C Programming LAB Assignment

Submitted By: Raj Kumar Patidar
Roll no.:- 52221201

Submitted to: Mr. Sumit Sharma

Q. Write a program to show binary search in C

```c
#include<stdio.h>
#include<conio.h>

void main(void){
    int n;
    printf("Enter the number of elements: ");
    scanf("%d",&n);
    int arr[n];
    printf("Enter the elements in sorted order: ");
    for(int i = 0; i<n; i++)
    {
        scanf("%d",&arr[i]);
    }
    int ele;
    printf("\nEnter the element to be searched in array: ");
    scanf("%d",&ele);

    int ub, lb, mid;
    ub = n-1;
    lb =0;
    mid = (ub+lb)/2;
    int flag =0;
    while(ub>=lb){
        mid = (lb+ub)/2;
        if(arr[mid]==ele){
            printf("Element found at position: %d", mid+1);
            flag =1;
            break;
        }
        else if(arr[mid]>ele)
```

```
        else if(arr[mid]>ele)
        {
            ub = mid -1;
        }
        else if(arr[mid]<ele)
        {
            lb = mid + 1;
        }
    }
    if(flag ==0)
    {
        printf("\nElement not found!!");
    }
}
```

output:

```
PS D:\C Programming LAB MANUAL\lab manual-Programs> ./a.exe
Enter the number of elements: 5
Enter the elements in sorted order: 1
2
3
4
5

Enter the element to be searched in array: 3
Element found at position: 3
```

Q. Wap to sort using selection sort.

```c
#include<stdio.h>
#include<conio.h>

void selection(int arr[], int n){
    for(int i = 0; i<n; i++){
        int min_so_far = arr[i];
        int index;
        for(int j = i; j<n; j++)
        {
            if(min_so_far>arr[j]){
                min_so_far = arr[j];
                index = j;
            }
        }
        int temp = arr[i];
        arr[i] = arr[index];
        arr[index] = temp;
    }

    for(int i =0; i<n; i++)
    {
        printf("%d ", arr[i]);
    }
}


void main(void){
    int n;
    printf("\nEnter the number of elements: ");
    scanf("%d",&n);
    printf("\nEnter the elements in array: ");
    int arr[n];
    for(int i = 0; i<n; i++)
    {
        scanf("%d",&arr[i]);
    }

    selection(arr,n);
}
```

Output:

```
PS D:\C Programming LAB MANUAL\lab manual-Programs> ./a.exe

Enter the number of elements: 5

Enter the elements in array: 7
9
4
5
6
4 5 6 7 9
```

Q.WAP to sort using bubble sort.

```c
#include<stdio.h>
#include<conio.h>

void bubble(int arr[], int n){
    for(int i = 0; i<n; i++)
    {
        for(int j = 0; j<n-i; j++)
        {
            if(arr[j]>arr[j+1])
            {
                int temp = arr[j];
                arr[j] = arr[j+1];
                arr[j+1] = temp;
            }
        }
    }

    for(int i = 0; i<n; i++)
    {
        printf("%d ", arr[i]);
    }
}


void main(void){

    int n;
    printf("\nEnter the number of elements: ");
    scanf("%d",&n);
    int arr[n];
    printf("\nEnter the elements in array: ");
    for(int i = 0; i<n; i++)
    {
        scanf("%d",&arr[i]);
    }

    bubble(arr, n);
}
```

Output:

```
PS D:\C Programming LAB MANUAL\lab manual-Programs> gcc .\bubble_sort.c
PS D:\C Programming LAB MANUAL\lab manual-Programs> ./a.exe

Enter the number of elements: 5

Enter the elements in array: 7
8
9
4
5
4 5 7 8 9
```

Q. WAP to sort using insertion sort

```c
#include<stdio.h>
#include<conio.h>

void insertion(int arr[], int n){
    int key,j;
    for(int i = 1; i<n; i++){
        key  = arr[i];
        j = i -1;

        while(j>=0&&arr[j]>key){
            arr[j+1] = arr[j];
            j = j-1;
        }

        arr[j+1] = key;

    }

    for(int i =0 ; i<n; i++){
        printf("%d ", arr[i]);
    }
}

void main(void){
 int n;
 printf("\nEnter the number of elements in array: ");
 scanf("%d", &n);

 printf("\nEnter the elements in array: ");
 int arr[n];

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

insertion(arr, n);

}
```

output:

```
PS D:\C Programming LAB MANUAL\lab manual-Programs> gcc .\insertion_sort.c
PS D:\C Programming LAB MANUAL\lab manual-Programs> .\a.exe

Enter the number of elements in array: 5

Enter the elements in array: 7
8
9
4
1
1 4 7 8 9
PS D:\C Programming LAB MANUAL\lab manual-Programs>
```

Q.Search element in array & return index

```c
#include<stdio.h>
#include<conio.h>


void search_element(int arr[],int n, int key){
    int flag=0;
    for(int i = 0; i<n; i++){
        if(arr[i]==key){
            printf("\nElement found at location %d", i+1);
            flag =1;
            break;
        }
    }

    if(flag == 0){
        printf("\nElement not found!!");
    }

}

void main(void){
    int n ;
    printf("\nEnter the number of elements: ");
    scanf("%d",&n);
    int arr[n];
    printf("\nEnter the elements in array: ");
    for(int i = 0; i<n; i++){
        scanf("%d",&arr[i]);
    }

    int key;
    printf("\nEnter the element to be searched in array: ");
    scanf("%d",&key);
    search_element(arr,n,key);

}
```

output:

```
PS D:\C Programming LAB MANUAL\lab-manual-10> gcc .\search-element.c
PS D:\C Programming LAB MANUAL\lab-manual-10> ./a.exe

Enter the number of elements: 5

Enter the elements in array: 1
2
3
4
5

Enter the element to be searched in array: 1

Element found at location 1
PS D:\C Programming LAB MANUAL\lab-manual-10>
```

Q. Perform addition of all elements in array.

```c
#include<stdio.h>
#include<conio.h>

void main(void){
    int n;
    printf("\nEnter the number of elements: ");
    scanf("%d",&n);
    int arr[n];
    int sum =0;
    printf("\nEnter the elements: ");
    for(int i = 0; i<n; i++){
        scanf("%d", &arr[i]);
        sum = sum + arr[i];
    }

    printf("The sum of the elements are: %d", sum);

}
```

output

```
PS D:\C Programming LAB MANUAL\lab-manual-10> gcc .\addition-element.c
PS D:\C Programming LAB MANUAL\lab-manual-10> ./a.exe

Enter the number of elements: 5

Enter the elements: 1
2
3
4
5
The sum of the elements are: 15
PS D:\C Programming LAB MANUAL\lab-manual-10>
```

find largest & smallest in array

```c
#include<stdio.h>
#include<conio.h>

void main(void){
    int n;
    printf("\nEnter the number of elements: ");
    scanf("%d",&n);
    int arr[n],min,max;
    printf("\nEnter the elements in array: ");
    scanf("%d",arr);
    max = arr[0], min = arr[0];
    for(int i =1; i<n; i++){
        scanf("%d",&arr[i]);
        if(min>arr[i]) min = arr[i];
        else if(max<arr[i]) max = arr[i];
    }

    printf("\nThe max element is %d, min element is %d",max, min);
}
```

output

```
PS D:\C Programming LAB MANUAL\lab-manual-10> gcc .\largest_smallest.c
PS D:\C Programming LAB MANUAL\lab-manual-10> ./a.exe

Enter the number of elements: 5

Enter the elements in array: 1
2
3
4
5

The max element is 5, min element is 1
```

deletion of element from specified position in array

```c
#include<stdio.h>
#include<conio.h>

void main(void){
    int n;
    printf("\nEnter the number of element in array: ");
    scanf("%d",&n);
    int arr[n];

    printf("\nEnter the elements in array: ");
    for(int i =0; i<n; i++)
    {
        scanf("%d",&arr[i]);
    }

    int index;
    printf("\nEnter the index from where your want to delete the element: ");
    scanf("%d",&index);

    if(index==n-1){
        n--;
    }
else if(index<n){
        for(int i = 0; i<n; i++){

            while(index<n){
                arr[index] = arr[index+1];
                index++;
            }
        }
        n--;
    }
    else{
        printf("\nInvalid Index");
    }

    for(int i =0; i<n; i++){
        printf("%d ",arr[i]);
    }
}
```

output

```
PS D:\C Programming LAB MANUAL\lab-manual-10> gcc .\deletion-element.c
PS D:\C Programming LAB MANUAL\lab-manual-10> .\a.exe

Enter the number of element in array: 5

Enter the elements in array: 1
2
2
4
5

Enter the index from where your want to delete the element: 2
1 2 4 5
```

reverse the element of array:

```c
#include<stdio.h>
#include<conio.h>


void main(void){
    int n;
    printf("\nEnter the number of elements: ");
    scanf("%d",&n);
    int arr[n];
    printf("\nEnter the elements in array: ");
    for(int i =0 ; i<n; i++)
    {
        scanf("%d",&arr[i]);
    }

    for(int i = 0; i<n/2; i++)
    {
        int temp = arr[i];
        arr[i] = arr[n-i-1];
        arr[n-i-1] = temp;
    }

    for(int i =0; i<n; i++){
        printf("%d ",arr[i]);
    }
}
```

output

```
PS D:\C Programming LAB MANUAL\lab-manual-10> gcc .\reverse.c
PS D:\C Programming LAB MANUAL\lab-manual-10> ./a.exe

Enter the number of elements: 5

Enter the elements in array: 1
2
3
4
5
5 4 3 2 1
```

Write a C program to store the elements of 2-D matrix(3X3) in array. Also display the elements in matrix format.

```c
#include<stdio.h>
#include<conio.h>

void main(void){

    int arr[3][3];
    printf("\nEnter the elements in 3x3 matrix: ");
    for(int i =0; i<3; i++){
        for(int j = 0; j<3; j++){
            scanf("%d",&arr[i][j]);
        }
    }

    for(int i =0; i<3; i++){
        for(int j =0; j<3; j++){
            printf("%d ",arr[i][j]);
        }
        printf("\n");
    }


}
```

output

```
PS D:\C Programming LAB MANUAL\lab-manual-10> gcc .\insert-2d.c
PS D:\C Programming LAB MANUAL\lab-manual-10> ./a.exe

Enter the elements in 3x3 matrix: 1
2
2
4
5
6
7
8
9
1 2 2
4 5 6
7 8 9
```

Perform the addition of two 2-D matrix of size (3X3). Display the addition in matrix form

```c
#include<stdio.h>
#include<conio.h>

void main(void){

    int A[3][3];
    int B[3][3];
    int C[3][3];


        printf("\nEnter elements in first matrix: ");
            for(int i =0; i<3; i++)
            {
                for(int j =0; j<3; j++){
                    scanf("%d",&A[i][j]);
                }
            }

            printf("\nEnter elements in second matrix: ");
            for(int i =0; i<3; i++){
                for(int j =0; j<3; j++){
                    scanf("%d",&B[i][j]);
                }
            }

            for(int i =0; i<3; i++){
                for(int j =0; j<3; j++){
                    C[i][j] = A[i][j] + B[i][j];
                }
            }
   printf("\nArray after addition: \n");
   for(int i =0; i<3; i++)
   {
        for(int j = 0; j<3; j++){
            printf("%d ",C[i][j]);
        }
        printf("\n");
   }

}
```

output

```
PS D:\C Programming LAB MANUAL\lab-manual-10> gcc .\addition-matrix.c
PS D:\C Programming LAB MANUAL\lab-manual-10> ./a.exe

Enter elements in first matrix: 1
2
3
4
5
6
7
8
9

Enter elements in second matrix: 7
8
9
4
5
6
1
2
3

Array after addition:
8 10 12
8 10 12
8 10 12
PS D:\C Programming LAB MANUAL\lab-manual-10>
```

Write a program to calculate sum of first 20 natural numbers using recursive function.

```c
#include<stdio.h>
#include<conio.h>

int sum_twenty(int n){
    if(n!=0){
        return n + sum_twenty(n-1);
    }
    else {
        return n;
    }

}

void main(void){
    int sum;

    sum = sum_twenty(20);

    printf("\nThe sum is: %d",sum);
}
```

output

```
PS D:\C Programming LAB MANUAL\lab-manual-10> gcc .\recursive-sum.c
PS D:\C Programming LAB MANUAL\lab-manual-10> ./a.exe

The sum is: 210
PS D:\C Programming LAB MANUAL\lab-manual-10>
```

Write a program to generate Fibonacci series using recursive function

```c
#include<stdio.h>
#include<conio.h>

void fibonacci(int n){
  static int n1 =0, n2 = 1, n3= 1;
  if(n>0){
    n3 = n1+n2;
    n1 = n2;
    n2 = n3;
    printf(" %d",n3);
    fibonacci(n-1);
  }
}

void main(void){
    int n;
    printf("\nEnter series length: ");
    scanf("%d",&n);

    printf("%d %d",0, 1);

    fibonacci(n-2);


}
```

output

```
PS D:\C Programming LAB MANUAL\lab-manual-10> gcc .\fibonacci.c
PS D:\C Programming LAB MANUAL\lab-manual-10> ./a.exe

Enter series length: 5
0 1 1 2 3
PS D:\C Programming LAB MANUAL\lab-manual-10> ./a.exe

Enter series length: 7
0 1 1 2 3 5 8
```

Write a program to find sum of digits of the number using Recursive Function.

```c
#include<stdio.h>
#include<conio.h>

int rec_sum(int num)
{
    if(num>0){
        return num%10 + rec_sum(num/10);
    }
    else{
        return 0;
    }
}


void main(void){
    int n;
    printf("\nEnter the number: ");
    scanf("%d",&n);
    int sum;

    sum = rec_sum(n);

    printf("\nSum is: %d",sum);

}
```

output

```
PS D:\C Programming LAB MANUAL\lab-manual-10> gcc .\recursion-sum-digit.c
PS D:\C Programming LAB MANUAL\lab-manual-10> ./a.exe

Enter the number: 456

Sum is: 15
```

Write a C program to find power of any number using recursion.

```c
#include<stdio.h>
#include<conio.h>

int power(int base,int exponent){
    if(exponent>0){
        return base * power(base, exponent-1);
    }
    else{
        return 1;
    }
}

void main(void){
    int base,exponent;

    printf("\nEnter base and exponent: ");
    scanf("%d %d",&base,&exponent);

    printf("\nresult is: %d", power(base,exponent));
}
```

output

```
PS D:\C Programming LAB MANUAL\lab-manual-10> gcc .\power-rec.c
PS D:\C Programming LAB MANUAL\lab-manual-10> ./a.exe

Enter base and exponent: 2
3

result is: 8
```

Write a C program to find factorial of any number using recursion.

```c
#include<stdio.h>
#include<conio.h>

int factorial(int num){
    if(num>0){
        return num*factorial(num-1);
    }
    else{
        return 1;
    }
}

void main(void){
    int n;
    printf("\nEnter the numeber: ");
    scanf("%d",&n);

    printf("\nFactorial is: %d",factorial(n));
}
```

output

```
PS D:\C Programming LAB MANUAL\lab-manual-10> gcc .\factorial-rec.c
PS D:\C Programming LAB MANUAL\lab-manual-10> ./a.exe

Enter the numeber: 5

Factorial is: 120
```

Write a C program to create, declare and initialize structure.

```c
#include<stdio.h>
#include<conio.h>

struct student{
    int rollno;
    char name[100];
};

void main(void){
    struct student s1;

    printf("\nEnter name: ");
    scanf("%[^\n]s",&s1.name);
    printf("\nEnter rollno: ");
    scanf("%d",&s1.rollno);

    printf("\nYour name is: %s", s1.name);
    printf("\nYour roll no is: %d",s1.rollno);
}
```

output

```
PS D:\C Programming LAB MANUAL\lab-manual-10> gcc .\sturct-dec.c
PS D:\C Programming LAB MANUAL\lab-manual-10> ./a.exe

Enter name: Maaz Ansari

Enter rollno: 211

Your name is: Maaz Ansari
Your roll no is: 211
```

Write a program to store information of 5 students in structure and display it.

```c
#include<stdio.h>
#include<conio.h>

struct student{
    int rollno;
    char firstname[100];
};

void main(void){
    struct student s[5];
for(int i =0; i<5; i++){
    printf("\nEnter name: ");
    scanf("%s",&s[i].firstname);
    printf("\nEnter rollno: ");
    scanf("%d",&s[i].rollno);
}

for(int i =0; i<5; i++){
    printf("\nname of %d is: %s",i+1, s[i].firstname);
    printf("\nroll no of %d is: %d",i+1,s[i].rollno);
}
}
```

output

```
PS D:\C Programming LAB MANUAL\lab-manual-10> gcc .\5students.c
PS D:\C Programming LAB MANUAL\lab-manual-10> ./a.exe

Enter name: Rachel

Enter rollno: 23

Enter name: Ross

Enter rollno: 12

Enter name: Joey

Enter rollno: 33

Enter name: Pheobe

Enter rollno: 14

Enter name: chandler

Enter rollno: 4

name of 1 is: Rachel
roll no of 1 is: 23
name of 2 is: Ross
roll no of 2 is: 12
name of 3 is: Joey
roll no of 3 is: 33
name of 4 is: Pheobe
roll no of 4 is: 14
name of 5 is: chandler
roll no of 5 is: 4
```

Write a program to create a structure named company which has name, address, phone and no Of Employee as member variables. Read name of company, its address, phone and no Of Employee. Finally display these members‟ value

```c
#include<stdio.h>
#include<conio.h>

struct company{
    char name[100];
    char add[200];
    int phone;
    int noemp;
};


void main(void){
    struct company c1;

    printf("\nEnter company name: ");
    scanf("%s",&c1.name);
    fflush(stdin);
    printf("\nEnter address: ");
    fgets(c1.add,200,stdin);

    printf("\nEnter phone number: ");
    scanf("%d",&c1.phone);
    printf("\nEnter number of employees: ");
    scanf("%d",&c1.noemp);

    printf("\nCompany name is: %s",c1.name);
    printf("\nCompany address is: %s",c1.add);
    printf("\nPhone number is: %d", c1.phone);
    printf("\nNumber of employees: %d",c1.noemp);
}
```

output

```
PS D:\C Programming LAB MANUAL\lab-manual-10> gcc .\company.c
PS D:\C Programming LAB MANUAL\lab-manual-10> ./a.exe

Enter company name: Google

Enter address: San-francicso

Enter phone number: 606

Enter number of employees: 50000

Company name is: Google
Company address is: San-francicso

Phone number is: 606
Number of employees: 50000
```

Write a program to add two distances in feet and inches using structure

```c
#include<stdio.h>
#include<conio.h>

struct distance{
    int inch;
    int feet;
};

void main(void){
    struct distance d1,d2;

    d1.inch = 17;
    d1.feet = 23;

    d2.inch = 25;
    d2.feet = 43;

    printf("Sum of distance is: %d inch & %d feet",d1.inch+d2.inch,d1.feet+d2.feet);
}
```

output

```
PS D:\C Programming LAB MANUAL\lab-manual-10> gcc .\distance.c
PS D:\C Programming LAB MANUAL\lab-manual-10> ./a.exe
Sum of distance is: 42 inch & 66 feet
PS D:\C Programming LAB MANUAL\lab-manual-10>
```

Write a program to show programming examples with union and enumerations

```c
#include<stdio.h>
#include<conio.h>

enum weekdays{mon,tues,wed,thrus,fri,sat,sun};

union student{
    char name[200];
    int rollno;
};

void main(void){
    union student s1;

    printf("\nEnter name : ");
    fgets(s1.name,200,stdin);
    fflush(stdin);
    printf("\nEnter roll no: ");
    scanf("%d",&s1.rollno);

    printf("\nresult of monday in enum: %d",mon);

    printf("\nYour name is : %s",s1.name);
    printf("\nYour roll no is: %d",s1.rollno);
}
```

output

```
PS D:\C Programming LAB MANUAL\lab-manual-10> gcc .\enum-union.c
PS D:\C Programming LAB MANUAL\lab-manual-10> ./a.exe

Enter name : Maaz

Enter roll no: 211

result of monday in enum: 0
Your name is :
Your roll no is: 211
```