CM1202: Developing Quality Software
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Assignment – Design of Educational Software Test System
Hand out date:

There are various hand in dates for the different sections. You will have been informed of these dates in the first lecture and can find the dates on the Module schedule on learning central. You will be provided with detailed information about the tasks and assessment criteria for each specific piece of work at appropriate points during the module.

Background

Automated assessment

With cohort sizes growing, the marking workload for lecturers is increasing. Although automated making of assessment is not desirable for all assessments, the assessment of knowledge and understanding of a topic often can be automated. As a school, staff are being encouraged to consider automated marking where appropriate to provide students with more timely feedback. Staff are also being encouraged to provide formative assessment opportunities which allow students to gain a better idea of their understanding of a module or topic area. Learning Central does provide facilities for online tests, but many staff do not like the Learning Central interface and so avoid trying this. Also, some of the facilities offered by Learning Central are not very flexible. We need a system that provides an assessment test that can be Summative or Formative depending on the needs of the module, lecturers and students.

Summative and formative assessments are defined as follows:

Summative assessment is the evaluation of student learning at the end of a module/unit or topic by comparing it against some standard or benchmark. The completion of the assessment results in a mark that contributes to the final module mark.

Formative assessment, including diagnostic testing, is designed to help students identify their strengths and weaknesses and target areas that need work during the module/unit or topic. Formative assessment provides ongoing feedback that can be used by students to improve and by staff to improve their teaching.

Scenario

You work for a company that develops educational software for Higher Education. The company sells software packages to universities to help support lecturers in delivering their modules. With student numbers increasing and lecturers making more use of formative as well as summative assessment the company recognises a need for a new product: An automated assessment package that provides formative and summative assessments. You are part of the new team formed to develop this

product.

The following product outline is already available:

The formative assessments will provide students with immediate feedback and reduce the marking workload for staff. For the summative assessments results and feedback will be made available to students following the assessment deadline, and module lecturers will be able to view or request result reports.

The software package should enable lecturers to set up, and modify a set of short assessments, in the form of tests. Short assessments should contain no more than 10 questions. The lecturer should be able to select whether they wish the assessment to be formative or summative just prior to releasing the assessment to students.

The software should operate differently for formative and summative assessments:

Formative assessment tests – Tests that are for formative assessment do not need to record individual student's performance for future reference. However, the package should record how many times a question was answered correctly / incorrectly, at the first attempt, for future use by the module lecturer. Students should be provided with the flexibility of having single or multiple attempts (in a single sitting). The student should get feedback after each attempt but only be provided with the answers following their final attempt.

Summative assessment tests – Tests that are for summative assessment need to record the student's performance. The student can have only one single attempt of a test, after which they are provided with their mark. The module lecturer should be able to view and retrieve the results for all students after the test deadline. An advanced package would allow the lecturer to view the results in a variety of orders (by name, by student ID, highest to lowest)

You can develop the package in either Python or Java. The decision of which to use must be agreed by the entire team. You will be provided with a workbook and link to a guide on Tkinter. Tkinter is a Python binding to the Tk GUI toolkit. It is the standard Python interface to the Tk GUI toolkit, and is Python's de facto standard GUI.

The scenario above provides you with the basic requirements, however, you may wish to extend your software package. Some possible examples are:

1. **Summative assessment test** - Allow the lecturers to obtain additional statistics about the test, for example average class score, question most often answered incorrectly and results for a particular student.

2. **Manging the tests –** Lecturers should be able to add, delete, and amend questions.

3. **Questions**, The questions could appear in a random order. The test could handle different formats of question and/or answers.

During an initial brainstorming session with potential users, it was clear that there were several concerns about security and that the system should have some basic protection against vandalism, e.g. unauthorised persons altering the questions, or gaining access to student data or the test questions.

It is possible that additional concerns will be raised by the users later in the development, and it is advisable that you design your system in such a way that these can be taken care of.

For the prototype you are free to use any set of questions, covering any topic of your choice. Your team will be expected to develop **at least two short tests**.