CS-111

<Module No- 5>

- Lab5

NITK SURATHKAL

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201EC226

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```c
// Lab 5 Questin 1
// Inbasekaran.P 201EC226
/*Write a function to generate n Fibonacci numbers*/

// For printf() and scanf()
#include <stdio.h>
// Including stdlib for system("clear") to clear the screen in the
 terminal.
#include <stdlib.h>

long long fib(int n)
{
    long long n_1 = 1;
    long long n_2 = 0;
    long long fib_n = 0;
    while (n-- > 0)
    {
        fib_n = n_1 + n_2;
        n_2 = n_1;
        n_1 = fib_n;
    }
    return fib_n;
}

int main()
{
    // To clear the console.
    system("clear");
    printf("Enter the value of n: ");
    int n;
    scanf("%d",&n);
    long long y = fib(n);
    printf("The value of fib(n) is : %lld\n", y);
    return 0;
}
```

OUTPUT

```
Enter the value of n: 10
The value of fib(n) is : 89
PS D:\Documents\NIT-K\My_Second_Sem\CS111\M5\functions>
```

```c
// Lab 5.1 Questin 3
// Inbasekaran.P 201EC226
/*Program to evaluate the equation y=x^1+ x^2+ x^3+.....+x^n*/

// For printf() and scanf()
#include <stdio.h>
// Including stdlib for system("clear") to clear the screen in the terminal.
#include <stdlib.h>


long long eval(int x, int n)
{
    long long y = x;
    long long xi = x;
    while (--n > 0)
    {
        xi *= x;
        y += xi;
    }
    return y;

}

int main()
{
    // To clear the console.
    system("clear");
    // input
    printf("Enter the value of x and n (n>0): ");
    int x,n;
    scanf("%d %d",&x,&n);
    long long y = eval(x,n);
    printf("The value of y is : %lld\n", y);
    return 0;
}
```

OUTPUT

```
Enter the value of x and n (n>0): 2 3
The value of y is : 14
PS D:\Documents\NIT-K\My_Second_Sem\CS111\M5\functions>
```

```c
// Lab 5.1 Questin 6
// Inbasekaran.P 201EC226
/*Program to find whether an entered year is a leap year or not*/

// For printf() and scanf()
#include <stdio.h>
// Including stdlib for system("clear") to clear the screen in the terminal.
#include <stdlib.h>
// To include bool data type.
#include <stdbool.h>

bool checkYear(int year)
{
    // If a year is multiple of 400,
    if (year % 400 == 0)
        return true;
    // The year is multiple of 4 and not multiple of 100.
    if (year % 4 == 0 && year % 100 != 0)
        return true;
    return false;
}

int main()
{

    // To clear the console.
    system("clear");
    // input
    int year = 2000;
    printf("Enter the year: ");
    scanf("%d",&year);
    checkYear(year)? printf("Leap Year"):printf("Not a Leap Year");
    return 0;
}
```

OUTPUT

```
Enter the year: 2020
Leap Year
PS D:\Documents\NIT-K\My_Second_Sem\CS111\M5\functions>
```

```c
// Lab 5.2 Questin 3
// Inbasekaran.P 201EC226
/*To search for a number using binary search method*/

// For printf() and scanf()
#include <stdio.h>
// Including stdlib for system("clear") to clear the screen in the terminal.
#include <stdlib.h>
#define MAX 100

int binary_search(int arr[], int low ,int high, int key)
{
    if(low > high)
        return -1;
    int mid = (high + low)/2;
    if(arr[mid] == key)
        return mid;
    if(arr[mid] > key)
        return binary_search(arr, low, high-1, key);
    if(arr[mid] < key)
        return binary_search(arr,mid+1, high, key);

}



int main()
{
    // To clear the console.
    system("clear");
    printf("Enter the size of the array: ");
    int n;
    scanf("%d",&n);
    int arr[MAX] = {0};
    printf("Enter the elements of the array.\n");
    for(int i = 0; i<n; ++i)
    {
        scanf("%d",&arr[i]);
    }
```

```
 printf("Enter the element to be searched in the array in a
sorted order.\n");
    int key;
    scanf("%d",&key);
    int y = binary_search(arr,0,n-1,key);
    if(y == -1)
        printf("Elenent not found !!! \n");
    else
        printf("The element found at indes: %d\n", y);
    return 0;
}
```

OUTPUT

```
Enter the size of the array: 5
Enter the elements of the array.
1 2 3 5 6
Enter the element to be searched in the array in a sorted order.
6
The element found at indes: 4
PS D:\Documents\NIT-K\My_Second_Sem\CS111\M5\recursion>
```

```c
// Lab 5.2 Questin 4
// Inbasekaran.P 201EC226
/*Program to evaluate the equation y=1+1/3!+1/5! + …… +1/N!*/
// For printf() and scanf()
#include <stdio.h>
// Including stdlib for system("clear") to clear the screen in the terminal.
#include <stdlib.h>

double eval(double n)
{
    static double fact = 1;
    static double i = 1;
    if(n == 1)
        return 1;
    double y = eval(n-1);
    fact *= ++i;
    fact *= ++i;
    return 1/fact + y;
}

int main()
{
    // To clear the console.
    system("clear");
    // input
    printf("Enter the value of n (n>0): ");
    int n;
    scanf("%d",&n);
    double y = eval(n);
    printf("The value of y is : %lf\n", y);
    return 0;
}
```

OUTPUT

```
Enter the value of n (n>0): 3
The value of y is : 1.175000
PS D:\Documents\NIT-K\My_Second_Sem\CS111\M5\recursion>
```

```c
// Lab 5.2 Questin 5
// Inbasekaran.P 201EC226
/*Program to find whether an entered year is a leap year or not*/
// For printf() and scanf()
#include <stdio.h>
// Including stdlib for system("clear") to clear the screen in the terminal.
#include <stdlib.h>
// To include bool data type.
#include <stdbool.h>

bool swap(char* a, char* b)
{
    *a = *a^*b;
    *b = *a^*b;
    *a = *a^*b;
    return true;
}


char* rev_str(char* string,int n)
{
    int i = 0;
    if(n<=1)
    {
        return string;
    }
    swap(&string[i], &string[n-i-1]);
    return rev_str(&(string[++i]), n-2);
}

int main()
{
    printf("Enter the string to be reversed: ");
    char string[100] = {'\0'};
    scanf("%s", string);
    int n = 0;
    while (string[n++]);
    rev_str(string, --n);
    printf("The reversed string is: %s \n", string);
    return 0;
}
```

OUTPUT

```
Enter the string to be reversed: inba
The reversed string is: abni
PS D:\Documents\NIT-K\My_Second_Sem\CS111\M5\recursion>
```