Ans 1 - Given two numbers x and y find a product using recursion.

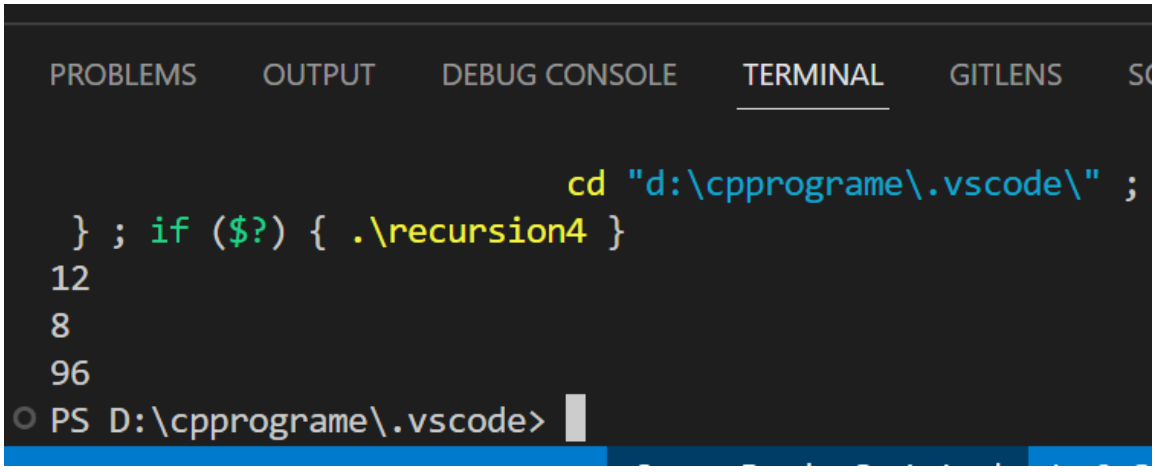
Input1 : x = 5, y = 2

Output1 : 10

.vscode > recursion4.cpp

```cpp
#include<iostream>
using namespace std;
int productOfTwoNumber(int x,int y){
    if(x==0 || y==0) return 0;
    return x+productOfTwoNumber(x,y-1);
}
int main(){
    int num1,num2;
    cin>>num1>>num2;
    cout<<productOfTwoNumber(num1,num2);

    return 0;
}
```



Ans 2 - Given a number n, check whether it's a prime number or not using recursion.

Input1 : n = 11. Output1 : Yes

Input2 : n = 15. Output2 : No

.vscode > recursion5.cpp

```cpp
#include<iostream>
using namespace std;
bool is_prime(int n, int i=2) {
    if (n <= 2)
        return (n == 2) ? true : false;
    if (n % i == 0)
        return false;
    if (i * i > n)
        return true;
    return is_prime(n, i + 1);
}

int main(){
    int n;
    cin>>n;
    int result=is_prime(n);
    if(result){
        cout<<"Yes";
    } else {
        cout<<"No";
    }

    return 0;
}
```

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  GITLENS

PS D:\cpprograme\.vscode> .\a.exe
15
No
PS D:\cpprograme\.vscode> g++ .\recursion5.cpp
PS D:\cpprograme\.vscode> .\a.exe
11
Yes
PS D:\cpprograme\.vscode>
```

Ans 3 - Given a decimal number as input, we need to write a program to convert the given decimal number into its equivalent binary number.

Input1 : 7. Output1 : 111

Input2 : 10. Output2 : 1010

.vscode > recursion6.cpp

```cpp
#include<iostream>
using namespace std;
void binary_number(int decimal_number){
    if(decimal_number==0) return;
    binary_number(decimal_number/2);
    cout<<decimal_number%2;
}
int main(){
    int number;
    cin>>number;
    binary_number(number);
    return 0;
}
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL GITLENS SQL

```
PS D:\cpprograme\.vscode> .\a.exe
10000
PS D:\cpprograme\.vscode> g++ .\recursion6.cpp
PS D:\cpprograme\.vscode> .\a.exe
7
111
PS D:\cpprograme\.vscode> g++ .\recursion6.cpp
PS D:\cpprograme\.vscode> .\a.exe
8
1000
PS D:\cpprograme\.vscode>
```

Ans 4 - Given the Binary code of a number as a decimal number, we need to convert this into its equivalent Gray Code. In gray code, only one bit is changed in 2 consecutive numbers.

Hint: The Most Significant Bit (MSB) of the gray code is always equal to the MSB of the given

binary code and other bits of the output gray code can be obtained by XORing binary code bit at that index and previous index.

.vscode > recursion6.cpp

```cpp
#include<iostream>
using namespace std;
int binary_to_gray(int n){
    if(!n) return 0;
    int a=n%10;
    int b=(n/10)%10;
    if((a && !b) || (!a && b)) return (1+10*binary_to_gray(n/10));
    return (10*binary_to_gray(n/10));
}
int main(){
    int number;
    cin>>number;
    cout<<binary_to_gray(number);
    return 0;
}
```

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  GITLENS

Unknown pseudo relocation protocol version %d.
PS D:\cpprograme\.vscode> cd "d:\cpprograme\.vscode
 } ; if ($?) { .\recursion6 }
1101100
1011010
PS D:\cpprograme\.vscode>
```