# SAT: Code Coverage

Consider the following piece of code, which plays a game of Blackjack:

```
1  public int play(int left, int right) {
2      int ln = left;
3      int rn = right;
4      if (ln > 21)
5          ln = 0;
6      if (rn > 21)
7          rn = 0;
8      if (ln > rn)
9          return ln;
10     else
11         return rn;
12 }
```

**1.** What is the minimum number of tests needed for 100%:

a) ... line coverage? 2 ... branch coverage? 2

b) ... branch+condition coverage? 2 ... path coverage? 8

**2.** You have written only one test where left=22 and right=21.

a) What is the line coverage? 7/9 = 78%

b) What is the branch coverage? 3/6 = 50%

c) What is the branch+condition coverage? 6/12 = 50%

d) What is the path coverage? 1/8 = 12.5%

**Note:** You may draw the control flow diagram to reason about the different coverage criterion.

Consider the following method:

```
1  public String sameEnds(String string) {
2    int length = string.length();
3    int half = length / 2;
4    String left = "";
5    String right = "";
6    int size = 0;
7    for (int i = 0; i < half; i++) {
8      left = left + string.charAt(i);
9      right = string.charAt(length - 1 - i) + right;
10     if (left.equals(right)) {
11       size = left.length();
12     }
13   }
14   return string.substring(0, size);
15 }
```

**3**. What is the minimum number of tests needed for 100%:

a) ... line coverage? 1 ... branch coverage? 1

b) ... branch+condition coverage? 1 ... path coverage? infinite

**4**. How many tests are needed to satisfy the ***loop boundary adequacy criterion***? What are these tests? Give concrete examples.

3 tests:
- loop zero times
- loop once
- loop multiple times

**Note:** You may draw the control flow diagram to reason about the different coverage criterion.