Project 1: Design of a Software System

Start Assignment

Due Tuesday by 11:59pm **Points** 100 **Submitting** a text entry box or a file upload
File Types zip

Goal

You are part of a 3-person design team. Your team will:

- Pick a design problem.
- Create the best possible high-level design for a solution that you can.
- Justify your design choices.
- Clearly explain and present the problem, solution, and rationale in the form of web pages.

By the posted deadline for Homework 2, please have one member in your project group start a new project-specific thread on Piazza and **post a one paragraph summary of the project you wish to pursue** (you can even use the description you wrote for Homework 2 if you prefer). All follow-ups regarding your project should be posted to this same thread.

Assignment

The main task of your assignment is to create a new system design as a group. You may choose any system to design that you wish (toy systems without interesting characteristics are not appropriate, of course). You can draw from a system you are working on at work or for another class if you wish, or you can make up a completely new system. You can also draw the problem your system is to address from one of the case studies described in any of the texts or readings (the robotics control problem, the oscilloscope problem, one of the hybrid designs in Garlan and Shaw's book, etc.). However, the design you create should be a new design; you **may not** simply recreate a design described in one of the case studies or from some other source.

In the end, your goal is to present what your team believes is the **best design possible** for the problem you have chosen. That means that if you choose to base your project on an existing system from work or from another class, you need not be bound by design choices made by others; feel free to change or refine any aspect of such a system if you believe it would lead to a higher quality result.

Your "deliverable" has three parts: requirements summary, high-level design, and design rationale. You will write up your results as a web site that will be published so that others in the class may view it, and

that will also be submitted electronically to the instructor. There is no minimum or maximum size for your web site, but as a rough guide you should expect that your team will write the equivalent of a report of approximately 25-30 pages (remember, UML is your friend, and careful diagrams go a long way toward communicating your design).

1. **Requirements Summary**: Provide a description of the high-level requirements for the system you are designing. Be sure the **customer** and the intended **user** audience are clearly stated. For this project, there is not enough time to prepare a complete requirements document, but clearly, succinctly present the **desired behavior** of the system along with any **critical non-functional requirements**. Be sure to use a **naming/numbering convention** so that each individual requirement can be identified in other portions of your work.

2. **High-Level Design**: Devise and present the high-level design of the system. Use **diagrams** that are appropriate for the design approach your team is practicing. Present the **top-level architecture** in as much detail as is feasible. The key concept is to provide a clear, easy-to-understand picture of the structure of the system--the "**guiding vision**" for addressing all of the requirements in the product while producing a high-quality solution. Again, be sure to use a **naming/numbering convention** so that each individual component of your design can be identified in other portions of your work. You should also provide a **traceability matrix** that indicates how individual requirements map to individual design components.

3. **Design Rationale**: Present the reasons why your design is the way it is. As with **Homework 1**, devise a list of key design decisions (be specific) that are relevant to your system. Each such decision should be driven by one or more requirements you have presented. To justify your design, explain how your design addresses each decision you have presented.

There are no hard and fast rules about how "long" each of these three items should be. Instead, your group should probably put about one quarter of its effort into requirements, one half into describing the design, and one quarter into design rationale.

Assessment

In grading your project, the following point breakdown will be used:

Grading

Criterion	Points
Requirements Summary	25
High-Level Design	40
Design Rationale	25
Writing/Presentation	10
Total	**100**

Submission

Be careful in writing up your assignment. As with the other assignments in this class, clear communication and good use of English are very important; part of your grade will be based on the effectiveness of your presentation. Clear organization of materials within your assignment pages is also important.

Your final product will be a web site describing your design. Please prepare your assignment as a collection of HTML files for submission. Organize all of your files in one subdirectory tree that you can zip into one binary file for submission.

Your site should also be published on the web so that other members of the class can view it once the assignment is completed. If one of your group members has space and a web site of their own, you can publish the web yourself. If you prefer, you can use a **Google Site (https://4help.vt.edu/sp?id=sc_cat_item&sys_id=a4da84cb0fd30a00005de498b1050ef8)** . Please post the URL for your project in the Project 1 site thread on Piazza when you submit your assignment.

Project 1 Peer Review Rubric

Criteria	Ratings	Pts
Requirements summary: strengths		0 pts
Requirements summary: clarity		5 pts
Requirements summary: completeness		5 pts
Requirements summary: verifiability		5 pts
High-level design: strengths		0 pts
High-level design: clarity		5 pts
High-level design: conceptual cohesiveness		5 pts
High-level design: traceability		5 pts
High-level design: brittleness		5 pts
Design rationale: strengths		0 pts
Design rationale: design decisions		5 pts
Design rationale: justification		5 pts
Design rationale: evolution		5 pts
Suggested improvements		0 pts
Summary		0 pts
		Total Points: 50