



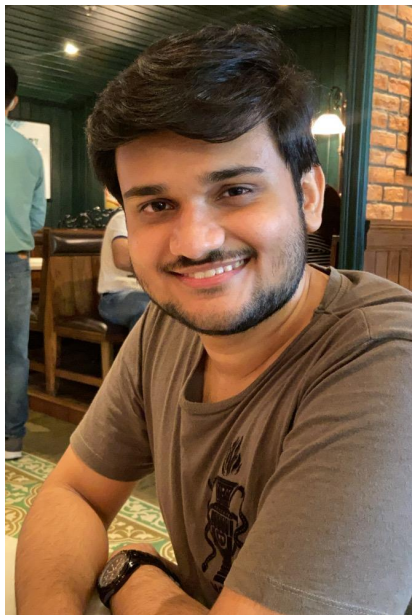
# Problem solving with arrays

**With Sanket Singh**

Let's crack Competitive Programming together!



# Sanket Singh



- Software Development Engineer @ **LinkedIn**
- Former Software Developer @ **Interviewbit/Scaler**
- Former Product Engineer @ **Coding Blocks**
- Cracked **Google** Summer Of Code 2019 under **Harvard University**
- Offers From **Linkedin, Sprinklr, Dunzo, Works Application(Singapore), Interviewbit, Grofers, Splash Learn**
- **No. 1** Educator in Unacademy Competitive Programming Track
- Former Research Intern @ **ISRO (Indian Space Research Organisation)**
- Taught 7,500+ programmers in Data Structures, Algorithms and Fundamentals of Computer Science
- Got **Rank 1** in Codechef Long Challenges
- Won **Infosys** Digital Make-a-thon



1. Consider the array  $A = [3, 2, 1, 0]$ , which of the following expressions is equal to 3?

A.  $A[3]$

B.  $A[1]$

C.  $A[0]$

D.  $A[2]$



1. Consider the array  $A = [3, 2, 1, 0]$ , which of the following expressions is equal to 3?

A.  $A[3]$

B.  $A[1]$

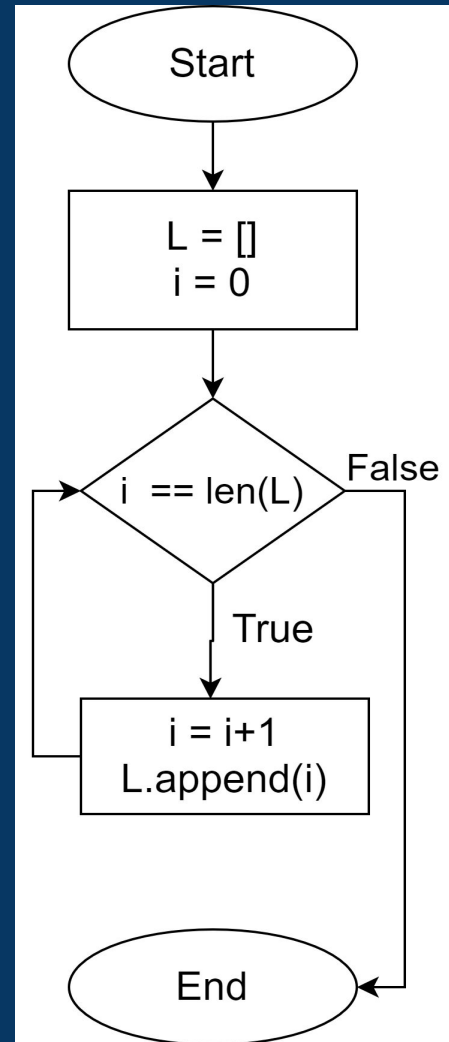
C.  $A[0]$

D.  $A[2]$

2. How many times will the loop run?

Note: assume that append adds the element at the last position.

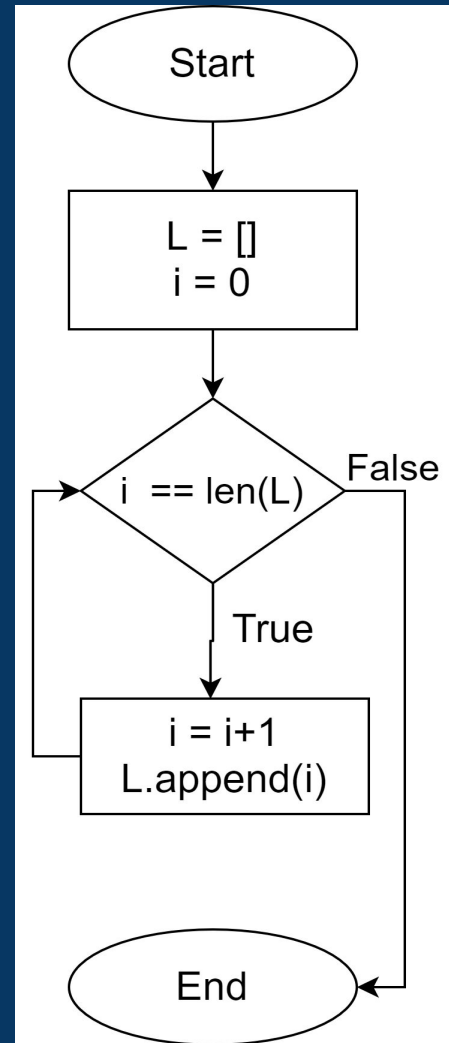
- A. 1000
- B. 0
- C. 1
- D. infinite



2. How many times will the loop run?

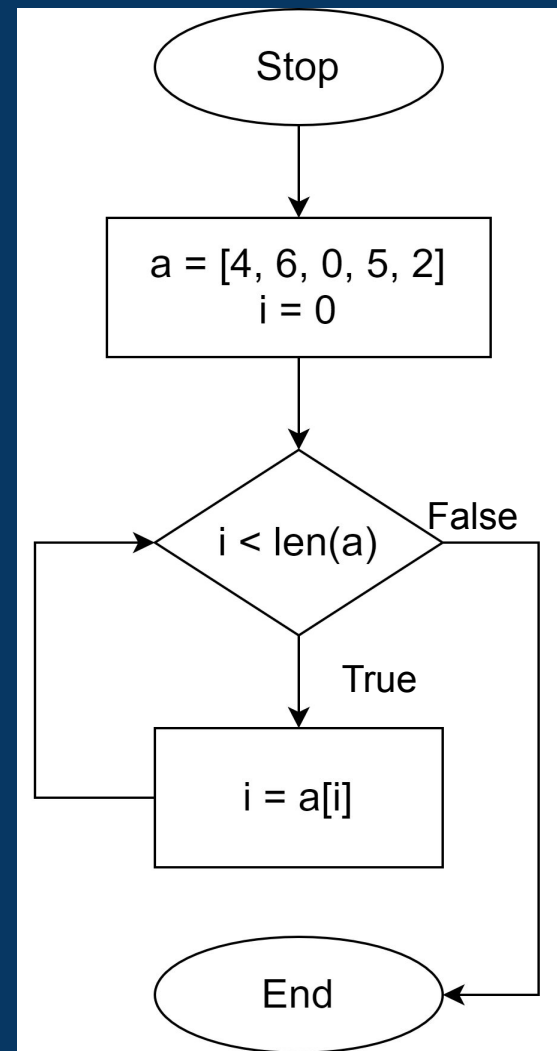
Note: assume that append adds the element at the last.

- A. 1000
- B. 0
- C. 1
- D. infinite**



3. How many times will the loop run?

- A. 5
- B. 3
- C. 6
- D. infinite



3. How many times will the loop run?

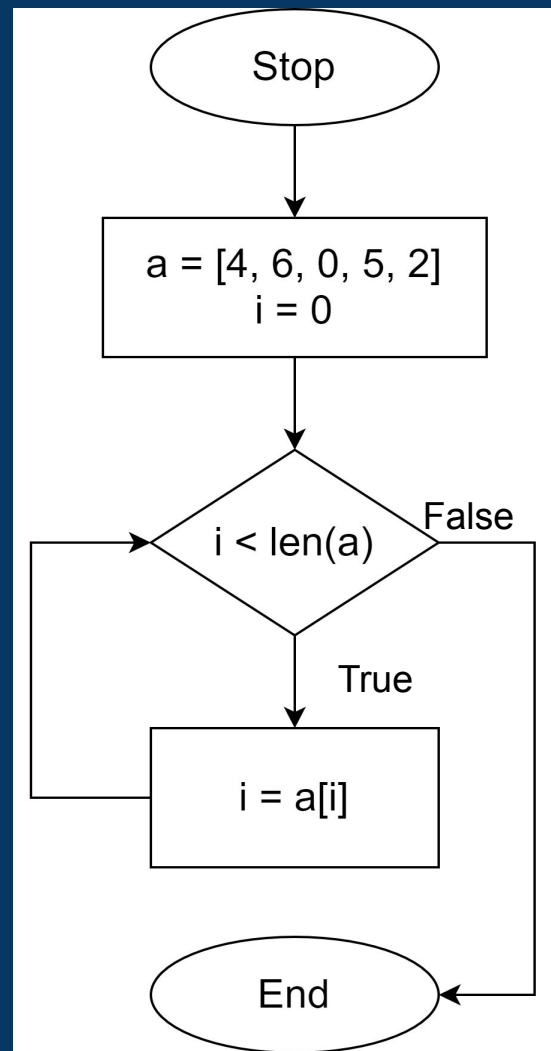
A. 5

B. 3

C. 6

D. infinite

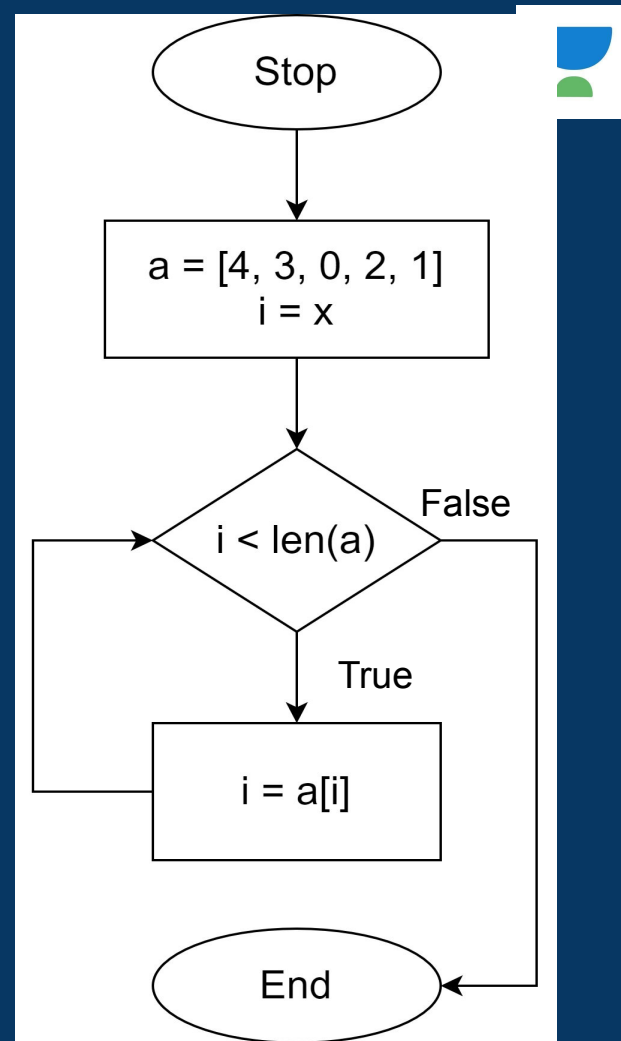
As loop will run  $i$  change as  $0 \rightarrow 4 \rightarrow 2 \rightarrow 0$  so we can see that  $i$  repeating itself so loop will never end.





4. Which of the following is true for all  $x$  where  $x$  can be 0, 1, 2, 3, 4  
In terms of number of times loop will run?

- A. Infinite time
- B. finite time
- C. Depend on the value of  $x$
- D. None of these



## 4. Solution - >

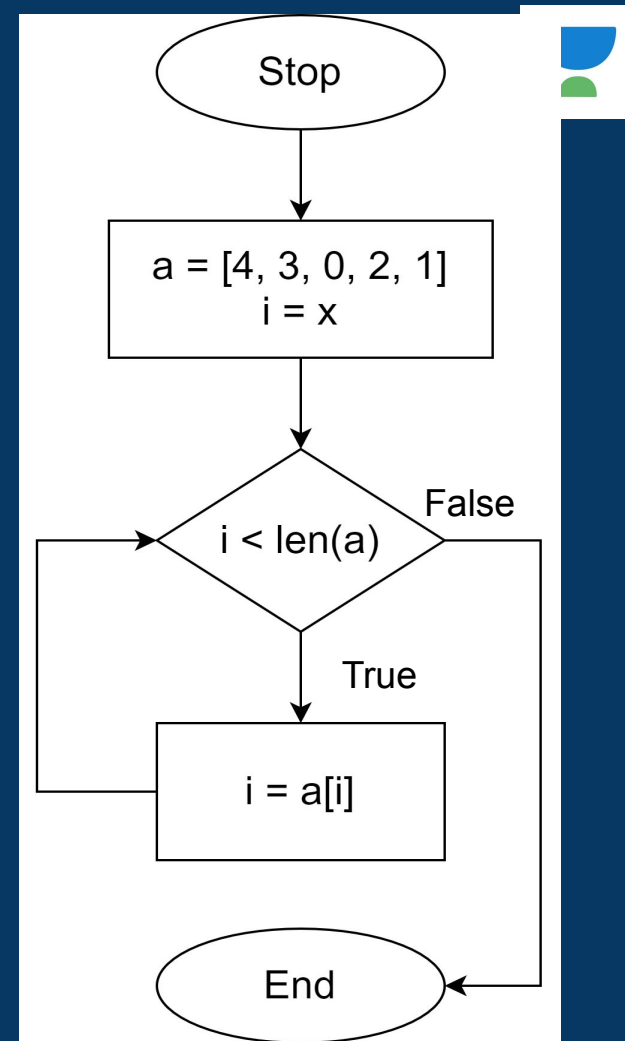
Since all the values of array are less than  $\text{len}(a)$  so it means it is independent that from where we run the loop  $i$  always be less than  $\text{len}(a)$  it means loop will run for finite time.

A. Infinite time

B. finite time

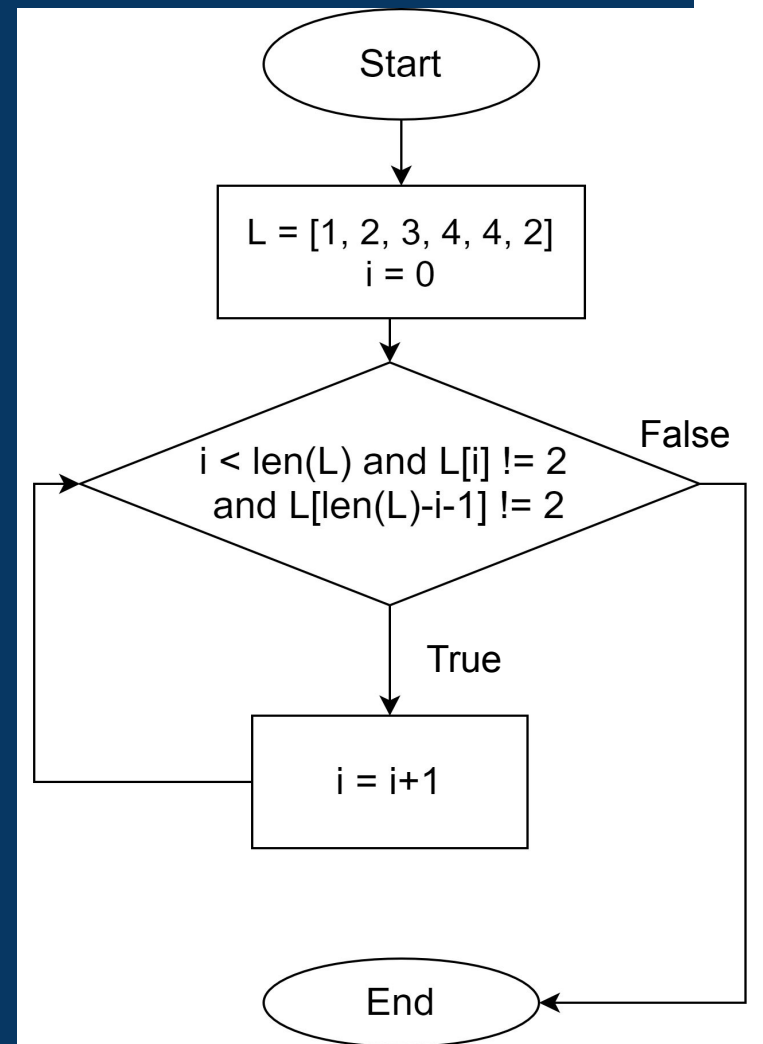
C. Depend on the value of  $x$

D. None of these



5. How many times will the instruction  $i = i+1$ , get executed?

- A. 1
- B. 6
- C. 0
- D. 2



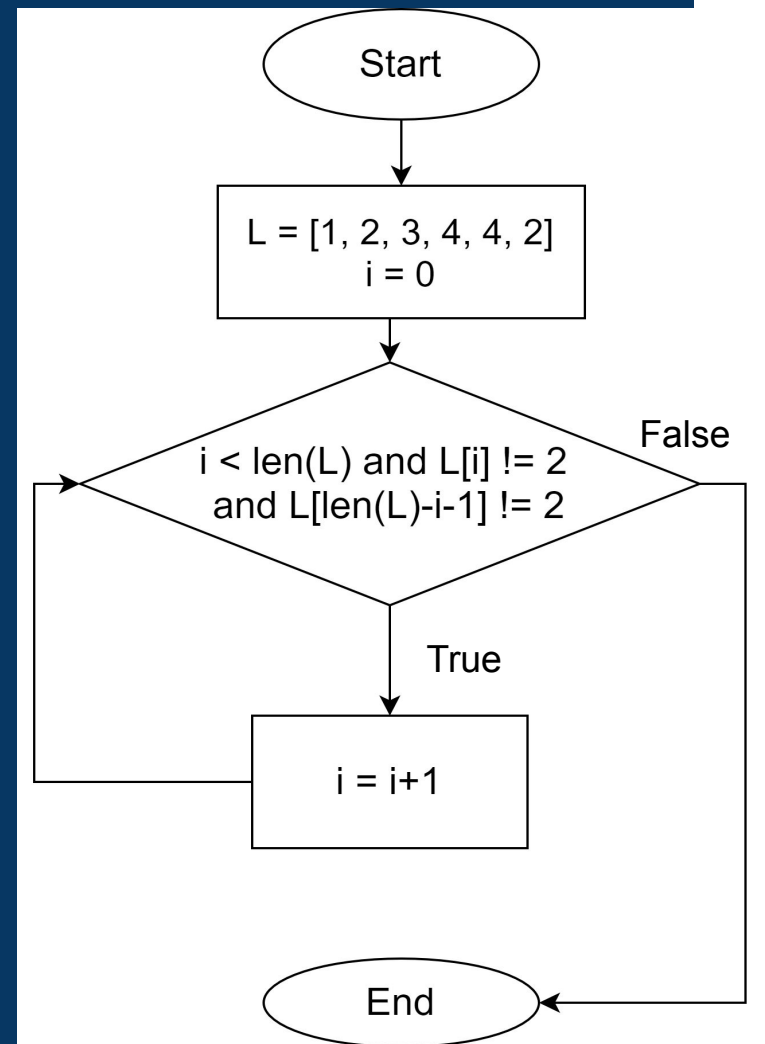
5. How many times will the instruction  $i = i+1$ , get executed?

A. 1

B. 6

C. 0

D. 2

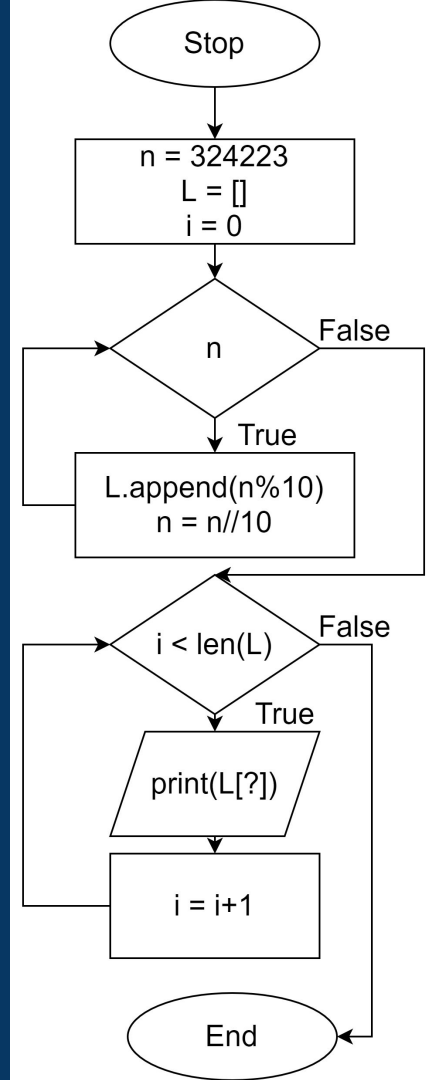


6. By what value ? should be replaced so that the flowchart prints n?

Note: Assume all the values printed by print are printed in a single line.

ex-print(1), print(2) = 12

- A. i
- B.  $\text{len}(L) - i - 1$
- C. 0
- D.  $\text{len}(L)$



6. By what value ? should be replaced so that the flowchart prints n?

Note: Assume all the values printed by “print” are printed in a single line.

ex-print(1), print(2) = 12

A. i

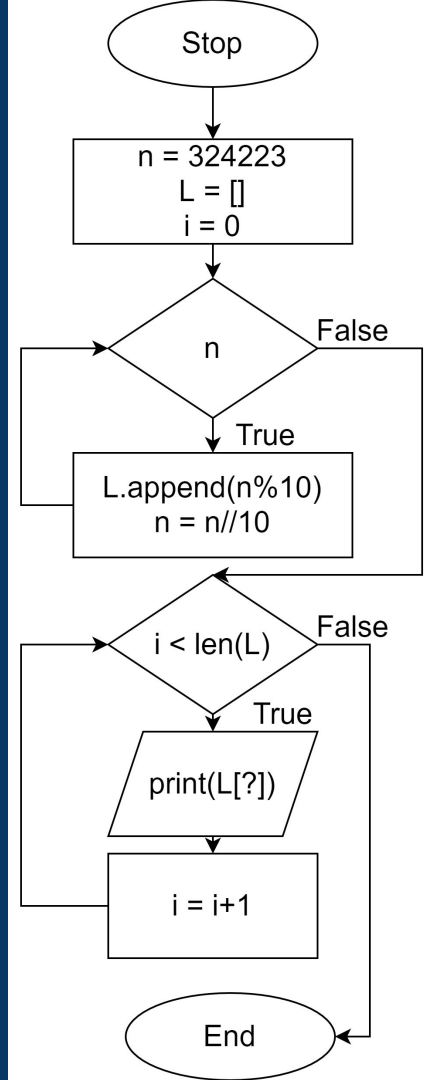
B. len(L)-i-1

C. 0

D. len(L)

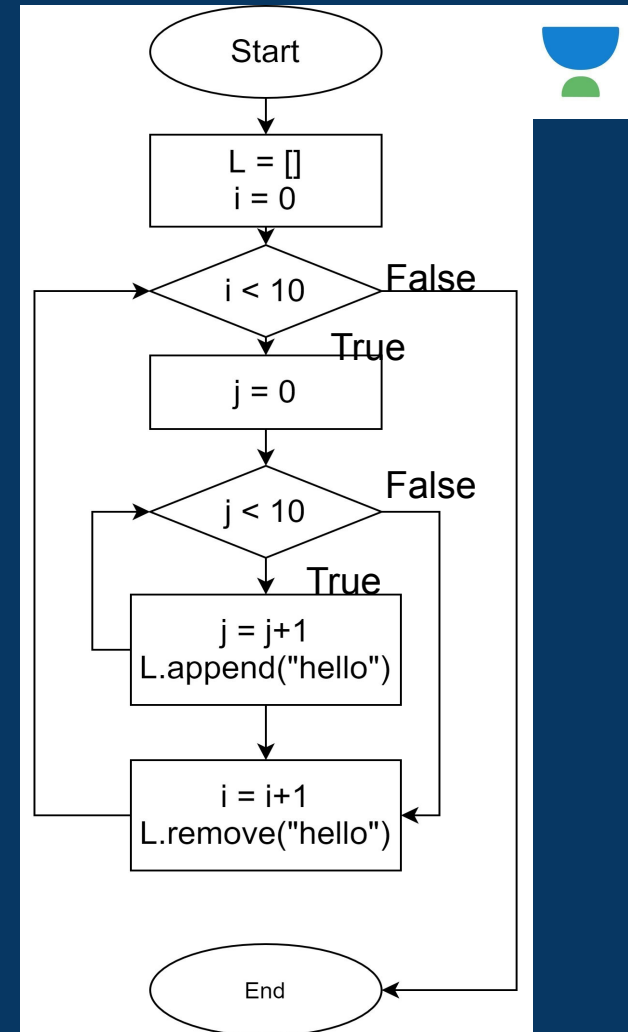
Since L stores the digit in reverse order like [3, 2, 2, 4, 2, 3]

So we have to print in reverse order, so the option B reverse the array.



7. What is the length of array **L** after running the flowchart?

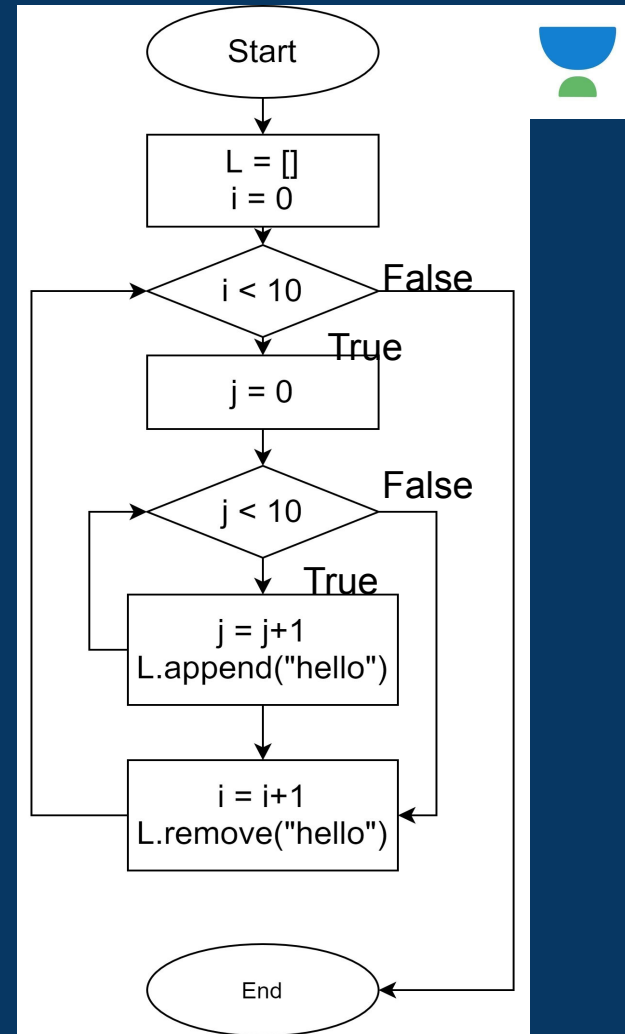
- A. 90
- B. 99
- C. 0
- D. 100



7. What is the length of array **L** after running the flowchart?

- A. 90
- B. 99
- C. 0
- D. 100

Flowchart will append 100<sub>times</sub> and remove 10<sub>times</sub> so the length array equals to 90.

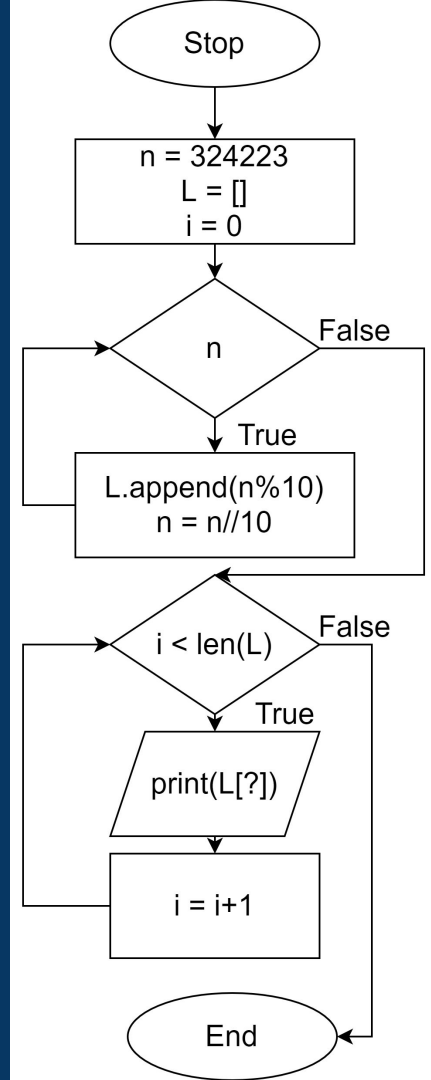




8. By what value ? should be replaced so that flowchart print n

Note: Assume all the value printed by print is printed in a single line.

- A. i
- B.  $\text{len}(L) - i - 1$
- C. 0
- D.  $\text{len}(L)$



8. By what value ? should be replaced so that flowchart print n

Note: Assume all the value printed by print is printed in a single line.

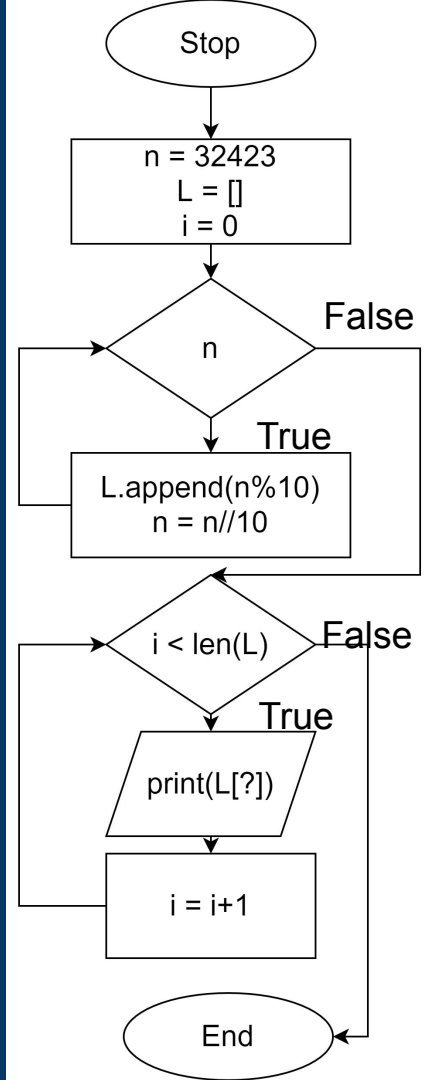
A. i

B.  $\text{len}(L)-i$

C. 0

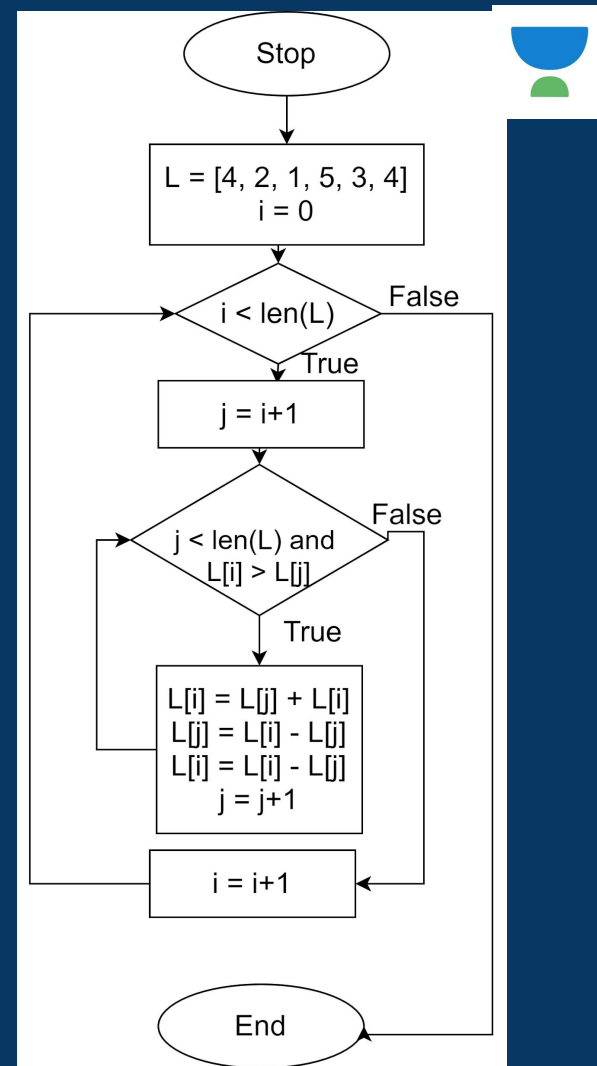
D.  $\text{len}(L)$

Here also L will stored the digit in reverse order but observe the digit of n it is palindrome.



9. Will given flowchart sort the array in increasing order?

- A. True
- B. False



## 9. Will given flowchart sort the array in increasing order?

A. True

B. False

Dry run the flowchart on given array it will not sort the array in ascending order the array becomes

After first iteration of  $i \rightarrow$

$L = [1, 4, 2, 5, 3, 4]$

After second  $\rightarrow$

$L = [1, 2, 4, 5, 3, 4]$

third  $\rightarrow$

$L = [1, 2, 4, 5, 3, 4]$

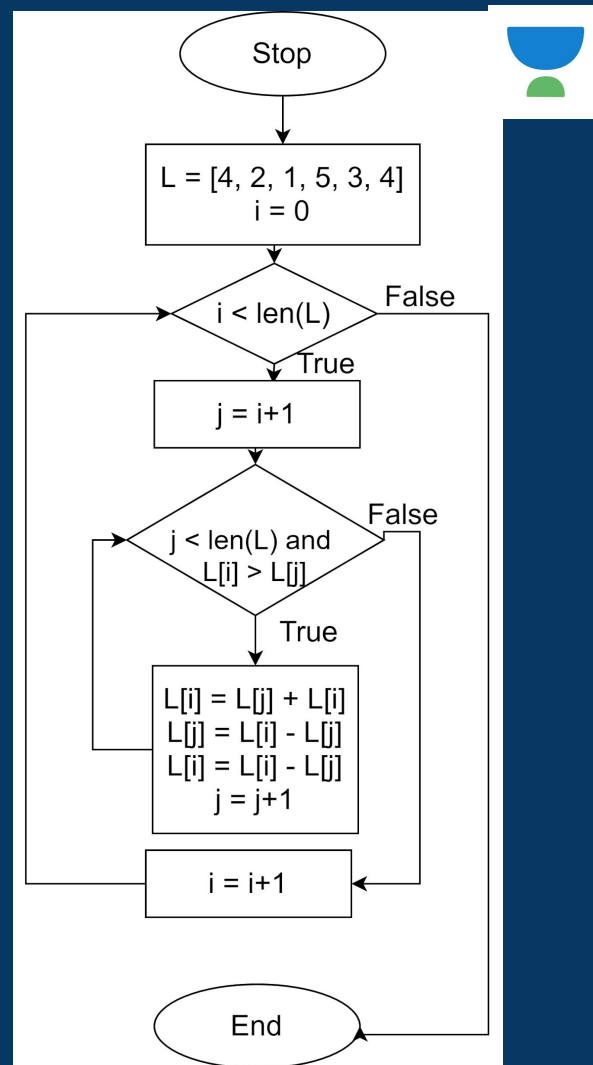
fourth  $\rightarrow$

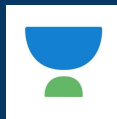
$L = [1, 2, 4, 3, 5, 4]$

fifth  $\rightarrow$

$L = [1, 2, 4, 3, 4, 5]$

Sixth will not change anything





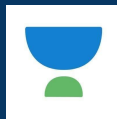
10. An array  $X$  of size  $N$  is split into  $B$  different arrays  $Y_1, Y_2, \dots, Y_B$ . (every element of  $X$  is in exactly one of  $Y_1, Y_2, \dots, Y_B$  and union of all the  $B$  arrays gives  $X$ ).

Let  $mx$  be the **maximum** of sizes of all the  $B$  arrays

Let  $mn$  be the **minimum** of sizes of all the  $B$  arrays

The minimum value of  $mx - mn$  is

- A. Always 0
- B. 0 if  $N \% B == 0$ , 1 otherwise
- C.  $N \% B$
- D.  $B - 1$



Solution. The following procedure gives minimum value of  $mx - mn$ ,

Assign 0<sup>th</sup> element of X to Y1

Assign 1<sup>st</sup> element of X to Y2

... Assign (B-1)<sup>th</sup> element of X to YB

Assign B<sup>th</sup> element of X to Y1 ...

In general assign x<sup>th</sup> element to  $(x \% B + 1)$ <sup>th</sup> array.

In this procedure the maximum size difference of the arrays is 1.

A. Always 0

B. 0 if  $N \% B == 0$ , 1 otherwise

C.  $N \% B$

D.  $B - 1$