CSS 508: Self-Assessment Answer Keys   Name: _____

Software Testing and Quality (CSS 508)

1. You are a QA engineer assigned to a new project. Your supervisor gives you the requirements specification to help you understand the software being developed. You are then expected to test the software and file bug reports.

    a) Which testing approach (black box or white box) will you use and why? (4pts)

Answer: Black box, because testing against the specification or the expected behavior of the system

    b) The software being developed is FindIt, a software that gives driving directions from point A (origin) to point B (destination). Based on your answer to (a), what technique will you use to develop test cases?

Answer: Equivalence Partitioning or Boundary Value Analysis

2. Your organization has been selected to develop the software system for the next-generation Mars Rover. The multi-million dollar project will span 10 years and is expected to work with the latest hardware technology available. The software system is expected to be reliable and to have little or no downtime throughout the telescopes lifetime, which is 20 years. Your customer contact is limited to four site visits a year. The customer is unresponsive to phone or email.

    a) What static analysis techniques testing technique will you use? Why? (Hint: these techniques aid in the verification and validation of the software) (4pts)

Answer: Any of the following: walkthroughs, code inspection, code reviews, pair programming

    b) What dynamic analysis techniques testing technique will you use? Why? (Hint: these techniques aid in the verification and validation of the software) (4pts)

Answer: Any of the following: defect testing, statistical testing, usability testing

3. What is the purpose of unit tests?
    a) to detect mismatches *between* modules
    b) to find bugs *inside* a module
    c) to detect whether one module's provided interfaces match up with another module's required interfaces
    d) to determine whether a customer will accept the software

Answer: b) to find bugs inside a module

4. What are the three principal threats to the security of a system? (3pts)

Answer: Confidentiality, integrity, availability

5. What input test case(s) will guarantee node coverage for the following piece of code (which may help you identify a fault in this code)?

```
calculateAverage(float[] scores) {
  min = 99999;
  total = 0;
  for (int i = 0; i < scores.length; i++) {
    if (scores[i] < min)
      min = scores[i];
    total = total + scores[i];
  }
  total = total – min;
  average = total / (scores.length – 1);
}
```

Answer: scores array containing one element

6. You are given the following piece of code. Use one of the mutation operators to seed an error into this program:

```
calculateAverage(float[] scores) {
  min = 99999;
  total = 0;
  for (int i = 0; i < scores.length; i++) {
    if (scores[i] < min)
      min = scores[i];
    total = total + scores[i];
  }
  total = total – min;
  average = total / (scores.length – 1);
}
```

Answer: Any of the following answers are correct:

- Replace the < to > or >=
- Replace i++ with i—
- Replace "-" with "+"

- Delete one line of code
- Replace min variable with max variable and change the initialization values
- Other answers are also possible

7. _____ is a reference model for assessing quality-oriented process improvement of an organization and it is geared toward large organizations. It also provides a basis for complying with ISO 900x and related standards.

CMM or Capability Maturity Model