A Project Report on

"Assignment Management System"

As part of

IBM Virtual Faculty Build-A-Thon

In

Cloud Application Development

Submitted by

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1. Introduction

Assignment Management System (AMS) provides an automated solution for managing assignments at schools, colleges and universities. Teachers and students register themselves to the web application and can login to use various features that are built for assignment related tasks. Teachers can create, view and evaluate assignments. Students can view and submit assignments by uploading a file. Admin can view the list of teachers, students and assignments. This application provides end-to-end solution for educational organizations which reduces the burden of manual tasks which consumes more time.

Assignment management system is divided into 3 modules with features as shown in figure 1.1. The modules are as listed below:
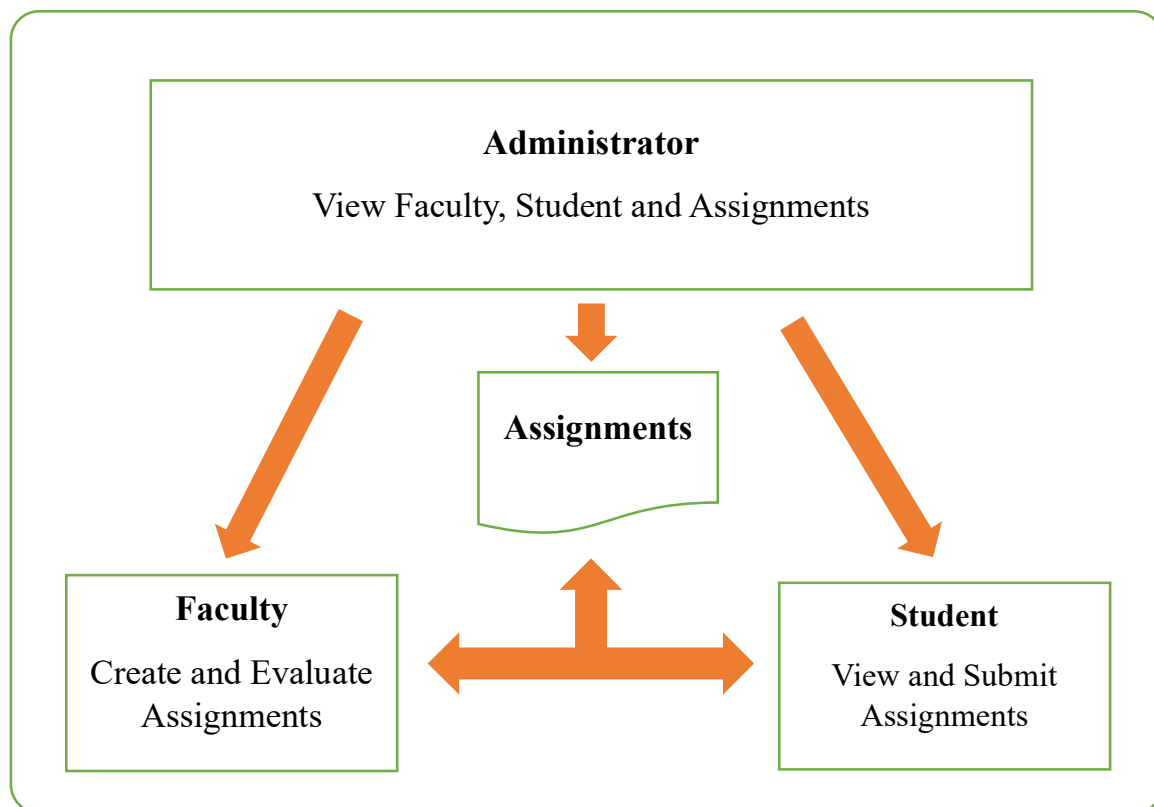
1. Admin
2. Faculty
3. Student

Administrator

View Faculty, Student and Assignments

Assignments

Faculty

Create and Evaluate Assignments

Student

View and Submit Assignments

Fig. 1.1 Modules in Assignment Management System

2. Requirement Specification

The requirement specification is the first step in software development. Based on the tasks of faculty and student with respect to assignments, the applications is divided into 3 modules each for admin, teacher and student. The following key requirements are identified with regard to assignment management:

2.1 Admin

Admin is the privileged user who can view all the information regarding assignment management system. Admin has privileged access to view all information related to Assignment management. There can be more than one administrator and is provided with a registration form to register. Admin is provided with following features:

- View list of teachers
- View list of students
- View list of created assignments
- View list of submitted assignments

2.2 Teacher/Faculty

Teacher is responsible for creation and evaluation of assignments. Teacher can view the uploaded assignment file and can assign marks for the assignment. The following functionalities are provided to a teacher:

- Create assignment
- View list of assignments
- View assignment submission
- Evaluate assignment submission

2.3 Student

Student can view and submit assignments. And he can view the deadline. The following features are provided to a student:

- View assignment information (Question, deadline, teacher etc)
- Submit assignment by uploading the file

3. Design

The design of AMS includes flow chart, database and use cases. The application development always starts with the design phase. Various design tools are used to describe the application.

3.1 Flow chart

Any software can easily be explained by making used of flow chart. It will give a pictorial representation of the application in detail. The flow chart shown in fig. 3.1 shows the flow of Assignment Management System.
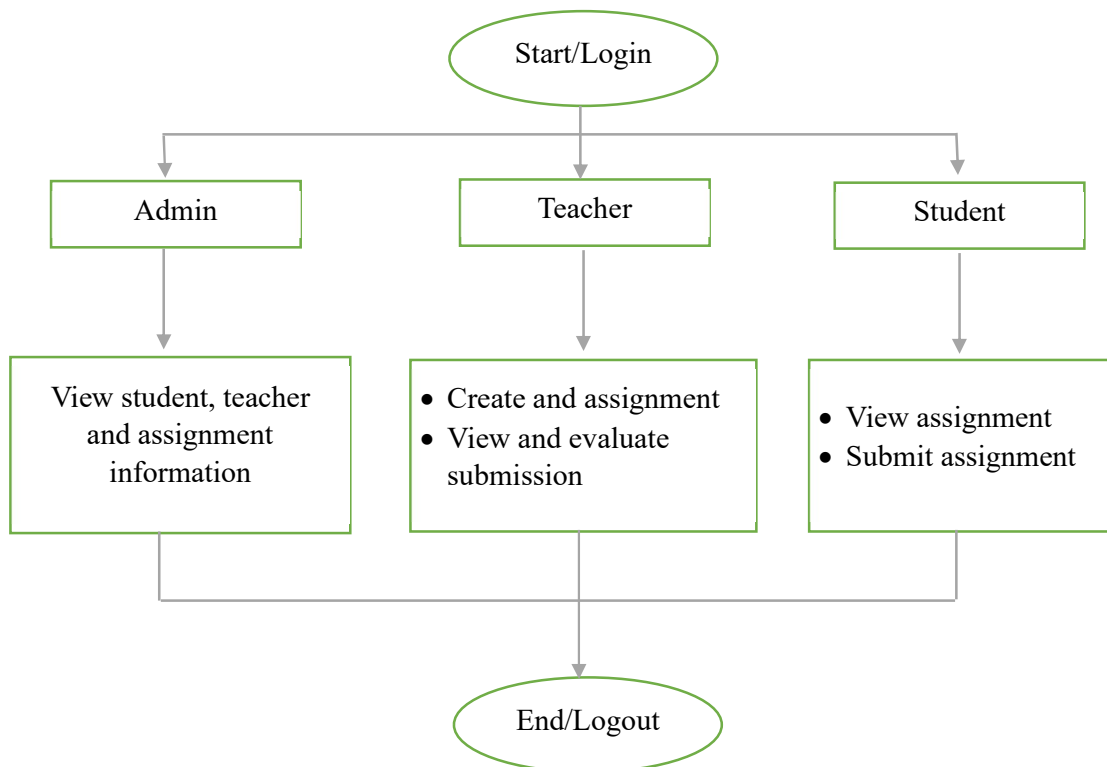

Fig. 3.1 Flow chart

3.2 Database design

The design of database is an important phase as it requires the fields to be chosen with its data types. Tables and its attributes are decided with its dependencies and constraints. The following tables are designed.

FACULTY

NAME	DESIGNATION	BRANCH	EMAIL	PHONE	PASSWORD

STUDENT
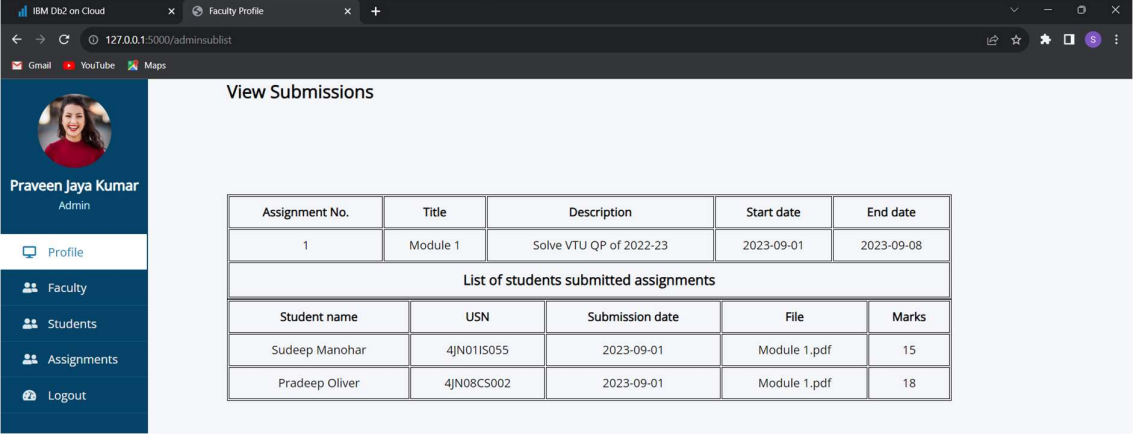
USN	NAME	BRANCH	SEMESTER	EMAIL	PHONE	PASSWORD

ADMIN

NAME	EMAIL	PHONE	PASSWORD

ASSIGNMENT

ASSN_NO	TITLE	DESCRIPTION	S_DATE	E_DATE	FACULTY_ID

SUBMISSION

STUDENT_ID	ASSN_NO	SUB_DATE	FILENAME	MARKS

3.3 Use case diagram

The use case diagram gives the information about the various types of users for the applications and their functionalities. The AMS application is used by 3 types of users namely admin, teacher and student. Fig 3.2 shows the use cases of all the users of the application.

Admin
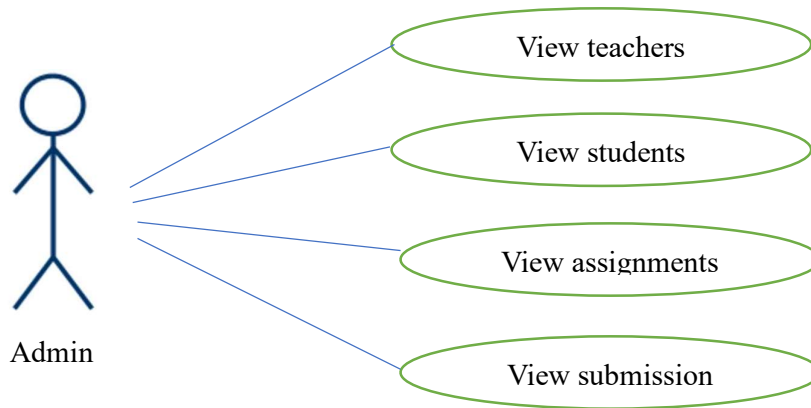
Fig. 3.2 (a) – Use case diagram of Admin

Teacher
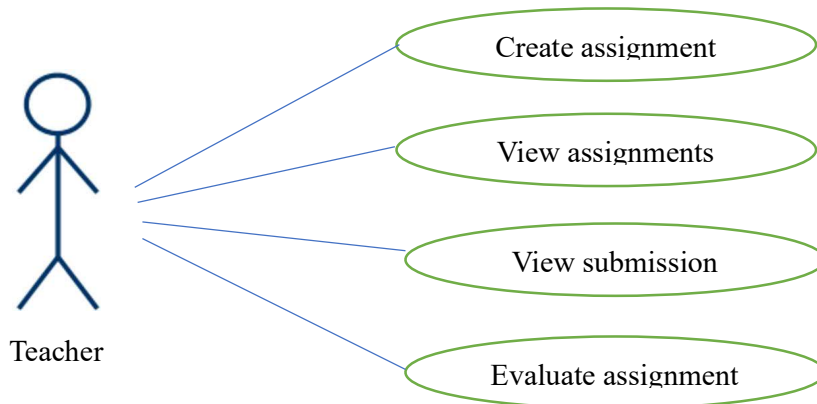
Fig. 3.2 (b) – Use case diagram of Teacher

Student
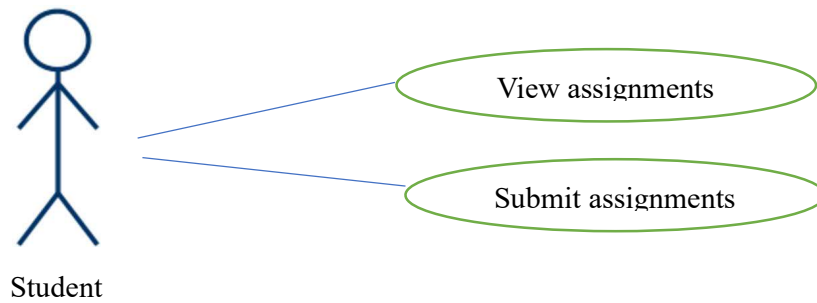
Fig. 3.2 (c) – Use case diagram of Student

4. Implementation

Various tools and programming languages are used to implement the AMS application. The implementation includes coding and deployment in various cloud platforms. The following are the programming languages and tools that are used for implementing the application.

4. 1 Programming languages

HTML and CSS

The front end designing is done using HTML and CSS. Raw scripting is done using simple editor. <form> tag is used for sending data to database. GET and POST methods are used for sending data over the network. CSS is used for styling the webpages. <table> tags are used for creating tables for listing database tuples that are retrieved.

Python

The server side programming is done using Python language. Python provides various built-in methods for connecting to databases. It provides a feature rich interface to connect with various other cloud applications.

Jinja

Jinja is used to display the dynamic content in web pages. The jinja scripts are embedded between HTML code wherever required to display the tuples and data that are fetched from the database tables. Jinja works in conjunction with flask web application framework.

4.2 Tools

Flask

Flask is a web application framework written in python which eases the web application development. It includes a collection of libraries and modules that helps a developer to build web applications without worrying the underlying implementation.

Docker

Docker provides the facility to bundle the application with necessary tools, libraries and packages. It creates a single unit called package which can be easily deployed in any computer.

Docker desktop is needed to create images and run the images as a single package. These images can be ported to any computer and run locally to access the web application.

Kubernetes

Kubernetes is a platform to run the web application on a remote server so that the application could be accessed over the internet. Kubernetes provides multiple options for deploying applications such as Docker, Github, YAML etc.

4.3 Web platforms

Docker hub

Docker hub is an online platform for managing docker images. The docker images can be uploaded to docker hub using docker desktop also. The repository where the docker images are pushed can be pulled by anyone if its visibility is set to public.

Redhat Openshift

Redhat Openshift is a Kubernetes platform for deploying images of applications. It provides multiple options to deploy the applications. Some of the options are as follows:

Github

The application can be deployed by using the copy of application that is stored in Github. The Github path where the application is store has to be given in order to access the same from Openshift. Once the pull is successful the application deploys and starts running. The exposed URL can be used to access the application over the internet.

Docker hub

The docker hub repository path is used to pull the image and deploy the application. The application starts running and the URL can be used to access the application.

YAML

Using YAML the applications can be deployed in Redhat Openshift. One has to mention the service details and deployment details in the YAML code. If the code compiles successfully the service and bots are created. The ports are to be exposed manually using the command in the command line.

4.4 IDE

Spyder

Spyder IDE provides the necessary tools to edit and compile the python programs. The project is developed using Spyder. Spyder IDE comes installed with Anaconda navigator. It provides terminal feature to run commands.

4.5 Database

IBM DB2

The application has been developed using IBM DB2 database. It provides a cloud platform for creating and managing databases. A user interface is provided which helps in creating and updating tables. SQL command prompt is also available through which one can query the database with SQL queries.

5. Results

Login

Registration

Faculty homepage

Faculty assignment

Faculty assignment evaluation

Student registration

Student homepage

Student assignment

Admin registration

Admin homepage

Admin – view faculty

Admin – view students

Admin – view assignments

Admin view submissions

6. Conclusion

The Assignment Management System provides an easy way to manage assignments. The task of manual creation, submission and evaluation is made easy with this application. The use of flask, python, Jinja and IBM DB2 has made the development easier and faster. The packaging tool Docker has provided the facility to bundle all the necessary libraries in a single image. And the online deployment platform Redhat Openshift has made it easy to deploy the application in a remote server without the need to own a server.