

Analyzing Programming Skills through Online Compiler

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Abstract: *Online compiler helps to reduce the installation of many compilers of different languages in a single machine and often decreases problem of storage and portability of compilers. User needs to submit program of which language he/she wants in user interface, then back end server compiles program and send errors/output of program to user. The main advantage of this online compiler is that user need not to worry about installation of various compilers of different languages such as C, C++, JAVA, Python etc. this will eventually reduce time, storage, portability, compatibility issues in system. This research aims at developing an Online Compiler which provides a user interface for user to type program in text editor provided for user, select language which he/she wants to compile program and program is compiled by back end server and send spinal errors/output of program to user. After execution of program user can check that in his/her login. It also provide Admin login user to monitor users who are registered with online compiler and also view programs they executed. The application is developed using PHP language along with HTML and MYSQL. The main aim of project is to monitor students programming skills in college, how students are learning programming languages, and what type of errors they are generating, how good they are in programming etc. main reason for creating project is to provide a centralized compiling scheme for organizations or institutions.*

Keywords: *Compiler, PHP, MySQL, C, C++, JAVA, Python*

I. INTRODUCTION

In today's high-tech world students need smart programming skills to get the work in multinational company or an exceedingly smart company for that they must be smart in programming of diverse languages and conjointly a number of users doesn't have laptops or personal computer to rehearsal or execute programs which they have learned in the institution or perhaps another example programs of their own. Some users will be decent programmers, some will be normal and some may be not up to the mark, in order to analyse the programming skills of the students I instructed of developing a virtual compiler where users can execute the programs of different languages such as C, C++, JAVA, and Python.

An online compiler that helps to reduce the difficulties of portability and storage space. The ability to use exclusive compilers consents a programmer to pick up the fastest and most easy tool to compile the code and remove errors. A web based application is used remotely through any network connection and it is platform independent. The errors and output of the programs are stored in more convenient manner, also the trouble of installing the compilers of various languages on the computer can be avoided. Thus these benefits are also supportive in accompanying online exams.

A compiler which is the heart of any computing system, transform the source code from higher level language to machine level language. This is done mainly in order to create executable file which can be run to get the output of the program. A compiler mainly consists of three parts:

- 1) The Front end: It checks the syntax and semantics of higher level.
- 2) The Middle end: This performs the optimization through removal or useless code replacement of computation depending on the circumstance.
- 3) The Back end: The part where the transformation of the language actually takes place.

The online compiler provides service of compiling programs written in exceptional languages such as C, C++, JAVA and Python. The user want no longer to install compiler in to the systems instead he/she wishes to login to the web application, choose the language in which he/she has to write the program, the program has to be written in available text area and submit the program and user can get the output in the given output space.

The structural design of the online compiler is divided in to three parts which includes following:

- User Interface
- System Controller
- Compiler

User Interface: The web application to access, the user must register with application on clicking registration links provided at front page of application. Users have to fill all details provided in registration form such as username, email-id, password etc. after successful registering user must login with his/her username and password.

System Controller: This is the second segment of web application, after successful login user is directed to compiler page where he can select the programming language from the list and write program in text area and click on submit button to compile the program. After submit user can view output if program is runs successful or he can view errors in output space and also program is saved in server where user can view programs which he/she has executed for future reference.

Compiler: This is third phase of net application, where high end server is installed which has all compilers installed on it. The computer has Ubuntu 16.04 LTS server edition along with latest versions of GCC, G++, JAVA and Python compilers are installed. Along with normal user I have developed admin login where the admin can view all the user details along with programs that he/she has executed. Admin has separate login for the website and diverse operator interface which is completely different from the normal user interface. The online application is developed using PHP language and MYSQL as back end database server along with HTML for designing of website.

II. LITERATURE SURVEY

A literature study is generally a text of cerebral paper, which includes current awareness including substantial discoveries as well as speculative and operational assistances to a defined topic which shows numerous scrutinises and exploration made in the field of your interest and outcomes already published, taking into account various parameters of project and scope of project that leads to innovation of the new technology or topic in technical field.

Online compiler is one of the trending aspect in today's practical world, where everything is available online taking from shopping to watch movies, listening music, viewing live sports, seeing live tv channels etc. There are many virtual compilers available in internet market most of them provide paid service, some of them have limited access and some have limited features such as program files are not saved in user accounts, have limited or particular languages (C or C++) and some of them does not provide admin to users.

In [2] the author has developed online compiler using cloud computing which is a latest technology now in use. But it has online C and C++ languages and does not contain latest languages such as JAVA and Python.

In [13] the author has industrialised a cloud based C compiler for android application which is an app for mobile users. Again it is only for C language and also it does not provide the admin access.

In [1] the developer has built a cloud based web compiler application which provides service for compiling programs for only C, C++ or JAVA and not for Python. It does not provide access to program files of users and also it does not provide admin login.

The project have all the features that are not provided by other vendors. It has all basic languages that a beginner

required for him to learn intricate languages from basic C, C++ to advance languages JAVA and Python. For this user need not have to install all these individual software in system in order to execute these programs.

The user need to access website from the IP address as the URL, register with the web application, login with username and password, start typing program and click on submit button to compile for output.

Later operator can access program files that he/she executed which is saved in folder of his/her account for reference this will save lot of time, memory etc. of computer system.

The online application also provide admin login where a user can play administrator role for managing and maintaining website. The admin login has different modules such as adding a question, viewing the question, deleting a question after the completion of test or exam. It also has user accountability from where admin can view all users who have registered and also delete unnecessary users from application.

The main aim of the project is to provide a platform for colleges or institutions to conduct online test or exam for programming of various languages such as C, C++, JAVA and Python, where college can provide a set of questions of programs and ask students to write and execute programs for question provided. After execution from Admin login they monitor each and every student programs which will help them to analyse the programming skill of students and teach them according to results of programs.

III. SYSTEM ARCHITECTURE

The large structure is divided into smaller sub structures. Architecture design process is used to find these smaller sub classifications to generate a framework for these sub systems controlled and ensure that these sub systems are communicating with each other. System design gives an output called system architecture. The design architecture acts as foundation for structure of system. Communication between sub systems, the components of system all are found in design architecture.

The system is categorized into the following modules

User Login:

- Registration.
- Login.
- Choosing a question number.
- Compiler.
- View the compiled program.

Admin Login:

- Login.
- Adding question to the database.
- Viewing the added questions and deleting.

- Viewing the user details and deleting.

A. User Login:

a) Registration

In this phase user need to register himself in order to access web application, user has to fill required details given in registration form such as Username, Password, and Email-Id etc. After successful registration, a folder is created with username in the back end server for storing programs which user will execute after login.

b) Login

In this part the user wants to login with Username and Password provided during registration phase. After successful login user will be allowed to access web application.

c) Choosing a question number

In this stage user will be provided with a list of question number each of which is associated with question in back end database, on clicking any one button in the list user will get a question from database and for that particular question user has to write program and execute program.

d) Compiler

This segment provide user to type the program for question provided in the previous stage in text area of compiler after typing program, user has to click on submit button for compilation, if program is correct it will display output in to output space or it will display errors if any.

e) Viewing the compiled program

This helps the user to view programs which he/she has typed and compiled, once user clicked on submit button his/her program will be stored in folder of his/her username in back end server. On clicking view button user can view all programs that has executed.

B. Admin Login:

a) Login

This is the administrator login given to user who is maintaining the web application.

b) Adding question to the database

The admin can add a question to back end database for students.

c) Viewing the added questions and deleting

Admin can view added question from MySQL database and delete question if they are not required.

d) Viewing the user details and deleting

This will provide administrator to see user details who have registered with web application and also he can delete users if they are no longer required.

IV. IMPLEMENTATION

In the implementation stage of the project choosing the programming language, selection of platform on which this project is going to work. Speed at which the system

works to efficiently execute this project are identified at the primary stages of this phase.

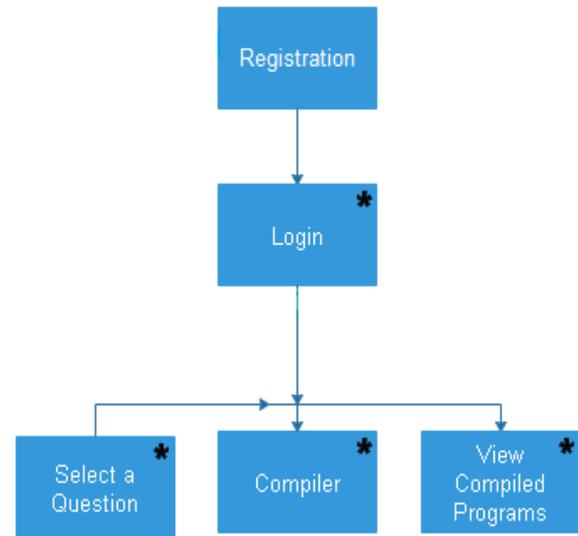


Fig 1. System Architecture for User Login

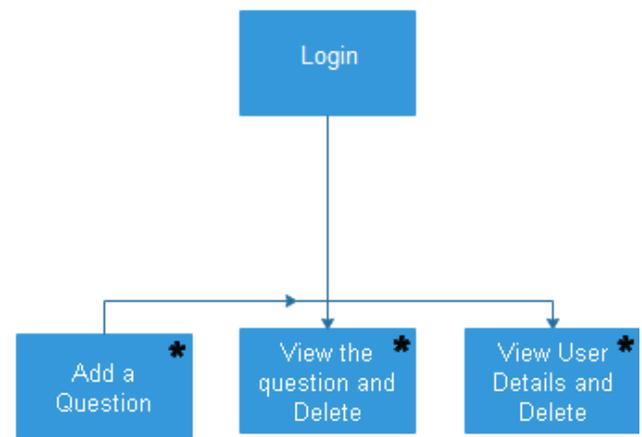


Fig 2. System Architecture for Admin Login

The methodology and avenues used to develop an online compiler involves different stages like Registration, Login, Compilation and viewing the compiled programs.

The complete project is developed using PHP and HTML languages and MySQL as the database server. The application has the following modules:

a) Registration

During registration user need to submit all details required for register, once the user filled all the details and click on submit button the application will create a folder of his/her username in the server and also copy some files required for compilation of programs, in order to store program files which user will execute after login and later to view files in his/her login. The following code will perform the task of folder creation for the user.

b) Login

After successful registration the user will login with username and password, in this phase the code will check the login details of user if it is correct it will allow the user to the next page or else it will display an error message seeking invalid username and password. The following code will perform the task for login verification for the user.

c) Compiler

After successful login user will be directed to compiler page where he will type the program of his/her language in which they have to execute, after typing the program it has to click on submit button in order to check output of that program. Once submit button is clicked the program will compiled and it is saved in folder of user in server. The following code will perform task for this.

In the compiler section it has the option of selecting programming language, the project is developed for C, C++, JAVA and Python languages the sample compiler code for C language is as follows:

```
<?php
    $CC="gcc";
    $out="/a.out";
    $code=$_POST["code"];
    $input=$_POST["input"];
    $filename_code="main.c";
    $filename_in="input.txt";
    $filename_error="error.txt";
    $executable="a.txt";
    $command=$CC." -lm
    ".$filename_code;
    $command_error=$command."
    2>".$filename_error;

    $file_code=fopen($filename_code,"w+");
    fwrite($file_code,$code);
    fclose($file_code);
    $file_in=fopen($filename_in,"w+");
    fwrite($file_in,$input);
    fclose($file_in);
    exec("chmod 777 $executable");
    exec("chmod 777 $filename_error");
    shell_exec($command_error);
    $out1=$out." < ".$filename_in." > "
    .$executable;
```

```
$out2=shell_exec($out1);
$error=file_get_contents($filename_error);
$com=exec("sed -n wprogram1.c
$filename_code $filename_in error.txt
$executable");
$path = '.';
$newpath = $path.'/'.'program1.c';
$newname = 'program1.c';
$counter = 0;
while (file_exists($newpath)) {
    $newname = program1.c !'_'.
$counter.".c";
    $newpath = $path.'/'.$newname;
    $counter++;
}
rename('program1.c',
$newname);
if(trim($error)== "")
{
    if(trim($input)== "")
    {
        $output=shell_exec($out);
    }
    else
    {
        $out=$out." <
        ".$filename_in;
        $output=shell_exec($out);
    }
    echo "$output";
}
else if(!strpos($error,"error"))
{
    echo "<pre>$error</pre>";
    if(trim($input)== "")
```

```

    {
        $output=shell_exec($out);
    }
    else
    {
        $out=$out."
    }
    echo "$output";
}
else
{
    echo "$error";
}
exec("rm $filename_code");
exec("rm *.out");
exec("rm *.txt");
exec("rm $executable");
?>

```

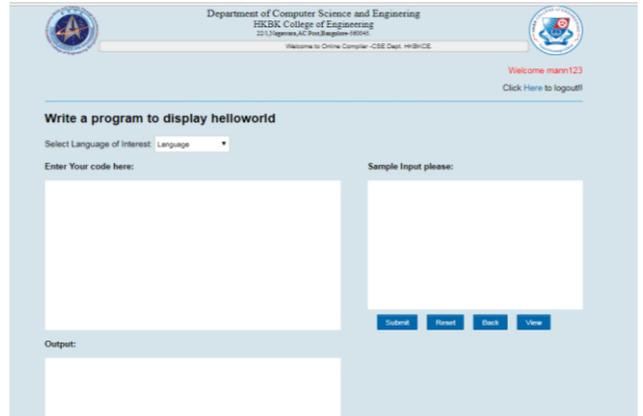


Fig 4. Compiler Page

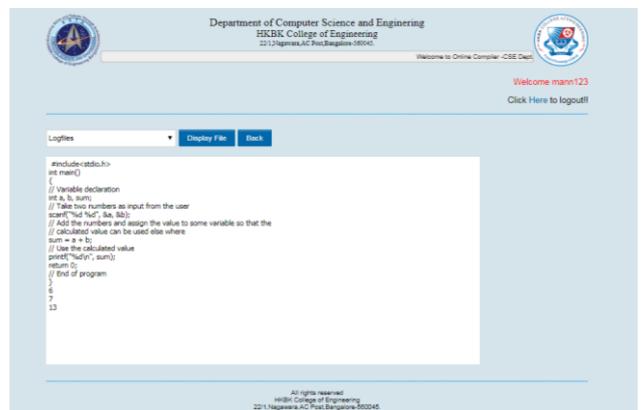


Fig 5. File Viewing Page

V. SCREENSHOTS



Fig 3. Login Page

VI. CONCLUSION

As everyone in the present day desires to get things to be executed very fast, easy and convenient with little efforts. In today's methodological world everything is on hand by means of World Wide Web that is the internet may this from an online shopping to document maintaining to IoT smart residence to virtual computers everything is available in the form of web application or the app which can be access from the PC's or smart phones.

The project has done the same thing keep in mind of today's fast world. This is very important for the students who does not have laptops or PC's in their homes but today smart phones are very cheaply available in market.

The development provide a platform for users to execute programs of different languages in same application and see output of program on drive. They are free from installing heavy and complicated software in system and worsening prised memory and convenience of system. User just need to register onto website and start using application without any further hurdles.

Experimental results can used to analyse the programming skills of students in institutions in order make them ready for industry skilled for placement recruitment. Web application can also be to conduct online

programming test for students for testing programming ability of students.

[18] <http://mrbool.com/how-to-create-a-login-page-with-php-and-mysql/28656>

The project can achieve greater heights in field of programming for different languages to help users to improve their programming skills.

ACKNOWLEDGMENT

The project is carried out to gain knowledge about how to run the C / C++ programs without installing the required compiler through internet using a web application.

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