

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

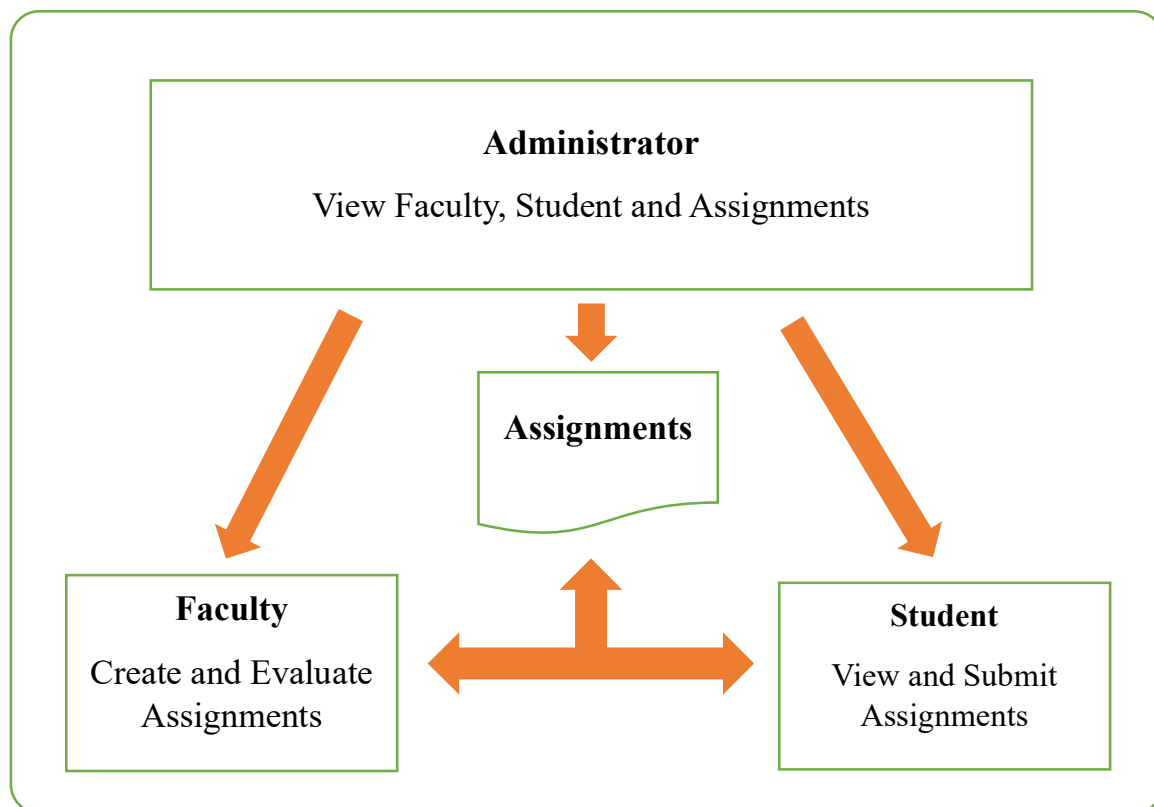


Fig. 1.1 Modules in Assignment Management System

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.

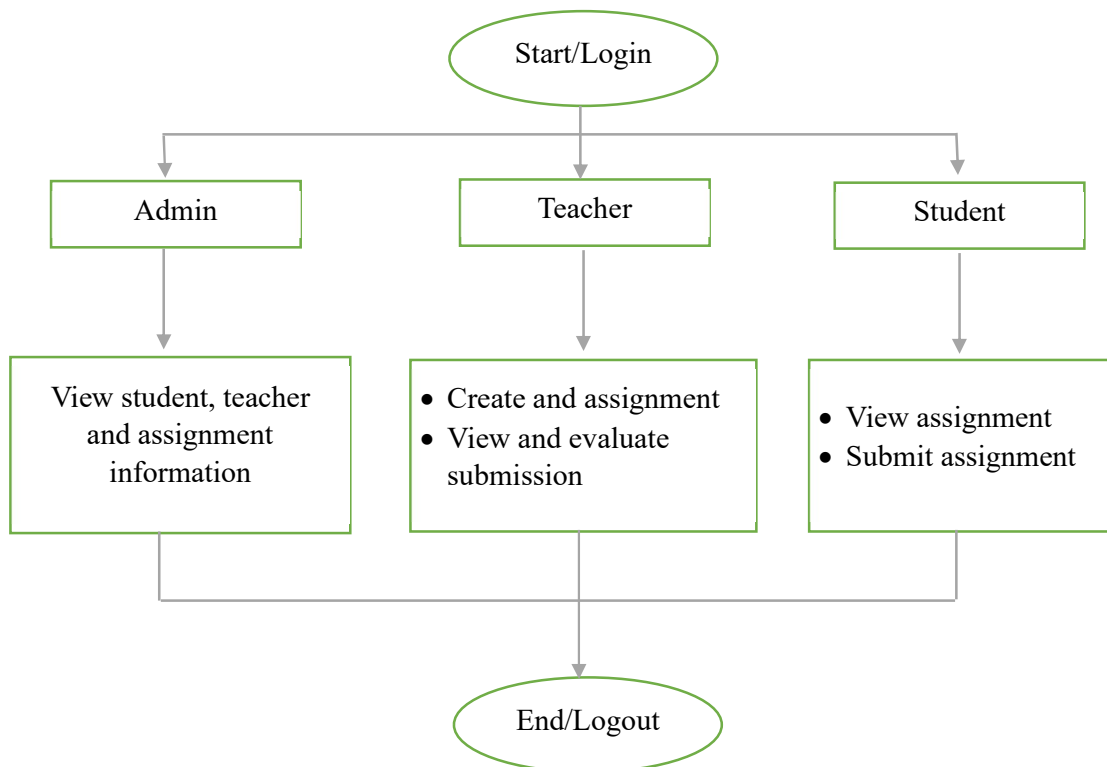


Fig. 3.1 Flow chart

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 | <u>EMAIL</u> | PHONE | PASSWORD |
|------|-------------|--------|--------------|-------|----------|

STUDENT

| | | | | | | |
|-----|------|--------|----------|--------------|-------|----------|
| USN | NAME | BRANCH | SEMESTER | <u>EMAIL</u> | PHONE | PASSWORD |
|-----|------|--------|----------|--------------|-------|----------|

ADMIN

| | | | |
|------|--------------|-------|----------|
| NAME | <u>EMAIL</u> | PHONE | PASSWORD |
|------|--------------|-------|----------|

ASSIGNMENT

| | | | | | |
|----------------|-------|-------------|--------|--------|------------|
| <u>ASSN_NO</u> | TITLE | DESCRIPTION | S_DATE | E_DATE | FACULTY_ID |
|----------------|-------|-------------|--------|--------|------------|

SUBMISSION

| | | | | |
|-------------------|----------------|----------|----------|-------|
| <u>STUDENT_ID</u> | <u>ASSN_NO</u> | 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

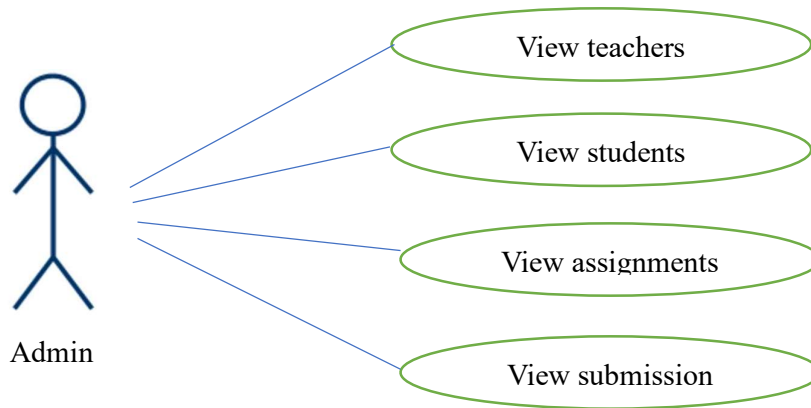


Fig. 3.2 (a) – Use case diagram of Admin

Teacher

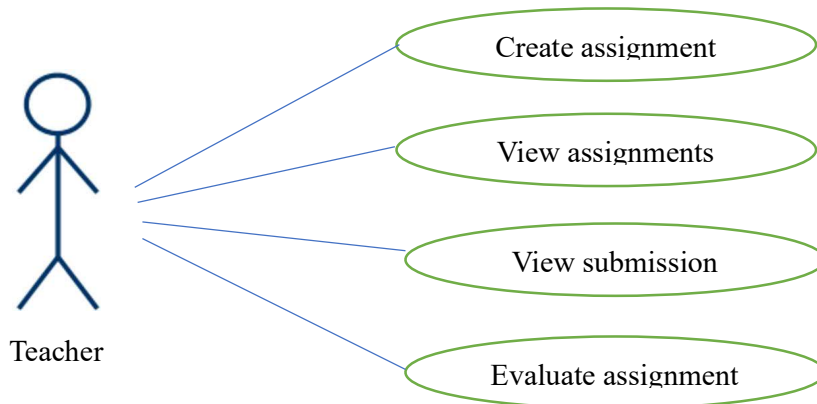


Fig. 3.2 (b) – Use case diagram of Teacher

Student

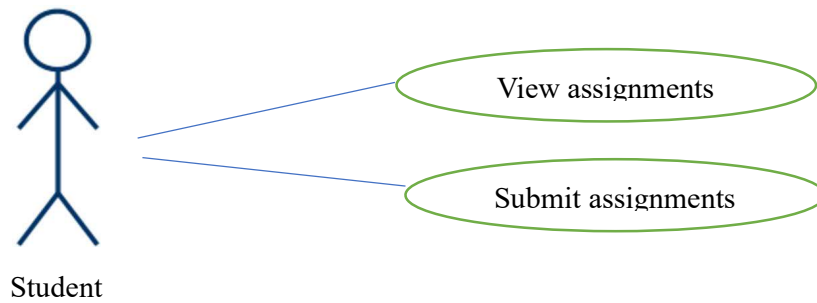


Fig. 3.2 (c) – Use case diagram of Student

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

The screenshot shows a web browser window with the title 'Assignment Management System'. The URL bar shows '127.0.0.1:5000'. The page has a dark blue background. In the center, there is a light blue rounded rectangle containing the login form. The form has the following fields: 'Role' (a dropdown menu with 'Faculty' selected), 'Email' (a text input with placeholder 'Enter your Email id'), and 'Password' (a text input with placeholder 'Please set your password'). Below these fields is a 'Login' button. At the bottom of the light blue box, there are three links: 'Faculty Registration [Click Here](#)', 'Student Registration [Click Here](#)', and 'Admin Registration [Click Here](#)'.

Registration

The screenshot shows a web browser window with the title 'AMS - Faculty Registration'. The URL bar shows '127.0.0.1:5000/facultyreg'. The page has a dark blue background. In the center, there is a light blue rounded rectangle containing the registration form. The form has the following fields: 'Name' (text input, placeholder 'Enter your name'), 'Designation' (dropdown menu with 'Professor' selected), 'Branch' (dropdown menu with 'Information Science' selected), 'Email' (text input, placeholder 'Enter your Email id'), 'Phone' (text input, placeholder 'Enter your phone number'), and 'Password' (text input, placeholder 'Please set your password'). Below these fields is a 'Submit' button. At the bottom of the light blue box, there is a link: 'Already Registered? [Login Here](#)'. In the bottom right corner of the page, there is a blue chat bubble with a white speech bubble icon and the text: 'Hi! I'm a virtual assistant. How can I help you today?'. Above the chat bubble is a 'Close' button.

Faculty homepage

The screenshot shows a web browser window with the URL `127.0.0.1:5000/login`. The page title is "Your Details". On the left, there is a sidebar with a profile picture of Sherely Christabel, her name, and the title "Faculty". Below this are links for "Profile", "Assignment", and "Logout". The main content area displays a table with the following details:

| | |
|-------------|---------------------|
| Name | Sherely Christabel |
| Designation | Assistant Professor |
| Branch | Information Science |
| Email | sherley@yahoo.in |
| Phone | 9480544544 |
| Role | Faculty |

Faculty assignment

The screenshot shows a web browser window with the URL `127.0.0.1:5000/f_assignment`. The page title is "Assignment No. 5". On the left, there is a sidebar with a profile picture of Sherely Christabel, her name, and the title "Faculty". Below this are links for "Profile", "Assignment", and "Logout". The main content area displays a form for creating an assignment with the following details:

| | |
|---------------------------------------|------------------|
| Assignment No. | 5 |
| Title | Module 5 |
| Description | Quiz on module 5 |
| Start date | 03-09-2023 |
| End date | 08-09-2023 |
| <input type="button" value="Submit"/> | |

Below the form, there is a table showing a list of assignments:

| Assignment No. | Title | Description | Start date | End date | Submissions |
|----------------|----------|-------------------------|------------|------------|--|
| 1 | Module 1 | Solve VTU QP of 2022-23 | 2023-09-01 | 2023-09-08 | 2 <input type="button" value="Evaluate"/> |
| 4 | Module 4 | Quiz on Module 4 | 2023-09-02 | 2023-09-04 | 1 <input type="button" value="Evaluate"/> |

Faculty assignment evaluation

The screenshot shows a web browser window with the URL `127.0.0.1:5000/viewsubmission`. The page title is "Evaluate assignment submissions". On the left, there is a sidebar with a profile picture of Sherely Christabel, her name, and the title "Faculty". Below this are links for "Profile", "Assignment", and "Logout". The main content area displays a table with the following details:

| Assignment No. | Title | Description | Start date | End date |
|----------------|----------|-------------------------|------------|------------|
| 1 | Module 1 | Solve VTU QP of 2022-23 | 2023-09-01 | 2023-09-08 |

Below the table, there is a section titled "List of students submitted assignments" with a table showing the following details:

| Student name | USN | Submission date | File | Marks | |
|----------------|------------|-----------------|---|-------|---|
| Sudeep Manohar | 4JN01IS055 | 2023-09-01 | Module 1.pdf <input type="button" value="Download"/> | 15 | <input type="button" value="Evaluate"/> |
| Pradeep Oliver | 4JN08CS002 | 2023-09-01 | Module 1.pdf <input type="button" value="Download"/> | 18 | <input type="button" value="Evaluate"/> |

Student registration

The screenshot shows a web browser window with the URL `127.0.0.1:5000/registration`. The page has a dark blue background. In the center, there is a light blue rounded rectangle containing the registration form. The form fields are: USN (text input), Name (text input), Branch (dropdown menu with 'Information Science' selected), Semester (dropdown menu with '1' selected), Email (text input), Phone (text input), and Password (text input with a placeholder 'Please set your password'). Below these fields is a 'Submit' button. At the bottom of the form, there is a link: 'Already Registered? [Login Here](#)'. To the right of the form, there is a blue chat bubble with the text: 'Hi! I'm a virtual assistant. How can I help you today?'. A 'Close' button is located at the top right of the chat bubble.

Student Registration Form

USN
Enter your USN

Name
Enter your name

Branch
Information Science

Semester
1

Email
Enter your Email id

Phone
Enter your phone number

Password
Please set your password

Submit

Already Registered? [Login Here](#)

Hi! I'm a virtual assistant. How can I help you today?

Student homepage

The screenshot shows a web browser window with the URL `127.0.0.1:5000/userprofile`. The page has a light blue background. On the left side, there is a dark blue sidebar with a profile picture of a woman and the text 'Pradeep Oliver Student'. Below the profile picture, there are three menu items: 'Profile' (with a person icon), 'Assignment' (with a document icon), and 'Logout' (with a door icon). The main content area is titled 'Your Details' and contains a table with the following data:

| | |
|----------|---------------------|
| USN | 4JN08CS002 |
| Name | Pradeep Oliver |
| Branch | Information Science |
| Semester | 1 |
| Email | pradeep@gmail.com |
| Phone | 9448562574 |
| Role | Student |

Student assignment

| Assignment No. | Title | Description | Start date | End date | Upload file |
|----------------|----------|-------------------------|------------|------------|---|
| 1 | Module 1 | Solve VTU QP of 2022-23 | 2023-09-01 | 2023-09-08 | Assignment submitted |
| 4 | Module 4 | Quiz on Module 4 | 2023-09-02 | 2023-09-04 | <input type="button" value="Choose File"/> No file chosen <input type="button" value="Submit"/> |

Open

2022-23 > Even > DAA > Assignment

| Name | Date modified | Type | Size |
|---|------------------|---------------------|-------|
| Assignment - Problem Solving - Module 1 | 22-08-2023 17:33 | Adobe Acrobat D... | 957 |
| Assignment - Problem Solving - Module 2 | 26-08-2023 11:04 | Adobe Acrobat D... | 931 |
| Assignment - Problem Solving - Module 3 | 26-08-2023 12:06 | Adobe Acrobat D... | 969 |
| Assignment - Problem Solving - Module 4 | 26-08-2023 12:26 | Adobe Acrobat D... | 1,012 |
| Assignment - Problem Solving - Module 5 | 26-08-2023 12:42 | Adobe Acrobat D... | 1,001 |
| Assignment - Problem solving | 26-08-2023 12:42 | Microsoft Word D... | 1,074 |

Admin registration

Admin Registration Form

Name
Enter your name

Email
Enter your Email id

Phone
Enter your phone number

Password
Please set your password

Already Registered? [Login Here](#)

Hi! I'm a virtual assistant. How can I help you today?

Admin homepage

The screenshot shows the Admin homepage in a web browser. The browser's address bar displays '127.0.0.1:5000/login'. On the left, a sidebar contains the user's profile picture, name 'Praveen Jaya Kumar', and role 'Admin'. Below this, a menu lists 'Profile', 'Faculty', 'Students', 'Assignments', and 'Logout'. The main content area is titled 'Your Details' and contains a table with the following information:

| | |
|-------|--------------------|
| Name | Praveen Jaya Kumar |
| Email | praveen@gmail.com |
| Phone | 9875874898 |
| Role | Admin |

Admin – view faculty

The screenshot shows the Admin view faculty page. The browser's address bar displays '127.0.0.1:5000/facultylist'. The sidebar is identical to the previous page. The main content area is titled 'Faculty list' and contains a table with the following data:

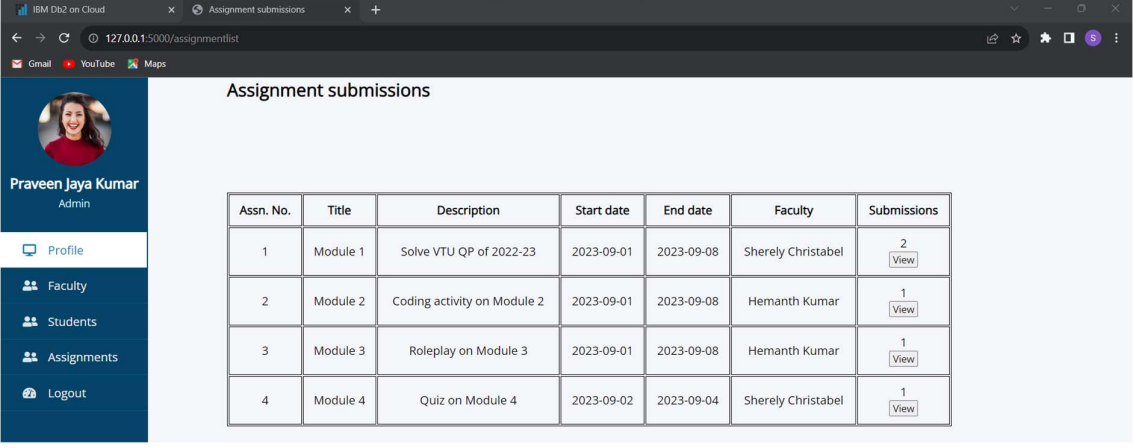
| Name | Designation | Branch | Email | Phone |
|--------------------|---------------------|---------------------|--------------------------|------------|
| Sherley Christabel | Assistant Professor | Information Science | sherley@yahoo.in | 9480544544 |
| Hemanth Kumar | Associate Professor | Computer Science | hemanthkumar@jnnce.ac.in | 9686007008 |

Admin – view students

The screenshot shows the Admin view students page. The browser's address bar displays '127.0.0.1:5000/studentlist'. The sidebar is identical to the previous pages. The main content area is titled 'Student list' and contains a table with the following data:

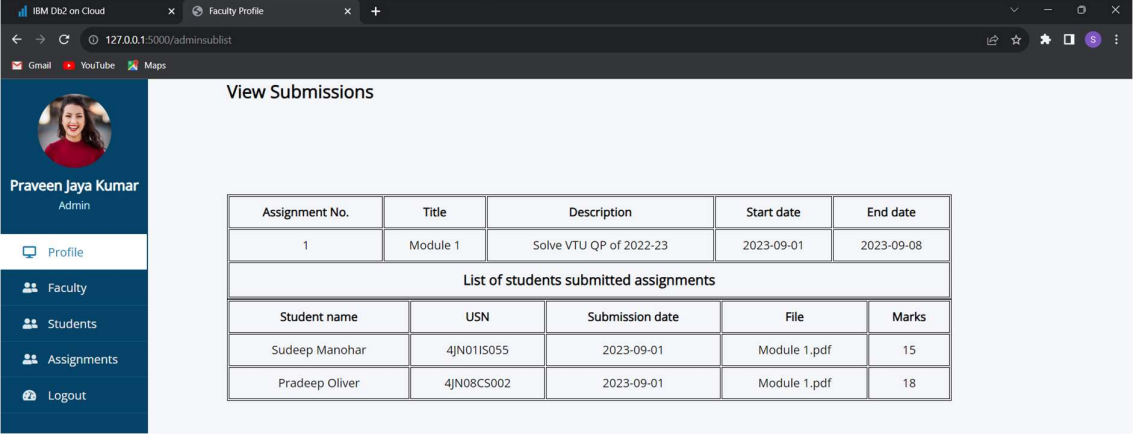
| USN | Name | Branch | Semester | Email | Phone |
|------------|----------------|---------------------|----------|------------------------|------------|
| 4JN01IS055 | Sudeep Manohar | Information Science | 4 | sudeep_mansh@yahoo.com | 9480544544 |
| 4JN01IS040 | Jacintha | Computer Science | 3 | jacintha@gmail.com | 9485215326 |
| 4JN08CS002 | Pradeep Oliver | Information Science | 1 | pradeep@gmail.com | 9448562574 |

Admin – view assignments



| Assn. No. | Title | Description | Start date | End date | Faculty | Submissions |
|-----------|----------|-----------------------------|------------|------------|--------------------|---------------------------|
| 1 | Module 1 | Solve VTU QP of 2022-23 | 2023-09-01 | 2023-09-08 | Sherely Christabel | 2 View |
| 2 | Module 2 | Coding activity on Module 2 | 2023-09-01 | 2023-09-08 | Hemanth Kumar | 1 View |
| 3 | Module 3 | Roleplay on Module 3 | 2023-09-01 | 2023-09-08 | Hemanth Kumar | 1 View |
| 4 | Module 4 | Quiz on Module 4 | 2023-09-02 | 2023-09-04 | Sherely Christabel | 1 View |

Admin view submissions



| Assignment No. | Title | Description | Start date | End date |
|----------------|----------|-------------------------|------------|------------|
| 1 | Module 1 | Solve VTU QP of 2022-23 | 2023-09-01 | 2023-09-08 |

List of students submitted assignments

| Student name | USN | Submission date | File | Marks |
|----------------|------------|-----------------|--------------|-------|
| Sudeep Manohar | 4JN01IS055 | 2023-09-01 | Module 1.pdf | 15 |
| Pradeep Oliver | 4JN08CS002 | 2023-09-01 | Module 1.pdf | 18 |

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.