

PROGRAM 1

Write a recursive program,

a. To solve the Towers-of-Hanoi problem

b. To find GCD

```
//To find GCD
#include <iostream>
using namespace std;
int gcd(int a, int b)
{
    if (a == 0)
        return b;
    return gcd(b % a, a);
}

int main()
{
    int a,b;
    cout<<"Enter X : ";
    cin>>a;
    cout<<"Enter Y : ";
    cin>>b;
    cout<<"GCD of "<< a <<" and "<< b <<" is ";
    cout<<gcd(a,b);
    cout<<"\n\n";
}
//Output:
```

```
> clang++-7 -pthread -std=c++17 -o main main.cpp
> ./main
Enter X : 36
Enter Y : 6
GCD of 36 and 6 is 6
> █
```

```

❏ clang++-7 -pthread -std=c++17 -o main main.cpp
❏ ./main
1Enter X :108
Enter Y : 9
GCD of 108 and 9 is 9

❏ █

```

//To find solve the Towers-of-Hanoi problem code

```
#include<iostream>
```

```
using namespace std;
```

```
void hanoi(int disk,char source,char dest,char aux)
```

```

{
    if(disk==1)
    {
        cout<<" Move Disk "<<disk<<" From "<<source<<" to "<<dest<<endl<<endl;
        return;
    }
    hanoi(disk-1,source,aux,dest);
    cout<<" Move Disk "<<disk<<" From "<<source<<" to "<<dest<<endl<<endl;
    hanoi(disk-1,aux,dest,source);
}

```

```
int main()
```

```

{
    int disk;
    cout<<" Enter number of disks : ";
    cin>>disk;
    cout<<endl;
    hanoi(disk,'A','B','C');
    return 0;
}

```

//Output

```
> clang++-7 -pthread -std=c++17 -o main main.cpp
> ./main
Enter number of disks : 2

Move Disk 1 From A to C

Move Disk 2 From A to B

Move Disk 1 From C to B

> |
```

```
> clang++-7 -pthread -std=c++17 -o main main.cpp
> ./main
Enter number of disks : 3

Move Disk 1 From A to B

Move Disk 2 From A to C

Move Disk 1 From B to C

Move Disk 3 From A to B

Move Disk 1 From C to A

Move Disk 2 From C to B

Move Disk 1 From A to B

> |
```