Assignment 01

EECS 3461, Fall 2017 v.1, Prepared by: M. Baljko

Submission
To submit your solutions to this assignment, you will use the submission facility on the course website on learn.lassonde.
This assignment is worth 15% of your final grade.
Due Date: Monday, October 16, 2017, 11:59pm

1. Task Summary

In this assignment, you will complete a number of interrelated components.

You will formulate one or more empirical questions. You will design a data collection protocol that is relevant to the empirical question. You will implement an interactive interface that will be used as the basis for the collection of data under your protocol. You will collect the data. You will analyze the data and present your findings.

Obviously, the type of interactive interface that you implement will determine the type of data that can be collected. This, in turn, will constrain the type of data collection protocol that can be deployed. The type of data collection protocol that can be designed, in turn, will constrain the type of empirical questions that can be asked.

In collecting your data, it is permitted to deviate by using "proxy" users in place of the participants from your target population. The proxy user, in the most basic case, would be yourself. Slightly better would be to ask your friends or classmates to act as participants.

2. Component: Interactive Application

You have been provided with an example codebase.
The codebase features the following:

1. An interface that features a prompt area and a single button.
2. Prompts appear to the user at regular intervals.
3. During the time that the prompt appears, the button is deactivated.
4. When the prompt disappears, the button activates.
5. If the user presses the button, the input action is recorded. An informational message is printed on the console. Message indicates the time elapsed (from the point at which the prompt appears to the time the button is pressed).

You may use this codebase as the starting point of this assignment.

2.1. Success Criteria

A. **Basic:** All resources required to run the interactive app have been submitted as per submission requirements. Javadoc has been generated.
B. **Documentation:**
   a. Class documentation is complete, accurate, and provides sufficient detail. Adheres to javadoc requirements.
   b. Method documentation is complete and accurate. Fully specifies the pre and post conditions. Adheres to javadoc requirements.
C. **Correctness:** application behaviour matches the specification (as found in the documentation of the class that contains the main method). App compiles and runs; does not crash.
D. **Design and Implementation:** Interactive interface makes use of all relevant architectural and software design patterns; adheres to principles of good programming.

E. **Degree of Sophistication:** [only attempt if all other criteria have been satisfied] sophistication of the implementation in terms of going beyond the provided codebase. Adds substantial new functionality and/or components.

3. Component: Study Report

Prepare a document that provides the following:

- Statement of empirical question
- Description of data collection protocol
- Concise summary of findings
- Detailed analysis of data
- Appendix containing the raw data and any other intermediate formats (such as a spreadsheet)

3.1. Evaluation Criteria:

F. **Quality of presentation**: Can the reader understand the key ideas being expressed in each section? Are the verbal descriptions concise yet adequately detailed? Is quality of expression of a high caliber? (grammatical? has been copy-edited? free of typos? well organized and well presented?)

G. **Completeness:** all required sections are present; each section contains required material. Degree to which empirical question(s) are answered. Quality of summary of findings (relevant but concise; hits on the key facts).

H. **Quality of empirical question(s) and study protocol**: Degree to which the empirical question goes beyond basic ideas. Does data collection protocol relate to question?

I. **Quality of analysis**: to what degree is stated answer supported by analysis? Quality of data preparation.

The appendix must contain raw data that was actually produced by your interactive application. The fabrication or modification of raw data is considered a breach of academic honesty.

A basic report will be one page long.

4. Examples

Here is are some examples. The basic bones of an assignment (not all details provided)

A. [basic]
Empirical Question: Of two horizontally-aligned buttons, do users press the button on the right faster than they press the button on their left? Codebase is modified to include a second button.
Quantitative data collected from one participant only (where the participant is the assignment submitter) over a trivial number of trials (like 10 or 20). Prompts alternate between asking participant to press left or right buttons. Data is analyzed in a spreadsheet, and an answer provided, as supported by the mean value of time-to-press.

B. [moderate]
Empirical Question: Of two horizontally-aligned buttons, do users press the button on their dominant side faster than they press the button on their non-dominant side? Codebase is modified to include a second button.
Quantitative data collected from a non-trivial number of participants (like, say, more than 2), with both left- and right-side dominant represented over a non-trivial number of trials. Prompts ensure equal distribution between left and right buttons, but order is randomized. Data is analyzed in a spreadsheet, and an answer provided, as supported by the mean value of time-to-press, with discussion of whether difference may be due to chance. We did not cover significance testing, and so including something like this would bring the assignment into the realm of "exceptional skill or great originality in the use of … concepts and techniques".

C. [moderate-to-advanced]
Empirical Question: Which has the bigger impact on button selection time: button position or button size? Codebase is modified to include variants with different button sizes and placements. Prompts are randomized but balanced. Quantitative data collected from a non-trivial number of participants (like, say, more than 2). Data is analyzed in a spreadsheet, and an answer provided, as supported by the data, with discussion of whether difference may be due to chance. We did not cover significance testing, and so including something like this would bring the assignment into the realm of "exceptional skill or great originality in the use of … concepts and techniques".

D. [moderate-to-advanced]
Empirical Question: In performing a difficult task using this interface [task needs to be devised and specified], what are the perceptions and opinions of participants about why the task is difficult? Codebase is modified to implement the difficult task, with appropriate prompting. Qualitative data collected from a non-trivial number of participants (observation, think-aloud protocol, interviewing, questionnaire). Data is analyzed using a method from the textbook. An answer provided, as supported by the data, with discussion.

4.1. Discussion of Marking

Your grade begins at zero and the submission earns grades with respect to each of the success criteria. The criteria will be graded using letter grades. The meaning of each grade is set out by the Senate and is also found in the course syllabus. The two primary criteria are weighed roughly equally.

This assignment has been designed with flexibility in mind. The grading criteria is provided up-front, so that students can decide their own strategy.

Here is some information that may help you calibrate your expectations.

If you submit a really basic version (like example A) that contains all the required components (you simply supply what has been asked in a basic way, with no deficiencies but with nothing beyond that), this is likely to earn a grade in the C/C+ range. If you provide more than the basics of what has been asked, the mark could potentially reach a B level.

If you submit a moderate version (like example B), and execute all of the components exceptionally well or with a high degree of skill, this could earn an A/A+. If you submit a moderate version and execute all of the components with a considerable skill, this is likely to earn a grade in the B/B+ range.

If you submit a moderate-to-advanced version (like example C or D), and execute all of the components exceptionally well, this would definitely earn an A+. Even if some of the components fell short of the standard of "exceptional", the quality of the other components, if executed with a high degree of skill in the majority, the submission could still earn a grade at the A level.

For an assignment such as this, typically about 15 A/A+ grades would be earned.