Lab sheet 7 & 8

Write the Program in Lab Workbook for questions - 4, 5, 12, 13 14, 17, 18, 19, 21, 23, 24, 25, 30, 31, 32, 33, 33, 34, 35

1. Write a program which reads in 10 integers from the user and stores them in an array. Find the largest value in the array and print it.
2. Modify the last program to use a preprocessor constant for the size of the array and in the test condition of the loop which processes the array.
3. Modify the last program to find mean of *n* numbers using arrays.
4. Write a program to interchange the largest and the smallest number in the array.
5. Write a program to find the second biggest number using an array of *n* numbers.
6. Write a program to find whether the array of integers contain a duplicate number. If it's there print the position of duplicate numbers.
7. Write a program which can store 10 integers in an array. Fill the array with "random" numbers using the library functions **rand()** instead of reading them from the user. Find the largest element in the array and print it out.
   Each time **rand()** is called it returns a "random" integer. Use the mod operator (%) to get a value in the desired range. For example:

   int **result;**
   result = **rand() % 1000;**

   will assign a random value in the range **0 – 999** to the variable **result.**
   Make sure your program contains the line:

   #include <stdlib.h>

   to include information about the **rand()** function.

8. Modify the last program so that instead of finding the largest element in the array, the program sorts the elements of the array into ascending order.
9. Write a program to find out whether a particular element is in the integer array using Linear search.
10. Write a program to find out whether a particular element is in the integer array using Binary search.
11. Write a program to sort an array of elements using Bubble sort.
12. Write a program to sort an array of elements using Selection sort.
13. Read a value k from the user and using k left rotation and right rotation depending on the user choice Left or Right, print the rotated value. [Use function for the rotations]
14. Read an array of size n and a variable k from user. find all the pairs of elements in the array which yields a sum as k.

2-D Array

15. Write a program to read and display a matrix.
16. Write a program to add two matrices.
17. Write a program to find the transpose of a matrix.
18. Write a program to find the sum of all the elements in a 2D array.
19. Write a program to find the sum of the elements in each row of a 2D array and print it.
20. Write a program to fill a square matrix with value 0 on the diagonal, 1 on the upper right triagle and -1 on the lower left triangle.
21. Write a program to multiply two matrices.
22. Write a program to find out whether a particular element is in the 2D integer array and print its row and column value using call by reference.
23. Write a program to interchange any two Rows & Columns in the given Matrix.
24. Write a program to Sort Rows of the Matrix in Ascending & Columns in Descending Order.

Sample Output

```
Enter the order of the matrix
3 3
Enter co-efficients of the matrix
3 7 9
2 4 8
5 2 6
The given matrix is
 3 7 9
 2 4 8
 5 2 6
After arranging rows in ascending order
 3 7 9
 2 4 8
 2 5 6
After arranging the columns in descending order
 5 7 9
 3 4 8
 2 2 6
```

25. Write a program to do the Sum of the Main & Opposite Diagonal Elements of a MxN Matrix.

Sample Output

```
Enter the order of the matix
2 2
Enter the co-efficients of the matrix
40 30
38 90
The given matrix is
```

```
40 30
38 90

The sum of the main diagonal elements is = 130
The sum of the off diagonal elements is  = 68
```

Strings

Reading Strings

26. If we declare a string by writing char str[50]; Then str can be read from the user by using three ways:
    1. Using scanf() function
    2. Using gets() function
    3. Using getchar() function repeatedly

Write program to read a string in the above three ways.

Writing strings

27. The string can be displayed on screen using three ways:
    1. Using printf() function
    2. Using puts() function
    3. Using putchar()function repeatedly.

    Modify the above program to display the string that you read.

28. Run the following program and analyze the result.

```
#include<stdio.h>
main()
{
        char str = “Hello”;
        printf(“\n %s”,str);
        printf(“\n %s”,&str);
        printf(“\n%s”,&str[2]);
}
```

29. Run the following program and analyze the result. It’s about the use of width and precision specifications along with %s .

```
#include<stdio.h>
main()
{
        char str[] = “Introduction to C”;
        printf(“\n |%s|”,str);
        printf(“\n |%20s|”,str);
        printf(“\n |%-20s|”,str);
        printf(“\n |%.4s|”,str);
        printf(“\n |%20.4s|”,str);
        printf(“\n |%-20.4s|”,str);
}
```

30. Write a program to find the length of a string. Also use strlen( ) to do the same.

31. Write a program to copy on string to another without using any string library functions. Do the same operation using strcpy() function in string.h)

32. Write a program to convert characters of a string to upper case.

Note: Recall that ASCII code for A-Z varies from 65 to 91 and the ASCII code for a-z ranges from 97 to 123

33. Write a program to concatenate two strings. (Do the same operation using the string library function *strcat()* and analyze the behavior; you should include *string .h*)

34. Write a program to compare two strings. (Do the same operation using the string library function *strcmp()* and analyze the behavior; you should include *string .h*)

35. Write a program to check whether the entered string is a palindrome.