

Com S 362
Spring 2002

Name: _____

Object-Oriented Analysis and Design

Exam 1: Inception and First Elaboration Iteration

This test has 3 questions and pages numbered 1 through 4.

Reminders

This test is open book and notes. However, it is to be done individually and you are not to exchange or share materials with other students during the test. So if you have materials on your team project you wish to refer to during the test, please make copies.

If you need more space, use the back of a page. Note when you do that on the front.

This test is timed. We will not grade your test if you try to take more than the time allowed. Therefore, before you begin, please take a moment to look over the entire test so that you can budget your time.

For diagrams and programs, clarity is important; if your diagrams or programs are sloppy and hard to read, you will lose points. Correct syntax also makes some difference.

1. (25 points) In this problem you will write a use-case in casual format.

The system helps users solve mathematical problems. In the initial system, we will focus on visualizing and solving problems in algebra, for example, graphing a set of equations, such as $\{y = x - 4, y = 2x + 5\}$, or solving for the unknowns in a set of equations. *Solving* for the unknowns in a set of equations means finding values for the unknowns that make all the equations true. A graph of an equation is a plot showing the values of the unknowns that make the equation true, for an equation in x and y , this is a set of points on the x - y plane. A graph of a set of equations shows the graphs of all equations together.

You are to write a use case, in casual format, for “Solving Sets of Equations.” In brief, what this should do is to obtain a set of equations from the user, and solve for the unknowns. The user should be able to interactively replace equations and way the graphs look (e.g., zooming in on part of the graph, or zooming out).

Consider at least one and no more than two alternative scenarios. Assume that the user has already started the application (the “Start Up” use case has run already). It’s not necessary for the user to save their work. Assume that equations are entered as text. Assume that there are at most two (2) unknowns and that the user may enter any number of equations. You can make any other reasonable assumptions, but note what they are. Please write your answer below.

Solving Sets of Equations

Main Success Scenario:

2. (25 points) Write a system sequence diagram, using the UML notation for the main success scenario in your use-case.

3. (50 points) This problem is about design for the main success scenario in the above use-case.

Write two (2) collaboration diagrams, in UML notation, to assign responsibilities and record the design of two system operations in the main success scenario of your use-case. These should be operations you identified in the previous problem. (If you only have one system operation, then write a collaboration diagram for the that, and also write a design class diagram the records the design.) Assume that for solving a set of equations, it is necessary to substitute some number for an unknown in an equation, but don't worry about other algorithmic aspects of solving sets of equations.