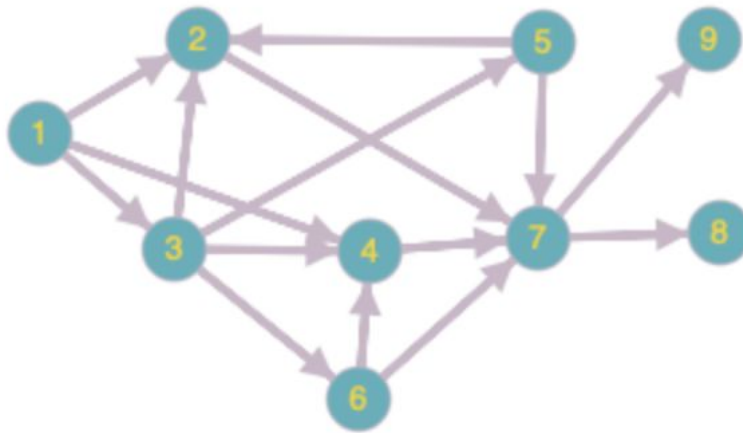


$N_0 = \{ 1 \}$
 $N_f = \{ 8, 9 \}$
 $E = \{ (1,2), (1,3), (1,4), (2,7), (3,2), (3,4), (3,5), (3,6),$
 $(4,7), (5,2), (5,7), (6,4), (6,7), (7,8), (7,9) \}$



- 1.1 Is the sequence [1, 3, 6, 4, 7, 9] a test path?
Yes, this is a valid test path that starts at the initial node (1) and ends at one of the final nodes (9)
- 1.2 Is the sequence [1, 2, 4, 7, 9] a test path?
No, because there is no edge connecting $2 \rightarrow 4$
- 1.3 Does the test path [1, 3, 6, 7, 9] tour subpath [6, 4, 7, 9]?
No, because the given test path never visits node 4; a test path p ([1, 3, 6, 7, 9]) tours subpath q ([6, 4, 7, 9]) if **q is a subpath of p** , which q ([6, 4, 7, 9]) is not.
- 1.4 Give a set of test requirements that satisfy Edge-Pair coverage (EPC)
 $TR = \{(1,2,7), (1,3,2), (1,3,4), (1,3,5), (1,3,6), (1,4,7),$
 $(2,7,8), (2,7,9),$
 $(3,2,7), (3,4,7), (3,5,2), (3,5,7), (3,6,4), (3,6,7)$
 $(4,7,8), (4,7,9),$
 $(5,2,7), (5,7,8), (5,7,9),$
 $(6,4,7), (6,7,8), (6,7,9)\}$

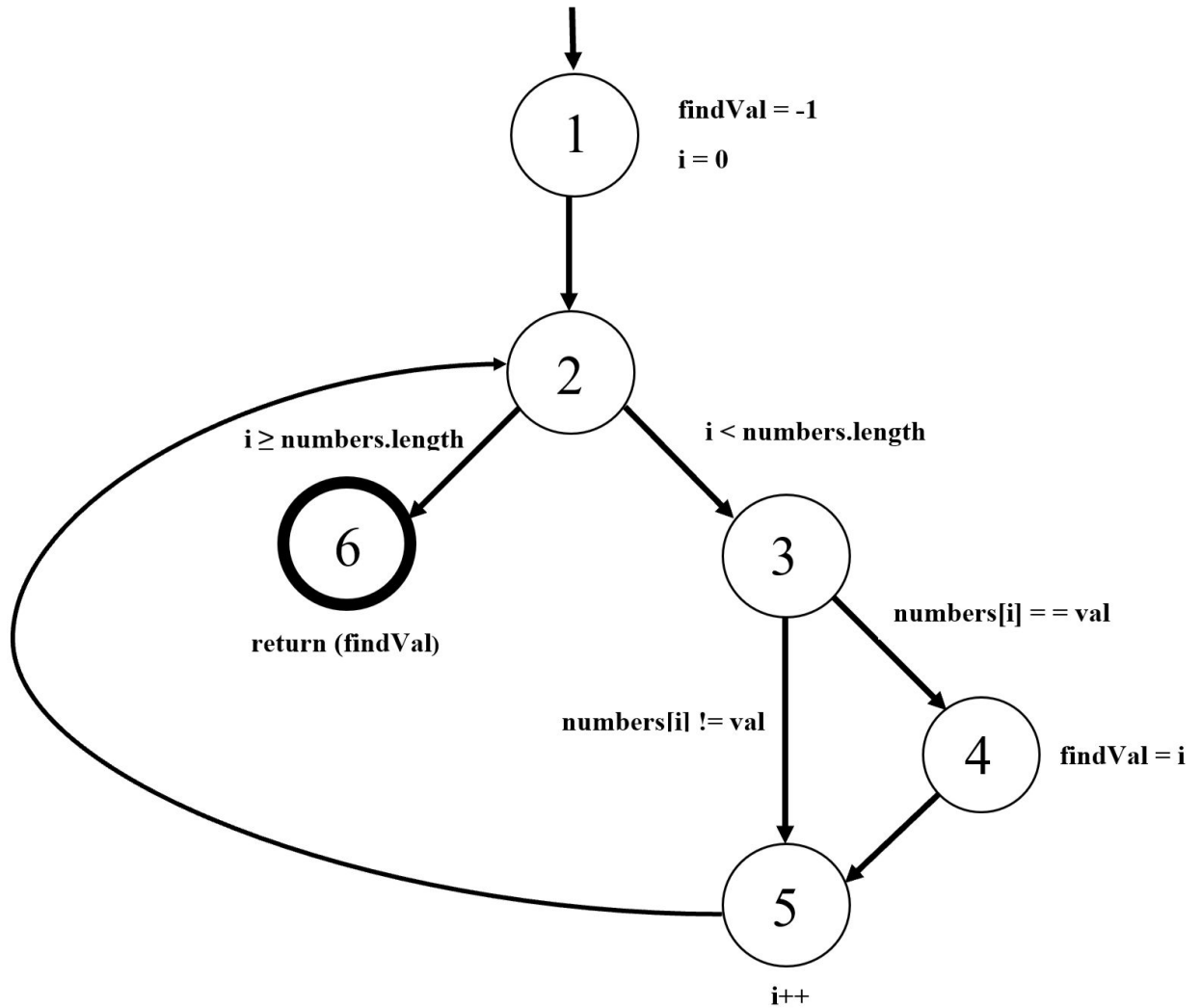
1.5 Give a set of test requirements that satisfy Prime Path coverage (PPC)

1	Length = 0	Length = 1	Length = 2	Length = 3	Length = 4	Length = 5
2	[1]	[1,2]	[1,2,7]	[1,2,7,8] !	[1,3,2,7,8] !	[1,3,5,2,7,8] !
3	[2]	[1,3]	[1,3,2]	[1,2,7,9] !	[1,3,2,7,9] !	[1,3,5,2,7,9] !
4	[3]	[1,4]	[1,3,4]	[1,3,2,7]	[1,3,4,7,8] !	[1,3,6,4,7,8] !
5	[4]	[2,7]	[1,3,5]	[1,3,4,7]	[1,3,4,7,9] !	[1,3,6,4,7,9] !
6	[5]	[3,2]	[1,3,6]	[1,3,5,2]	[1,3,5,2,7]	
7	[6]	[3,4]	[1,4,7]	[1,3,5,7]	[1,3,5,7,8] !	
8	[7]	[3,5]	[2,7,8] !	[1,3,6,4]	[1,3,5,7,9] !	
9	[8] !	[3,6]	[2,7,9] !	[1,3,6,7]	[1,3,6,4,7]	
10	[9] !	[4,7]	[3,2,7]	[1,4,7,8] !	[1,3,6,7,8] !	
11		[5,2]	[3,4,7]	[1,4,7,9] !	[1,3,6,7,9] !	
12		[5,7]	[3,5,2]	[3,2,7,8] !	[3,5,2,7,8] !	
13		[6,4]	[3,5,7]	[3,2,7,9] !	[3,5,2,7,9] !	
14		[6,7]	[3,6,4]	[3,4,7,8] !	[3,6,4,7,8] !	
15		[7,8] !	[3,6,7]	[3,4,7,9] !	[3,6,4,7,9] !	
16		[7,9] !	[4,7,8] !	[3,5,2,7]		
17			[4,7,9] !	[3,5,7,8] !		
18			[5,2,7]	[3,5,7,9] !		
19			[5,7,8] !	[3,6,4,7]		
20			[5,7,9] !	[3,6,7,8] !		
21			[6,4,7]	[3,6,7,9] !		
22			[6,7,8] !	[5,2,7,8] !		
23			[6,7,9] !	[5,2,7,9] !		
24				[6,4,7,8] !		
25				[6,4,7,9] !		

TR = {(1,2,7,8), (1,2,7,9), (1,4,7,8), (1,4,7,9),
 (1,3,2,7,8), (1,3,2,7,9), (1,3,4,7,8), (1,3,4,7,9), (1,3,5,7,8), (1,3,5,7,9), (1,3,6,7,8),
 (1,3,6,7,9), (1,3,5,2,7,8), (1,3,5,2,7,9), (1,3,6,4,7,8), (1,3,6,4,7,9)}

2.1 Draw a Control Flow Graph (CFG) for the findVal method

(DOWN BELOW)



2.2 $\text{TR} = \{(1,2,3), (1,2,6), (2,3,4), (2,3,5), (3,4,5), (3,5,2), (4,5,2), (5,2,3), (5,2,6)\}$

2.3 $\text{TR1}(1, 2, 6)$:
Input $\rightarrow \{[4, 5, 2], 5\}$
Output $\rightarrow 1$

Test Paths:

$\text{T1} = [1, 2, 6]$

$\text{T2} = [1, 2, 3, 5, 2, 3, 4, 5, 2, 6]$

Impossible to design test case for other test requirements because a test case must be executable; it maps to a test path. Thus, it starts at the initial node(1) and ends at a final node(6), which the other TR's don't.

2.4

Length = 0	Length = 1	Length = 2	Length = 3	Length = 4
[1]	[1,2]	[1,2,3]	[1,2,3,4]	[1,2,3,4,5]
[2]	[2,6] !	[1,2,6] !	[1,2,3,5]	[2,3,4,5,2] *
[3]	[2,3]	[2,3,4]	[2,3,4,5]	[3,4,5,2,3] *
[4]	[3,4]	[2,3,5]	[2,3,5,2] *	[3,4,5,2,6] !
[5]	[3,5]	[3,4,5]	[3,4,5,2]	[4,5,2,3,4] *
[-6] !	[4,5]	[3,5,2]	[3,5,2,3] *	[5,2,3,4,5] *
	[5,2]	[4,5,2]	[3,5,2,6] !	
		[5,2,3]	[4,5,2,3]	
		[-5,2,6] !	[-4,5,2,6] !	
			[5,2,3,4]	
			[5,2,3,5] *	

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

2.5 TR1 (1, 2, 6):

Input → {[], 0}

Output → -1

Since the array is empty, the output is -1 (what findVal was initially set as).

Impossible to design test case for other test requirements since some variables are not initialized (the TR doesn't start at 1), we cannot create test cases for the rest of the TR's.