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Software Testing (EE 360T) HW 2

1. [7 points] Exercises - Section 3.3 Question 3 - answer this question with respect to CACC instead of GACC (Pages 130-131)

```
fragment P:
  if (A || B || C)
  {
    m();
  }
  return;
```

```
fragment Q:
  if (A)
  {
    m();
    return;
  }
  if (B)
  {
    m();
    return;
  }
  if (C)
  {
    m();
  }
```

a. Give a CACC test set for fragment P. (Note that GACC, CACC, and RACC yield identical test sets for this example.)

P = {(A || B || C)} // only one predicate. Cp = {A, B, C} p = (A || B || C)

Truth Table:

A	B	C	A || B || C
T	T	T	T
T	T	F	T
T	F	T	T
T	F	F	T
F	T	T	T
F	T	F	T
F	F	T	T
F	F	F	F

For c = A: Choose B and C such that P(A = true) != P(A = false).

Set B and C false. A determines p, and the condition holds.

For c = B and c = C, set the other two clauses false, and the condition holds.

CACC Tests:

T = {(F, F, F), (T, F, F), (F, T, F), (F, F, T)}. // t = (A, B, C).

The predicate is in Disjunctive Normal Form (DNF), so this makes sense.

b. Does the CACC test for fragment P satisfy edge coverage on fragment Q?

Yes, the CACC test for fragment P satisfies edge coverage on fragment Q.

c. Write down an edge coverage test set for fragment Q. Make your test set include as few tests from the CACC test set as possible.

The CACC test set already is a minimal test suite for edge coverage.

T = {(F, F, F), (T, F, F), (F, T, F), (F, F, T)}. // t = (A, B, C).

2. [6 points] Exercises - Section 4.1 Question 2 (Page 159) - answer this question with respect to only the method Push using exactly two characteristics where each characteristic has two blocks in its partition

2. Derive input space partitioning tests for the **GenericStack** class with the following method signatures:
   - public GenericStack ();
   - public void Push (Object X);
   - public Object Pop ();
   - public boolean IsEmt ();

   Assume the usual semantics for the stack. Try to keep your partitioning simple, choose a small number of partitions and blocks.
   (a) Define characteristics of inputs
   (b) Partition the characteristics into blocks
   (c) Define values for the blocks

a. Define characteristics of inputs.

Characteristic 1: Input X is null.
Characteristic 2: Class of input X is Object.

b. ***Partition the characteristics into blocks.***

Characteristic 1: Input X is null.
{Input X is null, Input X is NOT null};
Characteristic 2: Class of input X is Object.
{Class of input X is Object, Class of input X is NOT Object};

c. Define values for the blocks.

Characteristic 1: Input X is null.
{(null), (new Object())};
Characteristic 2: Class of input X is Object.
{(new Object()), (new Integer())};

3. [7 points] Exercises - Section 4.2 Question 4 (Pages 163-164)

```
public Set intersection (Set s1, Set s2)
 // Effects:  If s1 or s2 are null throw NullPointerException
 //    else return a (non null) Set equal to the intersection
 //    of Sets s1 and s2
 //    A null argument is treated as an empty set.
```

Characteristic: Type of s1
- s1 = null
- s1 = {}
- s1 has at least one element

Characteristic: Relation between s1 and s2
- s1 and s2 represent the same set
- s1 is a subset of s2
- s2 is a subset of s1
- s1 and s2 do not have any elements in common

(a) Does the partition "Type of s1" satisfy the completeness property? If not, give a value for $s1$ that does not fit in any block.
(b) Does the partition "Type of s1" satisfy the disjointness property? If not, give a value for $s1$ that fits in more than one block.
(c) Does the partition "Relation between s1 and s2" satisfy the completeness property? If not, give a pair of values for $s1$ and $s2$ that does not fit in any block.
(d) Does the partition "Relation between s1 and s2" satisfy the disjointness property? If not, give a pair of values for $s1$ and $s2$ that fits in more than one block.
(e) If the "base choice" criterion were applied to the two partitions (exactly as written), how many test requirements would result?

a. Yes, it does satisfy the completeness property. No set s1 can be formed that does not fit in any of those three blocks.

b. Yes, it does satisfy the disjointness property. No set s1 can be formed that satisfies more than one of the block properties.

c. No, it does NOT satisfy the completeness property.

Consider the set pair (s1, s2) = ({3, 4, 5}, {3, 4, 6}). The two sets have

some elements in common, but they are not the same set. Also, neither set is a subset of the other!

d. No, it does NOT satisfy the disjointness property. Consider the pair where s1 and s2 are the same set, s1 is a subset of s2 and s2 is also a subset of s1! Ex.: (s1, s2) = ({6}, {6}). {6} and {6} are the same set. Also, {6} is a subset of {6}.

e. The number of tests that result from using the "base choice" criterion can be expressed as:

$$1 + \sum_{i=1}^{Q} (B_i - 1)$$

For this example, the total would be (1 + (3 – 1) + (4 – 1)) = 6 tests.