

>>> SOLUTIONS <<<

Welcome to your 10% exam for Senior Project. The time for this exam is 75 minutes. You may have with you the course assigned textbook and a one page “formula sheet”. On this one page sheet (which may be front and back on an 8.5x11in sheet of paper) you may have anything (even the answers to last semesters exam) you want generated by you in HANDWRITING. You may not have photocopies or computer generated content on your one page sheet. **Carefully follow instructions.** If a question states to “State your answer in two sentences.” this means that only the first two sentences of your answer will be read and graded. If you copy the answer directly out of the textbook (or some other source), be sure to properly “quote” the answer (otherwise it is assumed that any answer is given in your own words). There are 8 questions, each one worth 12 points (there are 4 points in this exam just for filling-in this cover sheet and submitting it on top of your answer sheets). It works best for you and me (with respect to grading) if you answer each problem on a separate sheet of paper.

Problem #1

Answer the following questions about the development process:

a) Describe the standard development process. List the steps and show the inter-relationship between the steps

Requirements -> Specification -> Design -> Implementation -> Test -> Manufacture -> Distribution -> Maintenance -> End-of-life. Feedback from Test to Design (verification) and Test to Requirements (validation).

b) Describe the purpose of a prototype demonstration

The purpose of a prototype demonstration is to 1) give confidence to a client that the project can be completed and 2) to give the client a view of what the final product will do. This allows the client to fine-tune his original requirements (e.g., to decide that additional functions are needed and/or existing functions be removed).

Problem #2

Answer the following questions about teamwork:

a) Teamwork may not always increase short-term productivity. Describe why. Describe why teamwork is a “good thing” in the long run.

In the short-run teamwork adds communications overhead to a task. There is also the effect of a slower person dragging down a faster person. In the long run teamwork adds redundancy to the process and prevents a single point of failure (e.g., the key person leaving). Teamwork also provides training and can create synergy.

b) According to Brooks, the ideal programming teams is similar in structure to a surgical team. Explain what this means. Hint: Simply describing the structure of the ideal programming team is not a good way to answer this question.

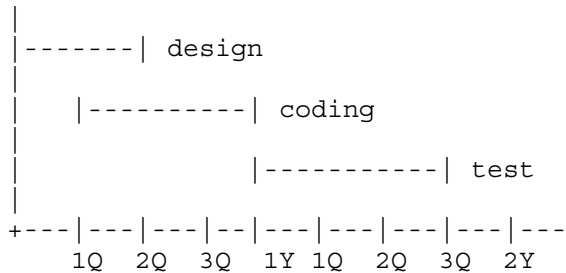
This means that one person makes the technical decisions (the chief programmer = chief surgeon) and all the others follow this decision without debate.

Problem #3

Answer the following questions about project planning and scheduling:

a) What is a Gantt chart? Sketch an example Gantt chart.

A Gantt chart is a graph showing duration of activities. An example Gantt chart is:



b) What is a milestone? What is an inchstone?

A milestone is a measurable accomplishment (something you can put on the table) that terminates a bar in the Gantt chart. An inchstone is a mini-milestone or a very small, but measurable, accomplishment.

c) How are schedules made?

In many ways. By customer and management dictate is one way. Another is based on past experience and "rules of thumb" judgment. Formal schedule sizing methods are often not very good.

Problem #4

Answer the following questions about requirements and specifications:

a) What is wrong with the requirement "The user interface must be easy to use"? Rewrite this requirement to be better.

A good requirement must be measurable. This is not a measurable statement. A better statement might be, "The user interface must be fully learnable by an eighth grade educated employee in less than 20 minutes".

b) What is the purpose of traceability from requirements to specification to test plan?

Traceability is to prevent unnecessary work from being done and also to make sure that all necessary items are covered.

c) How can traceability easily be shown in a document?

One way to show traceability is with a traceability matrix at the end of a document. The matrix has specification numbers on the row headings and requirement numbers on the column headings. Then each cell that corresponds to a covered item is checked-off.

Problem #5

Brooks says: "Amid a wash of paper, a small number of documents become the critical points around which every project's management revolves. These are the manager's chief personal tools." What are the key documents?

The key documents are objectives, specifications, schedule, budget, organization chart, space allocations, and estimate/forecast/prices. This is from pages 108-109.

Problem #6

Why did the Tower of Babel fall (again, as according to Brooks)? What relevance does this have to software development?

Because of lack of communications and its consequent, lack of organization.

Problem #7

Key to Brooks' silver bullet, if there ever is to be one, is that it can solve the essence of the software development problem and not just the accidents. What is meant by this? Define essence and accident as they apply to software development. Give examples of each.

Essence = difficulties inherent in the nature of software. Accidents = the difficulties that attend the production of software. An example of essence is determining and understanding the algorithm needed to solve a problem. An example of accident is learning how to use the operating system and C compiler (and, for that matter, learning the C language) necessary to implement the algorithm.

Problem #8

Why do we reference Dilbert so much in this class? How can Dilbert teach us to be better engineers?

Dilbert is a caricature of the engineering development shop. As a caricature it exaggerates certain features (typically, the amusing ones), but it contains very much a reflection of truth. Dilbert can teach us to be better engineers by educating us on what kinds of things happen in the real world engineering shop. To be forewarned is to be better prepared.



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