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A-28
LAB Assignment 10

1. Write a C Program to find out the value of for given integer values of n and r (user inputs) by using a user defined function for factorial.

Program:

```
#include<stdio.h>

int fact(int);

int main(){
  int num , n, r , r1 , nr , nr1 , ncr;
  printf("Enter the value of n and r =");
  scanf("%d %d",&num , &r );
  if (num>=r && num>=0 && r>=0){
    n= fact(num);
    r1 = fact(r);
    nr = num-r;
    nr1 = fact(nr);
    ncr = n /(nr1 *r1);
    printf("%d C %d = %d",num, r, ncr );
    }
  else{
    printf("invalid Value");
  }
  }

int fact(int a){
  int f=1,i;
  if ( a == 0 || a == 1){
    return f;
```

```
  }
  else{
    for (i=2; i<=a ; i++ ){
      f *= i;
    }
  }
  return f;
}
```

OUTPUT:

```
pCodeRunnerFile.c -o tempCodeRunnerFile } ; if ($?) {
Enter the value of n and r =5 4
5 C 4 = 5
PS C:\Users\Prasanna Dhungana\OneDrive\Desktop\2nd sem\
cc LA10_1_Combinations.c -o LA10_1_Combinations } ; if
Enter the value of n and r =5 3
5 C 3 = 10
PS C:\Users\Prasanna Dhungana\OneDrive\Desktop\2nd sem\
```

2. Write a C Program to find out the sum of digits of a given integer number n by defining and using a C function.

Program:-

```
#include<stdio.h>

int sum(int);

int main(){
  int num  ,s;
  printf("\n\nEnter the number = ");
  scanf("%d",&num);
  printf("The sum of the digits of the number is :
%d\n\n",sum(num));
}

int sum(int a){
  int su = 0 ,r ;
  while (a != 0){
    r = a % 10;
    su += r;
    a = a / 10;
  }
  return su;
}
```

OUTPUT:-

```
PS C:\Users\Prasanna Dhungana\OneDrive\Desktop\2nd sem\
cc LA10_2_Sum_of_The_digits.c -o LA10_2_Sum_of_The_digi


Enter the number = 255
The sum of the digits of the number is : 12

PS C:\Users\Prasanna Dhungana\OneDrive\Desktop\2nd sem\
cc LA10_2_Sum_of_The_digits.c -o LA10_2_Sum_of_The_digi


Enter the number = 999
The sum of the digits of the number is : 27

PS C:\Users\Prasanna Dhungana\OneDrive\Desktop\2nd sem\
```

3. Write a C Program to test whether a given integer number n is a palindrome number or not.

Program:-

```
#include<stdio.h>

void palindrome(int);

int main(){
  int num  ,s;
  printf("\n\nEnter any integer to check whether it is a palindrome or not = ");
  scanf("%d",&num);
  palindrome(num);
  return 0;
}

void palindrome(int a){
  int r , pl=0 , o;
  o = a;
  while (a != 0){
    r = a % 10;
    pl= (pl * 10) + r;
    a = a / 10;
  }
  if (pl == o){
    printf("It is a palindrome.\n\n");
  }
  else{
    printf("It is not a palindrome.\n\n ");
  }
  return ;
}
```

Output:-

```
Enter any integer to check whether it is a palindrome or n
It is a palindrome.

PS C:\Users\Prasanna Dhungana\OneDrive\Desktop\2nd sem\210
cc LA10_3_Palindrome.c -o LA10_3_Palindrome } ; if ($?) {


Enter any integer to check whether it is a palindrome or n
It is not a palindrome.


PS C:\Users\Prasanna Dhungana\OneDrive\Desktop\2nd sem\210
```

4. Write a C Program to calculate the value of x y for any given real number x and any integer number y by writing a suitable function for the same.

Program:-

```c
#include<stdio.h>

double power(double , int);

int main(){
  double x ,pw ;
  int n;
  printf("\n\nEnter any two numbers to find the the X^Y = ");
  scanf("%lf %d",&x,&n);
  pw = power(x ,n);
  printf("%.3lf ^ %d = %.3lf\n\n", x , n , pw);
  return 0;
}

double power(double a,int b){
  int i ;
  double p=1;
    for (i = 0 ; i < b ; i++){
        p =(float) p * a;
    }
  return p;
}
```

Output:-

```
Enter any two numbers to find the the X^Y = 5 4
5.000 ^ 4 = 625.000

PS C:\Users\Prasanna Dhungana\OneDrive\Desktop\2nd sem\21053439_A
cc LA10_4_power.c -o LA10_4_power } ; if ($?) { .\LA10_4_power }

Enter any two numbers to find the the X^Y = 20 9
20.000 ^ 9 = 512000000000.000

PS C:\Users\Prasanna Dhungana\OneDrive\Desktop\2nd sem\21053439_A
```

5. Write a C Program to generate all the prime numbers between 1 and n (a value supplied by the user). Use a user-defined function isPRIME(x) that can test whether the input x is prime number or not.

Program:-

```
#include <stdio.h>

int isPRIME(int);

int main(){
    int num , i  ,j , B ;
    printf("\n\nEnter a integer upto which program checks the prime : ");
    scanf("%d",&num);
    if (num>=2){
        for (i = 2 ; i<=num ; i++ ){
            B = isPRIME(i);
            if (B == 1){
                printf("%d ",i);
            }
        }
        printf("\n\n");
    }
    else {
        printf("invalid input!! your input was %d, Try other values",num);
    }
}

int isPRIME(int a){
    int flag = 1 , j ;
    for (j=2 ; j < a; j++){
        if (a % j ==0){
            flag = 0;
            break;
```

```
        }
    }
    return flag;
}
```

Output:-

```
Enter a integer upto which program checks the prime : 25
2 3 5 7 11 13 17 19 23

PS C:\Users\Prasanna Dhungana\OneDrive\Desktop\2nd sem\21053439_
cc LA10_5_primenumsN.c -o LA10_5_primenumsN } ; if ($?) { .\LA1

Enter a integer upto which program checks the prime : 50
2 3 5 7 11 13 17 19 23 29 31 37 41 43 47

PS C:\Users\Prasanna Dhungana\OneDrive\Desktop\2nd sem\21053439_
```

6. Write a C Program to compute the sine series using the following function representation:
sin(x) = x - x 3 /3! + x 5 /5! - x 7 /7! + ……..

Program:-

```
#include<stdio.h>

int factorial(int);
double power(double, int);

int main(){
    int  n ,y , f  , i  ;
    signed int sign;
    double num , pw, sum , deg = 0  ;
    printf("\n\nEnter the value of X in sin(X) in degrees and
upto which term to iterate the series of sinx :");
    scanf("%lf %d",&deg ,&n);
    num = ((deg*3.14)/180);
    for (i =0 ; i<n ; i++){
        y= (2*i)+1;
        pw= power(num ,y );
        f = factorial(y);
        sign = power(-1,i);
        sum = sum + ((sign * pw)/f);
    }
    printf("The value from the series is : %.3lf\n\n",sum);
}


double power(double a,int b){
  int i ;
  double p=1;
    for (i = 0 ; i < b ; i++){
        p =(float )p * a;
```

```
    }
  return p;
}

int factorial(int a){
  int f=1,i;
  if ( a == 0 || a == 1){
    return f;
  }
  else{
    for (i=2; i<=a ; i++ ){
      f *= i;
    }
  }
  return f;
}
```

Output:

```
cc LA10_6_sinseries.c -o LA10_6_sinseries } ; if ($?) { .\LA10_6_sinseries }

Enter the value of X in sin(X) in degrees and upto which term to iterate the series of sinx :45 10

The value from the series is : 0.707
```

7. Write a C Program to compute the cosine series using the following function representation:
cos(x) = 1 - x 2 /2! + x 4 /4! - x 6 /6! + ……..
Program:

```
#include<stdio.h>

int factorial(int);
double power(double, int);

int main(){
    int  n ,y , f  , i  ;
    signed int sign;
    double num , pw, sum = 0 ,deg;
    printf("Enter the value of X in cos(X) in degrees and upto
which term to iterate the series of cos(x): ");
    scanf("%lf %d",&deg ,&n);
    num = ((deg*3.14)/180);
    for (i =0 ; i<n ; i++){
        y= 2*i;
        pw= power(num ,y );
        f = factorial(y);
        sign = power(-1,i);
        sum = sum + ((sign * pw)/f);
    }
    printf("The value from the series is : %.3lf",sum);
}

double power(double a,int b){
  int i ;
  double p=1;
    for (i = 0 ; i < b ; i++){
        p =(float )p * a;
    }
  return p;
```

```
}

int factorial(int a){
  int f=1,i;
  if ( a == 0 || a == 1){
    return f;
  }
  else{
    for (i=2; i<=a ; i++ ){
      f *= i;
    }
  }
  return f;
}
```

Output:

```
cc LA10_7_cos_Series.c -o LA10_7_cos_Series } ; if ($?) { .\LA10_7_cos_Series }
Enter the value of X in cos(X) in degrees and upto which term to iterate the series of cos(x): 45 10
The value from the series is : 0.707388
```

8. Write a C Program to compute the power series (e to the power x) using the following function representation:
e^x = 1 + x + x 2 /2! + x 3 /3! + x 4 /4! + ……..
Program:-

```
#include<stdio.h>

int factorial(int);
double power(double, int);

int main(){
    int  n ,y , f  , i  ;
    double num , pw, sum = 0 , sign;
    printf("\n\nEnter the value of X in e^x and upto which
term to iterate the series of e^x: ");
    scanf("%lf %d",&num ,&n);
    for (i =0 ; i<n ; i++){
        pw= power(num ,i );
        f = factorial(i);
        sum = sum +  ( pw/f);
    }
    printf("The value from the series is : %lf\n\n",sum);
}

double power(double a,int b){
  int i ;
  double p=1;
    for (i = 0 ; i < b ; i++){
        p =(float )p * a;
    }
  return p;
}

int factorial(int a){
  int f=1,i;
```

```
  if ( a == 0 || a == 1){
    return f;
  }
  else{
    for (i=2; i<=a ; i++ ){
      f *= i;
    }
  }
  return f;
}
```

Program:

```
Enter the value of X in e^x and upto which term to iterate the series of e^x:  2 10
The value from the series is : 7.388713

PS C:\Users\Prasanna Dhungana\OneDrive\Desktop\2nd sem\21053439_A28\LAB10>
```

9. Write a C Program to find the LCM of two numbers a and b by using a suitable function.

Program:

```
#include<stdio.h>

int GCD(int,int);

int main(){
    int num1 , num2, LCM ;
    printf("\n\nEnter any two numbers:");
    scanf("%d %d",&num1 , &num2);
    LCM = (num1 * num2)/(GCD(num1,num2));
    printf("The LCM of numbers %d and %d is =
%d\n\n",num1,num2,LCM);
    return 0;
}

int GCD(int a ,int b){
    int i, g , c;
    c=b;
    if (a<b){
    c = a;
    }
    for (i =1 ; i<=c ; i++){
        if ((a % i == 0) && (b % i == 0))
        g=i;
    }
    return g;
}
```

Output:-

```
PS C:\Users\Prasanna Dhungana\OneDrive\Des
cc LA10_9_LCM.c -o LA10_9_LCM } ; if ($?)


Enter any two numbers:5 4
The LCM of numbers 5 and 4 is = 20

cc LA10_9_LCM.c -o LA10_9_LCM } ; if ($?)


Enter any two numbers:20 10
The LCM of numbers 20 and 10 is = 20

PS C:\Users\Prasanna Dhungana\OneDrive\Des
```