

Here is a list of questions. Midterm 1 on April 21 will include some of these questions, some questions which are variations of these questions, and some questions not on this list.

1. An approach suggested in the textbook for dealing with all the pieces, parts, and relationships in complex software systems is
 - a. start at the beginning.
 - b. ask the client.
 - c. divide and conquer.
 - d. use both white-box and black-box testing.
 - e. focus on non-technical issues.
2. Which of the following would *not* be a category of “nonfunctional requirements”?
 - a. Format of input data.
 - b. Performance requirements.
 - c. Modifiability requirements.
 - d. Real-time requirements.
 - e. These are all nonfunctional requirements.
3. Section 3.1 of the textbook describes some characteristics of software failure and some reasons for software success. Read the following Dilbert strip from Feb. 25, 2013:



What is the main example or reason from section 3.1 that is illustrated by this strip? Your answer should be just a few words long.

4. What is the first step in the requirements engineering process (not counting preparation, planning, and scheduling)? Your answer should just be a few words long.
5. In the “No Silver Bullet” essay, Brooks claims that the complexity of software is
 - a. metaphorically a silver bullet.
 - b. due to the difficulty of computer programming.
 - c. solvable by high level languages, time sharing, and unified programming environments.
 - d. an essential property, not an accidental one.
 - e. an accident of software, not an essence.
6. According to the lecture, which category employs the most computer programmers in the U. S.?
 - a. Games, apps, productivity software.
 - b. In-house staff writing programs for internal use.
 - c. Consulting companies.
 - d. Open source projects.
 - e. Creators of viruses and other malware.

Goals in Programming

Computer programming is the major bottleneck in the successful exploitation of computers, and the widespread use of good programming methods is imperative if the problem is to be overcome.

This text is intended to illustrate the application of good programming techniques to a wide range of current programming problems, and to illus-

7. Would Brooks agree or disagree with the statement above, based on what he writes in *No Silver Bullet*? Your answer should start with “He would agree, because” or “He would disagree, because”. Your answer should be no more than three sentences long. Your answer should be based on and refer to at least one specific opinion or statement in *No Silver Bullet*.
8. The textbook says that requirement errors are usually more expensive to fix than code errors because (circle *all* correct answers)
 - a. fixing a requirement error that escaped into design or code is generally more expensive than fixing a coding error.
 - b. fixing a requirement error requires both black box testing and white box testing.
 - c. executive management support is required to fix requirement errors.
 - d. an error introduced during the requirements phase may propagate into design and coding.
 - e. lack of user input during requirements engineering is due to inadequate prototyping.
9. The textbook says “The requirements engineering process begins with requirements analysts performing the elicitation and gathering of requirements from users and customers.” What is the next step? Your answer should just be a few words long.
10. What is the primary characteristic of the Waterfall Model of software development? (Circle *one* correct answer.)
 - a. The process is dangerous: people who go over waterfalls are often injured.
 - b. The process is circular: when the last phase is completed, then control returns to the first phase.
 - c. The process is parallel: multiple phases are performed at the same time.
 - d. The process is maximal: all communication paths between nodes are utilized.
 - e. The process is linear: when one phase is completed, then the next phase begins.

11. The waterfall process model is
 - a. linear and ideal.
 - b. nonlinear and ideal.
 - c. linear and realistic.
 - d. nonlinear and realistic.
 - e. more complex than is usually needed.

12. Nonfunctional requirements are
 - a. the manner in which the program must behave.
 - b. informally referred to as the “ilities”.
 - c. often measured on a linear scale where the measurement can vary.
 - d. sometimes overlapping with design constraints.
 - e. all of the above.

13. Which of the following is one of the top three failure factors for software projects, according to the Chaos report cited in the textbook?
 - a. Overreliance on the waterfall model.
 - b. A false assumption that each task will take only as long as it ought to take.
 - c. Incomplete requirements and specifications.
 - d. Insufficiently trained programmers.
 - e. The invisibility of software.

14. Within the context of requirements engineering, what is the primary purpose of creating a prototype?
 - a. To assist in understanding the user’s needs.
 - b. To provide a basis for further design and programming.
 - c. To help the user prioritize different and possibly incompatible requirements.
 - d. To determine the optimal programming language for the desired system.
 - e. To fulfill the structure of the spiral process model.

15. The reason for emphasizing “what” over “how” in a requirements specification is
 - a. the client is more interested in the “what” aspects.
 - b. the “how” aspects are best left to the programmers.
 - c. it is important to determine the “what” aspects before spending time on the “how” aspects.
 - d. the writers of the requirements specification may not be programmers or designers.
 - e. All of the above.

16. Imagine that you are writing the Requirements Specification for WebReg (or any similar system for registering students at a university). For this system, give an example (using one sentence each) of
- a functional requirement

 - a non-functional requirement

 - a design constraint
17. Brooks names four “inherent” properties of the “irreducible essence of modern software systems”. What are those four properties? You only need to name them.
18. Parnas and Randell describe software engineering using a sentence that includes the prefix “multi-“. Write down the complete sentence.
19. Brooks uses the analogy of a silver bullet that kills the werewolf to describe something in software that
- a. will have the impact of Ada and other high level languages.
 - b. will make digital computer systems conform to the laws of nature.
 - c. makes the invisible visible.
 - d. provide opportunities for growing designers to interact with and stimulate each other.
 - e. makes software costs drop as rapidly as computer hardware costs do.
20. Define the term “use case”.
21. Why is the waterfall model also known as the document-driven approach? If we wanted to describe the spiral model similarly, we could call it *X*-driven – what is the best single word for *X* here?
22. Why were elephants discussed in the first two lectures? Explain the metaphor clearly.
23. What central and very important part of software engineering is not a topic in Informatics 43?
24. Following the thinking of Brooks in *No Silver Bullet*, give an example of an essential aspect of software and an accidental aspect of software.
25. What role does Brooks see, in *No Silver Bullet*, for rapid prototyping as a potential “silver bullet”?
26. The textbook says, “it is extremely unwise to base software development without any requirements engineering activity.”
- a. In your judgment, is this a scenario that ever actually happens?
 - b. What negative consequences might ensue from omitting requirements engineering, according to the textbook?
27. On p. 110, the textbook has a figure labeled “The six dimensions of requirements”. Why are the six dimensions organized the way they are in the diagram?
28. Name and briefly define the two main tasks of requirement analysis.

29. Consider the following use case for Facebook, written in the Homework 1 style:
person – enters information

Why is this a weak use case?

30. Define the term “unit testing”.