

# Assignment 2, Part A

CSC410, Fall 2018 - Assignment 2a

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Lecture: Thursday

I am the sole author of this homework. Signature: XIAWEI ZHANG

## Problem 1

A:

((not a) ==> b) && (c || d) && (e && (not d))

Test Cases	a	b	c	d	e	Outcome
T1	T	F	T	F	T	T
T2	F	F	T	F	T	F
T3	F	T	T	F	T	T
T4	F	T	F	F	T	F
T5	T	F	T	T	T	F
T6	F	T	T	F	F	F

B: T1 and T2 achieve 100% decision coverage

C:

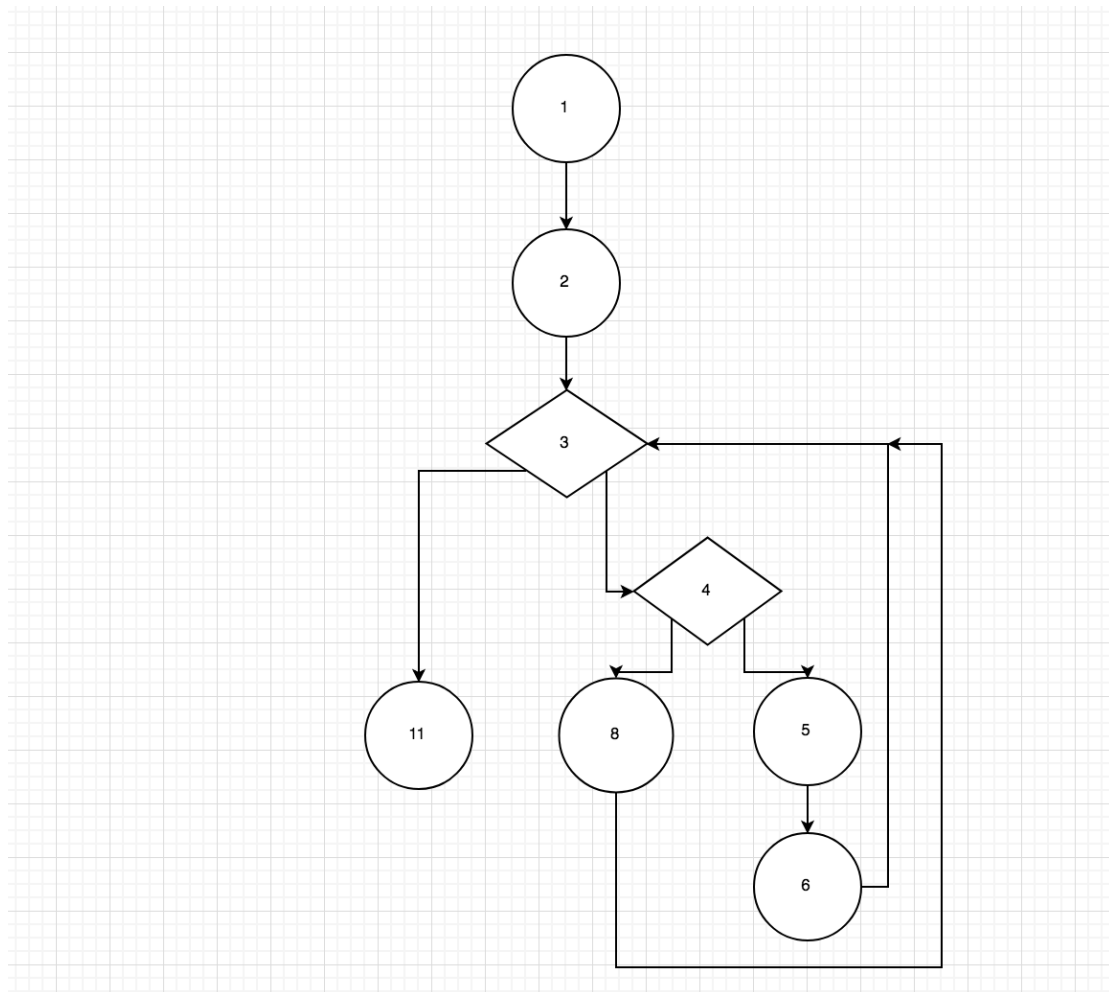
condition	Values of the other variables	Which test causes the branch condition to be true	Which test causes the branch condition to be false
a	b=..., c=..., d=..., e=...	T1	T2
b	a=..., c=..., d=..., e=...	T3	T2
c	a=..., b=..., d=..., e=...	T3	T4
d	a=..., b=..., c=..., e=...	T1	T5
e	a=..., b=..., c=..., d=...	T3	T6

D:

I think MC/DC coverage subsumes condition coverage and branch coverage because if we want MC/DC coverage then we will have to run over the entire branch. Therefore, the branch coverage must be full. Also, the condition coverage will be full as well since we change true/false for once when we do MC/DC coverage.

## Problem 2

A:



B:

#Node = 8

#Edge = 9

cyclomatic complexity =  $9 - 8 + 2 = 3$

C:

Test number	Value of y	Value of z	Path visited	# loop iterations
1	-100	100	1-2-3-11	0
2	-1	-1	1-2-3-4-8-3-11	1
3	1	-2	1-2-3-4-8-3-4-8-3-11	2

### Problem 3

A:

Definitions (def) of y	1, 2, 6, 8
Definitions (def) of z	1, 5
Uses of y	2, 3, 4, 6, 8, 11
Uses of z	4, 5, 8

B:

Yes, 100% "All-Defs" coverage be achieved

Test case	Def covered	nodes
T1	Def1y def2y	1-2-3-11
T2	Def1z def8y	1-2-3-4-8-3-11
T3	Def6y def5z	1-2-3-4-5-6-3-4-5-6-3-4

C:

No, there isn't a path which can make def6y to use11y because if we go inside node 4 with true condition in Control-flow Graph, then we keep z—and y++ so z+y will not change. Y is always greater than 0 and this loop will never finish so this def6y will never reach the use11y. This use is not covered with def6y therefore, we conclude that 100% "All-Uses" coverage will not be achieved.

D:

No, 100% "All-DU-Path" coverage will not be achieved because 100% "All-Uses" coverage is not achieved. Besides, there is no path which can bring def6y to the use11y which violates the definition of ALL-DU-Path coverage, therefore we conclude that 100% "All-DU-Path" coverage will not be achieved.

C:

Yes, 100% "All C-Uses, Some P-Uses" coverage can be achieved.

Test Case	"All C-Uses, Some P-Uses"	path
T1	C2y p3y c4y c4z p4z p4y c8y c8z c11y	1-2-3-4-8-3-11
T2	C2y p3y c4y c4z p4z p4y c5z c6y	1-2-3-4-5-6-3-4-5-6-3-4...