Milwaukee School of Engineering
Electrical Engineering and Computer Science Department

CS-489 – Software Engineering Design Take-Home Midterm Exam

Monday 8 October 2007
Dr. Durant

- Due: Wednesday of week 6 at 11 P.M.
- Allowed Materials: 1) All inanimate reference material, 2) CASE tools
- Please ask the instructor if you have any questions.
- Class is canceled during the first lecture of week 6. The instructor will be available in his office during this time and during regular office hours to answer questions.
- Questions may also be emailed to the instructor.
- You are allowed to work on this exam for a maximum of 2 hours. Include a time log showing starting, stopping, interruption, and total times for each work session. You must include time actively reading or otherwise working on the exam, but should not include time thinking about the exam.
- Email your solution as a single Word document or PDF to the instructor. Other formats may be accepted upon request. Include a short statement indicating that you neither gave nor received inappropriate aid on this exam.
- You may use EA to generate your diagrams, but it is not required.

Good luck!

Summary of points

- Problem 1: 40 Points
- Problem 2: 40 Points
- Problem 3: 20 Points

Problem 1 – Analysis (40 Points)

Cascabel, a Mexican-inspired fast food restaurant, is in the process of expanding from 2 to 3 locations and, based on its early successes, is planning for rapid expansion in the next 3 years. Their business plan calls for rolling out a web-based ordering system for pick up at about the same time the 3rd location opens. As identified by the marketing and technical team through market research, including interviews with current customers, the system must allow both new and repeat customers, who often place the same or similar orders, to easily place orders. The system must support a small number of beverages, side-items, and entree items. Entree items may be customized by adding various toppings, much like a pizza. You have been hired to organize the software development effort on this project. A future improvement that you should be aware of but that need not be modeled in the current work is integrating and replacing the current handwritten ticket system for in-person orders with this system. The business experts have determined that being able to support tech-savvy customers via online ordering is of a much higher priority than automating the in-store ticket system.

A. Write two expanded essential use cases describing user interactions with the operating system that will trigger events in your System. Do not make the mistake of imposing too much detail at this stage. Remember, an essential use case describes a typical single-session interaction with the system from start to finish.
B. A use case diagram showing the interaction of your user(s) and the use cases of A.
C. A domain model that addresses the needs of the use cases of A.
D. Write a detailed contract for one of the operations necessary to describe the behavior of one of the system behaviors implied by the use cases of A. Pick one with some real content so that this has a decent set of pre- and post- conditions. Failure to do this can render Problem 2 rather trivial which will result in a lower exam score.

Problem 2 – Design (40 Points)

Starting with the detailed contract from problem 1D generate the following:

A. An interaction diagram complete with likely argument and return types as well as comments or notation implying known looping and decision constructs.
B. A short narrative describing how you used the GRASP or other patterns to assign the responsibilities of the diagram in A. *I.e.,* why did you decide to assign the responsibilities where you did?
C. A design class diagram that includes the usual components (including dependencies) that describes the class relationships included in the diagram of A.

Problem 3 – Team Roles (20 Points)

Working in teams is a difficult task. At some point during the past three weeks some conflict must have arisen among you and your teammates. If your team has had no conflicts then you may adapt a conflict from another course to the structure of this course.

A. Describe one of these conflicts.
B. Explain how your role both as team member and as one of the team managers became a factor in the resolution of the problem.
C. Using hindsight, is there any way you'd change your response or your team's planning in anticipation of this type of conflict in the future?