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Class: EE382V (Software Testing Class)

HW#1 – Due Sep 16, 2014 @ 11:59pm

Exercises – Section 2.2.1 Question 3

Exercises – Section 2.2.1 Question 4

Exercises – Section 2.2.1 Question 5

Exercises – Section 2.2.1 Question 6

Q3) If we just considered the simple case of a many-to-one mapping that exists between the two criteria, then it would be clear that Cstrong subsumes Cweak. However, by definition, proper criteria subsumption requires that every test set that that satisfies Cstrong must also satisfy Cweak.

The question further states that it is not necessarily the case that Tweak is a subset of Tstrong. How is this possible if Cstrong subsumes Cweak? Well, that scenario is possible if there are infeasible test requirements in Cstrong that are feasible in Cweak. Therefore in such a scenario, it is possible that the test set Tweak may reveal a fault that Tstrong does not. This can also occur when touring with side trips can’t avoid taking a side trip to meet a test requirement.

Q4)

a. Draw the graph

b. List test paths that achieve node coverage, but not edge coverage

It is not possible to have test paths that achieve node coverage but not edge coverage. The reason is that all test paths have to begin at Node 1 and when Node 3 is visited, the only way to get to Node 4 is going through Node 2. This then provides [2,3] and [3,2] edge coverage in addition to [1,2] and [2,4]. Therefore a test path (t0 = [n1, n2, n3, n2, n4]) that provides node coverage in this question **also** provides edge coverage.

c. List test paths that achieve edge coverage, but not edge-pair coverage

t0 = [n1, n2, n3, n2, n4] achieves edge coverage but not edge-pair coverage as edge pair [3,2,3] is not toured

d. List test paths that achieve edge pair coverage

t0 = [n1, n2, n3, n2, n3, n2, n4] 🡨 tour with side trip

t1 = [n1, n2, n4] 🡨 tour with no side trip

T = {t0, t1} is a test set that achieves edge-pair coverage

5)

a) Draw the graph

b) List the test requirements for edge-pair coverage

TR = {[1, 2, 3], [1, 2, 4], [2, 3, 2], [2, 4, 5], [2, 4, 6], [3, 2, 3], [3, 2, 4], [4, 5, 6], [4, 6, 1], [5, 6, 1], [6, 1, 7], [6, 1, 2]}

c) Does the given set of test paths satisfy edge-pair coverage? If not identify what is missing.

No, the test paths do not satisfy edge=pair coverage. The following test requirements are missing:

[3, 2, 3], [6, 1, 2]

d) Does the test path tour the simple path directly? With a side trip? If so identify the side trip.

The test path does not tour the simple path directly

The test path tours the simple path with a side trip of **[4, 6, 1, 2, 4]**

e) List the test requirements for node coverage, edge coverage, and prime path coverage.

Node Coverage:

TR = {1, 2, 3, 4, 5, 6, 7}

Edge Coverage:

TR = {(1, 2), (1, 7), (2, 3), (2, 4), (3, 2), (4, 5), (4, 6), (5, 6), (6, 1) }

Prime Path Coverage:

TR = {[2, 3, 2], [3, 2, 3], [1, 2, 4, 6, 1], [2, 4, 6, 1, 2], [4, 6, 1, 2, 3], [4, 6, 1, 2, 4], [6, 1, 2, 4, 6], [1, 2, 4, 5, 6, 1], [2, 4, 5, 6, 1, 2], [3, 2, 4, 6, 1, 7], [4, 5, 6, 1, 2, 3], [4, 5, 6, 1, 2, 4], [5, 6, 1, 2, 4, 5], [6, 1, 2, 4, 5, 6], [3, 2, 4, 5, 6, 1, 7]}

\_\_\_\_\_\_\_

Work:

~~[1]~~

~~[2]~~

~~[3]~~

~~[4]~~

~~[5]~~

~~[6]~~

~~[7]!~~

~~[1, 2]~~

~~[1, 7]!~~

~~[2, 3]~~

~~[2, 4]~~

~~[3, 2]~~

~~[4, 5]~~

~~[4, 6]~~

~~[5, 6]~~

~~[6, 1]~~

~~[1, 2, 3]!~~

~~[1, 2, 4]~~

[2, 3, 2]\*

~~[2, 4, 5]~~

~~[2, 4, 6]~~

[3, 2, 3]\*

~~[3, 2, 4]~~

~~[4, 5, 6]~~

~~[4, 6, 1]~~

~~[5, 6, 1]~~

~~[6, 1, 2]~~

~~[6, 1, 7]!~~

~~[1, 2, 4, 5]~~

~~[1, 2, 4, 6]~~

~~[2, 4, 5, 6]~~

~~[2, 4, 6, 1]~~

~~[3, 2, 4, 5]~~

~~[3, 2, 4, 6]~~

~~[4, 5, 6, 1]~~

~~[4, 6, 1, 2]~~

~~[4, 6, 1, 7]!~~

~~[5, 6, 1, 2]~~

~~[5, 6, 1, 7]!~~

~~[6, 1, 2, 3]!~~

~~[6, 1, 2, 4]~~

~~[1, 2, 4, 5, 6]~~

[1, 2, 4, 6, 1]\*

~~[2, 4, 5, 6, 1]~~

[2, 4, 6, 1, 2]\*

~~[2, 4, 6, 1, 7]!~~

~~[3, 2, 4, 5, 6]~~

~~[3, 2, 4, 6, 1]~~

~~[4, 5, 6, 1, 2]~~

~~[4, 5, 6, 1, 7]!~~

[4, 6, 1, 2, 3]!

[4, 6, 1, 2, 4]\*

~~[5, 6, 1, 2, 3]~~

~~[5, 6, 1, 2, 4]~~

~~[6, 1, 2, 4, 5]~~

[6, 1, 2, 4, 6]\*

[1, 2, 4, 5, 6, 1]\*

[2, 4, 5, 6, 1, 2]\*

~~[2, 4, 5, 6, 1, 7]!~~

~~[3, 2, 4, 5, 6, 1]~~

[3, 2, 4, 6, 1, 7]!

[4, 5, 6, 1, 2, 3]!

[4, 5, 6, 1, 2, 4]\*

[5, 6, 1, 2, 4, 5]\*

[6, 1, 2, 4, 5, 6]\*

[3, 2, 4, 5, 6, 1, 7]!

f) List test paths that achieve node coverage but not edge coverage on the graph

T = {[1,2,3,2,4,5,6,1,7]}

g) List test paths that achieve edge coverage but not prime path coverage on the graph

path(t1) = [1, 2, 4, 5, 6, 1, 7]

path(t2) = [1, 2, 3, 2, 4, 6, 1, 7]

path(t3) = [1, 2, 3, 2, 4, 5, 6, 1, 7]

path(t4) = [1, 2, 4, 6, 1, 7]

T1 = {t1, t2}

T2 = {t3, t4}

6)

a. Enumerate the test requirements for node coverage, edge coverage, and prime path coverage on the graph

Node Coverage:

TR = {n0, n1, n2, n3, n4, n5, n6, n7, n8, n9}

Edge Coverage:

TR = {(n0, n3), (n0, n4), (n1, n4), (n2, n5), (n2, n6), (n3, n7), (n4, n7), (n4, n8), (n5, n1), (n5, n9), (n6, n9), (n8, n5)}

Prime Path Coverage:

TR = { [n0, n3, n7], [n0, n4, n7], [n0, n4, n8, n5, n1], [n0, n4, n8, n5, n9], [n1, n4, n8, n5, n1],[n1, n4, n8, n5, n9], [n2, n5, n1, n4, n7], [n2, n5, n1, n4, n8], [n2, n5, n9], [n2, n6, n9], [n4, n8, n5, n1, n4], [n5, n1, n4, n8, n5], [n8, n5, n1, n4, n7], [n8, n5, n1, n4, n8]}

b. List test paths that achieve node coverage but not edge coverage

T = {[n0, n3, n7], [n1, n4, n8, n5, n9], [n2, n6, n9]}

c. List test paths that achieve edge coverage but not prime path coverage.

T = {[n0, n3, n7], [n0, n4, n7], [n1, n4, n8, n5, n1, n4, n8], [n2, n6, n9], [n2, n5, n9]}