Web Based Online Coding Classroom

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Abstract: *Today online learning platforms are contributing a lot to the learning management systems which helps to empower teachers to bring coding into their classrooms. Even though we have a lot of platforms to work on and learn from, we are not properly trained in this domain. This has increased the need for a platform that is targeted only at college students to develop a coding culture among them, right from the start. The project that we aim to develop solves this particular issue and will also enhance the skills of the students through continuous feedback learning. The end product will be a website that the teachers can use to set the problems and give assignments while the students will use the application to solve the assignments. The website is being developed using: HTML, and CSS on the front end, and the database will be PHP. The platform will be composed in such a way endpoints for performing various operations. The website will be built to support modularity, scalability, and ease of use. Some of the features provided by the website are sharing of learning materials, students can practice coding and execution of the code, and support for many programming languages.*

Keywords: Programming, E-Learning, Coding Platform, Classroom

I. INTRODUCTION

"It was observed that the game-based learning act as a good alternative to regular lab assignments and rote learning. With the competitions and coding challenges, students tend to develop an interest and are expected to learn more quickly and think more creatively. Hence, digital digital-game based learning should be incorporated into our education system as it offers a unique structure to complement traditional strategies, infusing teaching with energy, spark innovative thinking and provide diversity in teaching methods." – Papastergiou, 2009. The primary aim of this project is to implement the practical system of college by providing an easy and convenient way to perform the practicals. The objective of this project is to develop a particle management system that will be helpful to teachers as well as students performing the practical. It is a server-based practical system capable of performing the programming in core languages (C/CPP/Java/Python) of computing and engineering courses. This system tries to solve various scenarios such as platform problems, computer problems, etc. Here an editor is integrated with the server, even if students don't have compilers or IDEs installed on their system they can learn and performs programs and code. This makes all the students submit the code as everyone has an account of their own. The teacher can check the students' submissions and the number of students enrolled in particular classes. They can solve the student queries through a discussion forum.

1.1 Aim and Objectives
- To implement the college practical system in an easier and more interesting way for students and teachers and also to overcome the common issues while performing the practical.
- To design a website that teachers can use to set the targets during practical hours, post assignments, and keep the record of individual students.
- To perform proper analysis on the student practical records individually.

1.2 Motivation
The real motivation is the actual requirement of the student as well as the teacher when they perform the practical. To reduce the extra workload by the students and teachers. There are many issues like internet connectivity, and different

platform compatibility; each system must be installed with the required IDE and many more. Another problem was a paper-based practical manual that takes up a lot of space. The primary aim was to overcome all these issues with one system.

1.3 Scope

The server-based practical system is developed for performing practicals in an easy way. As the practical is one of the most important to implement the theoretical knowledge in real-world programming. The system provides the facility to create separate classes after adding the announcement updating and deleting the operation and the compiler for the proper execution of programs reporting errors or output to the students.

II. LITERATURE REVIEW

2.1 History

The Web Integrated Development Environment is a browser-based IDE that enables software development or web development. A web IDE accessible from a web browser, such as Google Chrome or Mozilla Firefox, allows the creation of a mobile working environment. Web IDEs have some enhanced features as compared to traditional IDEs or desktop IDEs, although all the basic IDE features, such as syntax highlighting, are usually present. Coding platforms have made an impact in the world of programming would be a monumental understatement; they've revolutionized the way companies, and developers work. Pritchard's perspective with an internet sheet is a guide to setting up solutions and supplying the positions of the "fill in the blank" areas. Through a portal, students provide the fill-in blanks and submit them for evaluation. Portal supports java along with C++ and uses Code Mirror to edit text. The development comprises its unique in-class practices supporting real-time problems. Deeb and Hickey made Spinoza, a web-based IDE with an automatic judging engine. In the Spinoza exercise, advanced problems by providing analyzed data are the key to which posting such questions is quite easy. Additionally, teachers can track the current growth of the class. Completed tasks by the students are also visible to tutors.

2.2 Related Work

[1] An automated web-dedicated marking system called Infandango was developed by Klein, Hull, and Powell.
One of the best features of Infandango was to allow students to submit java source files along with the backend JUnit test engine which evaluates against predefined test cases. Later on, the results get stored in a database and the student gets a response on submission. The architecture of Infandango is designed in four sectors: a web front-end, the CoSign authentication module, the jester JUnit tester, and the PostgresSQL database.
[2] Online learning platforms allow learners to control the content, pace, and environment of learning. Apart from functioning as a repository of e-learning resources, a learning management system (LMS) can track students' performance and be used for small group teaching. Google Classroom is an open-source LMS. Teachers can effectively create and collect assignments online, as Google Classroom weaves together Google Docs, Drive, and Gmail and automatically creates Drive folders for each assignment and student.

2.3 Summery

The design and development of this system serve as an interactive coding platform with contemporary modes that have been presented. This platform consists of different modules which help it to meet up with its designed objectives. As google classroom is proven to be a very excellent platform for sharing the learning material. The same feature to create separate classes and post the announcements and provide the details for uploaded files and assignments created online and offline, and the open to all discussion forum allows students and faculties to post and respond to queries. While implementing these modules we learned the different web-based technologies and PHP as a scripting language.

III. DESIGN AND IMPLEMENTATION

3.1 Proposed System

As in practical sessions, we need to install all the related software for performing the practical on C/C++, Java, and Python on every individual system and it gets quite difficult for faculties to store and manage the records. But the problem is that no such systems are available or not in use for college practicals. Therefore, this college practical system can help teachers

in easily and properly configuring practicals by providing the announcements, and uploading lists for a practical and complete analysis of individual students. Also, there will be a simple and effective practical performance by the student.

3.2 System Design

The architecture of a practical system is such that it should provide flawless implementation and can resolve the related issues. In this proposed system there are two main modules students and teachers. Teachers have been given an interface where they can create the separate classes like google classroom where they can upload the practical in the image, pdf, or Word format with some description for their respective classes and check the code performed by the individual student and can accept or reject the particular practical.

Students, on the other hand, have to register with their ID so that they can log in to the system and can perform the practicals in C, C++, Java, and Python related to them. Students need to write the program based on the given problem statement, solve errors in their program if any, and submit their program code to the system so that teachers would be able to check it and accept or reject it accordingly. The discussion forum is also available to upload the query raised by the students if any.
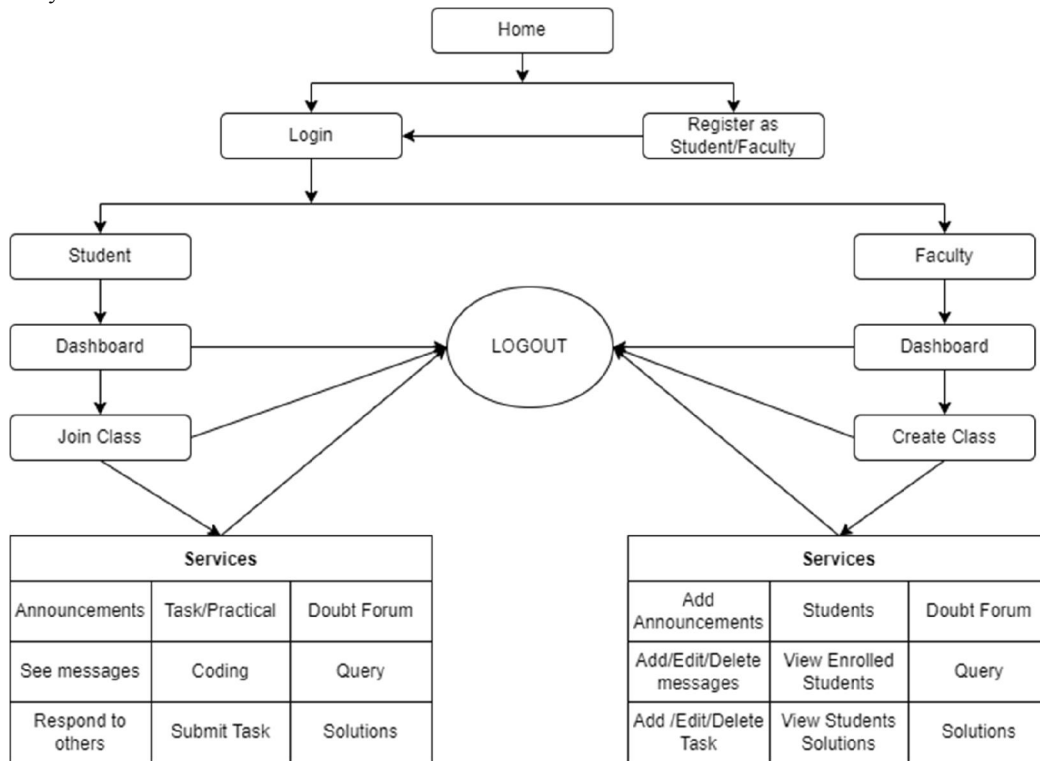

Figure 1: Data-Flow Diagram of Proposed System

The stepwise workflow of this working methodology is shown in Fig.1.

Stepwise workflow of working system for faculties:
1. Step 1: Registration for adding new faculty
2. Step 2: Log in to perform their respective activities.
3. Step 3: Creation and Joining of Classes
4. Step 4: Add an announcement or update and share the task.
5. Step 5: Update or delete the announcement or task.
6. Step 6: View and edit the class data.
7. Step 7: Analyze the practical data submitted by students.
8. Step 8: Response to queries in doubt forum if any.
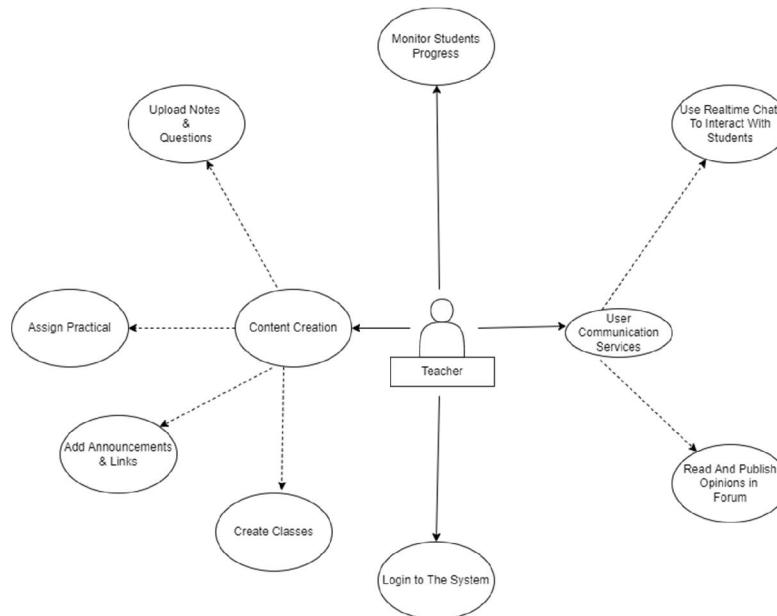9. Step 9: Logout

IJARSCT

Impact Factor: 6.252

Figure 2: Use Case Diagram for Teacher

IV. ADVANTAGES AND DISADVANTAGES

4.1 Advantages

- Easy to use the platform and allows teachers to share notes, assignments, and announcements.
- This platform can improve the communication and interaction among the teachers and the students.
- It can be used as a desktop IDE when set up with a Web server on the local machine.
- We can execute the practical task from anywhere and submit it.
- It highly helps teachers to save time.
- Teachers can effectively manage classes with a high number of students.
- No need to install a lot of software locally.

4.2 Disadvantages

- The utilization of this platform in the learning process must be supported by computers and the internet. It does not support smartphones or tablets well.
- This system does not provide automated quizzes and tests for students.
- Implementation can be difficult & time-consuming.

V. CONCLUSION AND FUTURE SCOPE

5.1 Conclusion

A coding platform for students may sound as simple as any online IDE's having the same functionalities. But a coding platform is a technology that focuses on providing programming challenges in a modernized way among the students in a college. The program may need to be solved in any of the programming languages given in the curriculum. The success of the online learning system is completely dependent on several components including students, teachers, learning resources, internet networks, and technology. The above project provides a key solution for the online compilation and execution of college practicals in multiple programming languages for college students. The third-party online compiler enables students to compile and execute their programs without having to configure the lab systems with software and applications. This also allows students to perform their practicals online, anytime. The facilities provided in this system allow the student to log in, see an announcement, practical details, or task and perform the provided practical and submit the code for checking. The platform makes it much easier for the students to perform the practical and for the teachers to evaluate and share the notices,

and tasks and solve the students' queries competently. This project helps the students to work on a single platform to execute the code instead of installing individual compilers and interpreters on the system.

5.2 Future Scope

In this project, we have used the third-party online editor to perform the programming task but we can build our own compiler with API and in that, we can add new features like adding the inbuilt test cases, debugging the code, and providing practice problems related to programming. Initially, this website includes four programming languages. We can improve this system by adding some more programming languages in the future. Enhancement can be done to maintain all the assignments, students' data, and tasks. We can also add a video-sharing facility.

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