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import java.math.BigInteger;
import java.util.*;

class rsa
{
    public static void main(String args[])
    {
        Scanner ip=new Scanner(System.in);
        int p,q,n,e=1,j;
        int d=1,i1;
        int t1,t2;

        int pt[]= new int[10];
        int ct[]= new int[10];
        int rt[]= new int[10];
        int temp[]= new int[10];

        String i=new String();

        System.out.println("Enter the two prime numbers:");
        p=ip.nextInt();
        q=ip.nextInt();

        System.out.println("Enter the message to be sent");
        i=ip.next();

        i1=i.length();
        n=p*q;
        t1=p-1;
        t2=q-1;

        System.out.println("\n-----");
        System.out.println("Sender Side:");

        while((t1*t2)%e==0)
        {
            e++;
        }

        System.out.println("Public Key(e)= "+e);
        System.out.println("-----");

        for(j=0;j<i1;j++)
        {

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        pt[j]=(i.charAt(j))-96;
//      System.out.println("Plain Text= "+pt[j]);
        ct[j]=((int)Math.pow(pt[j],e))%n;
        System.out.println("Cipher Text= "+ct[j]);
    }

    System.out.println("\nTransmitted Message:");
    for(j=0;j<i1;j++)
    {
        temp[j]=ct[j]+96;
        System.out.print((char)temp[j]);
    }

    System.out.println("\n\n-----");
    System.out.println("Receiver Side:");
    while((d*e)%(t1*t2)!=1)
    {
        d++;
    }
    System.out.println("Private Key(d)= "+d);
    System.out.println("-----");

    for(j=0;j<i1;j++)
    {
        //System.out.println("cipher Text= "+ct[j]);
        BigInteger very_big_no = BigInteger.valueOf(ct[j]);
        very_big_no = very_big_no.pow(d);
        very_big_no = very_big_no.mod(BigInteger.valueOf(n));
        rt[j] = very_big_no.intValue();
        System.out.println("Plain Text= "+rt[j]);
    }

    System.out.println("\n-----");
    System.out.println("Decrypted Message:");
    for(j=0;j<i1;j++)
    {
        rt[j]=rt[j]+96;
        System.out.print((char)rt[j]);
    }
    System.out.println("\n\n-----");
    ip.close();
}
}

```