Assignment 9: Array (1-D) and functions

You should read the following topics before starting this exercise

1. What are arrays and how to declare an array?
2. How to enter data in to array and access the elements of an array.
3. How to initialize an array and how to check the bounds of an array?
4. How to pass an array to a function

An array is a collection of data items of the same data type referred to by a common name. Each element of the array is accessed by an index or subscript. Hence, it is also called a subscripted variable.

Actions involving arrays	**syntax**	**Example**
Declaration of array	*data-type array_name[size];*	int temperature[10]; float pressure[20];
Initialization of array	*data-type array_name[]={element1, element2, ……, element n};* *data-type array_name[size]={element-1, element-2, ……, element-size};* You cannot give more number of initial values than the array size. If you specify less values, the remaining will be initialized to 0.	int marks[]={45,57,87,20,90}; marks[3] refers to the fourth element which equals 20 int count[3]={4,2,9}; count[2] is the last element 9 while 4 is count[0]
Accessing elements of an array	The array index begins from **0 (zero)** To access an array element, we need to refer to it as array_name[index].	Value = marks[3]; This refers to the 4th element in the array
Entering data into an array.		for (i=0; i<=9; i++) scanf("%d", &marks[i]);
Printing the data from an array		for(i=0; i<=9; i++) printf("%d", marks[i]);

Arrays and function	We can pass an array to a function using two methods.
	1. Pass the array element by element
	2. Pass the entire array to the function
		/* Passing the whole array*/
		void modify(int a[5])
		{
		int i;
		for(i=0; i<5 ; i++)
		a[i] = i;
		}

Sample program to find the largest element of an array

```
/* Program to find largest number from array */

#include<stdio.h>i
nt main()
{
    int arr[20]; int n;
    void accept(int a[20], int n);
    void display(int a[20], int n);
    int maximum(int a[20], int n);

    printf("How many numbers :");
    scanf("%d", &n);
    accept(arr,n);
    display(arr,n);
    printf("The maximum is :%d" , maximum(arr,n));
}

void accept(int a[20], int n)
{
    int i;
    for(i=0; i<n ; i++)
            scanf("%d", &a[i]);
}

void display(int a[20], int n)
{
    int i;
    for(i=0; i<n ; i++)
            printf("%d\t", a[i]);
}
int maximum(int a[20], int n)
{
    int i, max = a[0];

    for(i=1; i<n ; i++)
            if(a[i] > max)
              max = a[i];
    return max;
}
```

Set A. Write programs to solve the following problems

1. Write a program to accept n numbers in the range of 1 to 25 and count the frequency of occurrence of each number.

2. Write a function for Linear Search, which accepts an array of n elements and a key as parameters and returns the position of key in the array and -1 if the key is not found. Accept n numbers from the user, store them in an array. Accept the key to be searched and search it using this function. Display appropriate messages.

3. Write a function, which accepts an integer array and an integer as parameters and counts the occurrences of the number in the array.

4. Write a program to accept numbers and store all prime numbers in an array called prime. Display this array.

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Set B. Write programs to solve the following problems

1. Write a program to accept n numbers from the user and store them in an array such that the elements are in the sorted order. Display the array. Write separate functions to accept and display the array.(Hint: Insert every number in its correct position in the array)

2. Write a function to sort an array of n integers using Bubble sort method. Accept n numbers from the user store them in an array and sort them using this function. Display the sorted array.

3. Write a program to accept a decimal number and convert it to binary, octal and hexadecimal. Write separate functions.

4. Write a program to find the union and intersection of the two sets of integers (store it in two arrays).

5. Write a program to remove all duplicate elements from an array.

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Set C. Write programs to solve the following problems

1. Write a program to merge two sorted arrays into a third array such that the third array is also in the sorted order.

a 1	10	25	90					
a 2	9	16	22	26	10 0			
a 3	9	10	16	22	25	26	90	100

2. Write a program to accept characters from the user till the user enters EOF and calculate the frequency count of every alphabet. Display the alphabets and their count.
   Input: THIS IS A SAMPLE INPUT
   Output:

Character	Count
T	2
H	1
I	3
.....	

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Assignment Evaluation

0: Not done [ ] 2: Late Complete [ ] 4: Complete [ ]

1: Incomplete [ ] 3: Needs improvement [ ] 5: Well Done [ ]