CS 338: Graphical User Interfaces

Project

Goals

The class project is an individual project that allows you to design and implement a sophisticated, useful, and fun user interface. First, you will decide on an idea, and take steps toward defining the user interface in the project proposal and specification (Parts 1 & 2). The ultimate goal of this stage is to thoroughly think through the user interface requirements of your project before getting started on any prototypes or implementation.

You will also prototype your interface (Part 3), and discuss your idea and prototype in small groups during a special class session. This stage allows you both to receive feedback on your own project as well as to see and evaluate other students' projects. At the end of the class session, you will turn in an evaluation report that integrates the comments you received with your proposal for revising your project (Part 4). The ultimate goal of this is to improve both your project and other projects through team discussion and evaluation. From the feedback that you receive, you will refine your design and then implement your refined design as a high fidelity prototype that can be demoed to the potential users as well as the classzwqq (Part 5).

Project Timeline & Deadlines

Assignment	Due Date	Points
Part 1: Project Description & User Analysis	Monday, October 31, 10:00am	13
Part 2: Full Design Specification	Monday, October 31, 10:00am	22
Part 3: Interface Prototype	Monday, October 31, 10:00am	20
Part 4: Evaluation Session Report	Monday, October 31 –in class	15
Part 5: System Completion & Demo	Monday, November 28 and Wednesday, November 30 in class	30
Extra Credit	Saturday, December 3, 11:59pm	0-6 pts

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Part 1: Project Description and User Analysis (13 points)

Due Monday, October 31, 10:00am

Project Idea

First, you need to decide on a project idea that you would like to work on. You should note the following as you work out an idea:

- You should aim to develop a novel idea/interface for a particular purpose, and/or to address particular deficiencies of existing systems with your new system. In particular, you should avoid very common, general systems that people use often (e.g., contact manager, calendar system, chat messenger, photo manager, etc.) -- instead, be as creative as possible and try something different, and you will get more out the project. You are especially encouraged to design a user interface for a population that you are not part of. Some of the most interesting ideas come from considering subsets of possible users -- e.g., what applications might be good for a pharmacist? coach? fireman? artist? pilot? parent? person with low vision? etc. You also might consider applications for non-standard contexts or environments. Another possible inspiration could come for this year's CHI conference Student Design Competition. Check out the description here:
https://chi2017.acm.org/designcompetition.html

- Roughly speaking, your system should have a significant, interesting interface part and a significant, interesting computational infrastructure behind the interface. On the one hand, an application that focuses solely on GUI components would likely not do anything interesting; on the other hand, an application that is primarily "computational" (e.g., neural-network training) with the most basic GUI features would not be appropriate for this course. Thus, you should aim for a project in which you could imagine approximately half of the code being devoted to GUI construction and event handling, and half of the code being devoted to doing something interesting based on the user's interaction with the system.

- The application can be implemented in Java/Swing or HTML/CSS/Javascript, and all code developed for the project must be *new* code -- that is, you cannot build on or extend a system that you may have developed in a co-op, another class, etc. However, it is acceptable to import complex packages (e.g., a speech recognizer) to be utilized by your project code.

If you have any questions about the appropriateness of your idea, please email the professor for comments and suggestions.

Project Description

Write a 1-page **project description** as follows:

(1) **Project Title**: Come up with a catchy **title** for your project, likely including a system name and a catchy phrase that describes what it does -- e.g., "The Emblogulator: Brillig for Slithy Toves that Gyre and Gimble in the Wabe" (though yours should make sense! :))

(2) **Problem Description** (4 points): Write **one** paragraph describing the problem you are trying to solve. You should discuss what the problem is, how it is currently approached, what products/tools exist already, as well as what still needs improvement. Then describe your approach for solving it, as well as **one** paragraph describing the basic functionality that is planned.

(3) **User Analysis** (5 points): Write one paragraph (5 sentences minimum) describing the **users** of the system. Who are they? What are their demographics? Skills? This should expand on the specific audience intended to use the system, what are their goals for using the system, and what constraints may come into play (both limitations of the user and constraints on the task itself).

(4) **System Description** (4 points): Write one paragraph (5 sentences minimum) about the **system** itself. This is not an interface sketch/design (that comes below); it should be a description of what the user is able to do with the system to achieve their goals. What parts of the overall task does the system perform? What parts does the user perform?

Please note that you will revise this description into a few slides about your project for the demo. But this first description will allow you to think creatively about the problem you'd like to solve and how you intend to approach this from the users' point of view. It will also give the professor and your classmates a clear summary of the goals of your project.

Submission

For submission, you should do the following by the due date:

Submit **one PDF file** on Drexel Learn as an attachment for assignment P1.

Notes: Student's name and date should appear in top left corner.

Grading

The material for this stage of the project will take into account the quality, organization, and originality of the proposal. There should be flawless grammar, spelling and usage and the writing should have an appropriate scholarly tone.

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Part 2: Full Design Specification (22 points)

Due Monday, October 31, 10:00am

In this part, you will complete the design specification for your project idea. Refer to the lecture notes on Design Specification to complete this.

Conceptual Model (5 points)**:** This consists of a description of the conceptual model in terms of objects, relations between objects, actions on objects, and attributes of objects. The conceptual design identifies the set of objects and actions the user needs to know about in order to use the system. The complete model should list all **Objects, Object Attributes, Object Relationships, Actions on Objects, Actions on Object Attributes, Actions on Object Relationships** that the user is expected to know about. See the lecture notes for more details.

Semantic Level Design (5 points)**:** describes each function including its parameters, feedback, and potential error conditions.

Syntactic Level Design (7 points)**:** describes the syntax of the system, using one or more state diagrams. (If your syntactic level specifications become too lengthy and repetitive, you can select a subset of your interface and specify just that.) You can also use sub-diagrams (like diagram subroutines) to keep the state diagrams from becoming cluttered. **NOTE:** It is recommended that you do this with pencil and paper and then scan it to be included in your online submission. If you do not have access to a scanner, you could instead take a photo of your sketches, and include the photos with your submission. If neither of these options work, please get in touch with the professor.

Lexical Level Design (5 points)**:** gives the definitions of the tokens. (Again, if your lexical level specifications become too lengthy and repetitive, you can select a subset of your interface and specify just that.)

Submission

For submission, you should do the following by the due date:

Submit **one PDF file** on Drexel Learn as an attachment for assignment P2.

Notes: Student's name and date should appear in top left corner

Grading

Grading of the project will take into account the quality, depth, and completeness of the design specification.

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Part 3: Interface Prototype (20 points)

Due Monday, October 31, 10:00am

Goals

You will prototype your interface, and discuss your idea with your classmates

Part 3: Interface Prototype

The first step in planning your prototype is determining **what *single* question do you want to answer** with your prototype? Then, think about what elements in the design are relevant to that question. Remove or fake everything else in your prototype as you want to get feedback that will help you the most in your design.

You will need to create and submit **4 slides** (e.g. Powerpoint):

- **Slide 1** should have your name, date, and project name.
- **Slide 2** should provide a high level description of your project, the intended users and their goals, most of which was described in Part 1.
- **Slide 3** should identify the one question you would like to answer, what the focus of your prototype is, and where you would like to receive the most feedback.
- **Slide 4** should have instructions for using the prototype. If your prototype is online, it should have the URL where your prototype can be found. Otherwise, please indicate how the prototype was created and what will be submitted to Drexel Learn.

You will also create and submit the **interface prototype.** The **interface prototype** is a sketch of what your interface will look like. This should include any interface elements you will be producing -- that is, all windows, components, etc., with notes about their functionality whenever it is not apparent from the drawing. You can draw the sketch by hand or use one of the prototyping tools we discussed in class (Balsamiq or Fluid UI). If you are using an online or desktop tool, you must bring a laptop or arrange to borrow a laptop from the professor. Make sure you have set up your prototype so that is accessible online. If this is not feasible, **you must bring hardcopies**. The tools mentioned above allow you to export PDFs and/or HTML which can be printed or viewed on the classroom computers and also allow for interactive sessions. More information about the prototyping tools will be posted on Drexel Learn.

The interface sketch is intended to convey your interface design to other people to discuss advantages, disadvantages, and possible improvements; at the same time, the sketch provides a head start on the actual implementation and layout of the interface. All windows, panels, etc. should be represented in your sketches. Also, for paper prototypes, you should denote the control flow between windows/panels/etc. by means of graphic indications, such

as arrows going from one screen to the next, or menus showing various options, etc. These sample handwritten storyboards[1] serve as good examples of sketches that convey components, layout, *and* interaction between components (i.e., extra information the programmer needs to understand how the system should respond to user interaction). For online prototypes using one of the prototyping tools, these transitions should be implemented in the prototype itself. Each program allows for linking pages together, and you should be taking advantage of these features to demonstrate the interactive behaviors.

Submission

For submission, you should do one of the following by the due date:

1) Submit **one PDF file** on Drexel Learn as an attachment that includes your 4 slides that introduce your prototype.
2) If you have created a paper prototype, please scan it and submit it as **one PDF file** on Drexel Learn as an attachment for assignment P3.
3) If you have used a prototyping tool that allows you to export to PDF or to another format, please do so and submit **all necessary files** on Drexel Learn as an attachment for assignment P3.
4) If you have used an online prototyping tool, create a submission in Drexel Learn and put the **URL for the location of the prototype**.
5) **Bring *1* copy of project description (Part 1) to class on Wednesday, October 31. In addition, bring *4* paper copies of interface sketch to class, or have your online prototype prepared for accessing from a laptop in the classroom.**

Along with your submission, **you should provide the following information in the submission comments:**

Self-rating: [**0**: no functionality **1**: partial functionality **2**: fully functioning as expected]

- **Prototype layout of all windows/frames**: [0 1 2]
- **Prototype: all components:** [0 1 2]
- **Prototype: control flow/interaction:** [0 1 2]

Grading

The material for this stage will be graded based on the completeness, depth, and quality of your prototype, including the **layout**, all **components** and **interaction/control flow**.

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[1] http://cci.drexel.edu/faculty/esolovey/courses/CS338-F16/project/p1/Sample-Storyboards.pdf

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Part 4: Interactive Session and Evaluation Report (15 points)

Bring *1* copy of project description (Part 1). In addition, bring *4* paper copies of interface sketch to class, or have your online prototype prepared for accessing from a laptop in the classroom

Write evaluation report during class and submit at the end of class

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Goals

The evaluation session provides the opportunity for you both to receive feedback on your own project as well as to see and evaluate other students' projects. At the end of the session, you will turn in an evaluation report that integrates the comments you received with your proposal for revising your project. The ultimate goal of this stage is to improve both your project and other projects through team discussion and evaluation.

Evaluation Session

To prepare for the special interactive session, you should **set up your prototype on your own laptop** or **make sure that it will be accessible online from the classroom machines** or **make a hardcopy of your interface prototype** and **bring this to class**. Fluid UI allows you to share as a link or several different exporting options. MyBalsamiq also makes it possible to share as long as you are using the class account.

In the interactive session, we will break into small groups and each group will discuss each project for a given time using a set of evaluation heuristics. Then, at the end of class, each person will have some time to write an evaluation report summarizing (1) the comments received about their prototype, and (2) what to do to revise the interface and/or code to improve the final product. All students are expected to attend the entire class period so that they can participate in both giving and receiving comments for the entire group's projects.

Submission

Students are expected to bring their prototype to class on a laptop. If this is not feasible, you should contact the professor to borrow one for the class session. If this does not work out, **you must bring hardcopies**. The tools mentioned above allow you to export PDFs and/or HTML which can be printed or viewed on a computer and also allow for interactive sessions.

At the end of the interactive session, you will hand in the **evaluation report** submitted online through Drexel Learn during class (the details of which will be given at the start of class. This will contain the following sections:

1. In 1 paragraph, please summarize your project idea. (This will remind us of your idea and also allow us to keep track of how your idea has evolved since Stage 1, if it has.)
2. In about 2 paragraphs (3-4 sentences each), please summarize the comments you received about your interface sketch and implementation diagram. What did the other students like most about your initial design and implementation? What did they think could use the most improvement? Please list specific evaluation heuristics as well as general comments.
3. In about 2 paragraphs (3-4 sentences each), please summarize any changes or improvements you would like to make to your interface sketch and implementation diagram. You may include both changes that were directly suggested by your group as well as changes that came to mind reflecting back on your group discussion.

Grading

The material for this stage will be graded based on the completeness, depth, and quality of your prototype and evaluation report, as well as the feedback that you provided to others.

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Project Part 5: System Completion and Demo (30 points)

Demos in class on November 28 and November 30

Submit PDF slides on Drexel Learn by 9am the day of your project demo

Submit all electronic project materials by Wednesday, November 30, 11:59pm

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Goals

Part 5 marks the final stage of your class project. The main portion of this final stage involves the completion of your proposed system. You should keep in mind that because you'll demo the system to the class, you should focus on completing the system to the point where you can effectively run an interesting and fun demo.

Project demos will be held during the last week of classes.

We will run the demos in shifts. In each shift, a group of 4-5 students will do a brief slide presentation and then demo their running system:

- **Slide Presentation**. Create a **landscape PDF** file with 4 slides of the following content: (1) a title slide with your name and the name of your project; (2) an idea/users slide that summarizes what your system does and what users are intended as the main audience; (3) an implementation slide that includes screen shots and any relevant details about the implementation; (4) any additional points about system features, usefulness in the real world, extra screen shots, etc. You will have 3 minutes to present your slides. Note: Please do NOT submit the 4 slides embedded into a single page handout (as Powerpoint allows) -- the slides need to be full-size on separate pages to allow for presentation.

- **Running Demo**. After the presentations of 4-5 students, each student will set up and demo their system. Your demo should be an informal, interactive time in which you demonstrate the system to people who come by, highlighting the most interesting features of your system. This time can include a demonstration of a sample scenario, some discussion about interesting implementation details/issues, and/or allowing others to sit and play with the application. Students not running demos will mingle and see the other class projects in action.

Submission

- **BY 9AM THE DAY OF YOUR DEMO**: (Don't be late!!! -- I need time to create the final PDF)

- Submit through Drexel Learn the **landscape PDF file** with 4 slides as described above.
- **BY YOUR DEMO SESSION**:
  - Have your running demo ready to run, likely on your own laptop. TEST EVERYTHING BEFOREHAND!! The demo session will move fast and we won't have time to wait for you to boot up, debug, etc. -- the system should be up and running quickly so that others can play with it.
- **AT YOUR DEMO SESSION**:
  - Do your demo!
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Grading

This stage of the project grade will be based on the following criteria:

- **Presentation** (4 points)
  - Did your presentation include 4 slides as specified, with appropriate content? (2 points)
  - Was your presentation engaging and interesting? Was it effective in highlighting your project goals and accomplishments? (2 points)
- **Demo** (4 points)
  - Did your demo highlight interesting aspects of your program? (2 points)
  - Was the demo fun and interactive? (2 points)
- **Project Scope** (10 points):
  - Did you get the basic functionality working? (5 points)
  - Were you able to add a few interesting features that took the project in a creative direction? (5 points)
- **Project Quality** (12 points):
  - How well were your idea and interface sketches executed? (3 points)
  - Is the interface well thought out? (3 points)
  - Does the layout follow design heuristics? (3 points)
  - Is the code robust? (3 points)

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Project Extra Credit (0-6 points)

Due Saturday, December 3, 11:59pm

There are three opportunities for extra credit on your final project. Points will be added to your final project grade.

1. Open source your project. Send me a link. (up to 1 point)
2. Create a blog entry about your project. (up to 2 points)
3. Create a video about your project. (up to 3 points)

Here are the details:
DUE DATE: Saturday, December 3, 2016 at 11:59pm. No late submissions will be accepted.

OPEN SOURCE:

Put your project on github. If you have never used it before, there are many tutorials online: github.com
And you can always email me with questions.
The grade will be based on the following criteria:

1 point: Source code for project is on github. For full credit, it must include a README, explaining the goals of your project and how to set it up and use it. It must also be able to run from the source code and instructions/documentation that you provide. If you create a blog entry or video (see below), then you should also provide a link to it in the README.

BLOG:

Create a blog entry about your project. The blog post should also include the motivation and intended users for your project as well as the key features in it, and any future work. Explain what you think is interesting about your project, or about the design process, or any other key points you want to make.

The blog entry must be added to the course blog, which you will receive login information for. If you have your own blog, you can it there, but then just make sure to post a link to it from the course blog website.

The grade will be based on the following criteria:
1 point: Blog clearly describes motivation, audience, key features, and any future work.
2 points: Blog does all of the above, is extremely creative and interesting, and shows

thoughtful effort.

VIDEO:

Create a video about your project that **is no more than 1 minute long** and upload it to YouTube, and post a link to it on the course blog. The video should start with a title screen including your name. The video should also include the motivation and intended users for your project as well as the key features in it, and any future work. Explain what you think is interesting about your project, or about the design process, or any other key points you want to make. Have fun with it and be creative!

For inspiration, you can revisit the videos shown in class (linked from the lecture notes). You may also find inspiration from these videos that have been presented at the ACM CHI 2016 Conference: https://www.youtube.com/playlist?list=PLn0nrSd4xjjbNoDOzfsugtLQrHlLQHffg

In addition, there are some guidelines and tips for videos submitted to CHI that you might find useful. You don't have to follow all of the technical guidelines included there, but it just might help you design your video. https://chi2016.acm.org/wp/video-previews/#instructions

The CHI 2016 conference also provided a set of "concept videos" that were annotated to demonstrate effective filmmaking and storytelling techniques. Please take a look at the Example videos here: https://chi2016.acm.org/wp/video-showcase/#example-videos

The grade will be based on the following criteria:
1 point: Video has been created, including title and name, and some information about the motivation, users, or some features of the project.
2 points: Video clearly describes motivation, audience, key features, and any future work.
3 points: Video does all of the above, is extremely creative and interesting, and shows thoughtful effort.

Submission

If you complete any of these extra credit options, **you must create a submission in Drexel Learn** under extra credit and indicate which items you have completed and provide a link as well.