Computer Science 520-620, Spring Semester 2014
FINAL EXAMINATION
Due 8 May 2014 at 11:59PM
Submit examinations by email to ljo@cs.umass.edu

Instructions: This is a take-home final examination. It is open book. You may refer to course notes, and any books, written materials, or web sites that you may find useful. But collaboration is not allowed. You must not discuss the final examination questions with other students, and you may not make use of ideas, advice, or suggestions from any other person, student or otherwise. Your answers to these questions must be entirely the products of your own thought processes.

Note that there is a page limit for the answers to each of these questions. I do not plan to read more than the stated number of pages of your answer to either of these questions. The pages may be in any type font of any size, as long as it is not smaller than 11pt., with one-inch margins. You may not use single-spacing. As in the past, quality is far preferable to quantities of words. Think a lot, and then write only a small amount.

Question 1: (your answer should not be longer than two pages): The healthcare.gov rollout debacle: As you should know by now (if not, then scan the web for many articles and discussions), the Federal Government’s rollout on Oct. 1, 2013 of the web site healthcare.gov, intended to support the enrollment of millions of Americans, was a disaster. The site crashed and was unreliable for weeks or months afterwards. The President and his administration were very embarrassed and widely criticized. They have received all kinds of opinions about what went wrong. Many of these opinions came from people who were not trained in Software Engineering. In response President Obama has turned to you, a highly trained student of Software Engineering, for the honest truth. Being a very busy man, the President is not willing to read more than two pages that cut to the core of what went wrong.

Your assignment is to read up on the healthcare.gov situation and, drawing upon what you have learned in this course, describe the main failings of the healthcare.gov development and deployment fiasco. Capture them in a two-page (maximum!) memo to President Obama.

Question 2: (your answer should not be longer than one page): A scenario: You have, within the past few months, been hired as a software developer at XYZ Software Corp. and have just been given your first significant assignment. Your assignment is to examine a software module containing a few thousand lines of C++ code, and to reduce its execution time by at least 20%. In the course of scrutinizing the module you have discovered some strange code. It appears that this code is a “trapdoor” that has been inserted in order to allow the original developer of the code to gain unauthorized access to sensitive data. Because the code is very cleverly written it is hard for you to be sure
that you have discovered a trapdoor. Being sure will take you a few days. But your boss wants the speed improvement implemented ASAP, and you are eager to make a good impression on your new boss. To make matters more complicated, it appears that the strange-looking code was written by your boss.

Describe what you would do, and explain why you believe that is the right course of action. Your answer must be less than (maybe much less than) one page long.

**Question 3:** (Your answer should be no longer than two pages) A Scenario: A friend of yours has a great idea for an app that would developed by his company. He has some code that can read the red-green timing cycle of every traffic light in Boston, and also count the number of cars that are queued up at every traffic light, and report both in real time. The app that he has in mind will guide drivers through the streets of Boston in real time in such a way as to minimize travel times to their destinations. The app would not only specify where to turn, but also how fast to drive in order to make it through traffic lights. Some of his competitors have very similar ideas, and so he feels that it is very important to be able to crank out this app very quickly. He is convinced that if he can demonstrate the app before any of his competitors, then we will be able to sell his company to Google for billions of dollars. He needs you to write the code, though, and you have agreed to do so (in exchange for a big chunk of the stock of his company). What considerations should you take into account in deciding how to proceed? How should you proceed?