View all the employees and their details |
| --- | --- |
| Description | The IT department can view all the employees (including managers) that are registered on the EMS application. |
|  | |

| Use Case | Addition of an employee under a manager |
| --- | --- |
| Description | The IT department receives a request from the manager to add an employee under them. They can approve it or reject it. |
|  | |

| Use Case | Removing an employee from EMS |
| --- | --- |
| Description | The IT department can remove an employee from the EMS system. |
|  | |

| Use Case | Reset Password |
| --- | --- |
| Description | Any actor with respect to the EMS system can reset their password by clicking on Reset Password option. |
|  | |

### 3.3 Misuse Cases

| Misuse Case | User is outside the company network can access the EMS system |
| --- | --- |
| Description | User from outside the company network can register on the EMS application or can gain access to an account of an existing user on EMS. |
| Prevention | Applying firewalls so that only the organization PCs and IPs can access the EMS. |

| Misuse Case | Attacker can change the task of an employee |
| --- | --- |
| Description | An attacker can change the employee tasks and can make them perform in a different way as it was intended. |
| Prevention | Making sure that the authentication system is set correctly and proper checks are implemented. |

| Misuse Case | Attacker adds or removes employee(s) |
| --- | --- |
| Description | An attacker can add/remove an employee(s) from the system if they have compromised an IT department privilege account. |
| Prevention | Making sure that the authentication system is set correctly and proper checks are implemented. |

| Misuse Case | Privilege escalation |
| --- | --- |
| Description | A user with lower level privileges is able to access the roles of a higher privilege user by performing some type of attack. |
| Prevention | Making sure that the role based checks are strict while performing any kind of action. |

| Misuse Case | Unauthorized Database Access |
| --- | --- |
| Description | An attacker bypasses the system security and gains access to the database. |
| Prevention | Making sure that the inputs are sanitized and the network is secure to avoid any direct database access. |

| Misuse Case | Denial of Service |
| --- | --- |
| Description | An attacker can flood the EMS network which in turn can cause unavailability of the service. |
| Prevention | Implementing WAF rules and WAF based whitelisting. |

| Misuse Case | Modify logs |
| --- | --- |
| Description | An attacker can modify the logs if they get access to it. |
| Prevention | Strict checks on privilege based actions. |

| Misuse Case | URL Modification |
| --- | --- |
| Description | An attacker can modify the url and try to execute a malicious code on the EMS system. |
| Prevention | URL validations and sanitization should be done. |

## 4. Security Requirements

* EMS web application should be accessed on HTTPS connection so that the channel is secure.
* Software development should follow the security development life cycle and other security standards.
* To ensure secure access, the system will have a login screen protection which will require an email address and password for authentication.
* The privileges of any employee/manager can only be changed by the IT department.
* The system should be backed up in a secure location every 24 hours in a physical drive and cloud so that in case of an emergency situation, the system can be revived.
* The logs should be written for every successful login, unsuccessful login, task status changes, addition or removal of employee from the system, request for an addition of employee under a manager, viewing an employee. The logs should be descriptive about the event that was recorded.
* Input validations and sanitization should be done at all the places.
* All the credentials should be encrypted and stored in the database.
* The actor's actions based on the roles should be restricted and defined.
* URLs should also be sanitized and always validated.
* Use static and dynamic security analysis tools that will provide necessary security feedback.
* Add proper unit test cases for each module and integration test for the whole system.
* User should be logged out from the session if the session was idle for 5 minutes or if the browser tab/window was closed.
* Use a message queue for requests for new joinees or addition of employees so that the requests don’t overload the system.