Programs for Record work 2017-2018

1) Write a program to check if a given number is Krishnamoorthy Number
2) Write a program to Prime Factorise a given number
3) Write a program to check if a given number is Smith Number
4) Write a program to find whether the date entered from the keyboard is valid or not.

Input consists of the month number (MM), the day of the month DD and the year YYYY.

5) Write a program to calculate and print the corresponding day of the year (in the range 1 to 366)

   Example :

   Input: Month number: 05

   Day 03

   Year 1996

   Output: Corresponding day of the year is 124

6) Write a program to check if a given number is Automorphic Number
7) Write a program to check if a given number is Karprekar Number
8) Write a program to compute the LCM and HCF of two given numbers.
9) A simple encryption system uses a shifting process to hide a message. The value of the shift can be in the range 1 to 26. For example a shift of 7 means that A = U, B = V, C = W, etc., *i.e.*,

Text: A B C D E F G H I J K L M N 0 P Q R S T U V W X Y Z

Code: U V W X Y Z A B C D E F G H I J K L M N 0 P Q R S T

First an extra space is added to the end of the string. To make things a little more difficult, spaces within the original text are replaced with QQ before the text is encrypted. Double Q (QQ) was selected because no English word ends in Q or contains QQ.

Additionally the coded message is printed in blocks of six characters separated by spaces. The last block might not contain six characters. Write a program that takes the coded text (less than 100 characters), the shift value and prints the decoded original text. Your program must reject any non-valid value for shift and display an error message "INVALID SHIFT VALUE." Assume all characters are upper case. Test your program for the following data and some data that you have coded, using the rules given above:

SAMPLE DATA:

INPUT

CODED TEXT "UHINBY LKKQCH HYLKK"

SHIFT 7

OUTPUT

DECODED TEXT ANOTHER WINNER

INPUT

CODED TEXT "RUIJGG EVGGBK SAGG"

SHIFT 11

OUTPUT

DECODED TEXT BEST OF LUCK

INPUT

CODED TEXT "DKSMMW NAMMUK QMM"

SHIFT 29

OUTPUT

INVALID SHIFT VALUE.

10. A new advanced Operaing System, incorporating the latest hi-tech features has been designed by Opera Computer Systems.

The task of generating copy protection codes to prevent software piracy has been entrusted to the Security Department.

The Security Department has decided to have codes containing a jumbled combination of alternate uppercase letters of the alphabet starting from A upto K (Namely among A,C,E,G,I,K). The code may or may not be in the consecutive series of alphabets.

Each code should not exceed 6 characters and there should be no repetition of characters. If it exceeds 6 Characters, display an appropriate error message.

Write a program to input a code and its length. At the first instance of an error display “Invalid!” stating the appropriate reason. In case of no error, display the message “ Valid!”

Test your program for the following data and some random data.

SAMPLE DATA

INPUT

N = 4

ABCE

OUTPUT

Invalid! Only alternate letters permitted!

INPUT

N =4

AcIK

OUTPUT

Invalid! Only uppercase letters permitted!

INPUT

N =4

AAKE

OUTPUT

Invalid! Repetition of characters not permitted!

INPUT

N =7

OUTPUT

Error ! Length of string should not exceed 6 characters!

INPUT

N =4

AEGIK

OUTPUT

Invalid! String length not the same as specified !

INPUT

N =3

ACE

OUTPUT

valid!

INPUT

N =5

GEAIK

OUTPUT

valid!

11. A prime palindrome integer is a positive integer (without leading zeros) which is prime as well as a palindrome. Given two positive integers m and n, where m < n, write a program to determine how many prime-palindrome integers are there in the range between m and n (both inclusive) and output them.
The input contains two positive integers m and n where m < 3000 and n < 3000. Display the number of prime palindrome integers in the specified range along with their values in the format specified below:

Test your program with the sample data and some random data:

Example 1:
INPUT: m=100
N=1000

OUTPUT: The prime palindrome integers are:
101,131,151,181,191,313,351,373,383,727,757,787,797,919,929
Frequency of prime palindrome integers: 15

Example 2:

INPUT:

M=100

N=5000

OUTPUT: Out of range

12. Write a program to Bubble Sort the given 1D array

13. Write a program to perform Selection Sort on the given 1D array
14. Write a program to perform Binary Search on the given 1D array
15. Write a program to perform Binary Search on the given 1D array using recursion
16. Write a program to print Fibonacci series upto a given number(Recursion)
17. Write a program to print HCF of the given 2 numbers (Recursion)
18. Write a program to convert a given Decimal number to Binary
19. Write a program to accept a sentence which may be terminated by either ',', '?' or '!' only. Any other character may be ignored. The words may be separated by more than one blank space and are in upper case.

    Perform the following tasks:

    a) Accept the sentence and reduce all extra blank spaces between two words to a single blank space.

    b) Accept a word from the user which is a part of the sentence along with its position number and delete the word and display the sentence

    Example 1:

    INPUT: A MORNING WALK IS A IS BLESSING FOR THE WHOLE DAY.

    WORD TO BE DELETED: IS

    WORD POSITION IN THE SENTENCE: 6

    OUTPUT:A MORNING WALK IS A BLESSING FOR THE WHOLE DAY.

    Example 2:

    INPUT: AS YOU SOW, SO SO YOU REAP

    WORD TO BE DELETED: SO

    WORD POSITION IN THE SENTENCE: 4

    OUTPUT:AS YOU SOW, SO YOU REAP

Example 3:

INPUT: STUDY WELL ##

OUTPUT:INVALID INPUT

20. Given two positive numbers M and N, such that M is between 100 and 10000 and N is less than 100. Find the smallest integer that is greater than M and whose digits add up to N. For example, if M=100 and N=11, then the smallest integer greater than 100 whose digits add up to 11 is 119. Write a program to accept the numbers M and N from the user and print the smallest required number whose sum of all its digits is equal to N. Also, print the total number of digits present in the required number. The program should check for the validity of the inputs and display an appropriate message for an invalid input. Test your program with some sample data and some random data:

Example 1: INPUT : M= 100 N=11 OUTPUT: The required number is= 119 Total number of digits=3
Example 2 INPUT: M= 1500 N=25 OUTPUT: The required number is =1699 Total number of digits=4
Example 3 INPUT: M= 99 N=11 OUTPUT: INVALID INPUT Example 4 INPUT: M= 112 2 N=130

OUTPUT: INVALID INPUT

21. Write a program to declare a square matrix A[][] of order M x M where 'M' is the number of rows and the number of columns, such that M must be greater than 2 and less than 10. Accept the value of M as user input. Display an appropriate message for an invalid input. Allow the user to input integers into the matrix. Perform the following tasks:

a) Display the original matrix.
b) Rotate the matrix 90º clockwise as shown below:

Original matrix	Rotated matrix
1 2 3	7 4 1
4 5 6	8 5 2
7 8 9	9 6 3

c) Find the sum of the elements of the four corners of the matrix. Test your program for the following data and some random data:

Example 1:
INPUT :
M=3
3 4 9
2 5 8
1 6 7
OUTPUT:

ORIGINAL MATRIX
3 4 9
2 5 8
1 6 7
MATRIX AFTER ROTATION
1 2 3
6 5 4
7 8 9
Sum of the corner elements= 20
Example 2:
INPUT : M=4
1 2 4 9
2 5 8 3
1 6 7 4
3 7 6 5
OUTPUT: ORIGINAL MATRIX
1 2 4 9
2 5 8 3
1 6 7 4
3 7 6 5
MATRIX AFTER ROTATION
3 1 2 1
7 6 5 2
6 7 8 4
5 4 3 9 Sum of the corner elements= 18
EXAMPLE 3. INPUT : M = 14 OUTPUT: SIZE OUT OF RANGE

22. Write a program to accept a sentence which may be terminated by either '.' Or '?' only. The words are to be separated by a single blank space. Print an error message if the input does not terminate with '.' Or '?'. You can assume that no word in the sentence exceeds 15 characters, so that you get a proper formatted output.

Perform the following tasks:

i) Convert the first letter of each word to uppercase.

ii) Find the number of vowels and consonants in each word and display them with proper heading along with the words. Test your program with the following inputs:

Example 1 INPUT : Intelligence plus character is education.

OUTPUT: Intelligence plus character is education.

Word	Vowels	Consonants
Intelligence	5	7
Plus	1	3
Character	3	6

Is	1	1
Education	5	4

23. A Circular Prime is a prime number that remains prime under cyclic shifts of its digits. When the leftmost digit is removed and replaced at the end of the remaining string of digits, the generated number is still prime. The process is repeated until the original number is reached again. A number is said to be prime if it has only two factors 1 and itself.

Example; 131 311 113 Hence 131 is circular prime
Accept a positive number N and check whether it is circular prime or not. The new numbers formed after the shifting of the digits should also be displayed.
Test your program with the following data and some random data:
Example 1
INPUT : N= 197
OUTPUT: 197 971 719 197 IS A CIRCULAR PRIME
Example 2 I
NPUT: N=1193 OUTPUT: 1193 1931 9311 3119 1193 IS A CIRCULAR PRIME
Example 3 INPUT: 29 OUTPUT: 29 92 29 IS NOT A CIRCULAR PRIME

24. Write a program to accept a sentence which may be terminated by either '.', '?' or '!' only. The words may be separated by more than one blank space and are in UPPER CASE. Perform the following tasks:

a) Find the number of words beginning an ending with a vowel.
b) Place the words which begin and with a vowel at the beginning, followed by the remaining words as they occur in the sentence.
Test your program with the sample data and some random data:
Example 1
INPUT : ANAMIKA AND SUSAN ARE NEVER GOING TO QUARREL ANYMORE.
OUTPUT: NUMBER OF WORDS BEGINNING AND ENDING WITH A VOWEL = 3
ANAMIKA ARE ANYMORE AND SUSAN NEVER GOING TO QUARREL
Example 2
INPUT : YOU MUST AIM TO BE A BETTER PERSON TOMORROW THAN YOU ARE TODAY. OUTPUT: NUMBER OF WORDS BEGINNING AND ENDING WITH A VOWEL = 2
A ARE YOU MUST AIM TO BE BETTER PERSON TOMMORROW THAN YOU TODAY
Example 3
INPUT : LOOK BEFORE YOU LEAP.

OUTPUT: NUMBER OF WORDS BEGINNING AND ENDING WITH A VOWEL = 2
A ARE YOU MUST AIM TO BE BETTER PERSON TOMORROW THAN YOU TODAY
Example 4
INPUT : HOW ARE YOU@
OUTPUT: INVALID INPUT

25. A Composite Magic number is a positive integer which is composite as well as a magic number. Composite number : A composite number is a number which has more than 2 factors.

For example :- 10
Factors are : 1,2,5,10.
Magic number : A magic number is a number in which the eventual sum of the digits is equal to 1.
For example:- 28 = 2+ 8 =10 = 1+0=1
Accept 2 positive integers m and n, where m is less than n as user input. Display the number of composite magic integers that are in the range between m and n (both inclusive) and output them along with the frequency, in the format specified below.
Test your program with the sample data and some random data:
Example 1: INPUT: m=10 n=100
OUTPUT: THE COMPOSITE MAGIC INTEGERS ARE : 10,28,46,55,64,82,91,100
FREQUENCY OF COMPOSITE MAGIC INTEGERS IS :8
Example 2:
INPUT: m=1200 n=1300
OUTPUT: THE COMPOSITE MAGIC INTEGERS ARE :
1207,1216,1225,1234,1243,1252,1261,1270,1288
FREQUENCY OF COMPOSITE MAGIC INTEGERS IS :9
Example 3:
INPUT: m=120 n=99 OUTPUT: INVALID INPUT

26. An ISBN (International Standard Book Number) is a ten digit code which uniquely identifies a book. The first nine digits represent the Group, Publisher and Title of the book and the last digit is used to check whether ISBN is correct or not. Each of the first nine digits of the code can take a value between 0 and 9. Sometimes it is necessary to make the last digit equal to ten; this is done by writing the last digit of the code as X. To verify an ISBN, calculate 10 times the first digit, plus 9 times the second digit, plus 8 times the third and so on until we add 1 time the last digit. If the final number leaves no remainder when divided by 11, the code is a valid ISBN.

For example :

1. 0201103311 = 10*0 + 9 *2 + 8*0 +7 *1 + 6 * 1 + 5 * 0 + 4 * 3 + 3 * 3 + 2 * 1 + 1 * 1 = 55 Since 55 leaves no remainder when divisible by 11, hence it is a valid ISBN.
2. 007462542X = 10*0 + 9 *0 + 8*7 +7 *4 + 6 *6 + 5 *2 + 4 *5 + 3 * 4 + 2 *2 + 1 * 10 = 176 Since 176 leaves no remainder when divisible by 11, hence it is a valid ISBN.
3. 0112112425 = 10*0 + 9 *1 + 8*1 +7 *2 + 6 * 1 + 5 * 1 + 4 *2 + 3 * 4 + 2 *2 + 1 *5 =71
   Since 55 leaves no remainder when divisible by 11, hence it is a valid ISBN.
   Design a program to accept a ten digit code from the user. For an invalid input, display an appropriate message. Verify the code for its validity in the format specified below: Example 1
   INPUT CODE : 0201530821
   OUPUT: SUM =99
   LEAVES NO REMAINDER – VALID ISBN CODE
   Example 2
   INPUT CODE: 035680234 OUTPUT: INVALID INPUT
   Example 3
   INPUT CODE : 0231428031 OUPUT: SUM =122 LEAVES REMAINDER – INVALID ISBN
   CODE

27. Write a program to declare a square matrix A[][] of order (M x M) where M is the number of rows and the number of columns such that M must be greater than 2 and less than 20. Allow the user to input integers into this matrix. Display the appropriate error message for an invalid input.

Perform the following tasks:
a) Display the input matrix
b) Create a mirror image of the inputted matrix
c) Display the mirror image matrix
Test your program for the following data and some random data:
Example 1 INPUT : M = 3
4 16 12
8 2 14
6 1 3
OUTPUT :
ORIGINAL MATRIX
4 16 12
8 2 14
6 1 3
MIRROR IMAGE MATRIX
12 16 4
14 2 8

3 1 6
Example 2
INPUT : M=22 OUTPUT : SIZE OUT OF RANGE

28. A palindrome is a word that may be read the same way in either direction. Accept a sentence in UPPERCASE which is terminated by either ".", "?", or "!". Each word of the sentence is separated by a single blank space.

Perform the following tasks:
a) Display the count of palindromic words in the sentence.
b) Display the palindromic words in the sentence
Example of palindromic words: MADAM, ARORA, NOON
Test your program with the sample data and some random data:
Example 1 I
NPUT : MOM AND DAD ARE COMING AT NOON.
OUTPUT : MOM DAD NOON
NUMBER OF PALINDROMIC WORDS : 3
Example 2 INPUT : NITIN ARORA USES LIRIL SOAP.
OUTPUT : NITIN ARORA LIRIL
NUMBER OF PALINDROMIC WORDS : 3
Example 3 INPUT : HOW ARE YOU? OUTPUT : NO PALINDROMIC WORDS