

.Net Assignment-1

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1. You are given a number **N**. You need to print the pattern for the given value of **N**.

for **N = 2** the pattern will be

2 2 1 1

2 1

for **N = 3** the pattern will be

3 3 3 2 2 2 1 1 1

3 3 2 2 1 1

3 2 1

2. Given the first 2 terms **A1** and **A2** of an Arithmetic Series. Find the **Nth** term of the series.

Input:

A1=2

A2=3

N=4

Output:

5

Explanation:

The series is 2,3,4,5,6....

Thus, 4th term is 5.

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3. Given **N**, count all '**a**'(≥ 1) and '**b**'(≥ 0) that satisfy the condition **a³ + b³ = N**.

Input:

N = 9

Output:

2

Explanation:

There are two solutions: (a=1, b=2)

and (a=2, b=1).

4. Find all pairs (sets) of prime numbers (**p,q**) such that **p*q ≤ n**, where **n** is a given number.

Input: n = 4

Output: 2 2

Explanation: Pair (2, 2) which has both prime numbers as well as satisfying the condition

$2*2 \leq 4$.

5. Consider a sample space **S** consisting of all perfect squares starting from 1, 4, 9 and so on. You are given a number **N**, you have to output the number of integers less than **N** in the sample space **S**.

Input :

N = 9

Output: 2

Explanation: 1 and 4 are the only Perfect Squares less than 9. So, the Output is 2.

6. Given two rectangles, find if the given two rectangles overlap or not. A rectangle is denoted by providing the x and y coordinates of two points: the left top corner and the right bottom corner of the rectangle. Two rectangles sharing a side are considered overlapping. (L1 and R1 are the extreme points of the first rectangle and L2 and R2 are the extreme points of the second rectangle).

Input:

L1=(0,10)

R1=(10,0)

L2=(5,5)

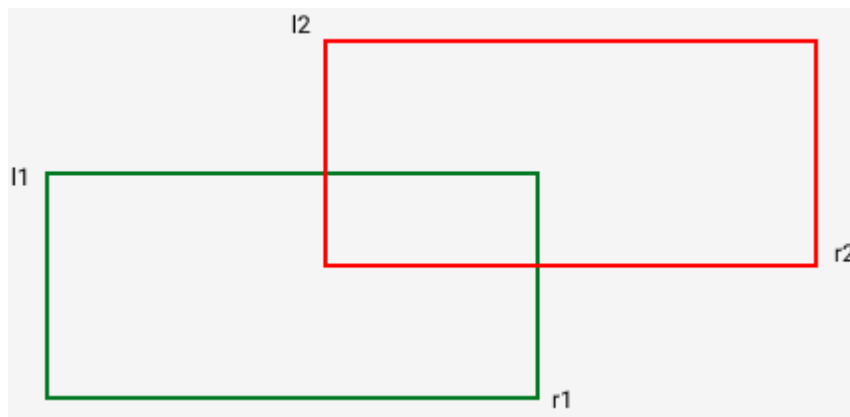
R2=(15,0)

Output:

1

Explanation:

The rectangles overlap.



7. For an integer **N** find the number of trailing zeroes in **N!**.

Input: N = 5

Output: 1

Explanation: $5! = 120$ so the number of trailing zero is 1.

8. Given four different points in space. Find whether these points can form a square or not.

Input:

x1 = 20, y1 = 10, x2 = 10, y2 = 20,

x3 = 20, y3 = 20, x4 = 10, y4 = 10

Output:

Yes

Explanation:

The points (20,10), (10,20), (20,20), (10,10) forms a square.

9. You have given a list of q queries and for every query, you are given an integer N . The task is to find how many numbers (less than or equal to N) have the number of divisors exactly equal to 3.

Input:

$q = 1$

$\text{query}[0] = 6$

Output:

1

Explanation:

There is only one number 4 which has exactly three divisors 1, 2 and 4 and less than equal to 6.

10. Given two positive numbers X and Y , check if Y is a power of X or not.

Input: $X = 2, Y = 8$

Output: 1

Explanation:

2 raised to 3 is equal to 8

11. Calculate the angle between the hour hand and minute hand.

Note: There can be two angles between hands; we need to print a minimum of two. Also, we need to print the **floor** of the final result angle. For example, if the final angle is 10.61, we need to print 10.

Input:

$H = 9, M = 0$

Output:

90

Explanation:

The minimum angle between hour and minute hand when the time is 9 is 90 degrees.

12. You are given an array A of size N . You need to print elements of A in alternate order (starting from index 0).

Input:

$N = 4$

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

Output:

1 3

13. Sort the array $A[]$ of size N , delete all the duplicate elements from $A[]$.

Note: Don't use set or HashMap to solve the problem.

Input:

$N = 3$

Array = $\{1, 2, 2\}$

Output: 1 2

14. Given an unsorted array **arr[]** of **n** positive integers. Find the number of triangles that can be formed with three different array elements as lengths of three sides of triangles.

Input:

n = 3

arr[] = {3, 5, 4}

Output:

1

Explanation:

A triangle is possible

with all the elements 5, 3 and 4.

15. Given an array **A[]** of **N** positive integers. The task is to find the maximum of **j - i** subjected to the constraint of **A[i] ≤ A[j]** and **i ≤ j**.

Input:

N = 9

A[] = {34, 8, 10, 3, 2, 80, 30, 33, 1}

Output:

6

Explanation:

In the given array **A[1] < A[7]**

satisfying the required

condition(**A[i] ≤ A[j]**) thus giving

the maximum difference of **j - i**

which is 6(7-1).



16. Given an array **A[]** of positive integers of size **N**, where each value represents the number of chocolates in a packet. Each packet can have a variable number of chocolates. There are **M** students, the task is to distribute chocolate packets among **M** students such that :
1. Each student gets **exactly** one packet.
 2. The difference between maximum number of chocolates given to a student and minimum number of chocolates given to a student is minimum.

Input:

N = 8, **M** = 5

A = {3, 4, 1, 9, 56, 7, 9, 12}

Output: 6

Explanation: The minimum difference between

maximum chocolates and minimum chocolates

is 9 - 3 = 6 by choosing following **M** packets :

{3, 4, 9, 7, 9}.

17. Given an unsorted array **Arr** of size **N** of positive integers. **One number 'A'** from set {1, 2, ...N} is missing and **one number 'B'** occurs twice in the array. Find these two numbers.

Input:

N = 3

Arr[] = {1, 3, 3}

Output: 3 2

Explanation: Repeating number is 3 and

The smallest positive missing number is 2.

18. You are given an array **Arr** of size **N**. You need to find **all pairs** in the array that sum to a number **K**. If no such pair exists then output will be -1. The elements of the array are **distinct** and are in **sorted** order.

Note: (a,b) and (b,a) are considered the same. Also, an element cannot pair with itself, i.e., (a,a) is invalid.

Input:

n = 7

arr[] = {1, 2, 3, 4, 5, 6, 7}

K = 8

Output: 3

Explanation:

We find 3 such pairs that

sum to 8 (1,7) (2,6) (3,5)

19. The cost of stock on each day is given in an array **A[]** of size **N**. Find all the days on which you buy and sell the stock so that in between those days your profit is maximum.

Note: There may be multiple possible solutions. Return any one of them. Any correct solution will result in an output of 1, whereas wrong solutions will result in an output of 0.

Input:

N = 7

A[] = {100,180,260,310,40,535,695}

Output:

1

Explanation:

One possible solution is (0 3) (4 6)

We can buy stock on day 0,

and sell it on 3rd day, which will

give us maximum profit. Now, we buy

stock on day 4 and sell it on day 6.

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

Input:

n = 5

nums[] = {10, 3, 5, 6, 2}

Output:

180 600 360 300 900

Explanation:

For $i=0$, $P[i] = 3*5*6*2 = 180$.

For $i=1$, $P[i] = 10*5*6*2 = 600$.

For $i=2$, $P[i] = 10*3*6*2 = 360$.

For $i=3$, $P[i] = 10*3*5*2 = 300$.

For $i=4$, $P[i] = 10*3*5*6 = 900$

