

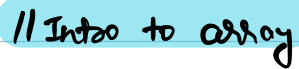


Today's agenda

- ↳ Intro to arrays
- ↳ Return sum of `arr[]` elements.
- ↳ Array with functions
- ↳ Swap 2 indexes.



AlgoPrep



1000 numbers?

Array

collection of variables.

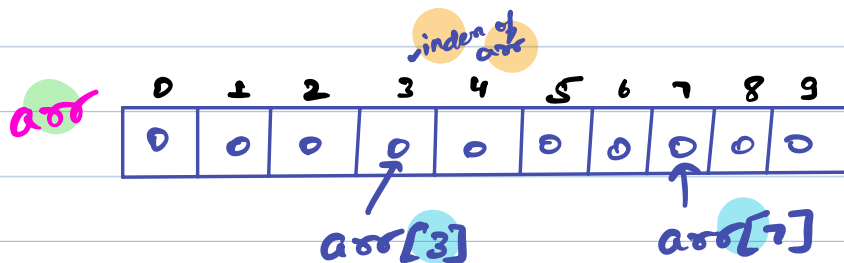
910 = 11

```
↳ type[] name = new type[size];
```

```
ex: int[] arr = new int[100];
```

Q) Create an array of size 10 named arr storing integers.

↳ `int[] arr = new int[10];`



// Input in array

Q) Create an array of length 5 with values 10 20 30 40 50
n=5



```
1 // "static void main" must be defined in a public class.
2 public class Main {
3     public static void main(String[] args) {
4         Scanner scn = new Scanner(System.in);
5         int n = scn.nextInt();
6
7         int[] arr = new int[n];
8
9         for(int i = 0; i < n; i++){
10             arr[i] = scn.nextInt();
11         }
12
13     }
14 }
```



stdin

5

10 20 30 40 50

→ initialize array on your own.

`int[] arr = {1, 2, 3, 4, 5};`

→ `arr.length` = no. of elements in array.

→ if `arr` is of length `n`,

1st index = 0

last index = `n-1`



Q) How to Print all the elements of arr.

Run Code

Untitled

Save

Java

Output: Finished

Clear Console

```
1 // "static void main" must be defined in a public class.
2 public class Main {
3     public static void main(String[] args) {
4         Scanner scn = new Scanner(System.in);
5         int n = scn.nextInt();
6
7         int[] arr = new int[n];
8         for(int i = 0; i < n; i++){
9             arr[i] = scn.nextInt();
10        }
11
12        for(int i = 0; i < n; i++){
13            System.out.print(arr[i]+" ");
14        }
15
16    }
17 }
18 }
```

Finished in 148 ms
1020304050

Finished in 175 ms
10 20 30 40 50

stdin

5
10 20 30 40 50

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Q) Sum of array

↳ Read an array of N length and Print the sum of all elements.

Ex: arr[4]: ⁰10 ¹-1 ²3 ³-7 → 5

Pseudocode

```
// "static void main" must be defined in a public class.
```

```
public class Main {
```

```
    public static void main(String[] args) {
```

```
        Scanner scn = new Scanner(System.in);
```

```
        int n = scn.nextInt();
```

```
        int[] arr = new int[n];
```

```
        for(int i = 0; i < n; i++){
            arr[i] = scn.nextInt();
        }
```

```
        int sum = 0;
```

```
        for(int i = 0; i < n; i++){
            sum = sum + arr[i];
        }
```

```
        System.out.println(sum);
```

```
    }
```

sum = 0

n = 4

arr[4]: ⁰10 ¹-1 ²3 ³-7

i	i < n	Sum
0	+	10
1	+	9
2	+	12
3	+	5
4	6 → exit	

T.C: $2n$
↓
 $O(n)$

S.C: $\frac{n}{2} + \frac{n}{2}$
↓
 $O(n)$

input & output is not your space



How arrays are actually stored?

```
int main() {  
    int n=10;  
    int[] arr = {10, 20, 30};
```

→ System.out.println(arr[2]);

3

main {

arr: #ref
n: 10

Stack

Heap

#ref
0 1 2
10 20 30



Break till 10:34 PM

AlgoPrep



Q) Swap the values of 2 variables.

$a = 10$ $b = 20$ \rightarrow $a = 20$ $b = 10$

// incorrect way

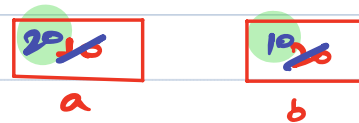
```
main() {  
    int a = 10;  
    int b = 20;  
    a = b;  
    → b = a;  
}
```



// correct way

```
main() {  
    int a = 10;  
    int b = 20;  
    int temp = a;  
    a = b;  
    → b = temp;  
}
```

temp → 10



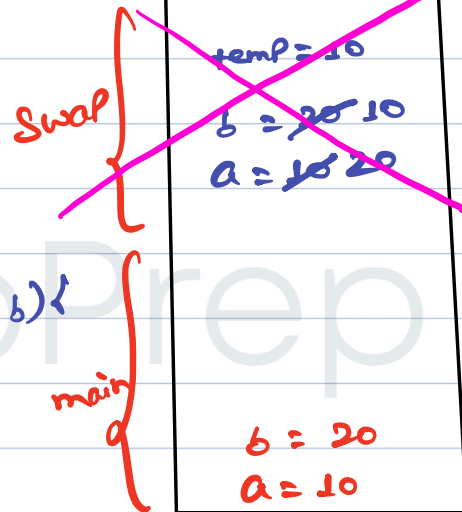


// function game

Quiz

```
main() {  
    int a = 10;  
    int b = 20;  
    Swap(a, b);  
    System.out.println(a); → 10  
    System.out.println(b); → 20  
}
```

```
        10      20  
        ↓      ↓  
Public & static void Swap(int a, int b) {  
    int temp = a;  
    a = b;  
    b = temp;  
}
```



↳ variables of 2 functions are not connected.



Quiz

main() {

int[] arr: {10, 20}

Swap(arr);
#ref

System.out.println(arr[0]); → 20

→ System.out.println(arr[1]); → 10

}

Heap

#ref	0	1
	10	20
	20	10

temp = 10

arr = #ref

Public static void swap(int[] arr) {

int temp = arr[0];

arr[0] = arr[1];

arr[1] = temp;

}

main

arr = #ref

Stack

↳ arrays across functions are connected.



Q) Swap indices

↳ Given array of length N and two indices $idx1$ and $idx2$, swap the element of those two indices.

Ex: $arr[5] : \{ 5, 15, 25, 35, 45 \}$
 $idx1 = 1 \quad idx2 = 3$

```
int temp = arr[idx1];  
arr[idx1] = arr[idx2];  
→ arr[idx2] = temp;
```

temp → 15

