# Exam 2
## Fall 2013

Name (Last, First): _____

**Rules:**

- No potty breaks.
- Turn off cell phones/devices.
- Closed book, closed note, closed neighbor.

- <u>WEIRD!</u> Do not write on the backs of pages. If you need more pages, ask me for some.

**Reminders:**

- Verify that you have all pages.
- Don't forget to write your name.
- Read each question <u>carefully</u>.
- Don't forget to answer <u>every</u> question.

**Additional Items:**

- For questions that involve writing code:
  - You may omit `import` statements.
  - You may omit exception-handling code.

1.  [2pts] If your project has unstable requirements (i.e., that are prone to change), you should use a waterfall process model.

    a.  True

    b.  False

2.  [2pts] In iterative development, how long should an iteration generally be?

    a.  1 week

    b.  2–6 weeks

    c.  2–4 months

    d.  6 months to a year

    e.  None of the above

3.  [12pts] On the next page, create a domain model (using class diagram notation) based on the following description.

    You have been contracted to build an asset-management system for a vampire-hunting company, *Stake4Less*. The organization consists of multiple teams of workers. Each team has a code name. Each worker belongs to one of the teams, and has an ID number, a first name, and a last name. There are two types of workers: hunters and support personnel. Hunters have a skill level. Each support person assists exactly one hunter on the team. Some hunters on the team may not be assigned a support person. The company also manages an arsenal of weapons. Workers of any type may check out up to 3 weapons from the arsenal. Each weapon has a serial number and replacement cost. There are two types of weapons in the arsenal: projectile and melee. Projectile weapons have a range, and may come with an ammo pack. An ammo pack has an ammo type, and includes some number of rounds. Melee weapons have a weight.

(Write your answer here.)

4. [8pts] Draw a control flow diagram for this function. Label each node in the graph with a capital letter, and label each edge with a lowercase letter.

```
int blammo(int u, int v) {
  int t;
  while (v != 0) {
    t = u;
    u = v;
    v = t % v; // Recall that % computes remainder of t/v
  }
  if (u < 0) { return -u; }
  return u;
}
```

5. [5pts] Fill in the table below with a test suite that provides <u>statement</u> coverage of the code from question 4. In the covers column, list the relevant labeled items in your CFG that each test case covers. Some cells in the table may be left blank.

| Input | | Covers |
|---|---|---|
| u | v | |
| | | |
| | | |
| | | |
| | | |
| | | |

6. [5pts] Fill in the table below with a test suite that provides <u>path</u> coverage of the code from question 4. Cover no more than 1 iteration of the loop. In the covers column, list the relevant labeled items in your CFG that each test case covers. Some cells in the table may be left blank.

| Input | | Covers |
|---|---|---|
| u | v | |
| | | |
| | | |
| | | |
| | | |

7.  [2pts] Which of the following best exemplifies the single responsibility principle?

    a.  Writing test code before you write the code under test

    b.  Creating mock objects to stand in for other objects in the system

    c.  Dividing each user story to be built next iteration into tasks and assigning each task to a developer on the team

    d.  For objects of a class $C$, creating a DAO (which knows how to read/write $C$ objects to a database) instead of putting all that database accessing logic in the $C$ class

    e.  Collecting feedback from the customer at the end of each iteration, instead of waiting until the system is finally delivered

8.  [2pts] What type of attack did the parents in this XKCD comic perform?
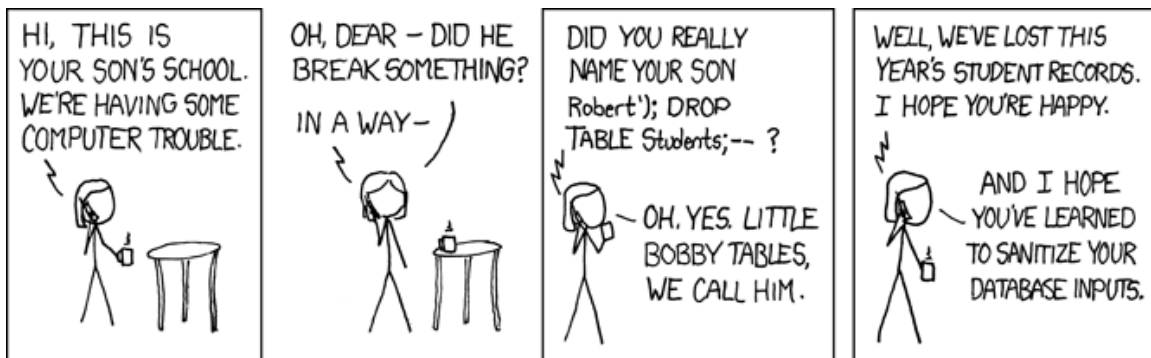


    a.  Cross-site scripting

    b.  SQL injection

    c.  Child endangerment

    d.  Reverse lookup

    e.  Mask and shift

9.  [12pts] Given the following scenario, draw a system sequence diagram on the next page.

    1.  Bank Customer inserts their Bank Card.
    2.  The ATM displays the different alternatives that are available on this unit.
    3.  The Bank Customer selects "Withdraw Cash".
    4.  The ATM prompts for an account.
    5.  The Bank Customer selects an account.
    6.  The ATM prompts for an amount.
    7.  The Bank Customer enters an amount.
    8.  The ATM validates the withdrawal.
    9.  Then money is dispensed, the Bank Card is returned, and the receipt is printed.

(Write your answer here.)

10. [2pts] Which question does <u>non-functional</u> requirements answer?

    a. What does the system do?

    b. When does the system do it?

    c. Where does the system do it?

    d. Why does the system do it?

    e. How well does the system do it?

11. [2pts] Which of the following should a user story <u>not</u> do?

    a. Describe one thing the software needs to do for the customer

    b. Be short

    c. Discuss specific technologies

    d. Be written using language the customer understands

    e. None of the above

12. [2pts] In the agile development process taught in class, the development team estimates each user story and decides the priority for each story.

    a. True

    b. False

13. [2pts] What type of object is used to store "conversational state" with a user?

    a. Servlet

    b. Request

    c. Request Dispatcher

    d. Response

    e. Session

14. [2pts] Which of the following is __not__ a desirable quality of a unit test?

    a.  No I/O

    b.  Fast

    c.  Non-deterministic

    d.  Tests one property

    e.  None of the above

15. [10pts] Given the class `Foo`, complete the JUnit test below. The `compute` method of a `Foo` object with $z = 10$ should return 69 if passed the argument 7 (as `x`). Your test should verify this behavior. Don't forget the JUnit method `fail`, which takes a `String` comment as its argument.

```
public class Foo {
    private int z;
    public Foo(int zarg) { z = zarg; }
    public int compute(int x) { … }

    …
}
```

```
public class FooTest {
    @Test
    public int testCompute(int x) {




































    }
}
```