

## CS3733-D04 Final Exam

Name:

Answer all of the questions as completely as possible. Do your own work. There is an academic honesty policy at WPI and it will be enforced. Good luck.

### Part 1: Basic Knowledge

For multiple choice questions, circle all that apply.

1. (4) UML sequence diagrams and collaboration diagrams contain which of the following UML modeling elements?
  - a. Classes
  - b. Objects**
  - c. Associations
  - d. Methods**
  - e. Dependencies
  
2. (6) What is the main goal of class design?  
**To assign responsibilities to classes.**
  
3. (4) Consider the two different styles of implementing a design: design-by-contract and defensive programming.  
  
**design-by-contract** is easier to test.  
**defensive programming** is a better style if you are building a class library for use in other applications.
  
4. (4) Which pattern is commonly used in GUI applications to handle the events like menu and button clicks?
  - a. Singleton
  - b. Façade
  - c. Adapter
  - d. Observer**
  - e. Iterator
  
5. (3) The letters C-R-C in CRC cards stand for what?  
**Class, Responsibility, Collaboration**
  
6. (6) What is a design pattern?  
**A general, proven solution to a common problem.**
  
7. (4) Two ways to perform integration are **phased** and **incremental**.

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8. (5) In UML, a class is represented as a rectangle divided into up to three compartments. What are the three compartments for?  
**Class name, properties (or attributes), operations (or methods)**  
[If they say variables for the first, give them one point]
9. (5) What is the major advantage of using the Iterator pattern in your code rather than using something like a for-loop to iterate over a collection?  
**It hides the implementation of the actual collection.**
10. (3) Which of the following are characteristics of beta software?  
a. Not licensed  
b. Free  
**c. Feature complete**  
d. Used for internal customers only  
e. Little, or no, documentation
11. (4) Which type of UML diagram is best for representing a use case scenario?  
**Sequence diagram**
12. (3) Which of the following are GRASP patterns?  
a. Iterator  
**b. Creator**  
c. Don't Talk to Strangers  
d. Adapter  
**e. Information Expert**
13. (3) Which of the following are true about CRC cards?  
a. They are not useful for experienced O-O developers  
**b. They describe methods and properties of classes**  
**c. They are easy to create and destroy**  
d. They are a formal specification of design  
**e. They are an O-O design tool**

### Part II: Longer answers

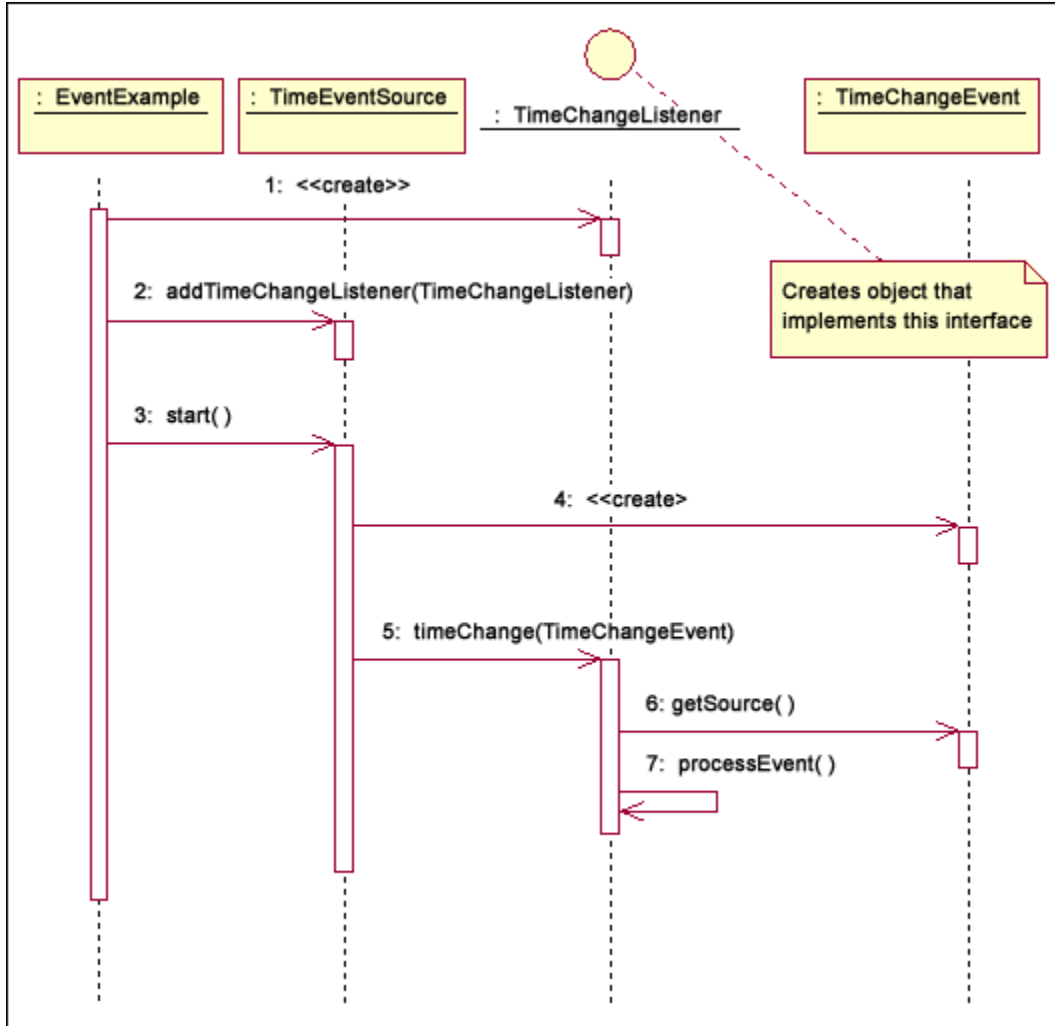
1. (15) Consider the paper *A Rational Design Process: How and Why to Fake It*. Give at least three reasons why a design process will always be an idealization. And describe *why* it is valuable to fake the process.  
**Any of the following reasons:**
- **stakeholders don't know what they want**
  - **some information only becomes apparent as we work through the project**
  - **there are too many details to get it right in the beginning**
  - **change happens**
  - **people make mistakes**
  - **some people have preconceived ideas about the design**
  - **we try to reuse software that wasn't designed for what we need**

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**It is valuable to fake the process because we waste time trying to keep everything up-to-date and in synchronization when it's continually changing and may be wrong.**

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2. (15) Convert the diagram below to an equivalent collaboration diagram.



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3. (15) Identify and discuss three issues that you must consider when you either license your software or use software that is licensed.

- **can I redistribute the software**
- **can I change the source code**
- **if I change the source code do I have to make mine public**
- **how long do I have the license for**
- **how many machines can I run the software on**
- **what are my liabilities**
- **what recourse do I have if something goes wrong**
- **what guarantees are there**
- **do I get upgrades**

[the above can be for either case, just change the “can I” to “can my customer”]