CST315 Software Enterprise: Project Handout **(Fall 2015 revision)**

Project Overview

This project is a semester long assignment in the area(s) you responded to on the student survey as being of high interest. The goals of CST3115 are to *understand the end user needs* and to *design a solution*. You will have 2 major types of deliverables from a project perspective:

1) prototypes of UI and system design solutions, and
2) a design specification document that describes a system design for software technology that addresses needs.

You will have 2 major deliverables as well from a learning perspective:

1) a *team website* that will provide evidence of how the team enacts the UX and Software Design Processes, and
2) an *individual portfolio* that you will do in conjunction with the modules we cover during class.

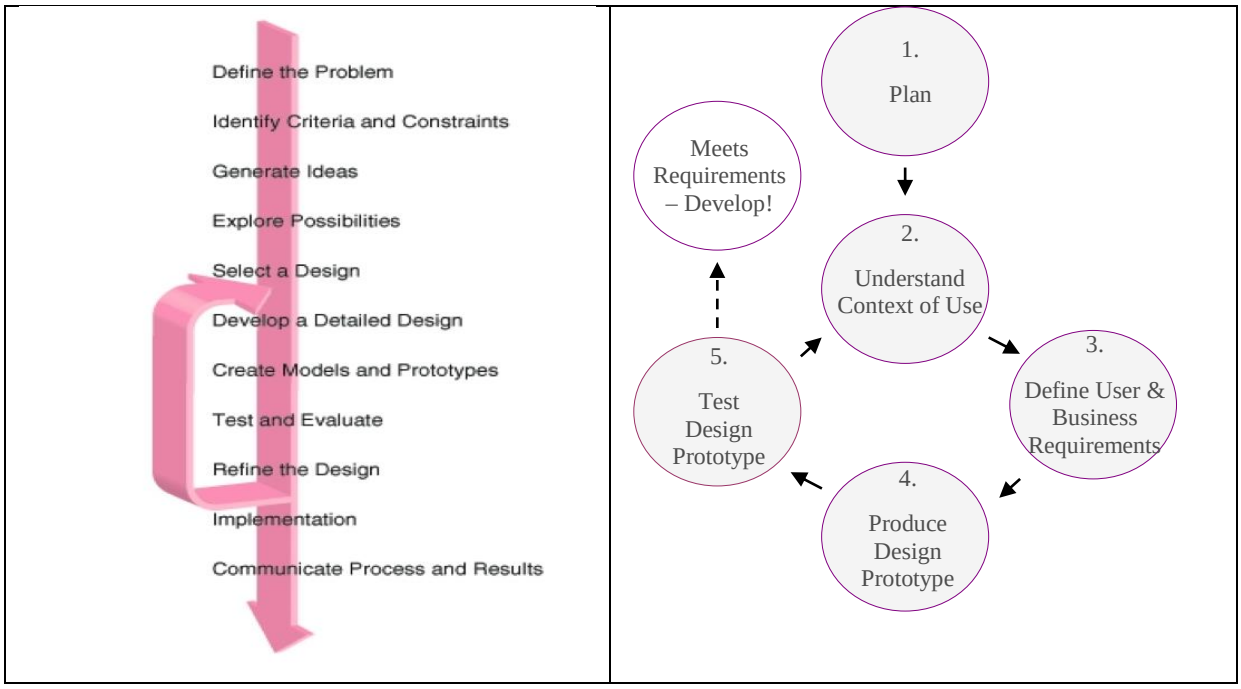
We will cover UI prototyping soon in class, and later will cover software system design methods and notations. The techniques we cover must be directly applied to your project. In contrast to this class, CST316 will have you concretely implementing software according to UI and system designs using best practices in software development.

Technology Infrastructure

Typically, special resources are not required in CST315. We will use Google Sites/Docs, and design tools that will be describe in class.

Design Process and Project Management

Ultimately, this class is about process. You are expected to follow the design processes we talk about in class. In particular, we have talked about the Software Development Lifecycle Process, and soon the User-Centered Design Process. The general Engineering Design Process is also touched on in the UCD lab. These processes are both iterative and exploratory; you rapidly brainstorm and propose solutions to the customer/end-users to get their feedback. You explore alternatives if you are not on a correct path.



Engineering Design Process (left), and the User-centered Design Process (right)

Team Expectations

You are expected to immediately begin research and brainstorming solutions. Your team must accumulate, post, and clearly identify your process-related evidence on a Google Site that you maintain. What does this mean? When you spend time to understand and "Define the Problem", describe what you found and the result of the process step on your site. Likewise when you then "Identify Criteria and Constraints." The nature of the evidence you post will depend on 1) the process step, and 2) how many iterations you are in on the process. For example, your initial Models and Prototypes may be whiteboard sketches, but your later ones may be in a design tool or traditional programming language.

In CST315 there is not a heavy project management burden. We are not requiring you to use a project management tool of any kind (though you can if your team finds it helpful). We do expect that you will post to your Google site with updates on your prototype and feedback from customers/end-users about EVERY WEEK AND A HALF, if not more often.

Individual Expectations

There are 3 individual expectations for each student in this class:

1. You are expected (individually) to work on the project for 10 hours per week. This is a "constant rate of work" expectation; it is not an "average rate of work" expectation. That is, it is **NOT OK** to not do anything on the project for a month and then pull 2 all-nighters to work 30 straight hours to catch up.
2. You are expected to conduct yourself in a professional and ethical manner at all times. *This includes respect for your teammates.* Manifestations of problems here include missing class/labs, missing meetings, and not putting in your fair share of work. ***Do not hurt your team's effort.***
3. You will need to individually maintain an electronic portfolio that gives your reflections on project decisions and your contribution of various process steps on the project. We will start this soon, more details to come.

Schedule of Deliverables / Grading Criteria / Rubrics

Project grades are determined primarily by your team's (and your individual) contribution to the design process:

1. **Adherence to the Design Process for UI Development** (30%)

   R1: Demonstrate execution of the design process, most importantly the exploration of ideas, the application of critical and external feedback, and the use of effective prototypes.

   Evidence: Posted to Google site, recorded in individual portfolio.

   R2: Demonstrate the iterative nature of the design process, by presenting maturing UI prototypes.

   Evidence: Prototypes are delivered at least every 1.5 weeks and are of increasing sophistication and detail.

. R3: Incorporate and adapt design techniques and tools in the context of the design process.

   Evidence: Your team should make explicit, as should you individually, how, when, and where you applied a design practice in your project. Evidence should be on your team Google site and your individual portfolio.

2. **Adherence to the Design Process for Systems Development** (30%)

   R1: Demonstrate execution of the design process, most importantly the exploration of ideas, the application of critical and external feedback, and the use of effective prototypes.

   Evidence: Posted to Google site, recorded in individual portfolio.

   R2: Demonstrate the iterative nature of the design process, by presenting maturing UML models.

   Evidence: You will post UML models of increasing detail to your Google site. Your team will produce a short design specification with your final models explained by the end of the semester.

   R3: Incorporate and adapt design techniques and tools in the context of the design process.

   Evidence: Your team should make explicit, as should you individually, how, when, and where you applied a design practice in your project. Evidence should be on your team Google site and your individual portfolio.

   R4: Demonstrate an understanding of architectural prototyping.

   Evidence: You will choose one complex issue from your UML models and gain design information by prototyping an internal design aspect. You will explain why that issue was chosen and what information was gained.

3. **Reverse Engineering / Design Patterns / Architectural Styles** (10%) - For the last modules of class we will discuss Architectural Styles, Design Patterns, and Reverse Engineering. We will add a constraint on your project that you use a particular open source platform to implement your solution. You will be asked to reverse engineer that platform, describe it in the language of styles and patterns, and compare this "legacy design" to your "idealized design."
4. **Process and Project Management** (10%) – You are expected to keep your Google site updated without constant prodding from your instructor or TA. You are expected to demonstrate consistent activity and progress; we are not above surprise "spot checks" on your project progress.
5. **Presentations** (10%) – Teams will do 2; one in the middle and one at end of the semester.
6. **Teamwork** (10%) – We will use our own observations and peer review to assess the cohesiveness of the team.

REMINDER!

Keep in mind we am looking for evidence on the design process. While considering the above grading criteria, be sure to interpret it with respect to the process. Be sure to apply the design practices from class in your project and explain how you do so. Don't do all the work in the last week and expect a high grade!

Logistics & Project Descriptions
We will have multiple project teams, each with 4 students this semester. The project descriptions are below; you are welcome to select any project as long as the team is in agreement. Some disclaimers are below.

Projects:

1. **Entrepreneurship/Biz**: Entrepreneurship "simulator" - patterned after the game of Life. Research the lifecycle of the entrepreneurial process, what events happen to what degree of randomness, and what decisions the entrepreneur has to make. Advanced features might include role-play for the venture/angel investor. Create a simulation that teaches end users about the entrepreneurship process, the events that can happen, and the decisions one has to make.

2. **Entertainment/Finance:** An online virtual stock market platform. You have to build a platform in which users can register, buy and sell shares according to the trends of the current market by incorporating real-time stocks but with virtual money. The platform should be user-friendly so that the user should be able to get to view the trend of a share, profits and loss made by him. It might be difficult to incorporate a machine learning algorithm to predict the share values in the future, but it is possible to advise the users by showing them which are the hottest selling shares, the inside story of a company which may affect the stock value etc.

3. **Social Networking/Healthcare:** A HIS (Hospital Information System) – RIS (Radiology Information System) simulator. The workflow in hospitals for a patient to be scanned is quite complex which involves multiple users such as patients, radiologists, doctors etc. A patient comes to a hospital for getting scanned and the patient's details are stored in a hospital information system. The scan is scheduled for a date in which the patient comes pays a visit gets a CT/XR/MR scan with the help of radiologists. The images scanned are stored in PACS (Picture Archiving and Communication Systems) from which the doctors can fetch the images, view that and do some basic annotations, share their findings with other doctors etc. If the doctors are able to view and analyze the images through different types of devices, (PC, iPhone etc) the better.

4. **Entertainment/Healthcare**: For this task you will design a 2D distributed multiplayer serious game. The application domain is healthcare, specifically home monitoring for pediatric patients with a chronic asthma condition. The "serious" part of the game is to incentivize patient compliance with conducting and recording home air quality and spirometer readings. The distributed multiplayer part is the system's ability to have patients "compete" on compliance over the period of a clinical trial (usually 8-10 weeks). The Entertainment aspect of the system is important from the perspective of encouraging compliance; expecting the more fun a child has, the greater the rate of compliance.

5. **Education:** Create a better online Education Portal. We follow many educational lecture videos online (e.g., Coursera, YouTube, etc.) to gain a better understanding of a particular subject. How can we improve this process? The basic idea remains the same: build a platform where instructors can upload videos and the students can watch it. How to make it more student friendly? Won't it be better if students have an integrated online note taking tools with mechanisms for sharing the notes with the peers, ability to chat with others, post questions, get notifications, etc. The platform could also provide intellectual multiplayer games which can help the users to speed up the understanding of the concepts.

6. **Embedded Systems:** An Air Quality Monitoring for the SmartHome. The rapidly increasing COTS availability of SmartHome platforms creates integration possibilities for all different types of sensor platforms. The most common are thermometers and motion sensors. For this project you will create an air quality monitoring system that supports integration standards for the SmartHome.

In most of these categories there will be multiple teams. In the spirit of the design process we encourage you to review each other's projects, provide feedback, and perhaps get inspiration.