HW2 – Project Select, Requirements Definition, and Protocol Design

Estimated time: 12-16 hours (per person in the group)

Objectives

- Become familiar protocol design
- Practice analysis and requirements definition skills

Overview

This assignment consists of five parts: group formation, project selection, requirements definition, architectural design, and protocol design. For the 1st part, complete the online survey announced on canvas. Based on your responses, the instructor will establish and publish the groups on canvas.

For the 2nd part, meet with your group and explore ideas for a non-trivial distributed application that you want to build for a course project. Examine each project idea in terms of its interest to the whole group and whether it meets the following minimum criteria.

- The distributed application must involve at least three different kinds of shared resources
    - Focus on logical resources, like files, database tables, records, shared objects, etc.
- The distributed application must include least three different kinds of processes for which you must implement programs
    - At least two of the programs must be resource managers. In other words, your application cannot have just one type of "server"
- The application must allow multiple instances of at least one of the process types
    - Consider applications where there could be multiple process of each type
- At least six unique application-level communication protocols, which use any combination of two or more transport-layer communication protocols, e.g., TCP, UDP, DCCP, etc.

For the 3rd part, as a group, you will analyze and document your system's requirements, following a standard requirement definition template. To do this, it is important that you consider the purpose, scope, and functionality of the system you want to build. Be careful not to get lost in detailed design issues at this point.

For the 4th part, you will do a high-level architectural design that outlines the major components of your system and their relationships with each other. You can document and communicate your architectural design in any understandable form, but UML class diagrams with some explanatory text might be a simple choice.

For the 5th part, you will design and document the application-level communication protocols for your system. Naturally, the participants in the communications will be the components identified in your architectural design. Your protocols must be documented using the standard format provided by the instructor.

Instructions

- Brainstorm a variety of ideas for projects. Talk to family and friends, colleagues, employees, potential customers, etc. Evaluate each one against the selection criteria given approve, your interesting in the project, and its complexity.
- Select a project and capture its purpose and essence in a conceptual overview document
- Email this conceptual overview to the instructor as soon as you have it done for feedback about its appropriateness and size
- Analysis the domain and the specific problem, using tools like UML class diagrams and interaction diagrams.
- Identifying a scope for the project that can be completed with remaining time of the semester (about 10 weeks @ 16 hours/week)
- Capture requirements using the provided template
- Organize your ideas for a software system into an architectural design and capture that design in a clear and consist document
- Design all the communication protocols for the system and document each one using the provided template

Submission Instructions

Send your conceptual overview to the instructor for pre-approval of your project selection as soon as possible. When all the other artifacts are complete, zip them up into an archive file called CS5200_hw2.zip and submit them zip file to the Canvas system. These artifacts must include a requirements definition document, architectural design document, and communication protocols definition document.

Grading Criteria

Criteria	Max Points
Clear, concise conceptual overview outlining a project that meets the selection criteria (send to instructor well in advance of deadline)	20
Thorough and understandable requirements definition	30
A clear and meaningful architectural design document	30
Application-layer communication protocol definitions document	70