Assessment Management System for Maties CS

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1 Project Description

At Stellenbosch University, Computer Science students spend a lot of time doing practical work. Managing all of this is a very large task, and the existing solutions are very frustrating and have led to a number of unofficial solutions being made by different people. Maintaining and using the current solutions is time consuming for lecturers and demis that need to manage and mark large numbers of submissions that come in many different shapes and forms.

This project aims to solve this problem by creating a submission platform that can be easily used from both the submission and submission handling ends. This platform should be able to work through the Stellenbosch University single sign-on system and the actions on uploads will be configurable from the marking points of view. The configurations should allow for easy testing and marking of submissions via scripts and frameworks, reporting of results as well as calling on plagiarism checkers.

The plan of action for the implementation of this project is to create a web-app with a Python backend that is easy to use for lecturers, demis, students and maintainers. This backend should be usable from both the web-app and from a command line interface. The project will then be stress tested to ensure that it can handle real world use. The project will be tested on real world users once it has been sufficiently stress tested.

2 Human Interaction

2.1 Submission System

In general, the submission system will allow the lecturers to configure a project to their requirements and allow students to submit files that fit the configurations, after logging in with their student numbers. The submissions will then be available to the lecturer and teaching assistants for marking purposes. The marks could be stored in a Google document and the presentation of these marks will be up to the lecturer. This is intended as a clear and unambiguous alternative to the Sunlearn submission system to make the process easier for the students as well as the markers. The only data that will be kept by this project will be student numbers, the submitted assignments and the marks associated with the submission. The submitted assignments will be stored on the university servers and backed up in accordance to the standard data handling protocols of the Stellenbosch University Computer Science Division. Only the lecturers and teaching assistants will have access to the marks and assignments.

2.2 Real World Testing

The submission system will be tested with the help of the students of Scientific Computing 272, which is a course presented by this project's supervisor, Willem Bester. The testing will take place during the assessment scheduled for the week of the 18th to the 25th of Ocober 2019. This assessment counts for 7% of the students' year mark.

2.3 Dealing With Issues

In the case of an issue with the system, the existing submission system will be available at all times. That is to say that if the system were to fail, there is an alternative submission system that the students are familiar with. The students will not be penalised in any way if they were to submit through the existing submission system rather than this project. There will also be a voluntary feedback form for the students to fill out to give me an indication of the success of the project.

2.4 Protecting Data

The assignments and associated marks will not be publicly available. The only people that will have access to this information will be the lecturers and teaching assistants involved with the marking.

There is a risk of data corruption or loss of submissions due to unforeseen circumstances. This will be protected against by backing up all data and submissions periodically.

3 Goals

1. There will be secure upload functionality for submissions.[4, 3]
2. There will be the ability to run tests on uploaded submissions. [3, 2]
3. There will be the ability to run marking scripts on uploaded submissions. [3, 2]
4. There will be the ability to call plagiarism tests on the uploaded submissions. [3, 2]
5. The results of actions on the submissions will be inputted into online services like Google sheets.[1]
6. There should be continuous integration of the submissions with the use of Git hooks.

4 Reading List

[1] Google. *Python Quickstart.* 2019. URL: `https://developers.google.com/sheets/api/quickstart/python`.

[2] Asad Memon. *How we used Docker to compile and run untrusted code.* 2016. URL: `https://blog.remoteinterview.io/how-we-used-docker-to-compile-and-run-untrusted-code-2fafbffe2ad5`.

[3] Pallets Team. *Uploading Files*. 2010. URL: http://flask.pocoo.org/docs/1.0/patterns/fileuploads/.

[4] tutorialspoint.com. *RESTful Web Services - Introduction*. 2019. URL: https://www.tutorialspoint.com/restful/restful_introduction.htm.