uOttawa

SEG2105 - Introduction to Software Engineering - Fall 2019
Assignment 4 (3%) – Optional Assignment

Assignment due: Nov. 30 2019 (by midnight).

- You may work individually or in groups of two.
- You can use the tool of your preference, **but you need to use a tool**! I suggest you use one of the following tools: {ArgoUML, Visual Paradigm, Umple (does not support sequence diagrams)}
- **Incomplete assignments will NOT be graded.** That is, you cannot obtain points if you do not have an answer for all questions in the assignment.
- This assignment is **optional**. If you complete it, you will be able to recover lost points in assignments 1, 2 and 3 (only). That is, points obtained will be used to top up your assignment points.
- **No late assignments**

1. [10 marks] Write 10 functional **requirements** and 5 non-functional requirements for the system below.
2. [20 marks]Create a list of use cases for the system. Draw a **use case diagram** AND provide a detailed description for the use case 'Create a survey`.
3. [20 marks] Create a **UML class diagram** for system described below. Make sure you include correct multiplicity. Show all attributes and associations plus at least five important operations. If generalizations are necessary, show them too. Marks will be given for effort, even if you do not have a perfect solution. However, marks will be lost for the common types of mistakes we talked about in class (e.g. poor generalizations, wrong multiplicity, etc). Methods need to be part of your class diagram.
4. [30 marks] Design a **state diagram** describing the states a *Survey* instance can be in. You can define composed Boolean expressions to make your diagram more readable.
5. [20 marks] Draw a **sequence diagram** illustrating the sequence of actions involved in the creation of a survey.
6. [BONUS 1 - 10 marks] Improve your class diagram by applying two of the patterns discussed in Chapter 6.
7. [BONUS 2 – 10 marks] Draw a UML deployment diagram for the system below. Make all necessary assumptions.

An Online Survey System

You are creating a system that will allow people to create online surveys (questionnaires). There are two types of users: Survey makers and survey takers. All users are identified by their email, first, last name and address. An user logs-in the system with his (her) email and a password.

Each survey maker has an account and each account can have any number of surveys associated with it. Surveys go through a series of steps as they are being set up. The survey is first 'being designed'. When the initial design is complete, the survey maker can tell the system that the survey is now 'being tested'. During this step, users can be asked to use the survey, but the data is thrown away; changes can be made to the survey at any time. Previous versions of the survey are always kept in case the survey maker makes a mistake and wants to go back to a previous one. After testing, the survey changes so that it is 'gathering data'. Finally, after the date gathering is done, they survey is 'closed'. A survey can be reopened at a later date, and a survey (and all its data) can be deleted entirely.

A survey has a series of pages, and each page has an ordered set of items. Pages and items can be used on several different surveys. Some items are just text that explains the survey. The remaining items are questions. Questions all have some text asking the question and then accept answers of various kinds:

- Multiple choice (with the option to allow the user to select just one or many answers).
- Text (with maximum number of characters and lines that can be specified by the survey maker)
- An integer
- Boolean

If a user gives a certain answer to some multiple choice questions, then the survey software can be made to automatically skip to a certain page. So for example, a survey can ask someone if they own a car; if the survey taker says they don't own a car then the survey can skip all questions about the car.

The answers of every survey taker must be saved. On some surveys, each survey taker is given a number. They can then come back and modify their answers until a certain date.

The company expects to have many thousands of users, so has many servers around the world. Data for each survey is kept on at least three servers in different places. One place is the master, the others are backups. However, when a user accesses a survey, data is transferred from wherever the master is stored (or from a backup if the master is down).