JEE

PLP(Pseudo Live Project)

Expense Management System (EMS)

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# Introduction

This document outlines a case study for PLP project. The project is to develop an Expense Management System as integration of all independent micro services. This document contains the work flow of the system and gives guidelines on how to build the functionality gradually in each of the course modules.

## Setup Checklist for Mini Project

Minimum System Requirements

* Intel Pentium 90 or higher (P166 recommended)
* Microsoft Windows 95, 98, or NT 4.0, 2k, XP, Windows 7 , Windows 10
* Memory: 8GB of RAM (8GB or more recommended)
* Internet Explorer 11.0 or higher or Chrome 45 or above

**Software/Tool Requirements**

* JDK 8
* IDE-STS(Spring Tool Suite)
* MAVEN
* Tomcat
* Putty and Puttygen
* Win SCJP- File Transfer to EC2 Instance Tool
* Cloud AWS Account Register
* Docker Hub Account
* JackDB Account Register
* PostMan Master
* GitHub- Version Control System

## Instructions

* The code modules in the PLP Project should follow all the coding standards.
* Create a directory by your name in drive **<drive>**. In this directory, create a subdirectory **PLP Project**. Store your Project here.
* You can refer to your course material.
* You may also look up the help provided in the java docs and documentation provided with Tomcat and Spring Micro services and Cloud Documentation for Production Environment. **Docker** documentation for container services.
* The total time required to complete this PLP Project is 42 hrs.
* Since this project work will span over couple of weeks, you will need to take care of maintaining the code and coding standards.

# Problem Statement

## Objective

Develop an Expense Management System that will replace old xls based claim system.

## Abstract of the project

This project is aimed at developing an online expense claim system. This is a web based application that can be accessed over the web.

## Functional components of the project

In this project, there are four independent functions and the description about those functional components are as:

**Employee Code Module**: Following is a list of functionalities of the module. The operations defined in this module are add, delete, update and view the employee details.

1. Add Employee Details as listed below and inject the values into database table if data are valid else display appropriate error messages

* Employee ID has to be auto generated.
* Employee Name is a combination of uppercase, lowercase alphabets and whitespaces (cannot be empty).
* Employee PAN is a combination of uppercase alphabets and digits (cannot be empty).
* Employee Designation is a combination of uppercase, lowercase alphabets and whitespaces (cannot be empty).
* Employee Domain is a combination of uppercase, lowercase alphabets and whitespaces (cannot be empty).
* Employee DOJ needs to undergo regular date validation (DD/MM/YYYY) (cannot be empty).
* Employee DOB needs to undergo regular date validation (DD/MM/YYYY) (cannot be empty).
* Employee Salary needs to undergo regular number validation (cannot be empty).
* Employee Mail ID needs to undergo regular mail ID validation (cannot be empty).
* Employee Password can be of any combination of characters (cannot be empty).

1. Modify Employee details:

* Based on existing Employee ID, modify all the fields of Employee Entity and the changes will be reflected in the database.

1. Display all Employee details:

* Display Employee details based on the entered Employee ID.
* If ID is not found, error message will be displayed.

1. Search details of an employee based on his/her Employee ID

* The results will be filtered and displayed based on the Employee ID.

1. Delete an employee based on his/her Employee ID

**Project Code Module**: Following is a list of functionalities of the system. There is a user who can add, delete, update and view the project details.

1. Add project details as listed below and inject the values into database table if data are valid else display appropriate error messages
   * Project Code has to be auto generated.
   * Project Description can be combination of alphabets, digits and underscores (cannot be empty).
   * Start date and End date need to undergo regular date validation (DD/MM/YYYY) (cannot be empty).
   * Project end date has to be greater than project start date (cannot be empty).
2. Modify Project details:
   * Based on existing project ID, display the following fields, Project Description, Start date, End date and Business Unit (validation should be taken care of).
3. Display all Project details:
   * Display Project details based on the entered Project ID.
   * If ID is not found, error message will be displayed.
4. Search Project details based on Project ID:
   * The results will be filtered and displayed based on the Project ID.

**Expense Code Module**: Following is a list of functionalities of the system. There is a user who can add, delete, update and view the expense details.

1. Add Expense Code details:

* Insert the values into database table if data is valid, else display appropriate error messages.
* Expense Code has to be auto generated.
* Expense Type must start with capital character, should only contain alphabet and it should contain minimum 3 and maximum 15 characters (cannot be empty).
* Expense Description can be combination of alphabets, digits and underscores and it should contain minimum 15 and maximum 100 characters (cannot be empty).

1. Modify Expense details:

* Based on existing expense code, update the following fields Expense Code, Expense Type and Expense Description (validation should be taken care of).

1. Display Expense details:

* Based on existing expense code, display the following fields Expense Code, Expense Type and Expense Description.

1. Display All Expense details:

* Display the following fields Expense Code, Expense Type and Expense Description for all expense codes in the database.

1. Delete Expense details:

* Based on existing expense code, delete the following fields, Expense Code, Expense Type and Expense Description.

**Expense Claim Details Module**: The functionality of this module is to integrate the micro services, i.e. Employee Code Module, Project Code Module and Expense Code Module. The portal is created through which a user can claim, view, update and delete the expense. Following is a list of detailed functionalities under this module.

1. Claim an Expense:

* Enter the Employee ID. If valid, the corresponding details will be fetched from Employee Code Module and displayed.
* Else, the error message will be displayed and the user will not be able to proceed further.
* Select the Project Code from drop down list. The corresponding details will be fetched from Project Code Module and displayed.
* Select Expense Code from drop down list. The details will be fetched from Project Code Module and displayed.
* Enter some additional details, i.e. Start Date, End Date, Expense Amount, etc. These details, along with some required details of other micro services (Employee ID, Project Code and Expense Code) will be stored into the database.
* The Expense Code ID will be auto generated and displayed on the screen.

2. View Expense Claim Details by ID:

* Enter the Expense Code ID. If valid, the corresponding details will be displayed. Else if the ID is wrong, the error message will be displayed.

3. Update an Expense Claim:

* Enter the Expense Code ID. If valid, the details will be displayed and user will be able to modify the details wherever required. Else if the ID is wrong, the error message will be displayed.

4. Delete an Expense Claim:

* Enter the Expense Code ID. If valid, all the corresponding details will be deleted from the database. Else if the Id is wrong, the error message will be displayed.

## Technology used:

* + - Front End & Web Components:–
* HTML or Postman Client
  + - Business Logic Components and Services :-
* Java Beans, Spring, JPA, REST WebService
  + - Application Servers :-
* Tomcat
  + - Databases:-
* MySQL

**Note**: Create micro services for Expense Management System of all modules through Spring Micro Service Implementation and run them inside container. This is done by using **Docker** container as part of development and **AWS container** for QA/ Prod env.