Introduction to Software Analysis and Testing

In this course, you will work in teams of 3–4 students to learn new concepts. The first activity will introduce you to the process. Next we'll take a first look at software testing.

Meta Activity: Team Roles

Decide who will be what role for today; we will rotate the roles each week. If you have only three people, one should have two roles. If you have five people, two may share the same role.

Manager:
Presenter:
Recorder:
Reflector:

Questions (15 min) Start time:

1. What is the difference between **bold** and *italics* on the role cards?

2. Manager: invite each person to explain their role to the team. Recorder: take notes of the discussion by writing down key phrases next to the table above.

3. What responsibilities do two or more roles have in common?

4. For each role, give an example of how someone observing your team would know that a person is <u>not</u> doing their job well.

- Manager:
- Presenter:
- Recorder:
- Reflector:

Model 1 Triangle Program Testcases

Questions (15 min) Start time:

5. Consider the following program and provide your testcases with explanations for why each testcase is needed:

```
1  import java.util.*;
2  public class Triangle {
3   public static void main(String[] args) {
4    Scanner in = new Scanner(System.in);
5    System.out.print("Input side1: ");
6    int s1 = in .nextInt();
7    System.out.print("Input side2: ");
8    int s2 = in .nextInt();
9    System.out.print("Input side3: ");
10   int s3 = in .nextInt();
11
12   if (!isValidTriangle(s1, s2, s3))
13     System.out.println("These sides can't form a triangle");
14   else if (isEquilateral(s1, s2, s3))
15     System.out.println("These sides can form an equilateral triangle");
16   else if (isIsosceles(s1, s2, s3))
17     System.out.println("These sides can form an isosceles triangle");
18   else
19     System.out.println("These sides can form a scalene triangle");
20  }
21  public static boolean isValidTriangle(int a, int b, int c) {
22   return (a + b > c && b + c > a && c + a > b);
23  }
24  public static boolean isEquilateral(int a, int b, int c) {
25   return (a == b && b == c);
26  }
27  public static boolean isIsosceles(int a, int b, int c) {
28   return (a == b || b == c || a == c);
29  }
30 }
```

Model 2 Triangle Program Testcases Checklist

Questions (15 min) Start time:

Specify which of your initial testcases falls under each category or provide an additional test-case otherwise:

6. Do you have a test case that represents a valid scalene triangle?

7. Do you have a test case that represents a valid equilateral triangle?

8. Do you have a test case that represents a valid isosceles triangle?

9. Do you have at least three test cases that represent valid isosceles triangles such that you have tried all three permutations of two equal sides?

10. Do you have a test case in which one side has a zero value?

11. Do you have a test case in which one side has a negative value?

12. Do you have a test case with three integers greater than zero such that the sum of two of the numbers is equal to the third?

13. Do you have at least three test cases such that you have tried all three permutations where the length of one side is equal to the sum of the lengths of the other two sides?

14. Do you have a test case with three integers greater than zero such that the sum of two of the numbers is less than the third?

15. Do you have at least three test cases such that you have tried all three permutations?

16. Do you have a test case in which all sides are zero?

17. Do you have at least one test case specifying noninteger values?

18. Do you have at least one test case specifying the wrong number of values?

19. For each test case did you specify the expected output (or behavior) from the program in addition to the input values?

Model 3 Discussion

Questions (15 min) Start time:

20. The handout for the pre-class reading introduced you to two testing techniques: black-box and white-box. What are some similarities and differences between the two?

21. Which testing technique is superior (between black-box and white-box)?

22. What kind of testing technique (black-box or white-box) did you employ in Model 1 and 2?

23. Are the testcases required by the checklist (Model 2) enough to properly test the triangle program? Did you come up with any additional testcases?

24. Are more testcases better than less testcases?

Model 4 Testing Principles

Questions (15 mins) Start time:

25. For the principle (or principles) assigned to your group provide the arguments (or examples) that the author makes in support of the principle.

26. Do you agree/ disagree/ or both agree and disagree with the arguments or the examples? Also write down any interesting arguments, comments, or examples that come up in your group discussion.

27. Reason and come up with examples of why the arguments provided by the author are enough (or not enough) to constitute a principle for testing.