CS 522: HW 3   **Maximum points: 100**

General instructions:

- You must submit your **<u>own</u>** work. You can clarify doubts with your peers and discuss the assignment, but not use each other's code, data, analysis, or write up.
- This is an **<u>individual</u>** assignment, not a group assignment. Your answers should not significantly resemble your classmates' work. Any significant similarity between two submissions will result in an automatic F. Use proper quotations, citations, and references, where applicable.
- Please stick to the word limits, where given. Any number of figures are allowed.
- Please write a coherent, concise, and convincing answer. If I cannot understand your logic, I cannot award you points.
- If referring to a class reading in your answer, provide the page number(s) in your citation.
- Submit your answers in Blackboard in a single word/txt/pdf/zip/rar file and name it Lastname_CS_522_HW_3.

Grading rubric: Appropriateness: 70% | Clarity: 15% | Insightfulness: 10% | Accurate references: 5%

Assignment specific instructions:

Part A is for students from the Department of Communication and does NOT involve programming.
**Part B** is for <u>all other students</u> and does involve programming.

This assignment is about conducting empirical research, which is somewhat different from the conceptualize-gather requirements-design-implement-test-and-iterate method that we have adopted for the course project. The objective of an HCI experiment or empirical research is to *discover* rather than *invent* a technology.

Because of the class's scope and time constraints, I am not asking you to find a solution to an open problem. Rather, you are going to replicate an HCI theory (Part A) or use an established method to look at an ordinary HCI context (Part B).

Part A: Rapid Contextual Design
Read Chapters 4 (The Contextual Inquiry Interview) and 6 (Work Modeling) of the book Rapid Contextual Design: A How-to Guide to Key Techniques for User-Centered Design to learn how to conduct rapid contextual design. The book is freely available online from the UIC library (http://library.uic.edu.proxy.cc.uic.edu/search?q=contextual+design).
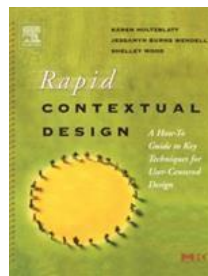
Rapid Contextual Design: A How-to Guide to Key Techniques for User-Centered Design

Wendell, Jessamyn, Holtzblatt, Karen, Wood, Shelley

ISBN: 9780123540515
Morgan Kaufmann [Imprint], 2004

Your assignment is to choose ONE interesting work setting that might be significantly improved by the introduction of a computing application. Conduct ONE contextual inquiry (CI) session and present your findings. Report the three work models: physical, artifact, and sequence. (Although the book asks you to conduct interpretation in groups, you don't need to. This is an individual assignment.).

Your work will be evaluated on (1) the rigor with which you conduct CI, (2) correctness of the work models, and (3) the intellectual merit of your insights and understanding as evident from your work models.

Part B: Fitts's Law Replication

For this assignment, you will be replicating Fitts's law experiment for aimed movement in graphical user interfaces (GUI). You will need to build the experimental apparatus before collecting and analyzing data. Developing an application for this experiment is **<u>required</u>**. You are NOT allowed to use a third-party app for collecting data in this assignment.

1) Describe Fitts's Law (Fitts's 1954).
2) Conduct and report a Fitts's law experiment for aimed movement.

Developing the experimental apparatus (app):
   a. Your input modality could be mouse, trackpad, or touchscreen. Choose ONE of them.
   b. You will be designing a 2D pointing task to test Fitts's law. Use the ISO 9241-9:2000 standard for designing your experimental tasks (multi-directional tapping task; e.g., Figure 2, http://www.yorku.ca/mack/ijhcs2004.html)
   c. Have 2 different target sizes and 3 different distances.
   d. You may use any programming language to design the experiment and collect data.
   e. Use the Shannon formulation of Fitts's law.

Data collection:
   f. After developing the apparatus, collect data by once using it yourself and once by a peer (2 users; no need to have more users).

Data analysis:
   g. Find the regression coefficients after fitting your movement time data (HINT: use R, MATLAB, or Python).
   h. Plot movement time over Index of Difficulty.
   i. Plot throughput over Index of Difficulty.

Deliverable:
1) The application source code (preferably a link to a Bitbucket or GitHub repo)
2) Data dump
3) A brief report describing the experimental method and analysis of the data collected (maximum 3 pages + figures)

An example of the Fitts's law experiment and visualization: http://simonwallner.at/ext/fitts/
This is an example implementation (All aspects of this implementation may not be correct. This is provided as an example.). Do NOT use this app to collect data as part of this assignment. You MUST develop your own application to collect data.