1. Write a multifunction program to print the following patterns where number of rows is user input and must be read in main function. There should be separate function for each of the following patterns and note that, you cannot pass any data through parameters to those functions.

(a)
```
4444444
 33333
  222
   1
```

(b)
```
7654321
 54321
  321
   1
```

(c)
```
* * * * *
 * * *
  *
 * * *
* * * * *
```

problem2.c | problem3.c | exercise1.c | exercise2

```c
#include<stdio.h>//2204044
int line;//2204044
int patternA();//2204044
int patternB();//2204044
int patternC();//2204044
int main(){
  printf("Enter line number :");//22040
  scanf("%d",&line);//2204044
  patternA();//2204044
  patternB();//2204044
  patternC();//2204044
  return 0;//2204044
}
int patternA(){
  int i,j=line;
  printf("Pattern A:\n");//2204044
  while(j){
    for(int i=j*2-1;i>0;i--){
      printf("%d",j);//2204044
    }
    printf("\n");//2204044
    j--;//2204044
  }
}
int patternB(){
  int i,j=line;
  printf("\nPattern B:\n");//2204044
  while(j){
    for(int i=j*2-1;i>0;i--){
      printf("%d",i);//2204044
    }
    printf("\n");//2204044
    j--;
  }
}
```

"C:\Users\MohatamimHaque\

```
Enter line number :4
Pattern A:
4444444
33333
222
1

Pattern B:
7654321
54321
321
1

Pattern C:
*****
***
*
***
*****

Process returned 0 (0x0)   exec
Press any key to continue.
```

```c
int patternC(){
  int i,j=line+1;//2204044
  printf("\nPattern C:\n");//2204044
  while(j>1){
    for(int i=j;i>0;i--){
      printf("*");//2204044
    }
    printf("\n");//2204044
    j-=2;//2204044
  }
  while(j<=line+1){
    for(int i=j;i>0;i--){
      printf("*");//2204044
    }
    printf("\n");//2204044
    j+=2;//2204044
  }
}
```

2. Write a function to calculate the factorial value of any integer entered through the keyboard.

problem2.c | problem3.c | exercise1.c | exercise2

```c
#include<stdio.h>//2204044
int fact(int n);//2204044
int main(){
    int num;//2204044
    printf("Enter an Integer :");//2204
    scanf("%d",&num);//2204044
    printf("Factorial :%d",fact(num));/
    return 0;//2204044
}
int fact(int n){
    if(n>0){
        return n*fact(n-1);//2204044
    }
    return 1;//2204044
}
```

```
"C:\Users\MohatamimHaque\
Enter an Integer :8
Factorial :40320
Process returned 0 (0x0)   exec
Press any key to continue.
```

3. A prime integer is entered through the keyboard. Write a function to obtain the prime factors of this number. For example, prime factors of 24 are 2, 2, 2 and 3 whereas prime factor of 35 are 5 and 7.

problem2.c | problem3.c | exercise1.c | exercise2

```c
#include <stdio.h>//2204044
void primeFactor(int n);//2204044
int main(){
  int num;//2204044
  printf("Enter an Integer :");//220404
  scanf("%d",&num);//2204044
  printf("Prime Factor :");//2204044
  primeFactor(num);//2204044
  return 0;//2204044
}
void primeFactor(int n){
  if(n>=2){
    for(int i=2;i<=n;i++){
      if(n%i==0){
        printf("%d ",i);//2204044
        primeFactor(n/i);//2204044
        break;//2204044
      }
    }
  }
}
```

```
"C:\Users\MohatamimHaque\
Enter an Integer :48
Prime Factor :2 2 2 2 3
Process returned 0 (0x0)   exec
Press any key to continue.
```

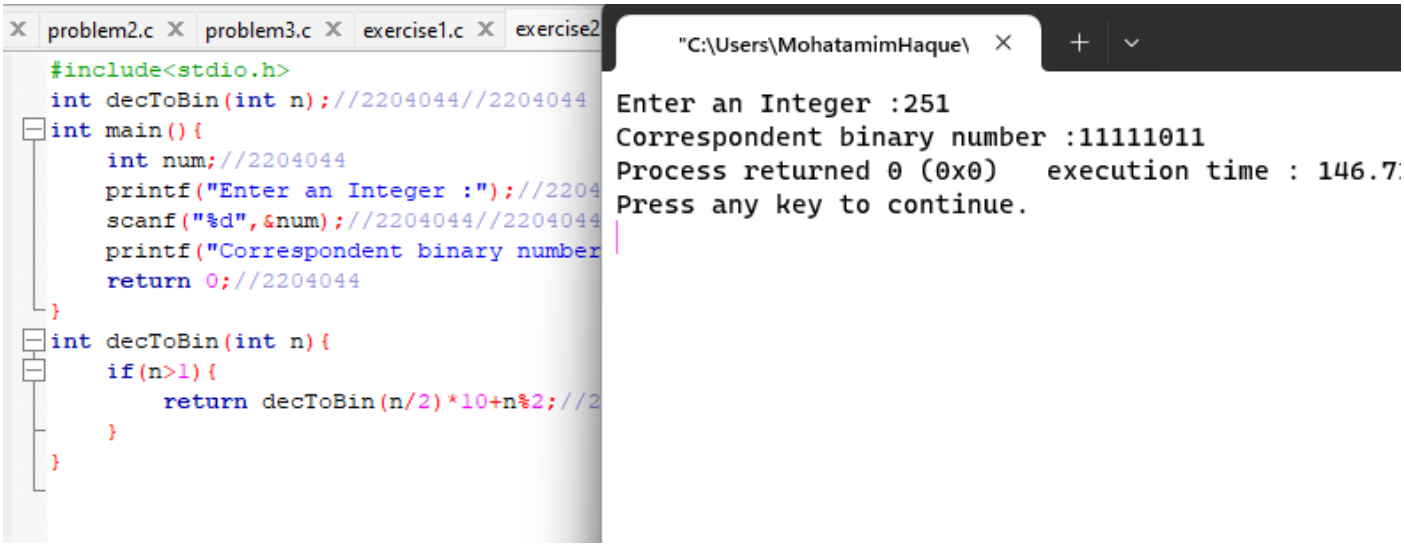
1. The series 0, 1, 1, 2, 3, 5, 8, 13, … is called the Fibonacci series. Here, $term_n = term_{n-1} + term_{n-2}$, for n>1, term0 = 0, term1 = 1. Write a program that finds the sum of first n terms of the series using recursion.

problem2.c | problem3.c | exercise1.c | exercise2

```c
#include <stdio.h>//2204044
int fibonacci(int n);//2204044
int main(){
  int num;//2204044
  printf("Enter Terms :");//2204044
  scanf("%d",&num);//2204044
  printf("First %d terms fibonacci Sum
  return 0;//2204044
}
int fibonacci(int n){
  static int a=0,b=1;//2204044
  if(n>0){
   int c=a;//2204044
   b=b+a;//2204044
   a=b-a;//2204044
   return c+fibonacci(n-1);//2204044
  }
  else return 0;//2204044
}
```

```
"C:\Users\MohatamimHaque\
Enter Terms :9
First 9 terms fibonacci Sum :54
Process returned 0 (0x0)   execution time : 9
Press any key to continue.
```

2. Convert a decimal number into correspondent binary number using recursion where decimal number is input from user.



problem2.c | problem3.c | exercise1.c | exercise2

```c
#include<stdio.h>
int decToBin(int n);//2204044//2204044
int main(){
    int num;//2204044
    printf("Enter an Integer :");//2204
    scanf("%d",&num);//2204044//2204044
    printf("Correspondent binary number
    return 0;//2204044
}
int decToBin(int n){
    if(n>1){
        return decToBin(n/2)*10+n%2;//2
    }
}
```

"C:\Users\MohatamimHaque\

```
Enter an Integer :251
Correspondent binary number :11111011
Process returned 0 (0x0)   execution time : 146.7
Press any key to continue.
```