CS350 Midterm

Fall 2017

You can answer the questions either in English or Korean.

The total score of this midterm towards your final grade will be 20%, reduced from 25%.

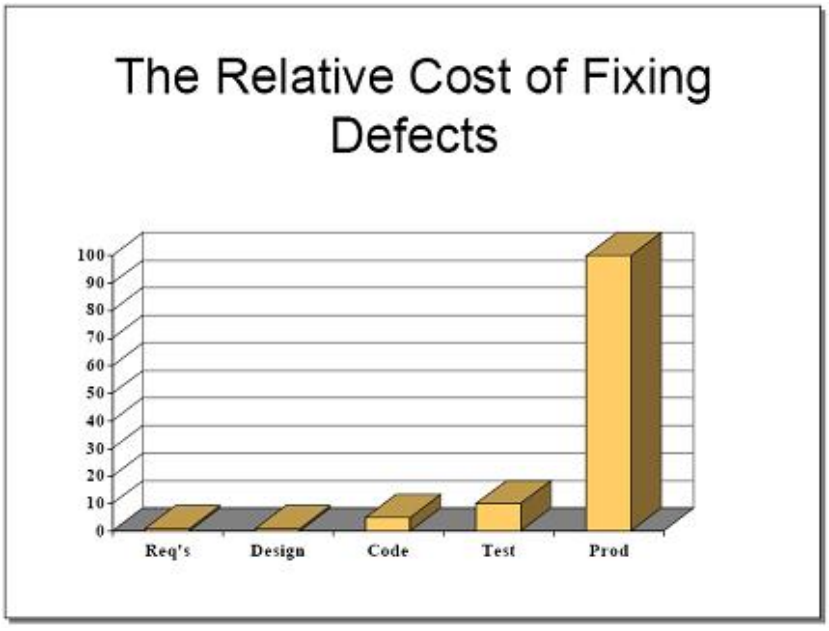
(The total scores for this midterm is 80 pts. Your final will be 120 pts.))

1. We discussed 4C's in Software Engineering to manage. Among those 4C's, which C is the most fundamental issue? Just choose one and Justify your answer. Here, the fundamental issue means that removing it will significantly mitigate/alleviate (or even removing) others. (10 pts)

2. The following figure tells us that (a) a defect can be made in any phase of software life cycle and (b) the relative cost of fixing a defect varies depending on the time of discovery. Its fixing cost will increase significantly as the software development moves to following phases. Please answer the following questions based on this figure:

(a) How does the relative cost of fixing a defect vary? (Explain its trend briefly.) (3 pts)

(b) If you want to reduce the total cost of software, in particular the cost of fixing defects, during the software life cycle, what can you do? Justify your answer. (7 pts)



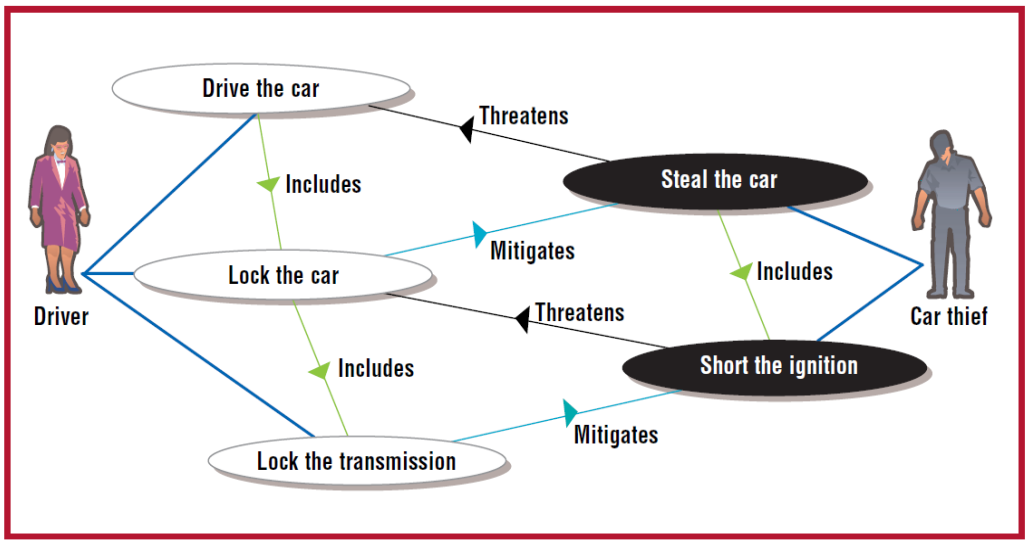
3. In class, we discussed the different layers of software, such as commodity layer, value-added layer, and innovative layer.

   (a) Which layer is the most appropriate for open-source development? Justify your answer. (5 pts)

   (b) Which layer is the least appropriate for open-source development? Justify your answer. (5 pts)

4. The following use case diagram specifies use cases from a driver of a car and a car thief.

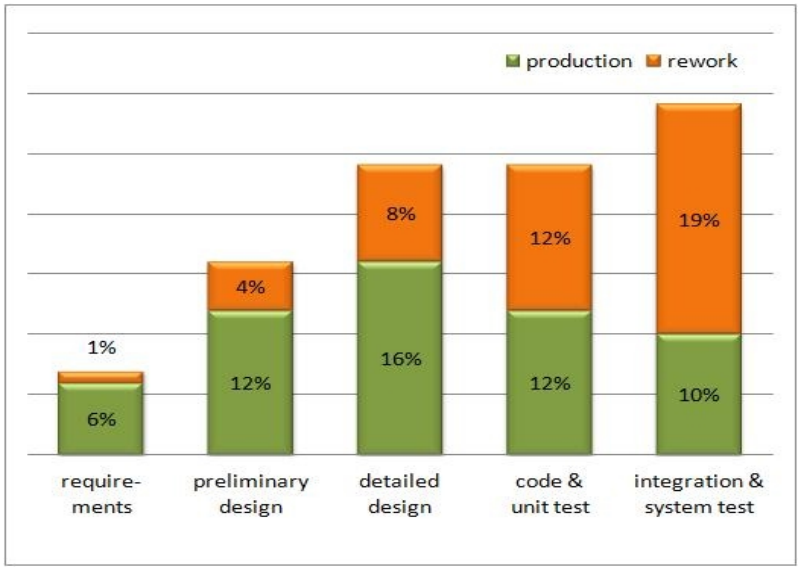
   (a) A misuse case is a usage from an actor hostile to the system. In this case, hostile actor is a car thief. Describe this use case diagram with three use cases and two misuse cases in a natural language. ('Mitigate' means alleviate or reduce.) (15 pts)



   (b) The security aspect of the system is being described with this 'misuse case'.

   Tell me your opinion on this extension of use case diagrams with misuse cases whether it is useful or not. Justify your answer. (10 pts)

5. The following figure shows that the software artifact production in each phase of software development requires the effort to produce its initial version (showed in the lower part of the stick) and requires the additional effort (showed in the upper part of the stick). The additional effort, also called 'the rework effort', is the effort for modifying its initial version.



(a) What is the total rework cost for a software development? (3 pts)

(b) If this trend is true in all the software projects, it means that even if smart software engineers work very hard in your project, the rework is not avoidable. Suppose that you are a project manager and want to manage the software development. What can you do to reduce the total cost of software development? Justify your answer. (7 pts)

6. Draw a Petri-net diagram that can demonstrate a resource sharing (to be implemented as a critical section; cannot be shared by more than one process concurrently) between the two processes. For example, you have two PC systems sharing the same printer. The printer cannot be used simultaneously by the two PC systems. Your Petri-net diagram needs to include two PC processes and a shared printer, with proper tokens representing initial markings of the processes and shared resource. Also, there must be a cycle back to the initial marking (or state). (15 pts)