Virtual Labs

Kavya Koliwad, Neha Joshi, Vaishnavi Bammigatti, Vamshipriya.K, Prof. Pratap Kumar. M.K

Abstract— **In the current scenario, students face a lot of problems with the installation of different language compiler. To solve these problems an application for educational establishments is built in which students can use a single editor to practice programming in different languages without downloading specific software defined for different languages. It can also be used in the universities to perform realistic exams. The main objective of this project is to reduce time and storage.**

The project is hosted on a centralized server and the student will use client machines to access this web application. In addition to the editor, students are provided with individual workspace where programs can be saved and reviewed when necessary.

Index Terms— **deployed, installation, storage, workspace.**

I. INTRODUCTION

In the earlier days, it was difficult to install all compilers on a single computer irrespective of the user's choice. At the time of learning programming languages such as c, c++, java and python the beginners faced various issues related to installing specified compilers. Sometimes students have not been able to successfully run the program due to incomplete configuration of the compiler. There have been drawbacks, such as time complexity, mobility and storage issues.

Virtual Labs has been designed primarily for educational institutions where students can try to code multiple times using the various compilers provided by this application and view programs. Organizations may conduct practical exams online using this application. It is used to execute programs of different languages in a single editor, and server also provides the well-configured compiler services, i.e., bringing different language compilers under one platform with common interface. This software or application avoids unnecessary system configurations/installation process for the system administrators, as all users can access it from the server. At the beginning when user starts the application, it loads dashboard with list of compilers for the end user which is displayed after user selection.

The ability to use various compilers helps the programmer to pick up the fastest or most convenient tool to compile the code successfully and detect errors. The platform is an independent and user-friendly software.

The main purpose of the project is to easily write

Kavya Koliwad, Shri Dharmasthala Manjunatheshwara College of Engineering and Technology, Dhavalagiri, Dharwad, Karnataka

Neha Joshi, Shri Dharmasthala Manjunatheshwara College of Engineering and Technology, Dhavalagiri, Dharwad, Karnataka

Vaishnavi Bammigatti, Shri Dharmasthala Manjunatheshwara College of Engineering and Technology, Dhavalagiri, Dharwad, Karnataka

Vamshipriya. K , Shri Dharmasthala Manjunatheshwara College of Engineering and Technology, Dhavalagiri, Dharwad, Karnataka

Prof. Pratap Kumar. M.K, Shri Dharmasthala Manjunatheshwara College of Engineering and Technology, Dhavalagiri, Dharwad, Karnataka

programs and compile programs using the respective programming language. This client-server based application avoids unnecessary system configurations / installations overheads and helps the end user to focus more on coding part.

II. NEED FOR THE PROJECT

This project is aimed at increasing accessibility, solving the problem of saving files locally within the system and reducing storage as we merge all programming language compilers into "VIRTUAL LABS" single web application. This also aims to provide each user with individual workspace where they can save their programs and review whenever necessary. This application can be used to perform online assessments where the user has the right to select the programming language of preference. The controller will then load the stated compiler and display the output accordingly.

III. SYSTEM DESIGN

The Model-View-Controller (MVC) is an architectural pattern that separates an application into three main logical components the model, the view, and the controller. Each of these components are built to handle specific development aspects of an application. MVC is one of the most frequently used industry-standard web development framework to create scalable and extensible projects. This is done to separate internal representations of information from the ways information is presented to and accepted from the user.

Here the controller receives all requests for the application and then works with the model to prepare any data needed by the view. The view then uses the data prepared by the controller to generate a final presentable response.

Components of MVC according to our project --

Model

The Model refers to all logic relevant to the data in which the consumer operates. This may represent either the data being transmitted between the components of the View and Controller or some other data relevant to business logic. The user can select his language of preference to write the code, open, save and modify the files and transfer it back to the database.

View

The View aspect is used for all of the application's UI logic.The user view would contain all of the UI components the end user interacts with such as dropdown lists and menus. The output displayed is also rendered by it.

Controller

Controller serves as an interface between components Model and View to process all business logic and incoming requests, control programs using the Model feature, and communicate

with Views to render the final output. When user selects his language preference the controller loads the particular compiler and updation of programs is also done by controller. Open function works in accordance with this only.
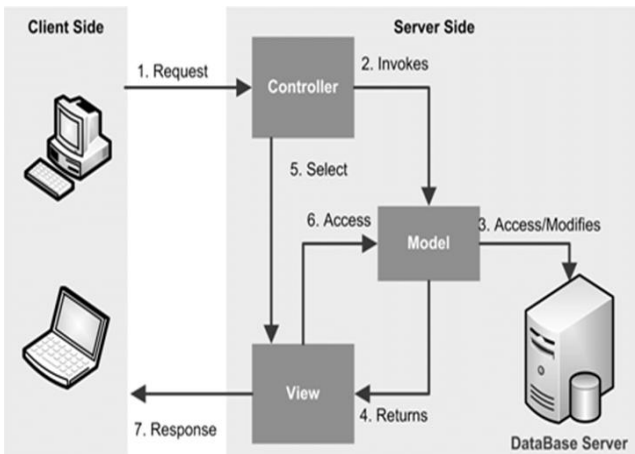

Fig1. Model-View-Controller

IV. LITERATURE SURVEY

[1] Online Compiler as a cloud Service
• The online compiler offers compilation facilities in C , C++ or Java.
• The user does not need to have a compiler installed on the system.

• He / she must submit the program to the user interface provided either by entering the code in the text box provided or by uploading the text file.

• After compiling, the user will get the output.

(a) User Interface Tier: Contains a user interface and a database that is implemented using a Microsoft SQL server. The user interface is a web application hosted on the IIS server, which provides the user with an interface to submit their programs.

b) Controller Tier: manages these interactions between the Tier user interface and the Tier compilation interface. The Compiler Control Center is the central part of the tier.

c) Compilation Tier: Consists of a "n" number of compiler servers used to compile and execute programs.

[2] Online C/C++ Compiler using Cloud Computing
- All programs and their timestamps of when they were compiled are stored in the server side database.

- The OCC is an online compiler cum interpreter and a simple collaborative tool. It's a paste bin that executes user code.

- This.exe file can then be accessed directly and downloaded to the user terminal using the URL

provided by the OCC itself.

- The feature of downloading the executable file to the terminal of the user ensures that malicious codes written on the server do not run on the server itself (thereby keeping the server intact and secure).

- The system uses a dual-layer architecture.

- The lower layer consists of clients with a lower configuration.

- The upper layer consists of the server.

V. EXISTING AND PROPOSED SYSTEMS

All existing online compilers do not have the option to save or open so that the user can view the programs. The main objective of our application is to provide an individual workspace for each new user with the option to save and open. As all compilers are incorporated in the framework and deployed in the centralized repository, it also helps to minimize time and storage space.

VI. IMPLEMENTATION
- This application is provided with the registration page, login page (if already registered) and the editor page.

- Every new user must register their details with this application and then log in to the web application.

- A separate workspace is provided for each user who registers and can save the files and access the programs whenever necessary.

- Once the user logs in, the editor will have a text area to write the file name, save button, run button and drop down menu to select the preferred language such as c, c++, java and Python. And also a text area to write the code and the output will be displayed in another text area.

- After choosing the desired language, the application loads the selected language's compiler.

- Later, the user must write the code in the given text area. After the code has been completed, the run button is pressed and the output will be shown if there are no errors or errors will be displayed.

- The command line arguments can also be passed in the output text area.

- The main purpose of this project is to have an individual workspace where all the user written programs can be saved and updated, if the program is incomplete/want to do any modifications to the saved programs, user can revisit the page and can access their dashboard where all programs have been saved.

- Different directories are maintained to save programs in the given workspace, depending on the language.

- Once all the functionalities have been fulfilled, the web application is deployed onto the server where it can be used for academic purposes as well as for online examinations.

VII. ADVANTAGES

I . This web-based application minimizes storage space and improves portability.

II . This is designed for educational purposes and for online practical examinations.

III .This provides user-friendly interface, as each user has their own workspace with open and save functionality.

VIII. SYSTEM DESIGN

The different modules included in Web Based application to Code are as per the following:

a) Registration:

Provides registration and login details for the end users. Every new user will get registration page to register their details with this application. Registered users will get authentication page to verify the authenticity of the user.

b) Login:

A registered user must log in with his or her username and password. This module helps to check the authenticity of the registered user.

c) Workspace allocation

This module helps to create a file and write a code with the language of the user's interest. The programs are stored in the user's workspace. This lets the user open existing programs. You can also change and update the programs if necessary. It allows the user to save the programs and the programs are stored in the user's workspace created after login.

d) Run:

This module allows clients to run a written code. The result will be displayed in the output text area
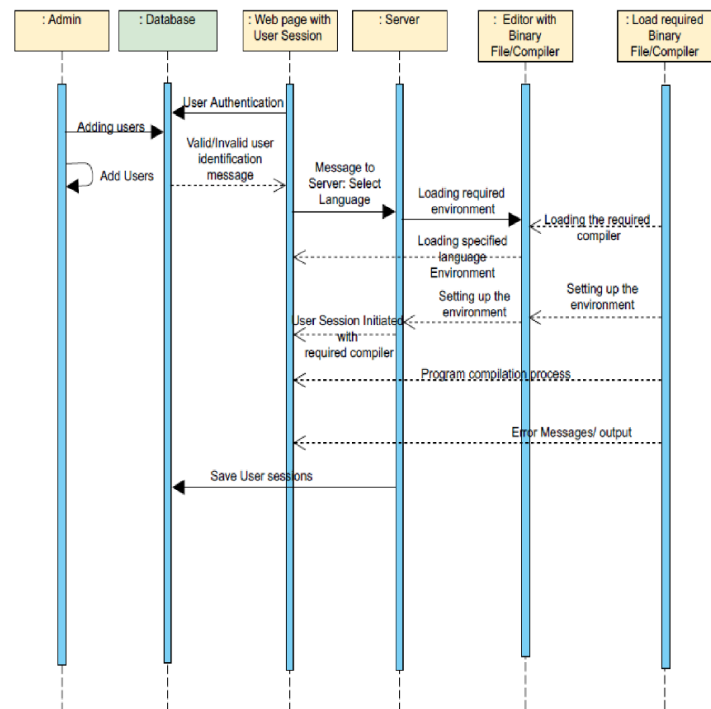

Fig 2. Sequence Diagram

VIII. ACKNOWLEDGEMENT

REFERENCES

[1] IEEE paper on Online C/C++ compiler using cloud computing by Aamir Nizam Ansari, Siddharth Patil,Arundhati Navada, Aditya Peshave, Venkatesh Borole Pune Institute of Computer Technology, Pune University of Pune

[2] IEEE paper on Online Compiler as a cloud service by Arjun Dattal, Amab Kumar Paue lResearch and Development 2M.Tech. in Software Engineering lLexmark International India Pvt. Ltd.Kolkata, India National Institute of Technology, Rourkela,Odisha, India

[3] https://youtu.be/cAeS1kvliGk-Integration of Compiler

[4] Online Language Compiler Using Cloud Computing For Android Mobile by Shan A S, Mr. Jithin Babu International Journal of Engineering and Technical Research (IJETR) ISSN: 2321-0869 (O) 2454-4698 (P), Volume-4, Issue-4, April 2016

[5] Online Editor for Compiling and Executing Different Languages Source Code Ratnadip Kawale,Pooja Soni,Gaurav Suryawanshi,Prof. Pradip Balbudhe VIII Sem, B.E., CE, 4 Assistant Professor,Suryodaya College of Engineering and Technology, Nagpur Maharashtra, India.

.