**ASSIGNMENTS OF VECTOR**

# Q.1 Find duplicates in O(n) time and O(1) extra space

Given an array of **n** elements that contains elements from**0** to**n-1**, with any of these numbers appearing any number of times. Find these repeating numbers in **O(n)** and use only constant memory space.

**Note:**The repeating element should be printed only once.

**Example:**

***Input:****n=7 , array[]={1, 2, 3, 6, 3, 6, 1}****Output:****1, 3, 6****Explanation:****The numbers 1 , 3 and 6 appears more than once in the array.*

***Input :****n = 5 and array[] = {1, 2, 3, 4 ,3}****Output:****3****Explanation:****The number 3 appears more than once in the array.*

# Q.2 Pair with given Sum (Two Sum)

Given an array A[] of n numbers and another number x, the task is to check whether or not there exist two elements in A[] whose sum is exactly x.

**Examples:**

***Input:****arr[] = {0, -1, 2, -3, 1}, x= -2****Output:****Yes****Explanation:****If we calculate the sum of the output,1 + (-3) = -2*

***Input:****arr[] = {1, -2, 1, 0, 5}, x = 0****Output****: No*

# Q.3 Product of Array except itself

Given an array arr[] of n integers, construct a Product Array prod[] (of the same size) such that prod[i] is equal to the product of all the elements of arr[] except arr[i].

**Note:**Solve it **without the division operator in O(n) time**.

Example:

**Input:** arr[] = {10, 3, 5, 6, 2}**Output:** prod[] = {180, 600, 360, 300, 900}

3 \* 5 \* 6 \* 2 product of other array

elements except 10 is 180

10 \* 5 \* 6 \* 2 product of other array

elements except 3 is 600

10 \* 3 \* 6 \* 2 product of other array

elements except 5 is 360

10 \* 3 \* 5 \* 2 product of other array

elements except 6 is 300

10 \* 3 \* 6 \* 5 product of other array

elements except 2 is 900

**Input:** arr[] = {1, 2, 3, 4, 5}**Output:** prod[] = {120, 60, 40, 30, 24 }

2 \* 3 \* 4 \* 5 product of other array

elements except 1 is 120

1 \* 3 \* 4 \* 5 product of other array

elements except 2 is 60

1 \* 2 \* 4 \* 5 product of other array

elements except 3 is 40

1 \* 2 \* 3 \* 5 product of other array

elements except 4 is 30

1 \* 2 \* 3 \* 4 product of other array

elements except 5 is 24

# Q.4 Largest Sum Contiguous Subarray

Given an array **arr[]** of size **N**.The task is to find the sum of the contiguous subarray within a **arr[]** with the largest sum.

**Example:**

***Input:****arr = {-2,-3,4,-1,-2,1,5,-3}****Output:****7****Explanation:****The subarray {4,-1, -2, 1, 5} has the largest sum 7.*

***Input:****arr = {2}****Output:****2****Explanation:****The subarray {2} has the largest sum 2.*

***Input:****arr = {5,4,1,7,8}****Output:****25****Explanation:****The subarray {5,4,1,7,8} has the largest sum 25.*

*------------------\*\*\*\*\*-----------------*