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HW#4 – Due Nov 28, 2014 @ 11:59pm

1. Section 5.2 Question 1 (Page 189) [answer this question only for mutants 2 and 5 in Figure 5.1 (and not the other mutants mentioned in the text)].

2. Section 5.2 Question 2 (Page 189)

3. Section 5.5 Question 5 (Page 209) [answer only parts (a) and (b)]

4. Section 5.5 Question 6 (Pages 209–210) [answer only part (a)]

Section 5.2 Question 1 (Page 189) [Answer]

For Mutant 2

Reachability: *true*

Infection:

Propagation:

Full Specification:

Test Case:

For Mutant 5

Reachability:

Infection:

Propagation:

Full Specification:

Test Case:

Section 5.2 Question 2 (Page 189) [Answer]

For findVal()

a) The for loop is always executed. So a test input that skips it cannot be found

b) The for loop is always executed. So when it is executed, an infection occurs

c)

int[] numbers new int[2]; numbers [0] = 1; numbers [1] = 2; val = 2;

d)

int[] numbers new int[2]; numbers [0] = 2; numbers [1] = 1; val = 2;

For sum()

a) An empty integer array x (no elements)

int[] x new int[];

b)

int[] x new int[2]; x[0] = 0; x[1] = 0;

c)

int[] x new int[2]; x[0] = 1; x[1] = -1;

d)

int[] x new int[2]; x[0] = 1; x[1] = 2;

Section 5.5 Question 5 (Page 209) [Answer]

a)

For the provided grammar, the following strings can be generated

**42**

Derivation

**4 2 +**

Derivation

**4 2 7 - \***

Derivation

**4 2 - 7 \***

Derivation

b)

The following strings can be generated only by the mutated grammar and not the original grammar

**4 + 2**

Derivation

Section 5.5 Question 6 (Page 209–210) [Answer]

a)

123-4567 (phone Number)

012-3456 (**non-phone** Number; exchangePart needs to start with **1 or 2**)

109-1212 (phone Number)

346-9900 (**non-phone** Number; exchangePart needs to start with **1 or 2**)

113-1111 (phone Number)

For exchangePart = D1D2D3,

D1 = 1 or 2

D2 = 0 or 1 or 2

D3 = 3 or 4 or 5 or 6 or 7 or 8 or 9

b)

Original:

Mutation:

In Mutated Grammar Only:

None of the provided strings fall in this category. But an external example is: 1**3**3-4567

In Original Grammar Only:

So we cannot find a string that is only in original grammar as exchangePart in original grammar is always a subset of exchangePart in mutation grammar.

In both Original & Mutated Grammar:

As exchangePart in original grammar is always a subset of exchangePart in mutation grammar, the following strings that satisfy the original grammar also satisfies the mutation grammar.

123-4567, 109-1212, 113-1111