Program Set 9

Dates: 16.01.2023 – 20.01.2023

1. Declare an integer type 2D array of size 5X4, name it A. Populate it with the following values: 5, 10,15,20,25,30,35,40,45,50,55,60,65,70,75,80,85,90,95,100. Print the following values and try to understand the reason behind the values getting printed (relation between pointers and 2D arrays).
    a. Size of int in your machine
    b. A, *A, **A
    c. A+1, *(A+1)
    d. A+2, *(A+2)
    e. A+3, *(A+3)
    f. A+4, *(A+4)
    g. A[0], *A[0]
    h. A[1], *A[1]
    i. A[0]+0, A[0]+1, A[0]+2, A[0]+3
    j. *(A[0]+0), *(A[0]+1), *(A[0]+2), *(A[0]+3)
    k. *(*(A+0)+0), *(*(A+0)+1), *(*(A+0)+2), *(*(A+0)+3)
    l. A[1]+0, A[1]+1, A[1]+2, A[1]+3
    m. *(A[1]+0), *(A[1]+1), *(A[1]+2), *(A[1]+3)
    n. *(*(A+1)+0), *(*(A+1)+1), *(*(A+1)+2), *(*(A+1)+3)
2. Declare and populate an int type 1D array of size 10 taking inputs from user. Pass individual elements to a function and print them and their corresponding characters from this function.
3. Declare and populate a float type 1D array of size 10 taking inputs from user. Pass the whole array to a function. Calculate the sum and product in the function and print them from main().
4. Write a program to pick up the largest number from any 3 row by 3 column matrix.
5. Implement the following procedure to generate prime numbers from 1 to 100 into a program. This procedure is called sieve of Eratosthenes.
   step 1: Fill an array num[100] with numbers from 1 to 100
   step 2: Starting with the second entry in the array, set all its multiples to zero.
   step 3: Proceed to the next non-zero element and set all its multiples to zero.
   step 4: Repeat step 3 till you have set up the multiples of all the non-zero elements to zero
   step 5: At the conclusion of step 4, all the non-zero entries left in the array would be prime numbers, so print out these numbers.
6. Write a program to obtain transpose of a 4 x 4 matrix. The transpose of a matrix is obtained by exchanging the elements of each row with the elements of the corresponding column.

7. For a 1-D array of type integer, size 5, write a function to shift it circularly left by 1 position. Call this function for a (3 x 5) matrix and get its rows left shifted.
   Example: if input array is 15, 30, 28, 19, 61
   After the shift: 30, 28, 19, 61, 15
8. Write a C Program to Check Palindrome String
   a. using String manipulation Library functions
   b. without using any string library functions.
9. Take a user input string.
   a. Copy it in another string using strcpy() – print both strings
   b. Check the error if size of the destination string is not large enough to store the copied string
   c. Write a function to mimic the strcpy() function and use it in your program. Do not use any predefined string manipulation functions.
10. Write a program that converts all lowercase characters in a string to its equivalent uppercase character.
11. Write a program that extracts part of the given string from the specified position.
12. Write the codes for strlen(), strcat() and strcmp() without using any string library functions.
13. Write a program to sort all the elements of a 4 x 4 matrix.
14. Write a program to multiply any two 3 x 3 matrices.
15. Declare an integer type 3D array of size 5X2X3. Populate it with user inputs. Display the values in proper format.