

Final Exam

CSE403 Spring 2006

NAME: _____

Question #	Value	Score
1	10	
2	5	
3	10	
4	5	
5	5	
6	5	
7	5	
8	5	
9	5	
10	5	
11	5	
12	5	
13	5	
14	5	
15	10	
16	5	
17	5	
18	5	
Bonus	2	
TOTAL:	105	

Instructions:

- Do not turn this page until instructed to do so.
- You may reference course textbooks and assigned papers. No electronic access, notes or slides.
- Please write legibly.
- Be sure to answer the question asked.
- As well as completeness, you will be graded on the quality of your answers. Provide reasonable support, including facts, references, and specific examples when applicable. We will be looking for solid understanding of the main concepts and ideas, and reasoning about how they interrelate.
- If you need additional space for any question, use the last page. Clearly identify the question to which the answer applies.

Q1 (10 pts): Teams typically go through four stages: forming, storming, norming, and performing. Describe one situation your team experienced in each stage and explain how it illustrates the stage.

Forming

Storming

Norming

Performing

In retrospect, how might your team have reached the “performing” stage faster?

Q2 (5 pts): There are a number of reasons why it is important for life cycle architecture documents, including requirements, architecture, schedule, and risk documents, to be “living” documents. Describe three reasons.

Q3 (10 pts): Wayne Yamamoto discussed an internet media startup development model used by Merchant Circle that was a mix of code-and-fix and staged delivery.

- a. Describe the code-and-fix aspect of the development model.
 - b. Describe the staged delivery aspect of the development model.
 - c. Name a major *benefit* of such a development model for the company, and a major *problem* of such a model for the company.
 - d. Given the Merchant Circle environment (small, little capital, internet media startup), how could you correct the problem you identified? If not, why not?

Q4 (5 pts): David Papworth, Intel Fellow, named 7 habits of Highly Effective Engineers: caring, sharing, responsibility, joy, growth, creativity, objectivity. Choose one of the habits and describe how you applied it to your activities during your 403 project.

Q5 (5 pts): One question on the Joel Test is, “Do you make daily builds?” All our industry guest speakers also advocated this practice. Why are daily builds so important? At what point in the development lifecycle is it critical to “not break the build”, and why?

Q6 (5 pts): Projects are typically constrained along three dimensions: time, resources, and features. Suppose the staff asked your team to supply more *features* with your final 403 deliverable. Which one dimension, *time* or *resources*, would you request to be extended (assume both are possible), and why would you make that choice?

Q7 (5 pts): Asaph Zemach contrasted software engineering practices used at Cray and Google. He argued that the differences were necessitated by the different environments of the companies. Describe three aspects of a company that would influence its development practices. Briefly explain.

Q8 (5 pts): Create a use case for a grade database system. Describe the scenario of a student looking up her grade on a particular class assignment, using the template below.

Goal	
Primary Actor	
Precondition	
Successful Postcondition	
Unsuccessful Postcondition	
Trigger	
Main Success Scenario	
Failure Scenario	

Q9 (5 pts): How could you mitigate the risk of your software being out of sync with the customer's expectations? Describe actions that you would take to mitigate the risk throughout the product lifecycle.

Q10 (5 pts): A system architecture is often described using multiple views.

- a. Why is this beneficial?

- b. Name two ways to “view” a software architecture. Include an example to support your answer.

Q11 (5 pts): In the article, “On the Criteria to be used in Decomposing Systems into Modules,” Parnas advocates decomposing a system based on information hiding vs control flow.

- a. Describe a module in your 403 project that was designed with information hiding in mind.

- b. What value does this decomposition provide to the development team? To the company?

Q12 (5 pts): Dennis Lee described how at Amazon, as well as other companies that build large distributed systems, they stress the importance of decoupling system components in their designs.

a. What does decoupling mean? Include an example (at a high level, using words or pictures) with your description.

b. Why is decoupling system components important to a company like Amazon?

Q13 (5 pts): Two schemas to describe a house and a car, which are unrelated except that both have a security system, are:

A.

```
class SecuritySystem{...}
class House {
    SecuritySystem s;
}
class Car {
    SecuritySystem s;
}
```

B.

```
class SecuritySystem {...}
class Object {
    SecuritySystem s;
}
class House::Object {}
class Car::Object {}
```

A is an example of which design method? _____

B is an example of which design method? _____

Which is more appropriate to use for this situation, and why?

Q14 (5 pts): Estimation of how long a task will take to be completed is notoriously hard. Consider the tasks you personally did on your 403 project. Did you underestimate or overestimate the time to complete any of them? *If so*, describe the situation and how you might improve your estimates going forward. *If not*, describe the process you used to create your estimates, and why it worked so well.

Q15 (10 pts): Refactoring is an important activity in engineering software.

- a. Identify a module, test, or tool that was developed as part of your 403 project that could use refactoring (or was refactored).
- b. Why is refactoring needed (why wasn't the code written differently initially)?
- c. What types of refactoring would you apply?
- d. What value would refactoring have to your company?

Q16 (5 pts): All your 403 projects used some form of third party software. Name three costs to consider when selecting a third party package to use with a product your company will ultimately ship.

Q17 (5 pts): What is the difference between an innovation protected by a patent and one protected by being a trade secret, if the innovation is disclosed to the public?

Q18 (5 pts): Picture yourself 5 years from now. What software engineering practice that you learned from 403 do you believe will be most valuable to you, and why?

Bonus (2 pts): Suppose your manager asked you to provide an estimate of how long it would take you to design and develop an airplane simulator. How would you answer?

Space below this point may be used to continue earlier answers. Please clearly label the question to which the answer applies.