CSE 4321 Homework 7

# Chapter 9

## Exercise 1

### For Mutant 2

Reachability is always true.

Infection condition is when

Propagation condition is when

Test cases where or will kill the mutant

### For Mutant 4

Reachability condition is when

Infection condition is when

Propagation condition is when

Test cases where will kill the mutant

### For Mutant 5

Reachability condition is when

Infection condition is when

Propagation condition is when

Test cases where will kill the mutant

### For Mutant 6

Reachability condition is when

Infection condition is when

Propagation condition is when

Test cases where will kill the mutant

## Exercise 3

1. It’s not possible to find any test inputs that do not reach the mutant. Even setting the x to NULL will throw a NullPointerException for x.length.
2. the mutated expression is independent of the method parameters (i=0 != i=1 for any input). Satisfying reachability implies satisfying infection for this mutant.
3. x is an empty array; if x.length is 0, then the initial value of i (for any i>=0) doesn't matter, even though the state of i is infected. Passing in null for x is another example that satisfies infection but not propagation.
4. x is a one-element array, whose element value equals value. There are many inputs that satisfy propagation, which means that the mutant can be killed. Whether the test actually kills the mutant depends on whether the test asserts on the outcome.