

```
package com.mycompany.discreteproject1;
```

```
import static java.lang.Math.pow;
```

```
import java.util.Scanner;
```

```
import java.math.BigInteger;
```

```
public class RSA {
```

```
    public static void main(String[] args) {
```

```
        int flag=0;
```

```
        int p=2;
```

```
        int q=2;
```

```
        Scanner s=new Scanner(System.in);
```

```
        System.out.println("Enter TWO distinct upper limits for the two primes p , q: ");
```

```
        System.out.print("Upper limit for p:");
```

```
        int maxp=s.nextInt();
```

```
        for(int i=2;i<maxp;i++)
```

```
        {
```

```
            for(int k=2;k<i;k++)
```

```
            {
```

```
                if(i%k==0)
```

```
                {
```

```
                    flag=1;
```

```
                    break;
```

```
                }
```

```
            }
```

```
            if(flag==0)
```

```
{  
  
    if(i>p)  
    {  
        p=i;  
    }  
  
}  
flag=0;  
}
```

```
System.out.print("Upper limit for q:");
```

```
int maxq=s.nextInt();
```

```
for(int i=2;i<=maxq;i++)
```

```
{  
    for(int k=2;k<i;k++)
```

```
{  
    if(i%k==0)
```

```
{  
    flag=1;  
    break;
```

```
}
```

```
}
```

```
if(flag==0)
```

```
{  
    if(i>q)
```

```
{  
    q=i;
```

```
}
```

```
}  
flag=0;  
}
```

```
System.out.println("p= "+p); //secret key  
System.out.println("q= "+q); //secret key
```

```
int n=p*q; //public key  
System.out.println("n= "+n);
```

```
int m=(p-1)*(q-1); //secret key  
System.out.println("m= "+m);
```

```
int e;  
for(e=1;e<=m;e++)  
{  
    if(m%e!=0)  
    {  
        System.out.println("e= "+e); //public key  
        break;  
    }  
}
```

```
int de;  
int d = 0;  
for(int k=0;k>=0;k++)  
{  
    de=(m*k)+1;
```

```

        if(de%e==0)
        {
            d=((m*k)+1)/e;
            System.out.println("d= "+d);
            break;
        }
    }
}

```

```

System.out.print("Enter original Message:");
s.nextLine();
String h=s.nextLine();
    BigInteger a,b,t,g,enc;
a=BigInteger.valueOf(n);
b=BigInteger.valueOf(e);
t=BigInteger.valueOf(d);
String decrypt[]=new String[h.length()];
    System.out.print("Encrypted Message: ");
    for(int i=0;i<h.length();i++){
        char o=h.charAt(i);
        int ascinum=(int)o;
        String asc=String.valueOf(ascinum);
        g=new BigInteger(asc);
        enc=g.modPow(b, a);
        decrypt[i]=enc.toString();
        System.out.print(new String(enc.toByteArray()));
    }
    System.out.print("\nDecrypted Message: ");

```

```
    for(int i=0;i<h.length();i++){  
        String dy=decrypt[i];  
        g=new BigInteger(dy);  
        enc=g.modPow(t, a);  
        System.out.print(new String(enc.toByteArray()));  
    }  
  
}  
  
}
```