Workshop 3 (Week 4) – Structural Coverage

The purpose of this workshop is to practice and develop an understanding of various control flow based structural coverage metrics.

1. Concepts

- What is condition coverage? Give an example.
- What is condition/decision coverage? Give an example.
- What is multiple condition coverage? Give an example.
- What is modified condition/decision coverage? Give an example.
- How do you compare these coverage metrics?

2. Coverage Analysis

Assume we want to test the following code, where A, B and C represent three atomic boolean expressions:

```
if ( (A || B) && C ) {
   /* Some code  */
}
else {
  /* Other code */
}
```

- Design test cases that can achieve 100% statement coverage
- Design test cases that can achieve 100% branch decision coverage
- Design test cases that can achieve 100% condition coverage
- Design test cases that can achieve 100% condition/decision coverage
- Design test cases that can achieve 100% multiple condition coverage
- Design test cases that can achieve 100% modified condition/decision coverage

3. The Compute Median Example

Consider the following function that computes the Median value:

Task 1: Design some test cases for the Median function.

Task 2: Compute test coverage (including condition, condition/decision, and multiple condition coverage).

Task 3: Design more test cases to achieve 100% condition, condition/decision, and multiple condition coverage.

Task 4: Implement your test cases as jUnit test cases and execute the test cases.

(If jUnit is not installed at your PC, install it from: https://junit.org/)

```
public static int median(int x, int y, int z){
      int median = 0;
      if(x >= y && x <= z){ // y<=x<=z
         median = x;
      } else if(x >= z && x <= y){ // z<=x<=y
         median = x;
      } else if(y >=x && y < z){ // x<=y<=z
         median = y;
      } else if(y >= z && y <= x){ // z<=y<=x
         median = y;
      } else {    // x<=z<=y or y<=z<=x
         median = z;
      }
      return median;
   }
}
```

4. Try the Web: Code in Game

https://www.codingame.com/ide/puzzle/the-descent