

Level 4 Individual Project: Project Summary Report

Exerciser- a tool allowing students to practice examples and acquire the necessary way of thinking for their area of interest

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Learning and most importantly teaching somebody how to “think” like a computer scientist, mathematician or any other kind of specialist cannot be achieved easily. Currently, in schools and universities, it is done by delivering raw theory, handing books to read and going over several independent examples. What follows is examining how successfully students can solve difficult problems related to what they have seen and read. However, rarely are students given the opportunity to exercise, to follow the process of thinking a specialist undertakes while solving the presented problem or to be told why they should approach it in a particular way. The option students to be able to go back and forward the steps that take to solve a problem and review parts they don’t find straightforward is crucial for the learning process. Last but not least, the steepness of the learning curve often needs to be reduced as students’ brains get overloaded and what they remain with after struggling with difficult problems is their frustration instead of key techniques for solving.

What would solve the issues described above would be application that allows students to go over examples with gradually increasing difficulty step by step with explanations about the process of thinking. Such a tool has recently been developed as a University of Glasgow PHD project. Its aim was to attempt to minimise the steep learning curve students have to overcome when they are taught a particular way of thinking. The idea and the current implementation are good with the only exception that it is a Java application and has a huge installation cost. The goal is to be able to deploy and use this application in schools with minimal setup cost hence the idea of having it as a web application with 0 installation cost and the only requirement- to have Internet connection.

Currently, the project has the major components implemented. These include:

- the implementation of a database to store the provided examples
- user-friendly interface for students that allows them to select an example to work on and go through it step by step together with explanations and practice questions
- logging data to analyse how students approach each example.

A feature still to be implemented is a teacher’s interface to generate a unique 7-digit random number for identification of their class and the ability to see how their students perform. An extensive evaluation of whether the goal of making the application more accessible and easy to use will be conducted in schools with the assistance of teachers there. Depending on the time left after

analysing the results of the evaluation and finishing most of the dissertation, an extension to the project may be added to develop an interface for creators of those examples. At the moment they would need to use the interface developed as a part of the previous project described above.

One of the major issues that needs to be dealt with is to give as much control to users as possible. This includes the ability to resize different components of the interface to suit users' needs. Furthermore, the design is intended to support responsiveness to changes in window size as well as cross-browser compatibility. These require more time than expected. However, this wouldn't affect the future progress of the project as they are addressed at an early stage and enough time is dedicated to resolving them.