Project Progress Report

- Project Description: clear description of the project, i.e. what it is that has to be done

- Progress: what you have achieved as of 19th December

- Plan: a plan of work for the remainder of the project

- Problems: any difficulties that you foresee or have experienced

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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December 19, 2014

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.

Project Progress Report

Project Description

This project is based on an already existing system for enabling students to work on pre-created examples in order to enhance their knowledge and understanding in a chosen subject. The aim is to reproduce a similar system which would be more easily accessible so that the cost of using it in terms of time and effort as well as installation is minimal. The current Worked Examples Interface is a Java application. The goal is a web application that has a similar functionality. This will address the issue of installation costs and will make it trivially easy to deploy and use.

The existing application enables the user to choose one or more examples to work on, providing a separate view for each. Each example is split into steps specified by its creator so that the user sees the process of solving the problem, explained by a specialist. The view consists of one or more panels showing the problem specification and a partial solution that reveals with every step together with and explanation towards the revealed part of the solution. The user has the freedom to go back and forwards to explore each step more deeply. Questions check user’s understanding. The application stores log data of how users work with the examples, i.e. time spent on each step, how often and when they go back to previous steps as well as any answers to questions. This information gives more details on what users find easy/difficult/unclear and could be used by creators of examples to improve the way they present them for maximum efficiency.

Here is a MoSCoW classification of the requirements for the project:

MUST:

* Create a database to store examples
* Read in XML files containing an example produced by a teacher/lecturer, parse it and populate the database appropriately
* Create an easy and user-friendly interface similar to the one on the existing interface which includes the following features:
  + Have a control part which enables the user to choose an example to work on, shows the name of the chosen example and buttons to go to the next/previous step in an example
  + Be flexible to show as many panels with example text as specified by the creator of the example at the same time
  + Have an explanation panel to show more details about the current step
  + Ask questions and store their answers
* Log data for further analysis of how users use the tool
* Provide a separate interface for teachers/lecturers to view the collected data

SHOULD:

* Everything should fit the window size
* Give the control of users to resize the panels and explanation components
* Be responsive to change of window size

COULD:

* Add shortcut keys to control the step transition

WOULD LIKE TO:

* Create an interface for teachers/lecturers to create worked examples

Note: This MoSCoW classification evolves with time, meaning this is not the finalised version.

Progress

Most of the MUST requirements are addressed. Currently, I am working on the SHOULD requirements as well as issues coming from the fact it is a web application, i.e. cross-browser compatibility and responsiveness. Logging of data is currently done into files but recently an idea for teacher/lecturer’s interface was introduced meaning that I need to store the log data into the database instead and provide this interface respectively.

Plan

In the remainder of the project, I plan to work on improving and evaluating the tool. I need to develop the interface for teachers/lecturers as well as fix the bugs/issues the current interface has. The tool will be tested in schools where real world data will be collected and analysed. I need to determine the purpose and process of evaluation as well as how I am going to analyse the results.

By the end of the winter break, the dissertation must have several sections completed, including Introduction and Project Management sections completed and Evaluation section started.

Depending on the remaining time after the evaluation and dissertation are complete, I will attempt to develop a complementary interface for creators of worked examples.

Problems