

## 1D Arrays

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Array  $\longrightarrow$  Sequential collection of same type of data  
Integer Array  
String Array.

How to initialise ?

`int[] A = new int[5];`

$\swarrow$  Array of int       $\searrow$  Size of Array

$\swarrow$  used in java to create object.

NOTE: new will be covered in depth during Memory lecture.

How to access element in an array ?

`int[] A = new int[] { 1, 5, 4, 3, 10 };`

0 1 2 3 4

Note  $\longrightarrow$  index in java starts from 0

Tell me the value stored at 0<sup>th</sup> index

`System.out.println(A[0]);`

```
public class Main {  
    public static void main(String[] args) {  
        Scanner scanner = new Scanner(System.in);  
        int N = scanner.nextInt(); // Size of the array  
        int[] A = new int[N];  
        for (int i = 0; i < N; i++) {  
            A[i] = scanner.nextInt();  
        }  
        // {1, 2, 3}  
        // 0 1 2  
        for (int i = 0; i < N; i++) {  
            System.out.println(A[i]);  
        }  
    }  
}
```

How to take an array as input.

QUIZ:

Max index of array of size N is ?  $N-1$

QUIZ:

Given an array  $A = \{3, 4, 1, 5, 1\}$

what is sum of all elements

$\text{sum} = 14$

Q1> Take an integer array as input and print its sum.

$N = 5$

$A[] = \{1, 2, 3, 4, 5\}$

Output  $\longrightarrow 15$

```
static int sumArray (int[] A) {  
    int sum = 0;  
    // iterate through the array and add to sum  
    for (int i = 0; i < A.length; i++) {  
        sum += A[i];  
    }  
    return sum;  
}
```

Gives you no. of elements  
stored inside the given  $A[]$

$\text{int}[] A = \{1, 2, 3, 4, 5\}$

// How to call sumArray function in the main

`System.out.println (sumArray (A));`

## QUIZ

Given an array  $A = \{3, 4, 1, 5, 1\}$

what is max of all elements

ans = 5

Q2> Take an integer array as input and print its max

$N = 5$

$A[] = \{1, 2, 3, 4, 5\}$

Output  $\longrightarrow 5$

```
static int maxOfArray (int[] A) {
```

```
    int maxVal = 0;
```

```
    for (int i = 0; i < A.length; i++) {
```

```
        if (maxVal < A[i]) {
```

```
            maxVal = A[i];
```

```
        }
```

```
    }
```

```
    return maxVal;
```

```
}
```

$A[] = \{1, 2, 3, 4, 5\}$

maxVal

0

1

2

3

4

5

$\{1, 5, 2, 3, 4\}$

0

1

5

5

5

5

5

# QUIZ

what will be the output of the above code

N = 5

A = {-3, -7, -2, -10, -1}

maxVal 0 0 0 0 0 0

To fix the above issue.

Initialise max with 0<sup>th</sup> index value

A[0]

```
static int maxOfArray (int[] A) {
    int maxVal = 0;

    for (int i = 0; i < A.length; i++) {
        if (maxVal < A[i]) {
            maxVal = A[i];
        }
    }

    return maxVal;
}
```

N = 5

A = {-3, -7, -2, -10, -1}

maxVal -3 -3 -3 -2 -2 -1

```
static int maxOfArray (int[] A) {
    int maxVal = A[0];

    for (int i = 0; i < A.length; i++) {
        if (maxVal < A[i]) {
            maxVal = A[i];
        }
    }

    return maxVal;
}
```

Q3> Take an integer array as input and print its min

N = 5

A[] = { 1, 2, 3, 4, 5 }

Output → 1

```
public class Main {  
    static int minOfArray(int[] A){  
        int minVal = A[0];  
  
        for(int i = 0; i < A.length; i++){  
            if(minVal > A[i]){  
                minVal = A[i];  
            }  
        }  
        return minVal;  
    }  
    public static void main(String[] args) {  
        int[] A = {-1, 12, -13, 4, 3};  
        System.out.println(minOfArray(A));  
    }  
}
```

Break : 22 : 31

Q4> Take an  $A[N]$  as input.

Check whether  $k$  is present or not in array

$N = 5$

$A[] = \{1, 2, 3, 4, 5\}$

$k = 4$

Output  $\longrightarrow$  true

$N = 5$

$A[] = \{1, 2, 3, 4, 5\}$

$k = 10$

Output  $\longrightarrow$  false

```
static boolean findK (int[] A, int k) {  
    for (int i = 0; i < A.length; i++) {  
        if (A[i] == k) {  
            return true;  
        }  
    }  
    return false;  
}
```

$k = 1$   
 $\downarrow$   
 $\text{int[] } A = \{1, 1, 1, 1\}$   
true

Quiz:

Given  $A[] = \{3, 4, 1, 5, 1\}$ . What is frequency of 1

$\longrightarrow$  How many no. of time val == 1 is present in A

count = 2 or freq = 2

Q5> Take an  $A[N]$  as input.

Return the frequency of  $k$  in the array.

$N = 5$

$A[] = \{1, 2, 3, 4, 5\}$

$k = 1$

Output  $\longrightarrow 1$

```
static int freq (int[] A, int k) {  
    int freq = 0;  
    for (int i = 0; i < A.length; i++) {  
        if (A[i] == k) {  
            freq++;  
        }  
    }  
    return freq;  
}
```

$\{3, 4, 1, 5, 1\}$ .

$k = 1$   
 $\text{freq} = 2$



Q6> Take an  $A[N]$  as input.

Return the frequency count of the array

$N = 5$

$A[] = \{ \downarrow 1, \downarrow 2, \downarrow 3, \downarrow 4, \downarrow 5 \}$

Output  $\longrightarrow [1, 1, 1, 1, 1]$

$N = 7$

$A[] = \{ \downarrow 1, \downarrow 1, \downarrow 2, \downarrow 1, \downarrow 3, \downarrow 1, \downarrow 3 \}$

Output  $[4, 4, 1, 4, 2, 4, 2]$

Sol" at 22:57

```
static int[] freqOfArray (int[] A) {  
    int freq[] = new int[A.length];
```

```
    for (int i = 0 ; i < A.length ; i++) {  
        // freq of A[i] in A[]  
        freq[i] = freq(A, A[i]);  
    }
```

```
    return freq;
```

look for this func" in  
prev page.

$N = 7$

$A[] = \{ \downarrow 1, \downarrow 1, \downarrow 2, \downarrow 1, \downarrow 3, \downarrow 1, \downarrow 3 \}$

$freq[] = [\cancel{0}, \cancel{0}, \cancel{0}, \cancel{0}, \cancel{0}, \cancel{0}, \cancel{0}]$   
 $\quad \quad \quad 4 \quad 4 \quad 1 \quad 4 \quad 2 \quad 4 \quad 2$

Q7> Take an  $A[N]$  as input.  
check whether its strictly increasing.

$N = 5$

$A[] = \{1, 2, 3, 4, 5\}$

Output  $\longrightarrow$  true

$N = 7$

$A[] = \{1, 10, 11, 13, 20, 21\}$

Output  $\longrightarrow$  true

$N = 8$

$A[] = \{1, 2, 3, 3, 10, 30, 31, 35\}$

Output  $\longrightarrow$  false

$N = 5$

$A[] = \{5, 4, 3, 2, 1\}$

Output  $\longrightarrow$  false

```

static boolean strictlyIncreasing (int[] A) {
    for (int i=0; i < A.length-1; i++) {
        // curr A[i]
        // next A[i+1]
        if (A[i] >= A[i+1]) {
            return false;
        }
    }

    return true;
}

```

$N = 5$   
 $A[] = \{1, 2, 3, 4, 5\}$   
 $\downarrow$   
 $c \ n$

```

static boolean strictlyIncreasing (int[] A) {
    for (int i=0; i < A.length; i++) {
        // curr A[i]
        // next A[i+1]
        if (i+1 < A.length && A[i] >= A[i+1]) {
            return false;
        }
    }

    return true;
}

```