IT161: Introduction to Programming and Problem Solving

Lab 5/Assignment 5

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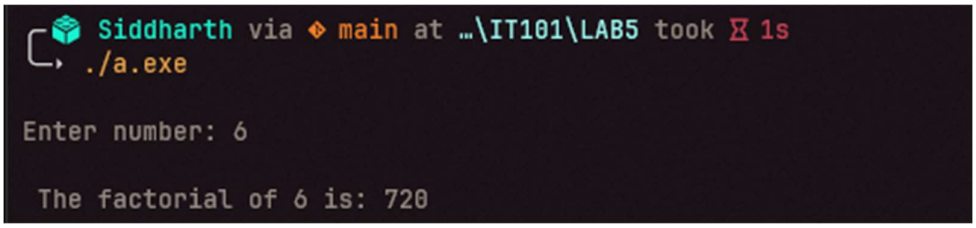
PROGRAMS

1.Factorial of number n using recursion:

Code:

```c
#include <stdio.h>


int factorial(int n);

int main(){
    int n;
    int fac;
    printf("\nEnter number: ");
    scanf("%d",&n);
    fac = factorial(n);

    printf("\n The factorial of %d is: %d\n",n,fac);
    return 0;
}

int factorial(int n){
    if (n == 1) {return n;}
    else{
        return n * factorial(n-1);
    }
}
```

OutPut:

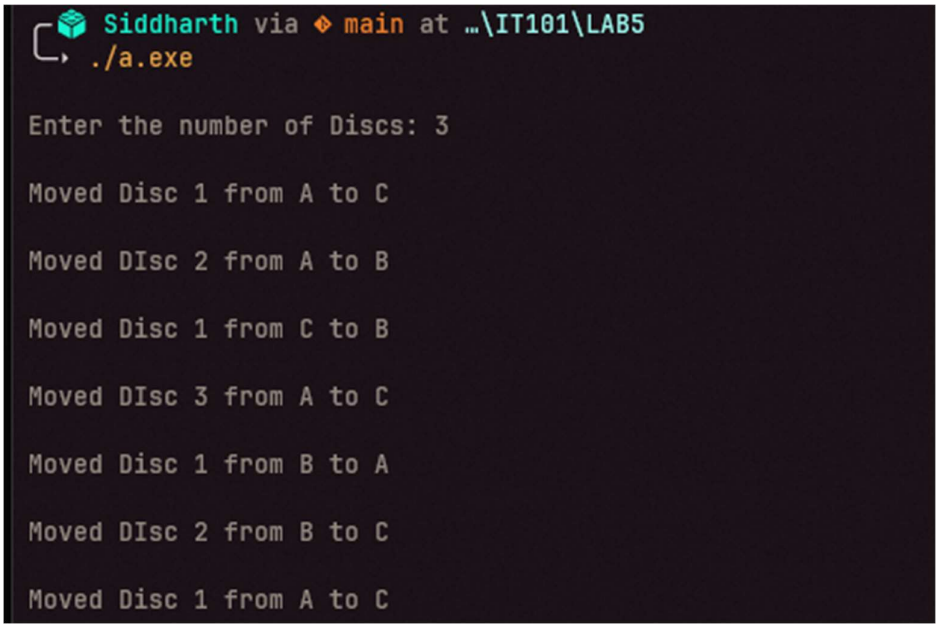


2. Hanoi Tower using Recursion:

Code:

```c
#include <stdio.h>

void moveDisc(int n, char A, char B, char C);

int main(){

    int n;
    printf("\nEnter the number of Discs: ");
    scanf("%d",&n);
    moveDisc(n,'A','B','C');
    return 0;
}

void moveDisc(int n, char A, char B, char C){
    if(n == 1){
        printf("\nMoved Disc %d from %c to %c\n",n,A,C);
        return;
    }
    else{
        moveDisc(n-1,A,C,B);
        printf("\nMoved DIsc %d from %c to %c\n",n,A,C);
        moveDisc(n-1,B,A,C);
    }
}
```

Output:



3.Printing Array using pointer:

Code:

```c
#include <stdio.h>

int main(){
    int n;

    printf("\n Enter N: ");
    scanf("%d",&n);

    int Arr[n];
    printf("\nEnter Elements: ");
    for(int i = 0; i<n;i++){
        scanf("%d",&Arr[i]);
    }

    int *pArr = Arr;

    for(int i = 0; i<n;i++){
        printf("%d ",*(pArr+i));
```

```
    }
    printf("\n");
    return 0;
}
```

Output:

```
Siddharth via ◆ main at …\IT101\LAB5
./a.exe

 Enter N: 5

Enter Elements: 1 2 3 4 5
1 2 3 4 5
```

4.Checking prime number using a efficient way:

Code:

```
#include <stdio.h>

int main(){
    int n;

    printf("\n Enter N: ");
    scanf("%d",&n);

    int count = 0;
    int temp = 5;

    if(n % 2 == 0 || n % 3 == 0){
        count += 1;
    }
    if (n % 6 == 0){
        count += 1;
    }
    while(temp < n){
        if(n%temp == 0){
            count += 1;
        }
        temp += 5;
    }
```

```
    if(count == 0){
        printf("\nPRIME!\n");
    }
    else{
        printf("\nNOT PRIME!\n");
    }
    return 0;
}
```

Output:

5.Solving Quadratic equations and printing values using pointers:

Code:

```
#include <stdio.h>
#include <math.h>

void quad(double ,double ,double , double * , double *);

int main(){
    double a,b,c;
    double r1,r2;
    //double *pr1 = &r1;
    //double *pr2 = &r2;

    printf("\nEnter a: ");
    scanf("%lf",&a);
    printf("\nEnter b: ");
    scanf("%lf",&b);
    printf("\nEnter c: ");
    scanf("%lf",&c);
```

```c
    quad(a,b,c,&r1,&r2);

    printf("\nthe roots of quadratic equations are: %lf %lf
\n",r1,r2);


    return 0;
}

void quad(double a,double b,double c , double *r1 , double
*r2){
    double d;
    double x = (b*b)-(4*a*c);
    d = sqrt(x);
    *r1 = ((-b) + d) / (2*a);
    *r2 = ((-b) - d) / (2*a);
}
```

Output:

```
Siddharth via ◆ main at …\IT101\LAB5
./a.exe

Enter a: 1

Enter b: 3

Enter c: 2

the roots of quadratic equations are: -1.000000 -2.000000
```

6.Printing Three names from array using pointers:

Code:

```c
#include <stdio.h>

int main(){
    char *Arr[] = {"Joseph","Vissarionovich","Stalin"};

    printf("\n");
    for(int i = 0; i<3;i++){
        printf("%s ",Arr[i]);
```

```
    }
    printf("\n");
    return 0;
}
```

Output: