

## CS3733-D05 Midterm Exam

Name:

This exam consists of two parts. If you have read the textbook, attended the lectures, done the homework, and studied the notes you are prepared.

Remember that there is a code of academic honesty at WPI and you are expected to do your own work. Good luck.

1. (5) Consider people, process, and tools. Which of the three are most important to the success of a project and why?

**People. People are needed to do the work, follow the process, use the tools, etc. People also can cause a project to fail by refusing to do good work.**

2. (4) What are the two roles in pair programming? What is each role responsible for?  
**Driver. Controls the keyboard and mouse. Writes the tests and code and talks to the co-pilot.**

**Co-pilot. Actively reviews the driver's work as the work is being done. Makes suggestions about the code, points out mistakes, etc. The co-pilot can become the driver whenever it is appropriate.**

3. (4) Which of the following is not an agile value as specified in the Agile Manifesto? (circle the correct response)

- a. Working software over comprehensive documentation
- b. Immediate feedback over delayed responses**
- c. Individuals and interactions over processes and tools
- d. Responding to change over following a plan
- e. Customer collaboration over contract negotiation

4. (5) When using user stories to specify tasks to be done, there is an assumption that the stories are independent of each other. Why is this a poor assumption?  
**While user stories are small functional descriptions, there may be a dependence upon another story's completion before a story can be implemented. In this case, the stories are not independent and must be implemented in some specific order, or additional testing code must be implemented in order to handle it.**

5. (4) What is a well-formed request?

**A well-formed request is one that specifies who will do what by when (and sometimes where).**

6. (6) Name two reasons that iterative, incremental development improves upon the waterfall approach.

- **It adapts to change better**
- **It reduces risk better**
- **It ensures that working code is being built**

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7. (4) Your team has been using user stories and the planning game. Your velocity for the past six weeks has been: 25, 25, 30, 25, 25, 48 units. For your 7<sup>th</sup> iteration, how many units do you ask your customer to select?

**48**

8. (6) Name two benefits of Test-First Programming (TFP).

- **The tests reflect the requirements**
- **You get 100% code-coverage from your tests**
- **You don't write code that is not needed**

9. (8) You are going to write a program to convert integers from 1 to 3,999 to Roman numerals. You decide that there will be a class called RomanConverter and a method convertToRoman(int i) that returns a String. Identify four tests that you might write initially to test different features that the method must support. Use the following table:

<b>Input</b>	<b>Expected output</b>
1	I
3999	MMMCMXCIX
0	Error
550	DL

10. (4) What is the primary purpose of UML?

**Communication**

11. (4) Explain why individual productivity on a project decreases as the team size increases.

**Increased team size means that there is more time needed for communication and ensuring that everyone knows what to do (process).**

12. (4) Name two reasons why software engineering is different than other types of engineering.

- **Constant change in requirements**
- **Rapid technology changes**
- **No fundamental scientific principles like other sciences and engineering**
- **Most software is a one-of-a-kind program**

13. (4) List two *people* factors to consider when forming a team?

- **Individual skills – you don't want all superstars**
- **Personalities – pick people that can work together**
- **Desire to learn something**
- **Attitudes about what it means to develop software as part of a team**

14. (5) In a couple of sentences, tell why you need a process.

**You need a process so that people know what they are supposed to do, what they can expect from others on the project team, and what they must provide to others and why. The process is a guide to how the team works – the team’s culture.**

15. (6) What are two things wrong with the following JUnit test method?

```
public void loadProgramTest()
{
    try {
        writeProgram();
        DataInputStream ds;
        ds = new DataInputStream(new ByteArrayInputStream(program));
        m.loadProgram(ds);
    } catch (Exception e) {
        // unexpected
    }
}
```

- **It is not named properly. It must start with “test.”**
- **There are no assertions or checks to see if the test passes.**

16. (4) In the planning game, what does it mean to “predict today’s weather based upon yesterday?”

**You assume that the team will be able to do the same amount of work in the upcoming iteration as they did in the current (previous) iteration.**

17. (4) What are mock objects and what are they used for?

**Mock objects are objects that are created to be a simple representation of an object when it is too costly to create the real one. They are used mainly for testing purposes when the real object is not yet available or too costly to use. Mock object provide just the amount of behavior needed for the tests.**

18. (4) Give two reasons why it is important to automate your testing?

- **It is too time-consuming or expensive to manually rerun tests all the time.**
- **It is too easy to make a mistake when manually running tests.**

19. (15) You are going to develop an application that runs the automatic self-service checkout machines in the super market. This is where the shopper scans the items in and, when done, pays by cash or credit card. Write three user stories that you, as the customer, would give to developers for implementing the functions of scanning the items and accumulating the amount due. You might describe different types of ways to enter products, where the prices are obtained from, etc. Each user story should describe one cohesive task that a developer might work on.

20. (2 – extra credit) What is this and what does it have to do with software engineering?



**It is a shakuhachi (Japanese bamboo flute). It was a reward for five years of service at Rational software. It illustrates one way of personalizing the reward process.**