- **Program Code:**

```
import java.io.*;
import java.math.*;
class rsa
{
public static void main(String args[])throws IOException
{

int q,p,n,pn,publickey=0,d=0,msg;
double cipher,ptext;
int check,check1;
BufferedReader in=new BufferedReader(new InputStreamReader(System.in));
System.out.println("ENTER NO");
p=Integer.parseInt(in.readLine());
q=Integer.parseInt(in.readLine());
check=prime(p);
check1=prime(q);
if(check!=1||check1!=1)
{
System.exit(0);
}
n=p*q;
pn=(p-1)*(q-1);
for(int e=2;e<pn;e++)
{
if(gcd(e,pn)==1)
{
publickey=e;
System.out.println("PUBLIC KEY :"+e);
break;
```

```
    }
    }
    for(int i=0;i<pn;i++)
    {
    d=i;
    if(((d*publickey)%pn)==1) break;
    }

    System.out.println("PRIVATE KEY :"+d);

    System.out.println("ENTER MESSAGE ");
    msg=Integer.parseInt(in.readLine());
    cipher=Math.pow(msg,publickey);
    cipher=cipher%n;
    System.out.println("ENCRYPTED  :"+cipher);
    ptext=Math.pow(cipher,d);
    ptext=ptext%n;
    System.out.println("DECRYPTED  :"+ptext);
    }
    static int prime(int a)
    {
    int flag=0;
    for(int i=2;i<a;i++)
    {
    if(a%i==0)
    {
    System.out.println(a+" is not a Prime Number");
    flag = 1;
    return 0;
    }
```

```
}
if(flag==0)
return 1;
return 1;
}
static int gcd(int number1, int number2)
{
if(number2 == 0)
{
return number1;
}
return gcd(number2, number1%number2);
}
}
```

- **Output:**

```
Output                                                    Clear
java -cp /tmp/5MDWywq86O rsa
ENTER NO
3
11
PUBLIC KEY :3
PRIVATE KEY :7
ENTER MESSAGE
20
ENCRYPTED  :14.0
DECRYPTED  :20.0
```