ESSAY QUESTIONS

1. A Pythagorean Triplet is a set of three integers m, n and o such that $m^2+n^2=o^2.$

   Given a limit A, generate all Pythagorean triples with value smaller that given limit A?

   Sample Input:

   A=12

   Sample Output:

   (3,4,5), (6,8,10)

   Test cases:

   1. A= 10
   2. A= -10
   3. A= #
   4. A=1.5
   5. A=25

2. Ask the user to enter any positive integer. Compile and Execute the C program to check whether the number is ARM Strong number or not.

   Sample Input:

   Enter the number to check for strong number: 145

   Sample Output:

   Factorial of 5 is =120

   Factorial of 4 is =24

   Factorial of 1 is =1

   Sum of the factorial of the a given number i145 is =145

   145 is the strong number.

   Test Cases:

   1. 153
   2. 26

3. 40585
4. 160
5. 59.5

3. Find the year of the given anniversary is leap year or not. If leap year then print the next anniversary, if not leap year then print the previous anniversary.

Sample Input:

Enter the Date: 04/11/1946

Sample Output:

Given Anniversary Year: Non Leap Year.

Anniversary Date: 04/11/1946

Test Cases:

1. 04/11/19.47
2. 11/15/1936
3. 31/45/1996
4. 64/09/1947
5. 00/00/2000

4. Write a program to print n prime numbers then find the nth Prime number

Sample Input:

N = 3

Sample Output:

3rd Prime number is 5

3 prime numbers after 5 are: 7, 11, 13

Test cases:

1. N = P
2. N = 0
3. N = -4
4. N = 11
5. N = 7.2

5. Write a program that would sort a list of names in alphabetical order Ascending or Descending, choice get from the user?

Sample Input:

Banana

Carrot

Radish

Apple

Jack

Order(A/D) : A

Sample Output:

Apple

Banana

Carrot

Jack

Radish

6. Find the Mean, Median, Mode of the array of numbers?

Sample Input:
Array of elements = {16, 18, 27, 16, 23, 21, 19}
Sample Output:
Mean = 20
Median = 19
Mode = 16
Test cases:

1. Array of elements = {26, 28, 37, 26, 33, 31, 29}

2. Array of elements = {1.6, 1.8, 2.7, 1.6, 2.3, 2.1, .19}

3. Array of elements = {0, 160, 180, 270, 160, 230, 210, 190, 0}

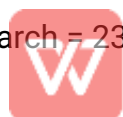4. Array of elements = {200, 180, 180, 270, 160, 270, 270, 190, 200}

5. Array of elements = {100, 100, 100, 100, 100, 100, 100, 100, 100}

7. Write a program to search the given element using binary search method and display its position in a linear array.

Sample Input;:

Array of elements = {16, 18, 27, 16, 23, 21, 19}

Element to search = 23

Sample Output:
Given element 23 is found at 5 th position

8. Find the Mth maximum number and Nth minimum number in an array and then find the sum of it and difference of it.

Sample Input:

Array of elements = {14, 16, 87, 36, 25, 89, 34}

M = 1

N = 3

Sample Output:

1st Maximum Number = 89

3rd Minimum Number = 25

Sum = 114

Difference = 64

   Test cases:

   1. {16, 16, 16 16, 16}, M = 0, N = 1

   2. {0, 0, 0, 0}, M = 1, N = 2

   3. {-12, -78, -35, -42, -85}, M = 3 , N = 3

   4. {15, 19, 34, 56, 12}, M = 6 , N = 3

   5. {85, 45, 65, 75, 95}, M = 5 , N = 7

9. Bubble sort is a straightforward sorting algorithm that checks and swaps elements if they are not in the intended order. It compares two adjacent elements to find which one is greater or lesser and switches them based on the given condition until the final place of the element is found. Write a Program to sort the given numbers in an array using bubble sort.

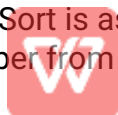Sample Input:
Enter the number of Elements: 5

Enter the Elements:

-2 45 0 11 -9

Output:

-9 -2 0 11 45

10. The selection Sort is assaulting algorithm that works bye buy a finding the smallest number from the array and then placing it of the first position. the

next array that is to be traversed will start from index next to the position where the smallest number is placed.Write a Program to sort the given numbers in an array using selection sort.

Sample Input:
Enter the number of Elements: 5

Enter the Elements:

47 34 21 89 12

Output:

12 21 34 47 89

11. Write a C program for Inserting an element to the array at the specified index.

Sample Input:
Enter the number of Elements: 5

Enter the Elements:

47 34 21 89 12

Element to be inserted 100

At position: 4

Output:

12 21 34 100 47 89

12. Write a C program to take two arrays as input and try to merge or concatenate two arrays and store the result in third array.
Sample Input:

Enter number of Element in array A: 7

Enter elements: 1 2 3 4 5 6 7

Enter number of Element in array B: 5

11 22 33 44 55

Output:

Merged in array C

1 2 3 4 5 6 7 11 22 33 44 55

13. Write a program in C such that the program will read the elements of a one-dimensional array, then compares the elements and finds which are the largest two elements in a given array.

Expected Input and Output:

1. Finding Largest 2 numbers in an array with unique elements:
If we are entering 5 elements (N = 5), with array element values as 2,4,5,8 and 7 then,
The FIRST LARGEST = 8
THE SECOND LARGEST = 7

14. kth smallest element is the minimum possible n such that there are at least k elements in the array <= n. In other words, if the array A was sorted, then A[k - 1] (k is 1 based, while the arrays are 0 based)C Program for finding the desired kth smallest element in an array.

Sample Input:
Enter the number of Elements: 5

Enter K = 3
Enter the Elements:
47 34 21 89 12

Output:
34

15. Write a program in C to count the number of vowels and consonants in a string using a pointer.
Test Data :
Input a string: string
Expected Output :

Number of vowels : 1
Number of constant : 5
Test cases:

1. HYPOTHECATION

2. MATRICULATION

3. MANIPULATION

4. SEDIMENTATION

5. EXPERIMENTATION

16. Write a program in C to find the sum of the series 1!/1+2!/2+3!/3+4!/4+5!/5 using the function.
Expected Output :

The sum of the series is : 34

17. Write a program using function to calculate the simple interest. Suppose the customer is a senior citizen. He is being offered 12 percent rate of interest; for
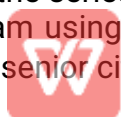
all other customers, the ROI is 10 percent.

Sample Input:

      Enter the principal amount: 200000

      Enter the no of years: 3

      Is customer senior citizen (y/n): n

Sample Output:

      Interest: 60000

  Test Cases:

 1. Principal: 2000 , Years: 0

 2. Principal: 20000 , Years: -2

 3. Principal: -2000 , Years: 2

 4. Principal: 2 , Years: 2000

 5. Principal: 0 , Years: 5

18. Write a program to find the Mean of first 'N odd numbers, even numbers, square numbers and cube numbers (using funtion)

Sample Input:

Enter N value : 5

Case: 2

Sample Output:

Mean of first 5 even numbers: 6

Test cases:

1. N = 16

2. N = -8

3. N = 0

4. N = -10.01

5. N = 11.22

19. Write a program in C to convert decimal number to binary number using the function.

 Test Data :

 Input any decimal number : 65

Expected Output :

The Binary value is : 1000001
Test cases:
1. 111
2. 15.2
3. 0
4. B12
5. 1A.2

20. Write a program to enter the marks of a student in four subjects. Then calculate the total and aggregate, display the grade obtained by the student. If the student scores an aggregate greater than 75%, then the grade is Distinction. If aggregate is 60>= and <75, then the grade is First Division. If aggregate is 50 >= and <60, then the grade is Second Division. If aggregate is 40>= and <50, then the grade is Third Division. Else the grade is Fail.
Sample Input & Output:
Enter the marks in python: 90
Enter the marks in c programming: 91
Enter the marks in Mathematics: 92
Enter the marks in Physics: 93
Total= 366
Aggregate = 91.5
DISTINCTION
        Test cases:
            a) 18, 76,93,65
            b) 73,78,79,75
            c) 98,106,120,95
            d) 96,73, -85,95
            e) 78,59.8,76,79

21. Write a C programming to find out maximum and minimum of some values using function which will return an array.
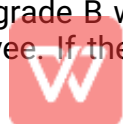Test Data :
Input 5 values
25
11
35
65
20
Expected Output :

Number of values you want to input: Input 5 values
Minimum value is: 11
Maximum value is: 65

22. In an organization they decide to give bonus to all the employees on New Year. A 5% bonus on salary is given to the grade A workers and 10% bonus on salary to the grade B workers. Write a program to enter the salary and grade of the employee. If the salary of the employee is less than $10,000 then the

employee gets an extra 2% bonus on salary Calculate the bonus that has to be given to the employee and print the salary that the employee will get.

Sample Input & Output:

Enter the grade of the employee: B

Enter the employee salary: 50000

Salary=50000

Bonus=5000.0

Total to be paid:55000.0

Test cases:

1. Enter the grade of the employee: A

   Enter the employee salary: 8000

2. Enter the grade of the employee: C

   Enter the employee salary: 60000

3. Enter the grade of the employee: B

   Enter the employee salary: 0

4. Enter the grade of the employee: 38000

   Enter the employee salary: A

5. Enter the grade of the employee: B

   Enter the employee salary: -8000

23. Write a program in C to check armstrong and perfect numbers using the function.

Test Data :

Input any number: 371

Expected Output :

The 371 is an Armstrong number.
The 371 is not a Perfect number.

24. Write a program in C to check whether two given strings are an anagram.

Test Data :
Input the first String : spare
Input the second String : pears

Expected Output :

spare and pears are Anagram.
Test cases:

    1. X = below , N = elbow

    2. X = arc , N = @rc

    3. X = study , N = dusty

    4. X = laying , N = lying

    5. X = abc, N = bac

25. Write a program to enter the marks of n student in four subjects using structure. Then calculate the total and aggregate, display the grade obtained by the student. If the student scores an aggregate greater than 75%, then the grade is Distinction. If aggregate is 60>= and <75, then the grade is First Division. If aggregate is 50 >= and <60, then the grade is Second Division. If aggregate is 40>= and <50, then the grade is Third Division. Else the grade is Fail.

Sample Input & Output:
Enter the marks in python: 90
Enter the marks in c programming: 91
Enter the marks in Mathematics: 92
Enter the marks in Physics: 93
Total= 366
Aggregate = 91.5
DISTINCTION

    Test cases:
        1.   18, 76,93,65
        2.   73,78,79,75
        3.   98,106,120,-95
        4.   96,73, AA,95

        5. 78,59.8,**,79

2.

26. Mr. Johnson would like to know how many As, Bs, Cs, Ds, and Fs his students received on a test. He has n students who took the test. He would like to enter the student number and the number grade for the test for each student using structure. Develop the solution to print out each student's student number, number grade and the total number of As, Bs, Cs, Ds, and Fs. His grading scale is as follows: 90−100 is an A, 78−89 is a B, 65− 77 is a C, 50−64 is a D, and below 50 is an F.

Sample Input :

Enter No.Students: 1

Enter student 1 Number , Grade : 2001, A

Sample Output:

Student 1 details:

Number : 2001

Grade : A

Total no. A: 1, B:0, c=0, D=0, F=0,

Test Cases:

No.Student :4 (Any details of student Number , Grade)

No.Student: 5

No.Student: 1(2004, 28)

No.Student: A

No.Student: 1(xxx, A)