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VLabCodeWave Studio

VirtuApp Lab:Virtual Lab with compile integration

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Abstract: Virtual lab is a platform at which certain practical's can be performed. Virtual lab is an excellent tool for education purpose for learners. Thus, by usage of virtual lab platform students can perform practical as given by the teacher. In virtual lab we provide simulation, open source for students. To provide a complete learning management system around the virtual labs for the students and teachers there are various tools available for learning. For the students virtual lab provides additional notes, assignments, web-resources, self - evaluation. In project students can clear concepts of all experiments via experiment related information. Today world, virtual lab is exist in which they can perform experience but for simulation of any experience student or faculty needs to use external compiler. The main objective to create a virtual lab is to solve this problem and provide compilers of every experiment, assignment, related videos, syllabus, experiment easily. And student can give feedback also. In future studies admin can integrate an online courses framework with certification of relates field.

Index Terms **–** VLab, Compiler, Simulation, Experiments, Programs.

I. INTRODUCTION

To provide a complete learning management system around the virtual labs for the students and teachers there are various tools available for learning. For the students virtual lab provides additional notes, assignments, web-resources, self-evaluation [1].

Virtual lab will reduce paper work and maintain all experiments efficient and systematic way. In these project students can clear concepts of all experiments via experiment related information. Virtual Labs can enhance the quality of engineering education each students can understand the course material. One example for the usage of Virtual Labs, they can serve as pre-work for the students to complete prior to attending the in-class physical labs, which will allow the students many opportunities to practice an experiment and understand concepts. Additionally, virtual Lab development can dramatically improve the quality of online learning program, by providing active learning opportunities to students that succeed by

employing more different learning styles. Specifically, virtual labs would provide a means of interaction and whenever loss in the course material that is often difficult in connecting with students [6].

Virtual lab is a platform at which certain practical's can be performed. Virtual lab is an excellent tool for education purpose for learners. Thus, by usage of virtual lab platform students can perform practical as given by the teacher. In virtual lab we provide simulation, open source for students. To provide a complete learning management system around the virtual labs for the students and teachers there are various tools available for learning. For the students virtual lab provides additional notes, assignments, web-resources, self-evaluation. In our project students can clear concepts of all experiments via experiment related information [2].

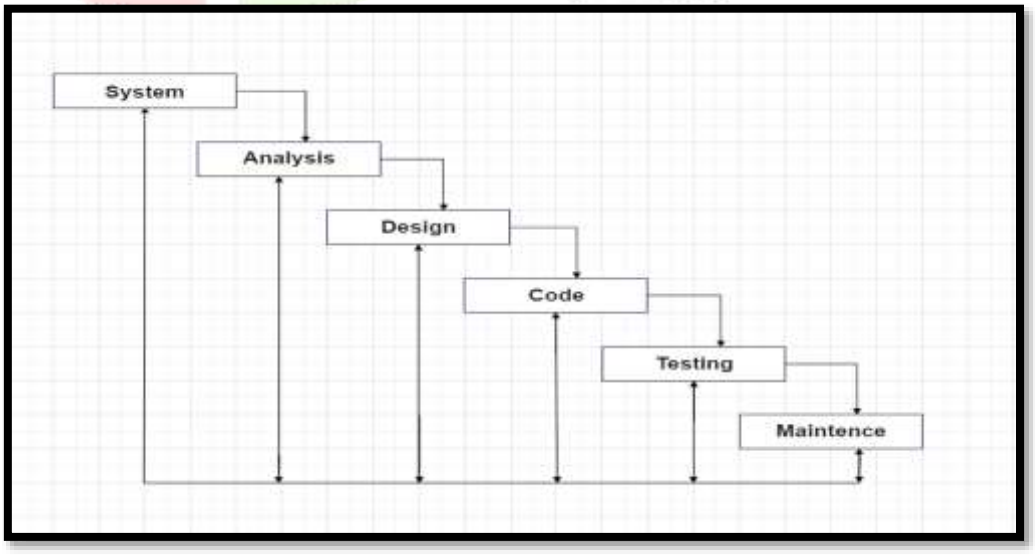
II. OBJECTIVES

- To provide virtual laboratories with all resources to students.
- To provide all notes, assignments, syllabus, notices, experiments.
- To provide videos related to the experiments to the students.
- To provide simulation and required compilers for the experiments to the student.
- To provide tutorials and notes about programming languages.
- To provide unlimited lab access to practice the experiments and coding.
- To provide multiple programming languages, and giving users a choice to learn out of them.

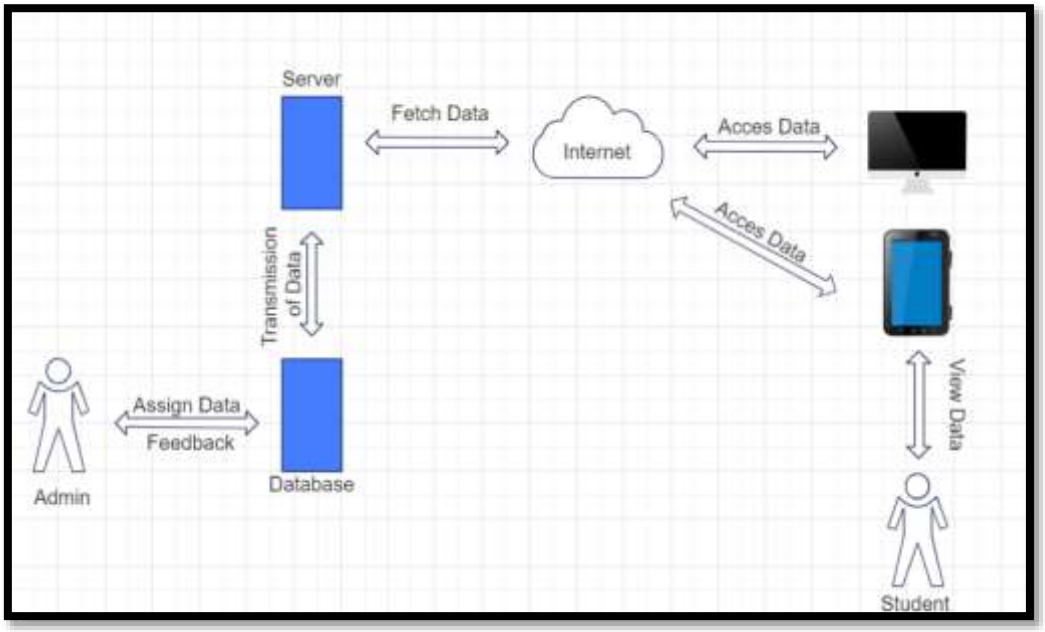
I. RESEARCH METHODOLOGY

The methodology section outline the plan and method that how the study is conducted. This includes Universe of the study, sample of the study,Data and Sources of Data, study's variables and analytical framework. The detailsare as follows;

3.1 Methodology/ System Life Cycle:



3.2 System Architecture:



In this system architecture, users interact with the VLAB through the user interface, which communicates user inputs to the application server through the internet. The application server processes these inputs, authenticates users, and manages the overall flow of the system. Experiment modules, powered by the simulation engine, simulate experiments, executes experiments on provided compilers and generate results, which are stored and retrieved from the database. External integrations enhance functionality, and the security layer and authentication/authorization components ensure data security and user access control.

This VLAB system architecture provides a structured, scalable, and secure environment for users to engage in virtual experiments and simulations and engage to see assignments, notes, related videos while ensuring data integrity and user experience.

IV. RESULTS AND DISCUSSION

5.1 ADMIN:

The system's admin side has a main page that allows navigation to different modules. These modules include adding classes, subjects, departments, syllabi, videos, notes, experiments, and assignments. Each module has specific forms for inputting relevant information. A menu bar is available to easily access all modules. The website section consists of a main page that provides an overview, a services page that outlines the college's offerings, an about page that details the college's background, a gallery that showcases campus life, and a contact page for visitor inquiries. The user section includes a login module for authentication and a home module for accessing features within the virtual lab environment.

5.2 Website:

The website section comprises a homepage that gives a summary of the site's content, a services page that elaborates on the academic programs, research facilities, and student support services of the college, and an about page that provides detailed information about the college's history, mission, vision, infrastructure, and faculty. Moreover, there is a gallery that displays images of campus life, events, and student activities, as well as a contact page that includes a form, email address, phone number, and physical address for visitor inquiries and information requests.

5.3 USER

5.3.1 LOGIN:

The login module handles user authentication. It allows users to log in by providing valid credentials. Upon successful login, users gain access to restricted areas of the application.

5.3.2 Home

The home module serves as the main entry point for users within the virtual lab environment. It provides an interface where users can access various features, navigate to different sections, and find relevant information.

5.3.3 Select Language

Fig.5.3.3 Select language

This module lets users choose from a list of supported programming languages. It's crucial for a versatile virtual lab.

5.3.4 Search Programming language

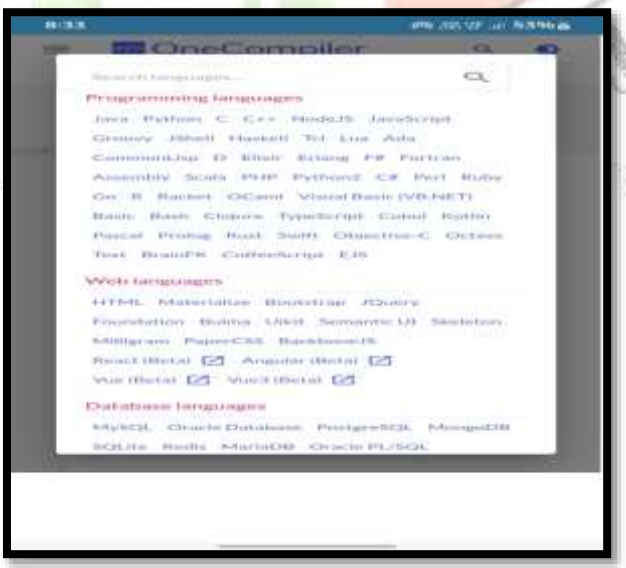


Fig. 5.3.4 Search language

The search programming languages module assists users in finding relevant information about different programming languages. It may include a search bar, filters, and documentation links.

5.3.5 Compile and run

Fig.5.3.5 Compile and run

The compiler module is essential for programming languages. It translates human-readable source code into machine-executable code, and provides accurate outputs and errors.

5.3.5 Compile and run

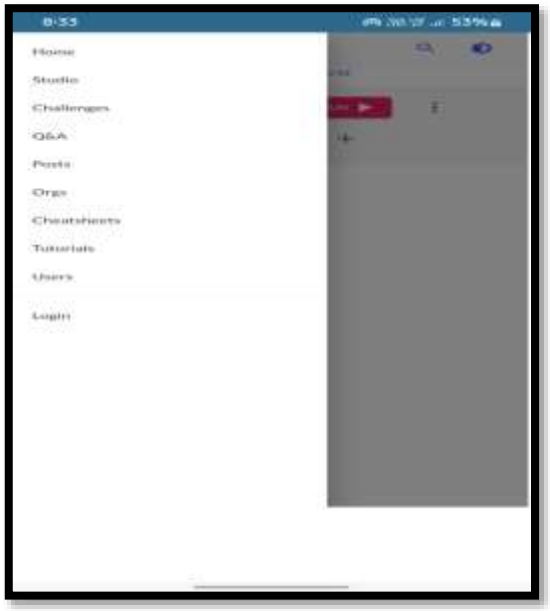


Fig.5.3.6 Menu

The menu module provides an organized way for users to access various functionalities within the virtual lab. Menu items allow users to navigate to specific experiments, assignments, notes, programs, settings, or help resources.

III. CONCLUSION

At this phase of implementation, this system has completed the design and implementation of the VLab project as admin side modules such as Home, Subject, Class, Syllabus, Experiment, Department, Videos, Notes, Assignment and has completed user side interface scenario and application and virtual lab website. At the end of completion passed system through unit testing and all possible test cases which gave the result as pass.

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