

Mini-Exam for Senior Project

Fall 2007

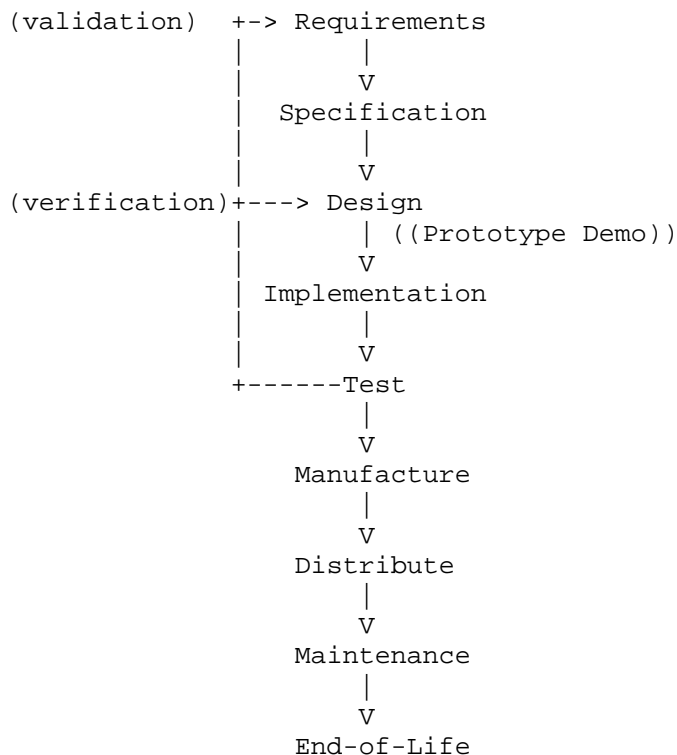
>>> SOLUTIONS <<<

Welcome to your 10% mini-exam for Senior Project. You have 75 minutes for the exam. The exam is “anything on a dead tree is allowed” as a reference. That is you may have anything with you on paper including copies of old exams, your notes, your book, and so on. You may not share material or give help during the exam. If you copy your 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). Read the last sentence again. There are five questions each worth 20 points and one extra credit question worth 10 points. Please use a separate sheet of paper for each question, do not write on the back of any sheet of paper, and submit your exam with this cover sheet as the topmost sheet and the problem sheets following in number order.

Use of a laptop for completing the exam: These problems require a lot of writing. If you are like me, you can type better than you can write by hand. So, I will allow you to use you laptop to type the answers to this exam. At the end of 75 minutes I will ask you to hand-in to me your thumb drive with your exam file (name the file with your last name)... we will then go up to my office and print-out your exam (and return the thumb drive to you). It is your responsibility to make sure your file is properly saved and not “eaten by the computer”. During the exam you may only have your word processor open to your exam answers file, and nothing else. I will proctor the exam from the back of the room.

Problem #1

a) Sketch the product development process as we have discussed and followed it in this class.



(yup... you can copy this for pretty much all previous old tests. Just by copying it, maybe you learned it just a little bit better!)

b) In real projects what is the procedure in going from step to step in the process?

Real projects will have some kind of formal review and sign-off process to go from step to step. We simulated this with the peer design review in this class.

c) In real projects how are requirements changes handled after the initial requirements sign-off?

In real projects a sign-off process is used where requirement changes will be reviewed and negotiated for increased cost and/or change in final delivery date.

Problem #2

What are Brooks' thoughts on Object Oriented Programming (OOP)? Is OOP a silver bullet? Why or why not?

Brooks' views OOP as 1) forcing good programming practices (modularity, clean interfaces, encapsulation, and etc.) and 2) as a mechanism for code re-use. Code re-use can produce large gains in productivity, but at the requirement of a large upfront, or front-loaded, investment (to produce code that is truly reusable). Brooks does not see this frontloading occurring. In any case, OOP does not remove the essential difficulties of design - as Brooks defines it - and thus cannot provide an order of magnitude improvement gain in programmer productivity. Brooks calls OOP a "Brass Bullet" and does hold out more hope for OOP than any other "technical fad of the day."

Problem #3

What exactly is the "Mythical Man Month"? Give examples of three kinds of projects where adding people can *reduce* the time to completion. Give examples of three kinds of projects where adding people with *increase* the time to completion. Explain why in all cases.

The mythical man month is that people and months are interchangeable in the time needed to complete a task. More people always equals less time to complete a task is only true if there is no communication needed (between the people doing the task). Communication is overhead. Since most tasks of any intellectual significance require communication, people and months are only rarely interchangeable. See page 16 of MMM.

Three examples where adding people (up to a point) can reduce completion time are: 1) harvesting a crop in a field, 2) painting a wall, and 3) searching for a lost item. None of these project require (much) communication or interaction between participants.

Three examples where adding people can increase completion time are: 1) designing and implementing software, 2) developing a new process, rule, or law, and 3) writing a book. All of these projects require communication and interaction between participants.

Problem #4

What are the steps in the design process as we discussed it in class? Hint: The first step is "Understand the problem".

The steps are:

- 1) Understand the problem (What are the objectives and assumptions?)
- 2) Background research (What have others done? Can you build on other's work?)
- 3) Brainstorming (list all possible solutions)
- 4) Choose the best solution

- 5) Build or model the solution
- 6) Analyze the solution (feedback and iterate to step (5))
- 7) Test solution
- 8) Ship it

Problem #5

Fill in the blanks (each blank is one word unless otherwise stated):

- a) A schedule is used to allocate resources, which are people, money, and equipment.
- b) Each line in a Gantt chart must end with a milestone.
- c) Milestones must be measurable.
- d) Never miss a schedule deadline, instead pull out function (more than one word)
- e) Every measurable aspect of a device should be covered in a specification
- f) A great example of a specification is a standard.
- g) Four reasons for a design review are feedback to improve design, education to others, evaluation of employees, and contractual (each blank may be more than one word)
- h) Verification answers the question “Does it meet the specification”
- i) Validation answers the question, “Does it meet the requirements”
- j) Not all paperwork is bad, only most of it (more than one word)
- k) The press release must cover the 5 Ws and 1 H which are Who, When, Where, What, Why and How.

Extra Credit

Describe the ideal or perfect project for this course from your point of view. What exactly would the project be? How would it be supervised? What sort of formal process should be in place? What should the expectations on the students be? How should the project be graded?

Need a reasonable answer to each subpart.