CSE 470

Assignment 3.

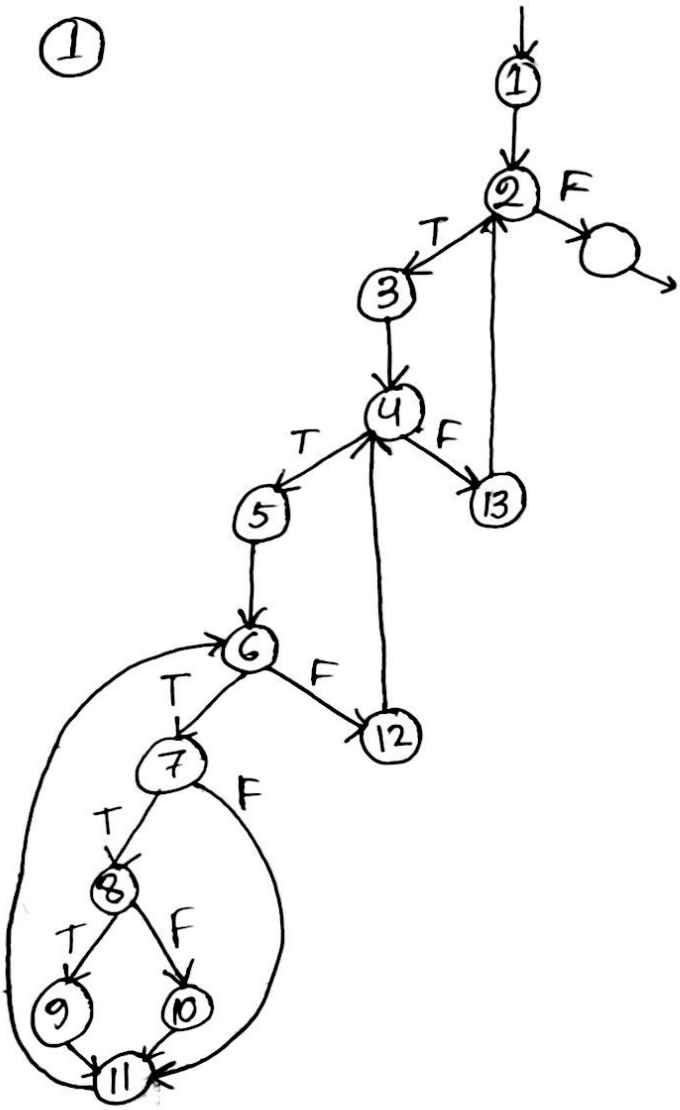
Name: Umme Abira Azmary

ID: 20101539

Section: 04

Ans. to the ques. no-01:

(1)

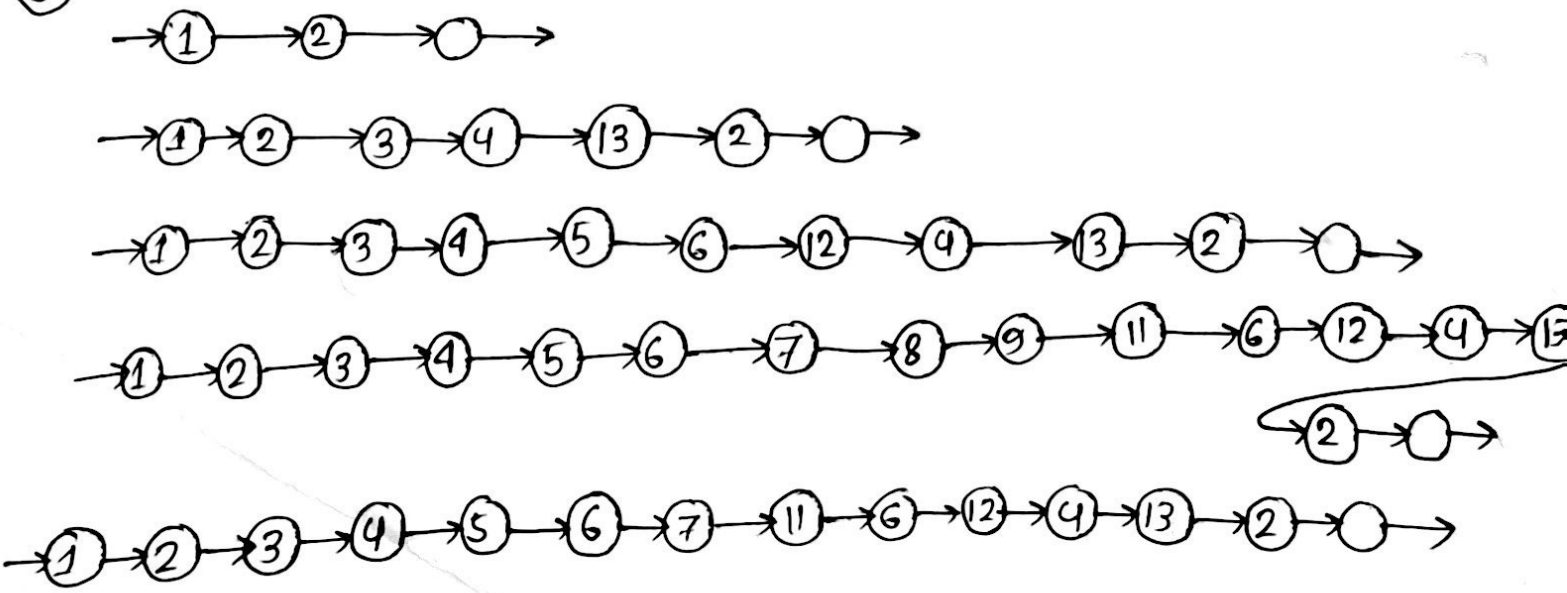


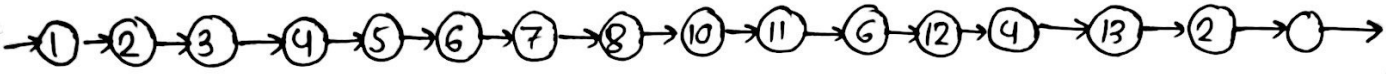
(2) $M = R + 1$
$= 5 + 1$
$= 6$

$M = P + 1$
$= 5 + 1$
$= 6$

$M = E - N + 2P$
$= 18 - 14 + 2 \times 1$
$= 4 + 2$
$= 6$.

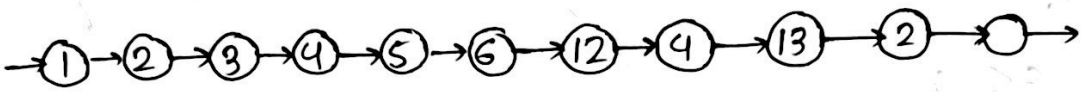
(3)





So, we have total 6 Independent paths.

Now, let's use the following ~~path~~ path to showcase a test case:



~~Condition~~

Node 1; $a=1$, Let's assume $n=1$;

Node 2: $a < n+1$.
$1 < 1+1$.
$1 < 2$

Node 3: $b=1$, Node 4: $1 < 1+1$
$1 < 2$

Node 5: $c=1$, Node 6: $c < n+1$
$1 < 1+1$
$1 < 2$

Node 7: Not satisfied, so go back to Node 12: $b = 1+1$
$b = 2$

Now, Node 4: $b < n+1$.
$2 < 1+1$
$2 < 2$ → Not satisfied

so, go back to Node 13: $a = 1+1$
$a = 2$

Node 2: $a < n+1$
$2 < 1+1$
$2 < 2$ → Not satisfied

Node Logical: Exit through Logical Node.

④ Here, no. of Independent path = 6.

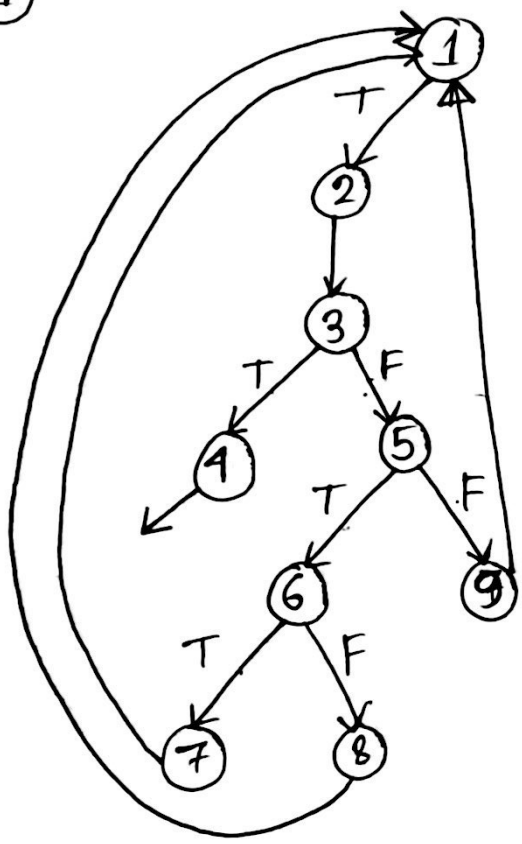
we know, if no. of Independent path <= M, our path-based testing is done correctly.

$$6 <= 6.$$

so, we understand our path-based testing is done correctly.

Answer to the ques. no- 02:

(1)



(2) $M = R + 1$.

$= 9 + 1$.

$= 10$

$M = P + 1$.

$= 3 + 1$.

$= 4$

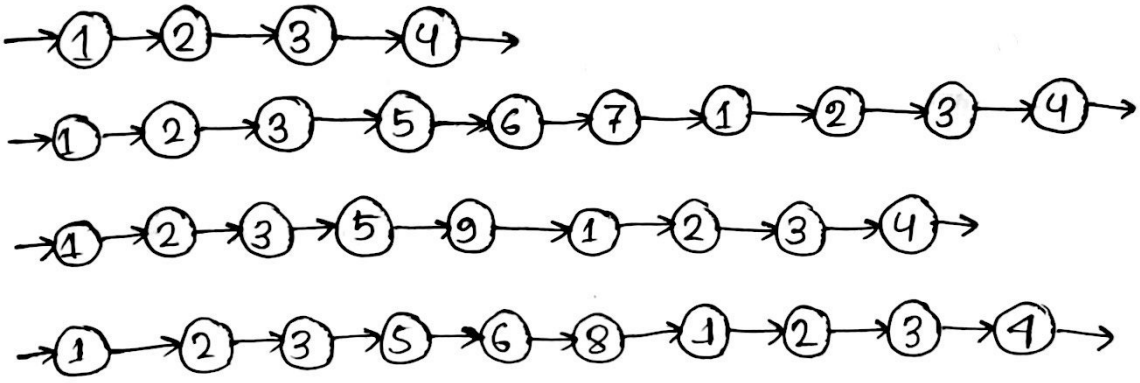
$M = E - N + 2P$

$= (11 - 9) + 2 \times 1$

$= 2 + 2$

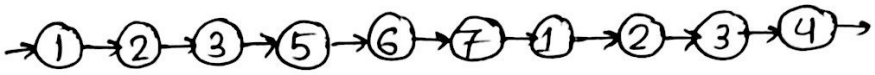
$= 4$.

(3) Independent Path:



Here, we have total 4 independent paths.

Now, let's use the following path to showcase a test case:



Node 1 : While True

Node 2: num = 12

Node 3: Not satisfied.

Node 5: 12 % 2 == 0 :

Node 6: 12 % 3 == 0 ;

Node 7 : print (" Even and divisible by 3")

Node 1 : While True continue

Node 2: num = -1

Node 3: num < 0 :
-1 < 1 (satisfied)

Node 4: print(" Negative Number entered")
break.

(4) We know,

No. of Independent path <= M.

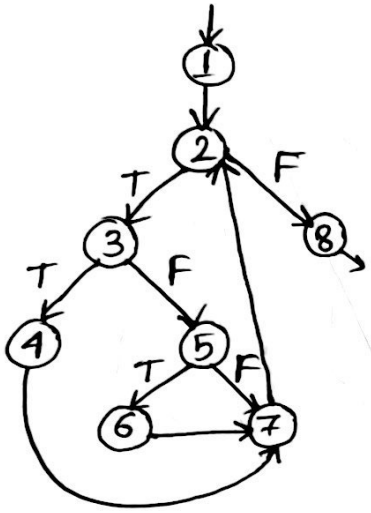
4 <= M.

4 <= 4.

So, we can say, our path-based testing is done correctly.

Answer to the ques. no-03:

① **Code1 :**

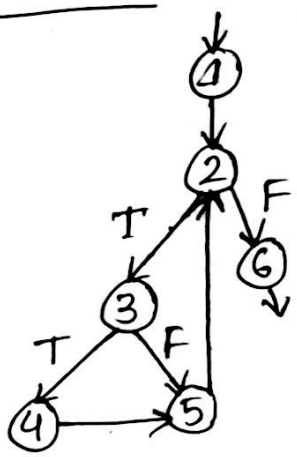


Cyclometric complexity, $M = R+1$
$= 3+1$
$= 4$.

$M = P+1$
$= 3+1$
$= 4$

$M = E-N+2P$
$= (10-8)+2\times1$
$= 4$.

Code 2 :



Cyclometric complexity, $M = R+1$.
$= 2+1$
$= 3$

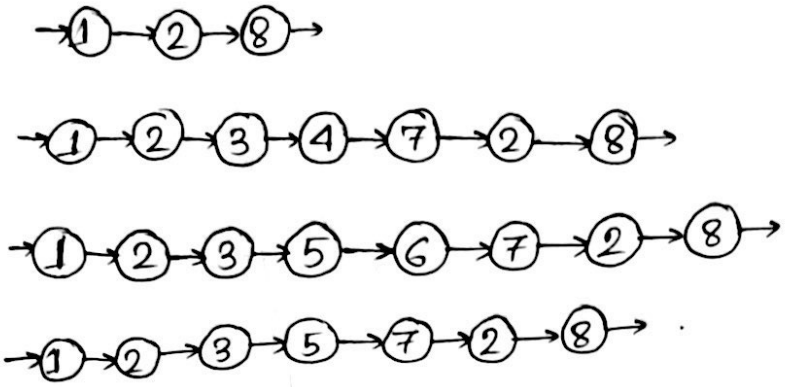
$M = P+1$.
$= 2+1$
$= 3$

$M = E-N+2P$.
$= (7-6)+2\times1$.
$= 3$

Here, Code 2 has better Cyclometric Complexity.

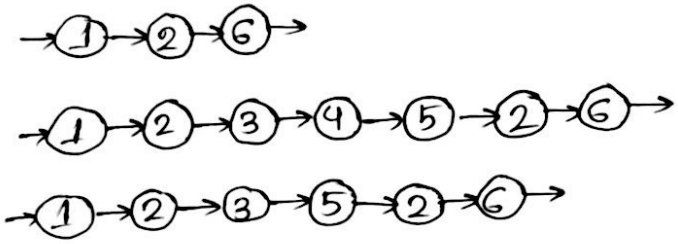
(2) Code 1,

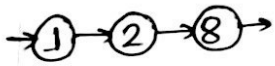
Independent Paths:



Code 2,

Independent Paths:

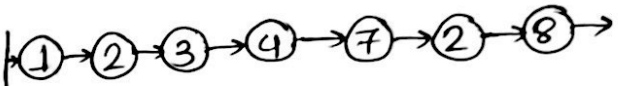


For Code 1, 

Node 1: int sum = 0
int i = 0

Node 2: A = [ ]
i < A.length.
0 < 0 → Not satisfied

Node 8: print (sum)
↳ sum = 0.



Node 1: int sum = 0
int i = 0

Node 2: A = [2,4], i < A.length
0 < 2

Node 3: A[0] % 2 == 0
2 % 2 == 0

Node 4: sum = 0+2 ⇒ sum = 2

Node 7: i = 0+1 = 1.

Node 2: 1 < 2.

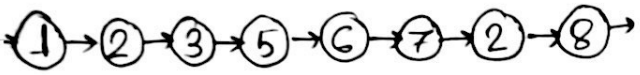
Node 3: A[1] ⇒ 4 % 2 == 0.

Node 4: sum = 2+4 ⇒ sum = 6.

Node 7: i = 1+1 = 2

Node 2: 2 < 8 → Not satisfied.

Node 8: Print (sum = 8)



Node 1: sum = 0
i = 0

Node 2: A = [3]

Node 3: A[0] % 2 == 0
3 % 2 == 0 → Not satisfied.

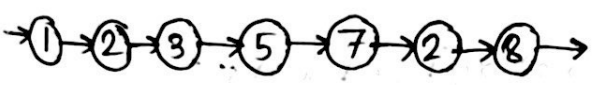
Node 5: A[0] % 2 != 0
3 % 2 != 0 →

Node 6: print(3 is odd, skipping...)

Node 7: i = 0+1.

Node 2 = A[1] % 2 == 0 → Not satisfied.

Node 8: sum = 3



Node 1: sum = 0
i = 0

Node 2: A = [3, 2]

Node 3: A[0] % 2 == 0
3 % 2 == 0 → Not satisfied.

Node 5: A[0] % 2 != 0
3 % 2 != 0 → This node allows node 6 to print. Which is not a part of this path.

So, there is no such value that can satisfy this path.

Code 2:

Node 1: sum = 0
i = 0

Node 2: ~~A = [2, 4]~~ A = [ ]
i < A.length
0 < 0 → Not satisfied

Node 6: sum = 0

Node 1: sum = 0
i = 0

Node 2: A = [2, 4]
i < A.length
0 < 2

Node 3: A[0] % 2 == 0
2 % 2 == 0

Node 4: sum = 0+2
sum = 2

Node 5: i = 0+1 ⇒ i = 1

Node 2: 1 < 2

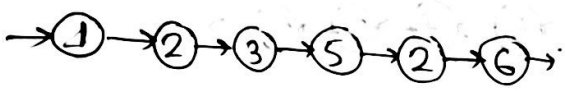
Node 3: A[1] % 2 == 0
4 % 2 == 0

Node 4: sum = 2+4 ⇒ sum = 6.

Node 5: i = 1+1 ⇒ i = 2

Node 2: 2 < 2 → Not satisfied

Node 6: sum = 6.



Node 1: sum = 0
i = 0

Node 2: A = [3]

Node 3: A[0] % 2 == 0
3 % 2 == 0 → Not satisfied.

Node 5: i = 0+1.
~~A[1] % 2 == 0 → Not satisfied~~.

Node 2: A[1] % 2 == 0 → Not satisfied.

Node 6: sum = 0.

Answer to the ques. no: 4:

$$SIX = \frac{NMO * DIT}{NMO + NMI + NMA}$$

NMO = 1

NMI = 1

NMA = 2

DIT = 1.

So, $SIX = \frac{1.1}{1+2+1}$.

$SIX = \frac{1}{4} \times 100\%$

$= 25\%$