

Please read the directions carefully. This exam is due by 11:59:59 PM on Tuesday May 4, to be emailed to

[mikeb@buffalo.edu](mailto:mikeb@buffalo.edu) AND [ifte2000@gmail.com](mailto:ifte2000@gmail.com)

You must answer BOTH questions. No late exams will be accepted, even by minutes, so plan accordingly. After weeks of hard work, please don't miss an exam grade because of a late email. There is a page limit of three pages for each question. Your answers must be single-spaced, with margins no larger than .7", in MS Word or pdf file format. Please name your file: *yourname.doc* or *yourname.pdf*, where yourname is your name.

*A note about grading, in order to better help you write your essays:*

**Accreditation Board (ABET) outcomes for this course:**

*c) an ability to design and construct a hardware and software system, component, or process to meet desired needs, within realistic constraints such as economic, environmental, social, political, ethical, health & safety, manufacturability, and sustainability.*

*f) an understanding of professional, legal, and ethical issues and responsibilities as it pertains to computer engineering.*

*h) the broad education necessary to understand the impact of computing in a global, economic, environmental, and societal context.*

*g) an ability to effectively communicate technical information in speech, presentation, and in writing.*

*j) a knowledge of contemporary issues.*

**How to answer essays:**

Essays are graded on content, explanation, convincing argument, and demonstration of a level of understanding. Free and abstract thought is encouraged, but only in defense of a solid point-of-view. Lists, or bullets, that are essentially correct but with no explanation, are given the minimum allowable credit (typically ONLY one-third). Each question must be approached from many angles: societal, legal, technical, managerial. Additional credit will be given for a demonstration of a substantial level of understanding (discussion of opposing points of view, for example, or the use of an example from real life, your reading, your team project, or an imagined impact of the subject, on your future job as a software engineer). Do not flood your answer with every possible point of view. Underlining your main points will help you focus your answer.

**An example essay question, the rationale, and grading rubric:**

What current event (i.e. story that has lately been in the news) could benefit from a computer software solution? Explain why and how, and describe the software solution. What special concerns would your system need to overcome? This question is graded as follows:

*I would expect knowledge of contemporary issues. The problem must be newsworthy and notable; the solution must make technical, financial, legal, and ethical sense. Global warming, anti-terrorism, protection of children from Internet predators, computer crime, etc. are all likely issues. This question will test a student's problem solving from a practical, software-engineering sense: which problems lend themselves to technical solutions, and – given a clean slate - how do we approach the solution? The student should mention legal and ethical concerns. The student should express both the advantages and disadvantages of their particular solution, and discarded solutions.*

*The question was worth 33 points: 5 if it is in fact contemporary, 5 if it attacks an "important" (non-trivial) societal issue (environment, safety, economic, etc.), 5 if the solution makes technical sense, 5 if the solution makes economic, legal, and ethical sense (or if the student at least recognizes violations of those factors), 5 for the disadvantages of the proposed solution, and 5 for disadvantages of discarded solutions. 3 points are awarded for other similar problems that this solution might address.*

## **The Exam:**

**Include your name and team letter in your submission: (1 pt.)**

**Question 1 (35 pts.):** Write your resume. Use the criteria and suggestions as portrayed in class. Remember that you're trying to get the attention of a Software Project Manager.

**Question 2 (64 pts.):**

a) Briefly describe the technical issues with the recent (2009-2010) recall of Toyotas:

<http://www.toyota.com/recall/>

[http://abcnews.go.com/Blotter/RunawayToyotas/runaway-toyotas-abc-news-investigation-continues/story?id=9810123.](http://abcnews.go.com/Blotter/RunawayToyotas/runaway-toyotas-abc-news-investigation-continues/story?id=9810123)

b) Specify the potential software issues related to these problems, and other safety and diagnostic issues that Toyota has been addressing, or (more importantly) refuses to address. This requires some research, because the main problems have uncovered many smaller problems.

**Answer the following questions based on the software issues you identified in part (b).**

c) Describe briefly which part of Software Development Life Cycle was supposed to take care of this problem. Do you think Toyota followed the dream curve with regards to this issue? Justify your answer.

d) Mention briefly how Toyota is trying to resolve this issue at present.

e) Which approach is more cost effective: following the dream curve or patching the bug after customer complaint? Why?

f) Apart from the cost, what other ways has Toyota had to pay for this mistake?

g) Do you think this incident will increase the public's distrust in complex computer designs? Why or why not?

h) Summarize briefly, what have you learned from this incident as a Software Engineer?

