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AUTOMATED PROGRAMMING ASSIGNMENT EVALUATOR PROJECT PROPOSAL

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CONTRIBUTIONS

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OVERVIEW

One of the best ways to teach and learn programming languages and concepts is by practicing. Therefore, teachers and instructors always focus on evaluating students by giving programming assignments and coding challenges. The main problem with this case is that a large number of assessments have to be evaluated one by one manually. This can be turned into a difficult or even an impossible task and it is a time-wasting approach. If we can introduce an automated system to evaluate and grade programming assignments efficiently, then it would be a great beneficiary for both instructors as well as students.

The proposed system will facilitate instructor post assignments with multiple questions with descriptions and relevant test cases. Students can submit answers to assignments. The system will evaluate and grade student submissions. It also provides error checking and plagiarism checking capabilities. Instructors can give feedback to the student submissions individually. The system will make it easier for students to write code, manage their submissions, view their progress, and share with others.

OBJECTIVES

- Design and implement a user-friendly web interface for users
- Provide the ability to conduct programming assignments securely
- Automate the evaluation process and grading process efficiently
- Provide the ability to check plagiarism among student submissions
- Provide modular architecture to integrate more programming languages
- Provide the ability to view and share relevant reports

USES

- The main focus is to provide a platform for instructors to post, evaluate, and grade assignments and provide feedback to their students efficiently.
- The system can be used to conduct online programming competitions as well.
- Subsystems like Remote Code Execution, Plagiarism Checker can work as individual systems and can be used to build any other system.

SCOPE

Instructor

- Create and post programming assignments
- Create, add, edit questions in a assignment
- Share assignment with group of students
- View progress of students (reports)
- Give feedback to students

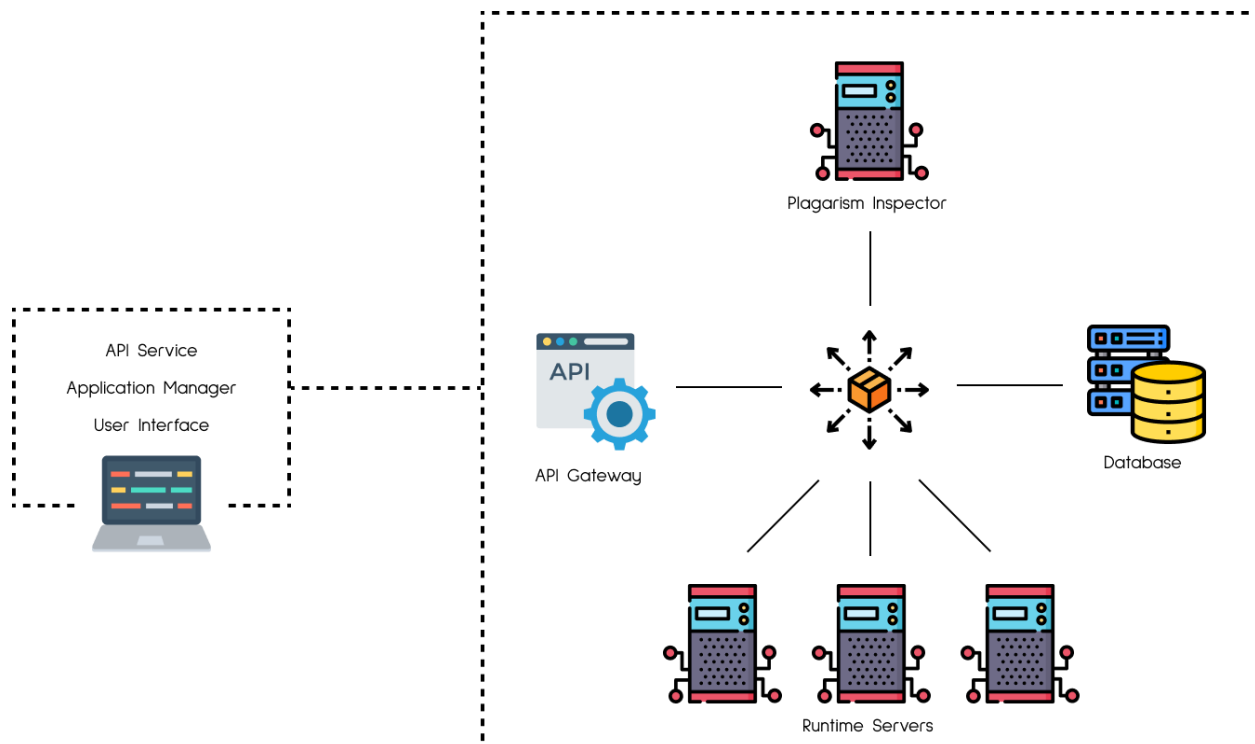
Student

- Submit answers to an assignment
- Write code (in preferable lang.) and test result
- Share results and achievements with others

DELIVERABLES

- Web based user interface for instructors and students.
- Web based administration panel for system admins.
- Backend API (which needs to be hosted separately.)

HIGH LEVEL ARCHITECTURE



EXISTING SYSTEMS

Web-CAT

Web-CAT is an advanced automated grading system for testing how students test their code. It is free and open-source software. It has a plugin-in-style architecture to provide additional features. It supports many models of grading, assignments, and feedback generations. The main focus of Web-CAT is to test the quality of the test case which is written by students for their code.[1][2][3]

Hackerrank

HackerRank is a platform that focuses on competitive programming challenges for both consumers and businesses, where developers compete by trying to program according to provided specifications. Hackerrank provides many facilities like practicing various programming languages, conducting online programming competitions.[4]

Algoexpert

Algoexpert is one of the newest leading interview preparation platforms for software engineers and programmers. It provides some modern features like explaining solutions to coding challenges using video tutorials.[5][6]

TECHNOLOGY

WebUI

Single page web application (SPA) using VueJs with Vuetify. VueJs is Progressive JavaScript Framework which is used to build reactive web applications. Vuetify is a UI Framework which is built on top of VueJs. (<https://vuejs.org>, <https://vuetifyjs.com>)

Backend API

Rest API using spring framework along with Java 11. The Spring Framework provides a comprehensive programming and configuration model for modern Java-based enterprise applications. (<https://spring.io/projects/spring-framework>)

Runtimes (Remote Code Execution)

Separate servers (microservices) will be used to execute source codes. Relevant programming environments and languages will be used for those. Ex: Remote Code Execution server for python programming language will be implemented using Python language or Java language. (<https://microservices.io>, <https://www.python.org>, [https://en.wikipedia.org/wiki/Java_\(programming_language\)](https://en.wikipedia.org/wiki/Java_(programming_language)))

Backend Database

MongoDB or Postgresql databases will be used.

MongoDB is an open source [document oriented](#) database. Postgresql is an open source advanced [relational database](#). (<https://www.mongodb.com>, <https://www.postgresql.org>)

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