Program 1:-Implement Casear Cipher

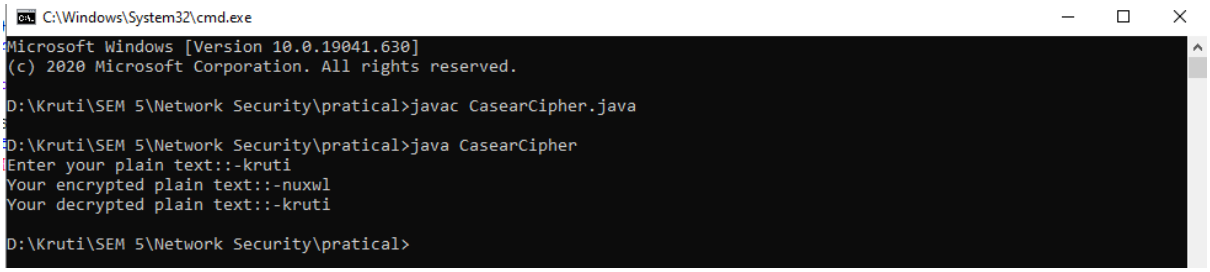
Code:-

```
import java.util.*;
class CasearCipher
{
	public static String encryption(String str)
	{
		String enc_text="";
		for(int i=0;i<str.length();i++)
		{
			char ch=str.charAt(i);
			if(Character.isUpperCase(ch))
			{
				int asc_ch=(((int)ch+3)-65)%26+65;
				enc_text=enc_text+(char)asc_ch;

			}
			else
			{
				int asc_ch=(((int)ch+3)-97)%26+97;
				enc_text=enc_text+(char)asc_ch;
			}
		}
		return  enc_text;
	}
		public static String decryption(String str)
	{
```

```
        String enc_text="";
        for(int i=0;i<str.length();i++)
        {
                char ch=str.charAt(i);
                if(Character.isUpperCase(ch))
                {
                        int asc_ch=(((int)ch-3)-65)%26+65;
                        enc_text=enc_text+(char)asc_ch;

                }
                else
                {
                        int asc_ch=(((int)ch-3)-97)%26+97;
                        enc_text=enc_text+(char)asc_ch;
                }
        }
        return  enc_text;
}
public static void main(String args[])
{
        Scanner s=new Scanner(System.in);
        System.out.print("Enter your plain text::-");
        String str=s.nextLine();
        String enc_text=encryption(str);
        System.out.println("Your encrypted plain text::-"+enc_text);
        String dec_text=decryption(enc_text);
        System.out.println("Your decrypted plain text::-"+dec_text);
```

```
    }
}
```

Output:-



Program 2:-Implement Substitution Cipher

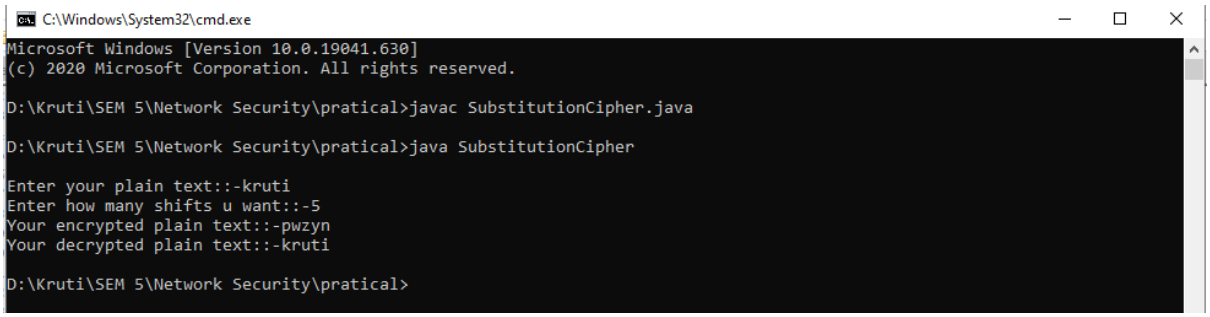
Code:-

```
import java.util.*;
class SubstitutionCipher
{
    public static String encryption(String str,int n)
    {
        String enc_text="";
        for(int i=0;i<str.length();i++)
        {
            char ch=str.charAt(i);
            if(Character.isUpperCase(ch))
            {
                int asc_ch=(((int)ch+n)-65)%26+65;
                enc_text=enc_text+(char)asc_ch;

            }
            else
            {
                int asc_ch=(((int)ch+n)-97)%26+97;
```

```
                enc_text=enc_text+(char)asc_ch;
            }
        }
        return  enc_text;
}
        public static String decryption(String str,int n)
{
        String enc_text="";
        for(int i=0;i<str.length();i++)
        {
            char ch=str.charAt(i);
            if(Character.isUpperCase(ch))
            {
                int asc_ch=(((int)ch-n)-65)%26+65;
                enc_text=enc_text+(char)asc_ch;

            }
            else
            {
                int asc_ch=(((int)ch-n)-97)%26+97;
                enc_text=enc_text+(char)asc_ch;
            }
        }
        return  enc_text;
}
public static void main(String args[])
{
```

```
            Scanner s=new Scanner(System.in);
            System.out.print("\nEnter your plain text::-");
            String str=s.nextLine();
            System.out.print("Enter how many shifts u want::-");
            int n=s.nextInt();
            String enc_text=encryption(str,n);
            System.out.println("Your encrypted plain text::-"+enc_text);
            String dec_text=decryption(enc_text,n);
            System.out.println("Your decrypted plain text::-"+dec_text);
        }
}
```

Output:-



Program 3:-Implement Transposition Cipher

Code:-

```
import java.util.*;
class Transposition
{
        public static void main(String args[])throws Exception
        {
            Scanner sc=new Scanner(System.in);
            System.out.println("enter key(of unique alphabets):");
```

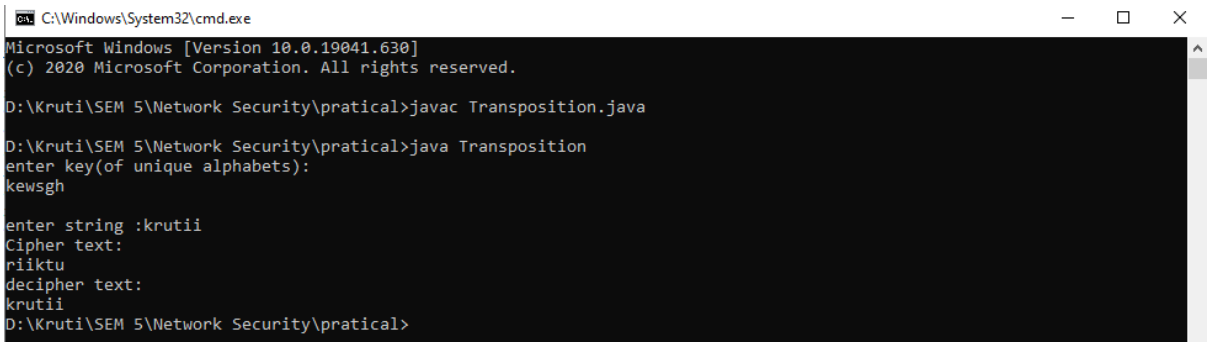
```
String k=sc.nextLine();
char[] key=k.toCharArray();
char[] temp_key=new char[key.length];
System.arraycopy(key,0,temp_key,0,key.length);
Arrays.sort(temp_key);
System.out.print("\nenter string :");
String t=sc.nextLine();
char[] str=t.toCharArray();
for(int i=0;i<str.length;i++)
{
	if(str[i]==' ')
		str[i]='$';
}
int index=0,row;
if(((str.length)%(key.length))==0)
	row=((str.length)/(key.length));
else
	row=((str.length)/(key.length))+1;
char[] cipher=new char[(row*(key.length))];
int ci=0;
while(ci<(row*(key.length)))
{
	for(int i=0;i<key.length;i++)
	{
	index=0;
	for(int j=0;j<key.length;j++)
	{
```

```
                    if(temp_key[i]==key[j])
                    {
                        index=j;
                        int l=0;
                        while(l<row)
                        {
                            if(index<str.length)
                            {
                            cipher[ci]=str[index];
                            ci++;
                            l++;
                            index=index+(key.length);
                            }
                            else
                            {
                                cipher[ci]='!';
                                ci++;
                                l++;
                            }
                        }
                        break;
                    }
                }
                }
}
System.out.println("Cipher text:");
for(int i=0;i<cipher.length;i++)
```

```
{
        System.out.print(cipher[i]);
}
char[] decipher=new char[cipher.length];
int di=0;
int l=0;
while(di<cipher.length)
{
        for(int i=0;i<key.length;i++)
        {
        index=0;
                for(int j=0;j<key.length;j++)
                {
                        if(key[i]==temp_key[j])
                        {
                                index=((j)*row)+l;
                                decipher[di]=cipher[index];
                                if(decipher[di]=='$')
                                        decipher[di]=' ';
                                if(decipher[di]=='!')
                                        decipher[di]='\0';
                                di++;
                                break;
                        }
                }
        }
        l++;
```

```
        }
        System.out.println("\ndecipher text:");
        for(int i=0;i<cipher.length;i++)
        {
            System.out.print(decipher[i]);
        }
    }
}
```

Output:-



Program 4:-Implement P-BOX

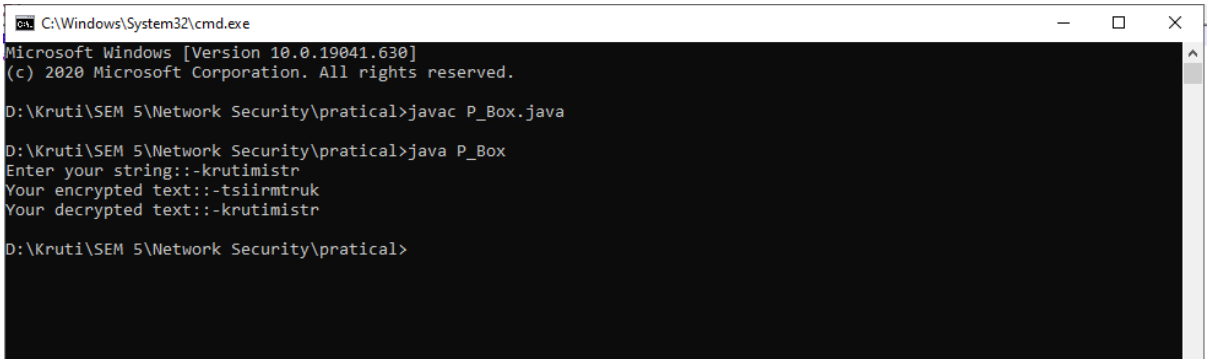
Code:-

```
import java.util.*;
class P_Box
{
    static String encryption(String msg)
    {
        byte arr[]=new byte[10];
        byte msg_arr[]=new byte[10];
        msg_arr=msg.getBytes();
        arr[0]=msg_arr[8];
        arr[1]=msg_arr[7];
        arr[2]=msg_arr[6];
```

```
        arr[3]=msg_arr[4];
        arr[4]=msg_arr[9];
        arr[5]=msg_arr[5];
        arr[6]=msg_arr[3];
        arr[7]=msg_arr[1];
        arr[8]=msg_arr[2];
        arr[9]=msg_arr[0];
        return(new String(arr));
}
static String decryption(String msg)
{
        byte arr[]=new byte[10];
        byte msg_arr[]=new byte[10];

        msg_arr=msg.getBytes();
        arr[0]=msg_arr[9];
        arr[1]=msg_arr[7];
        arr[2]=msg_arr[8];
        arr[3]=msg_arr[6];
        arr[4]=msg_arr[3];
        arr[5]=msg_arr[5];
        arr[6]=msg_arr[2];
        arr[7]=msg_arr[1];
        arr[8]=msg_arr[0];
        arr[9]=msg_arr[4];
```

```
            return(new String(arr));


        }
        public static void main(String args[])
        {
            Scanner s=new Scanner(System.in);
            System.out.print("Enter your string::-");
            String msg=s.nextLine();
            String encryption_txt=encryption(msg);
            System.out.println("Your encrypted text::-"+encryption_txt);
            String decryption_txt=decryption(encryption_txt);
            System.out.println("Your decrypted text::-"+decryption_txt);
        }


}
```

Output:-



Program 5:-Implement S-BOX

Code:-

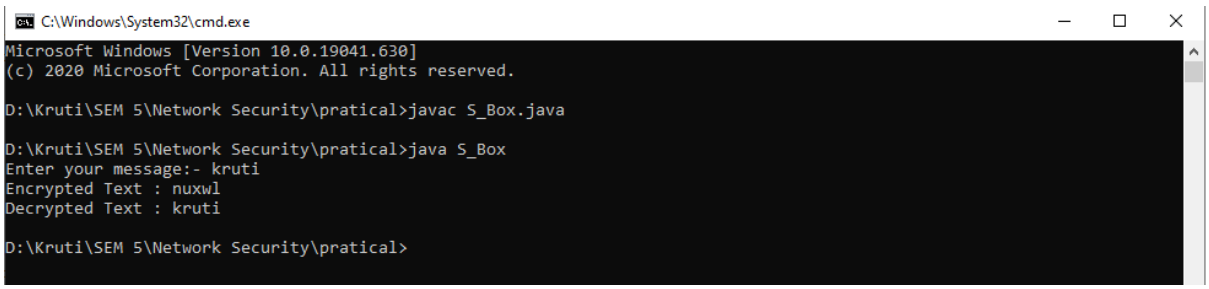
```
import java.util.*;
class S_Box{
```

```
char key[][];
Random r;
S_Box(){
	r=new Random();
	int add=r.nextInt(5);
	key=new char[52][2];
	char temp='A',ch;
	for(int i=0;i<key.length;i++,temp++){
		if(temp<='Z' && temp>='A'){
			ch=(char)(temp+add);
			if(ch>'Z'){
				ch=(char)(ch-'Z'+'A'-1);
			}
			key[i][0]=(char)temp;
			key[i][1]=(char)(ch);
			if(temp=='Z'){
				temp=(char)('a'-1);
			}
		}
		else if(temp<='z' && temp>='a'){
			ch=(char)(temp+add);
			if(ch>'z'){
				ch=(char)(ch-'z'+'a'-1);
			}
			key[i][0]=(char)temp;
			key[i][1]=(char)(ch);
		}
```

```
        }
    }
    public String doEncryption(String s){
        String cipherText="";
        for(int i=0;i<s.length();i++){
            for(int j=0;j<key.length;j++){
                if(s.charAt(i)==key[j][0]){
                    cipherText+=key[j][1];
                }
            }
        }
        return cipherText;
    }
    public void doDecryption(String s){
        String plainText="";
        for(int i=0;i<s.length();i++){
            for(int j=0;j<key.length;j++){
                if(s.charAt(i)==key[j][1]){
                    plainText+=key[j][0];
                }
            }
        }
        System.out.println("Decrypted Text : " + plainText);
    }
    public static void main(String args[]){
        S_Box s=new S_Box();
        Scanner sc=new Scanner(System.in);
```

```
            System.out.print("Enter your message:- ");
            String plaintext=sc.nextLine();
            String encrypted = s.doEncryption(plaintext);
            System.out.println("Encrypted Text : " + encrypted);
            s.doDecryption(encrypted);
        }
}
```

Output:-



Program 6:-Implement One Time Pad using XOR

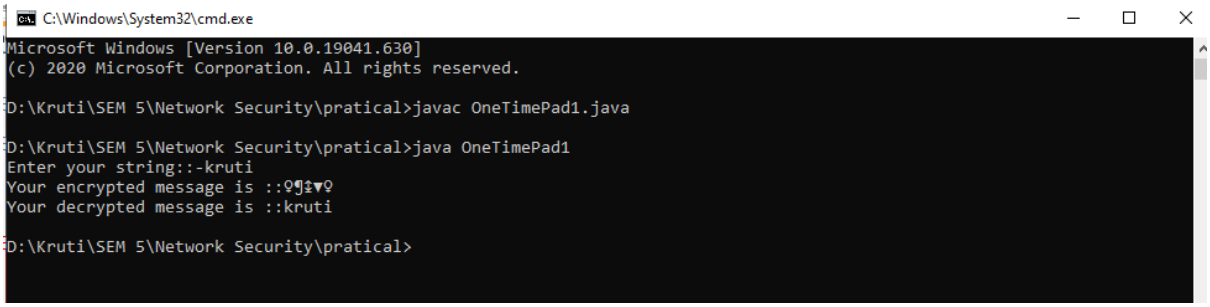
Code:-

```
import java.util.*;
class OneTimePad1
{
        static String generate_key(String msg)
        {
            String key="";
            Random str_ascii=new Random();

            for(int i=0;i<msg.length();i++)
            {
                int n=str_ascii.nextInt(26);
                key=key+(char)(n+97);
```

```
        }
        return key;

}
static String encryption(String msg,String k)
{
        String enc_text="";
        for(int i=0;i<msg.length();i++)
        {
                char enc_val=(char)(msg.charAt(i)^k.charAt(i));
                enc_text=enc_text+enc_val;
        }
        return enc_text;
}
static String decryption(String msg,String k)
{
        String dec_text="";
        for(int i=0;i<msg.length();i++)
        {
                char dec_val=(char)(msg.charAt(i)^k.charAt(i));
                dec_text=dec_text+dec_val;
        }
        return dec_text;
}
public static void main(String[]args)
{
        Scanner s=new Scanner(System.in);
```

```
            System.out.print("Enter your string::-");
            String message=s.nextLine();
            String key=generate_key(message);
            String encrypted_msg=encryption(message,key);
            System.out.println("Your encrypted message is ::"+encrypted_msg);
            String decrypted_msg=decryption(encrypted_msg,key);
            System.out.println("Your decrypted message is ::"+decrypted_msg);

        }
}
```

Output:-



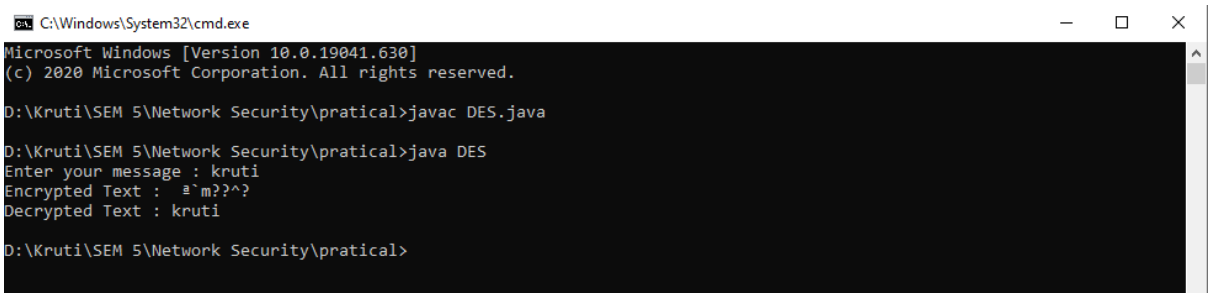
Program 7:-Implement DES

Code:-

```
import javax.crypto.*;
import javax.crypto.spec.*;
import java.util.Scanner;
class DES{
        private SecretKey secretKey;
        DES() throws Exception{
                secretKey=KeyGenerator.getInstance("DES").generateKey();
        }
        private byte[] doEncryption(String plainText) throws Exception{
```

```
            Cipher cipher=Cipher.getInstance("DES");
            cipher.init(Cipher.ENCRYPT_MODE,secretKey);
            return cipher.doFinal(plainText.getBytes());
        }
        private byte[] doDecryption(String cipherText) throws Exception{
            Cipher cipher=Cipher.getInstance("DES");
            cipher.init(Cipher.DECRYPT_MODE,secretKey);
            return cipher.doFinal(cipherText.getBytes());
        }
        public static void main(String args[]) throws Exception{
            Scanner sc=new Scanner(System.in);
            System.out.print("Enter your message : ");
            String plainText=sc.nextLine();
            DES DES=new DES();
            String cipherText=new String(DES.doEncryption(plainText));
            System.out.println("Encrypted Text : " + cipherText);
            System.out.println("Decrypted Text : " + new
String(DES.doDecryption(cipherText)));
        }
}
```

Output:-



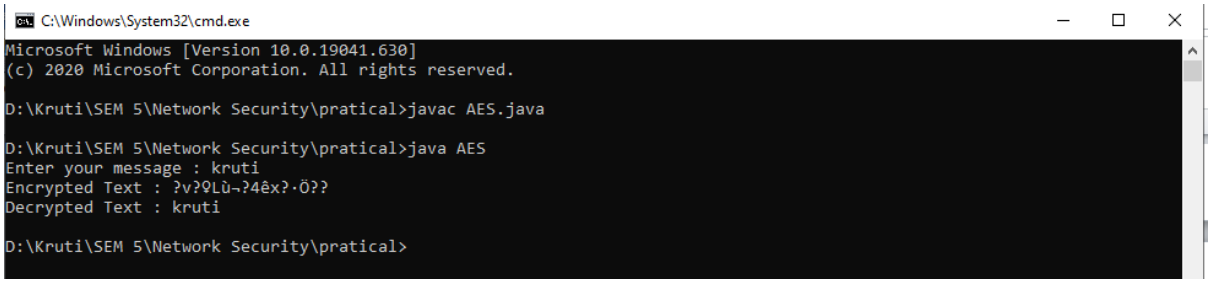
Program 8:-Implement AES

Code:-

```
import javax.crypto.*;
import javax.crypto.spec.*;
import java.util.Scanner;
class AES{
	private byte[] key;
	AES(){
		key="kHFlksfddsaKHBDS".getBytes();
	}
	private byte[] doEncryption(String plainText) throws Exception{
		SecretKeySpec secretKey=new SecretKeySpec(key,"AES");
		Cipher cipher=Cipher.getInstance("AES");
		cipher.init(Cipher.ENCRYPT_MODE,secretKey);
		return cipher.doFinal(plainText.getBytes());
	}
	private byte[] doDecryption(String cipherText) throws Exception{
		SecretKeySpec secretKey=new SecretKeySpec(key,"AES");
		Cipher cipher=Cipher.getInstance("AES");
		cipher.init(Cipher.DECRYPT_MODE,secretKey);
		return cipher.doFinal(cipherText.getBytes());
	}
	public static void main(String args[]) throws Exception{
		Scanner sc=new Scanner(System.in);
		System.out.print("Enter your message : ");
		String plainText=sc.nextLine();
		AES aes=new AES();
```

```
            String cipherText=new String(aes.doEncryption(plainText));
            System.out.println("Encrypted Text : " + cipherText);
            System.out.println("Decrypted Text : " + new
String(aes.doDecryption(cipherText)));
        }
}
```

Output:-



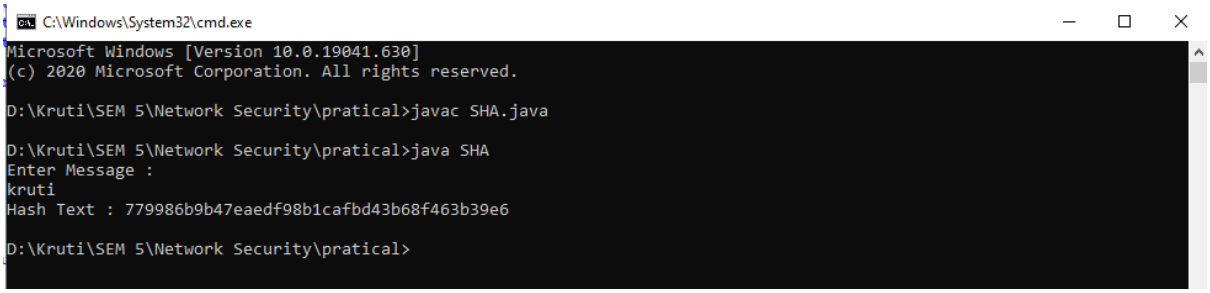
Program 9:-Implement SHA

Code:-

```
import java.util.Scanner;
import java.math.*;
import java.security.*;
class SHA{
        private String doEncryption(String text) throws Exception{
                MessageDigest md=MessageDigest.getInstance("SHA-1");
                byte[] msg=md.digest(text.getBytes());
                BigInteger bigInt=new BigInteger(1,msg);
                String hashValue=bigInt.toString(16);
                while(hashValue.length()<32)
                        hashValue+=0+hashValue;
                return hashValue;
        }
        public static void main(String args[]) throws Exception{
```

```
            SHA sha=new SHA();
            Scanner sc=new Scanner(System.in);
            System.out.println("Enter Message : ");
            String text=sc.nextLine();
            System.out.println("Hash Text : " + sha.doEncryption(text));
        }
}
```

Output:-



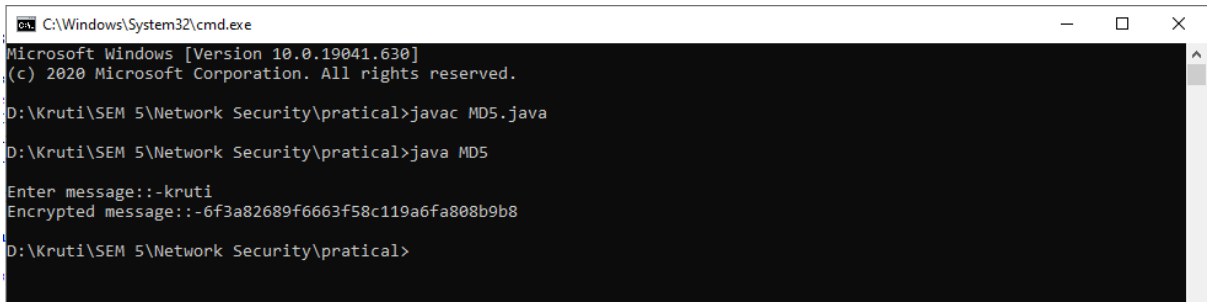
Program 10:-Implement MD5

Code:-

```
import java.util.Scanner;
import java.math.*;
import java.security.*;
class MD5
{
        static String encryption(String message)throws Exception
        {
            MessageDigest md=MessageDigest.getInstance("MD5");
            byte[] msg=md.digest(message.getBytes());
            BigInteger b=new BigInteger(1,msg);
            String hashval=b.toString(16);
            while(hashval.length()<32)
```

```
            {
                hashval+=0+hashval;
            }
            return hashval;
        }
        public static void main(String args[])throws Exception
        {
            Scanner s=new Scanner(System.in);
            System.out.print("\nEnter message::-");
            String msg=s.nextLine();
            String enc=encryption(msg);
            System.out.println("Encrypted message::-"+enc);

        }
}
```

Output:-



Program 11:-Implement RSA

Code:-

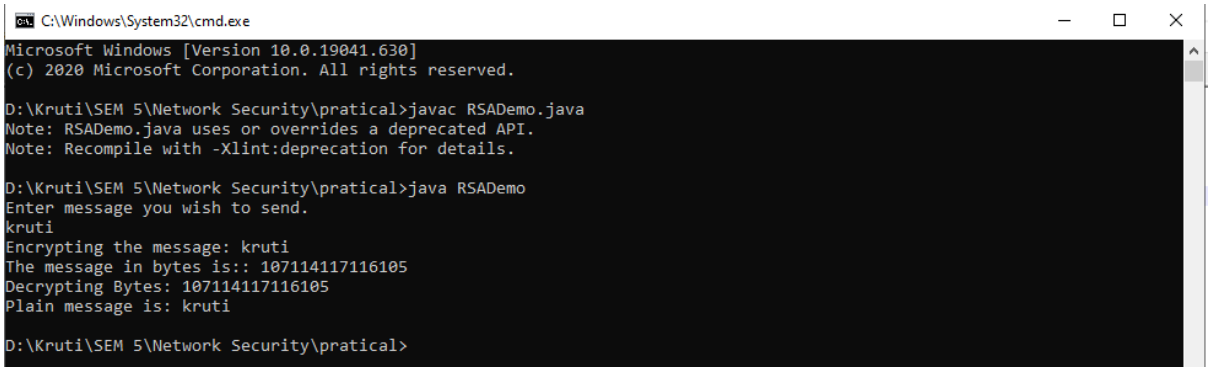
```
import java.io.DataInputStream;
import java.io.IOException;
import java.math.BigInteger;
import java.util.Random;
```

```
public class RSADemo{
    private BigInteger P;
    private BigInteger Q;
    private BigInteger N;
    private BigInteger PHI;
    private BigInteger e;
    private BigInteger d;
    private int maxLength = 1024;
    private Random R;
    public RSADemo(){
        R = new Random();
        P = BigInteger.probablePrime(maxLength, R);
         Q = BigInteger.probablePrime(maxLength, R);
        N = P.multiply(Q);
       PHI = P.subtract(BigInteger.ONE).multiply(  Q.subtract(BigInteger.ONE));
        e = BigInteger.probablePrime(maxLength / 2, R);
        while (PHI.gcd(e).compareTo(BigInteger.ONE) > 0 && e.compareTo(PHI) < 0)
        {
            e.add(BigInteger.ONE);
        }
        d = e.modInverse(PHI);
    }

    public RSADemo(BigInteger e, BigInteger d, BigInteger N)
    {
        this.e = e;
        this.d = d;
```

```
    this.N = N;
}

public static void main (String [] arguments) throws IOException
{
    RSADemo rsa = new RSADemo();
    DataInputStream input = new DataInputStream(System.in);
    String inputString;
    System.out.println("Enter message you wish to send.");
    inputString = input.readLine();
    System.out.println("Encrypting the message: " + inputString);
    System.out.println("The message in bytes is:: "
            + bToS(inputString.getBytes()));
    // encryption
    byte[] cipher = rsa.encryptMessage(inputString.getBytes());
    // decryption
    byte[] plain = rsa.decryptMessage(cipher);
    System.out.println("Decrypting Bytes: " + bToS(plain));
    System.out.println("Plain message is: " + new String(plain));
}

private static String bToS(byte[] cipher)
{
    String temp = "";
    for (byte b : cipher)
    {
        temp += Byte.toString(b);
```

```
        }
        return temp;
    }

    // Encrypting the message
    public byte[] encryptMessage(byte[] message)
    {
        return (new BigInteger(message)).modPow(e, N).toByteArray();
    }

    // Decrypting the message
    public byte[] decryptMessage(byte[] message)
    {
        return (new BigInteger(message)).modPow(d, N).toByteArray();
    }
}
```

Output:-



Program 12:-Implement RSA

Code:-

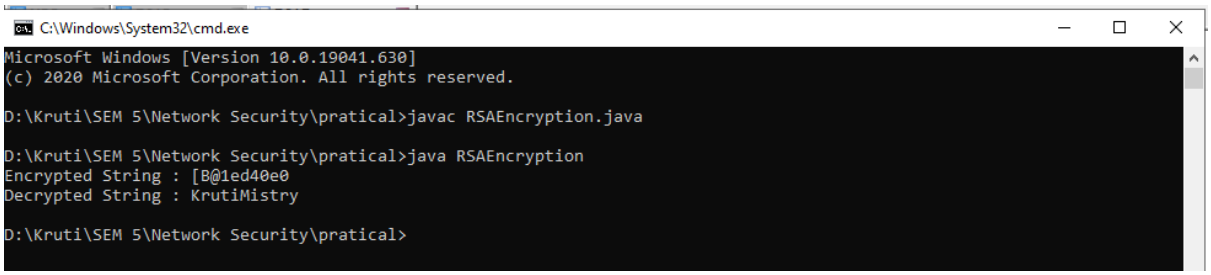
```
import java.security.*;
import javax.crypto.*;
```

```
import javax.crypto.spec.*;
class RSAEncryption
{
 public KeyPairGenerator keygenerator;
 public KeyPair myKey;
 Cipher c;
 public RSAEncryption() throws Exception
 {
  // Genrate the Key
  keygenerator = KeyPairGenerator.getInstance("RSA");
  keygenerator.initialize(1024) ;
  myKey = keygenerator.generateKeyPair();



  // Create the cipher
  c = Cipher.getInstance("RSA");



 }
 public byte[] doEncryption(String s) throws Exception
 {

     // Initialize the cipher for encryption
     c.init(Cipher.ENCRYPT_MODE,myKey.getPublic());

   //sensitive information
```

```
    byte[] text = s.getBytes();

  // Encrypt the text
    byte[] textEncrypted = c.doFinal(text);

  return(textEncrypted);
}
public String doDecryption(byte[] s)throws Exception
{

    // Initialize the same cipher for decryption
  c.init(Cipher.DECRYPT_MODE,myKey.getPrivate());

    // Decrypt the text
    byte[] textDecrypted = c.doFinal(s);

  return(new String(textDecrypted));
}

public static void main(String[] argv) throws Exception
{
   RSAEncryption d=new RSAEncryption();
  byte[] str=d.doEncryption("KrutiMistry");
  System.out.println("Encrypted String : "+str);
  System.out.println("Decrypted String : "+d.doDecryption(str));

}
```

}

Output:-



Program 13:- Implement authentication Service. The sender sends password in encrypted format to the receiver, the receiver checks the password (after decrypting) in its database/array and replies back as success or failure.

Code:-

Sender Side:-

```
import java.io.*;
import java.net.*;
import java.util.*;
class Ass2Prog1SenderSide_Otp
{
	static String serverside_msg(byte[] arr)
	{

		String dec_txt=" ";
		int i=0;
		while(arr[i]!=0)
		{
			dec_txt= dec_txt+(char)arr[i];
			i++;
```

```
            }

            return dec_txt;
        }
        static void generate_key(String msg)
        {
            String key="";
            Random str_ascii=new Random();

            for(int i=0;i<msg.length();i++)
            {
                int n=str_ascii.nextInt(26);
                key=key+(char)(n+97);
            }
            try
            {
      FileWriter fw=new FileWriter("programkey.txt");
      fw.write(key);
      fw.close();
    }
            catch(Exception e)
            {
                System.out.println(e);
            }
    System.out.println("Successfully written...");
}
```

```
static String read_data() throws IOException
{
	Scanner s=new Scanner(System.in);
	String filename=s.nextLine();
	int ch;
	String str="";
	FileInputStream in=new FileInputStream(filename +".txt");
	while((ch=in.read())!=-1)
	{
		str=str+(char)ch;
	}
	in.close();
	return str;
}
static String encryption(String msg)throws IOException
{
	System.out.print("\nEnter the file name for fetching key for encryption::-");
	String k=read_data();
	String enc_text="";
	for(int i=0;i<msg.length();i++)
	{
		char enc_val=(char)(msg.charAt(i)^k.charAt(i));
		enc_text=enc_text+enc_val;
	}
	return enc_text;
}
public static void main(String args[])throws Exception
```

```
        {


                Scanner s=new Scanner(System.in);

                System.out.print("Enter the password::-");

                String str=s.nextLine();

                generate_key(str);

                String enc_text=encryption(str);


                DatagramSocket data_socket=new DatagramSocket(6789);

                InetAddress ip=InetAddress.getLocalHost();

                byte s_arr[]=null;

                s_arr=enc_text.getBytes();

                DatagramPacket data_packet=new
DatagramPacket(s_arr,s_arr.length,ip,1234);

                data_socket.send(data_packet);

                byte[] r_arr=new byte[65335];

                data_packet=new DatagramPacket(r_arr,r_arr.length);

                data_socket.receive(data_packet);

                System.out.println("\nServer Side message::-"+serverside_msg(r_arr));


        }

}
```

Receiver Side:-

```
import java.io.*;

import java.net.*;

import java.util.*;

import java.sql.*;
```

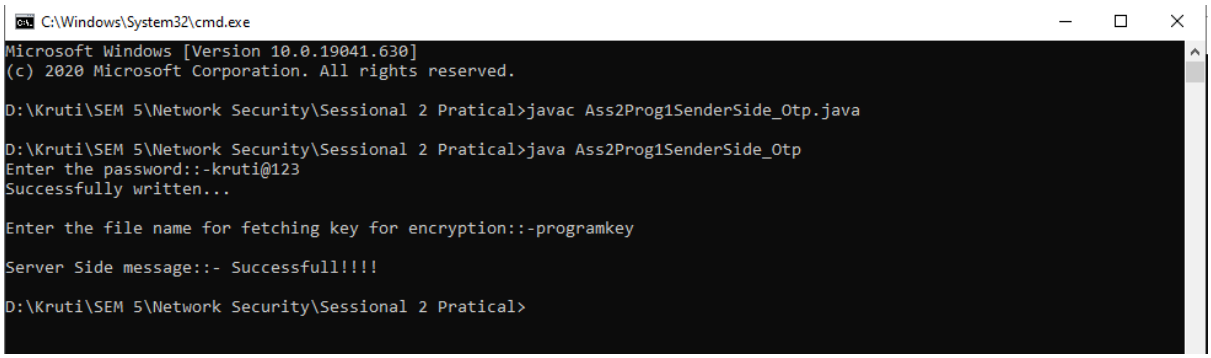
```
class Ass2Prog1ReceiverSide_Otp
{

	static String read_data() throws IOException
	{
		Scanner s=new Scanner(System.in);
		String filename=s.nextLine();
		int ch;
		String str="";
		FileInputStream in=new FileInputStream(filename +".txt");
		while((ch=in.read())!=-1)
		{
			str=str+(char)ch;
		}
		in.close();
		return str;
	}
	static String client_msg(byte[] arr)
	{
		String enc_txt="";
		if(arr==null)
			return null;
		int i=0;
		while(arr[i]!=0)
		{
			enc_txt=enc_txt+(char)arr[i];
			i++;
```

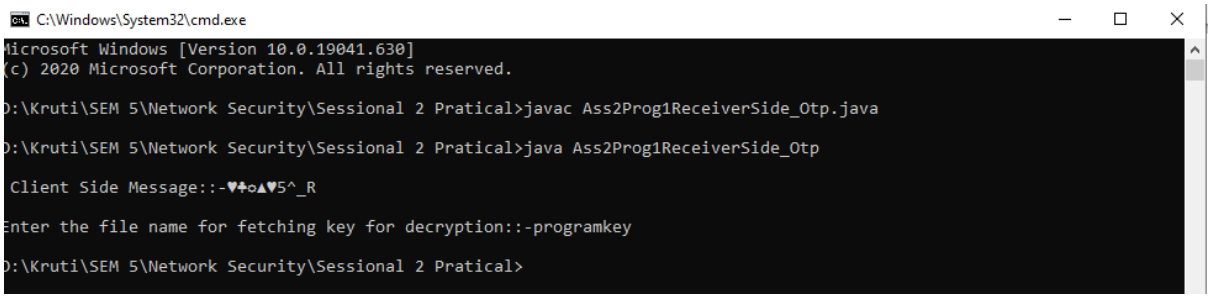
```
        }
        return enc_txt;
}
static String passwordCheck(String password)
{
        String msg="";
        String[] arr={"kruti@123","rekha","shivam","nilay@26","vishva"};
        for(int i=0;i<arr.length;i++)
        {
                String str=arr[i];

                if(password.equals(str))
                {
                        msg="Successfull!!!!";
                        break;
                }
                else
                {
                        msg="Unsuccessfull!!!";
                }
        }
        return msg;
}
static String decryption(String msg)throws IOException
{
        System.out.print("\nEnter the file name for fetching key for decryption::-");
        String k=read_data();
```

```
        String dec_text="";
        for(int i=0;i<msg.length();i++)
        {
                char dec_val=(char)(msg.charAt(i)^k.charAt(i));
                dec_text=dec_text+dec_val;
        }
        return dec_text;
}

public static void main(String args[])throws Exception
{
        Scanner s=new Scanner(System.in);
        DatagramSocket data_socket= new DatagramSocket(1234);
        byte[] rec_data=new byte[65335];
        DatagramPacket data_packet=new DatagramPacket(rec_data,rec_data.length);
        data_socket.receive(data_packet);
        String enc_txt=client_msg(rec_data);
        System.out.println("\n Client Side Message::-"+enc_txt);
        String dec_text=decryption(enc_txt);
        String msg_send_to_client=passwordCheck(dec_text);
        byte[] s_arr=new byte[65335];
        InetAddress ip=data_packet.getAddress();
        s_arr=msg_send_to_client.getBytes();
        data_packet=new DatagramPacket(s_arr,s_arr.length,ip,6789);
        data_socket.send(data_packet);
        data_socket.close();
}
```

}

Output:-





Program 14:- Implement a firewall that behaves like forwarder. It does not forward the packet that contains the word "terrorist".

Code:-

Client Side::-

```
import java.util.*;

import java.io.*;

import java.net.DatagramPacket;

import java.net.DatagramSocket;

import java.net.InetAddress;

import java.net.SocketException;


public class Ass2Prog3ClientSide

{

        public static void main(String args[]) throws IOException

        {
```

```
                Scanner sc=new Scanner(System.in);
                DatagramSocket ds=new DatagramSocket();
                InetAddress ip=InetAddress.getLocalHost();
                byte buf[]=null;
                String s;
                System.out.print("Enter your message: ");
                s=sc.nextLine();
                buf=s.getBytes();
                DatagramPacket dp=new DatagramPacket(buf,buf.length,ip,1233);
                ds.send(dp);

        }
}
```

Firewall:-

```
import java.util.*;
import java.io.*;
import java.net.DatagramPacket;
import java.net.DatagramSocket;
import java.net.InetAddress;
import java.net.SocketException;

public class Ass2Prog3Firewall
{
        public static void main(String args[]) throws IOException
        {
                DatagramSocket ds=new DatagramSocket(1233);
                DatagramSocket ds1=new DatagramSocket();
```

```
        InetAddress ip=InetAddress.getLocalHost();
        byte buf[]=new byte[65535];
        byte buf1[]=new byte[65535];
        String s;
        DatagramPacket dp=new DatagramPacket(buf,buf.length);
        ds.receive(dp);
        s=new String(buf).trim();
        System.out.println("String successfully received by Firewall: "+s);
        if(checkString(s)==null)
        {
                buf1=s.getBytes();
                DatagramPacket dp1=new DatagramPacket(buf1,buf1.length,ip,1234);
                ds1.send(dp1);
        }
        else
        {
                System.out.println("Message "+s+" cannot be send!");
                checkString(s);
        }
}

public static String checkString(String s)throws IOException
{
        BufferedReader br=new BufferedReader(new FileReader("keywords.txt"));
        String temp="";
        while((temp=br.readLine())!=null)
        {
```

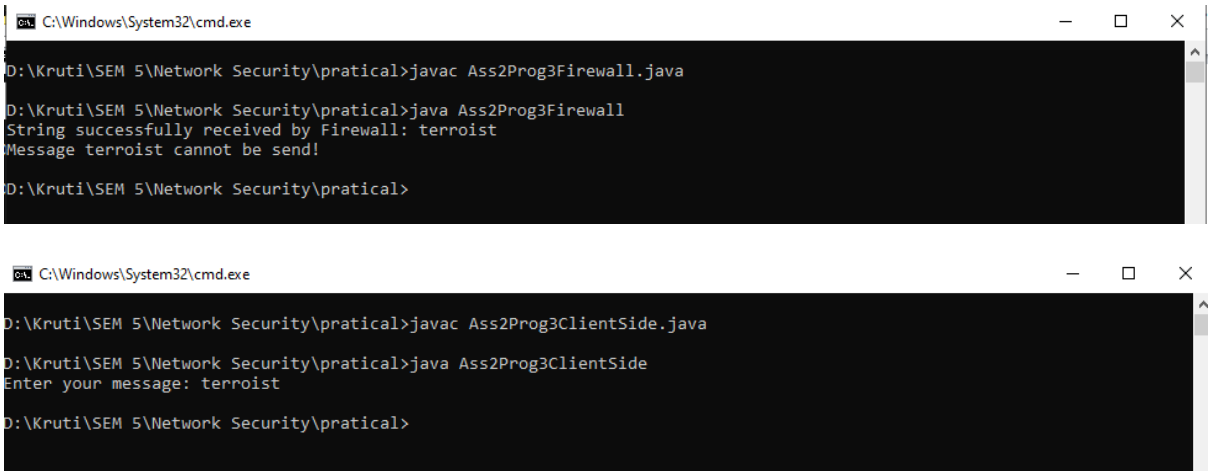
```
                    if((s.toUpperCase()).contains(temp))
                    {
                        return temp;
                    }
                }
                return null;
        }
}
```

Server Side::-

```
import java.util.*;
import java.io.*;
import java.net.DatagramPacket;
import java.net.DatagramSocket;
import java.net.InetAddress;
import java.net.SocketException;

public class Ass2Prog3ServerSide
{
        public static void main(String args[]) throws IOException
        {
                DatagramSocket ds=new DatagramSocket(1234);
                InetAddress ip=InetAddress.getLocalHost();
                byte buf[]=new byte[65535];
                String es;
                DatagramPacket dp=new DatagramPacket(buf,buf.length);
                ds.receive(dp);
```

```
            es=new String(buf).trim();
            System.out.println("String successfully received: "+es);
        }
}
```

Output:-



Program 16:- Implement a program to demonstrate the functioning of a KDC. There are three entities: sender, receiver and KDC. Assume that Sender and Receiver have already established their own individual permanent secret keys with KDC. The sender requests the KDC to issue a session key to communicate with receiver. The KDC is supposed to give session key information to sender in a secure way. The same session key is also to be communicated to the receiver securely. Use a suitable protocol to achieve the above functionality.

Code:-

```
import java.io.DataOutputStream;
import java.net.ServerSocket;
import java.net.Socket;
import java.security.SecureRandom;
import javax.crypto.Cipher;
import javax.crypto.spec.SecretKeySpec;

public class prg5_KDC {
    static SecretKeySpec senderkey,receiverkey;
      static  byte [] sessionkey,encryptedsessionkey;
       static  String senderid,receiverid;
    public static void main(String[] args) throws Exception {
        System.out.println("KDC");
        receiverid="receiver123";
        senderid="sender123";
        receiverkey=new SecretKeySpec("12345678".getBytes(),"DES");
        senderkey=new SecretKeySpec("87654321".getBytes(),"DES");
        ServerSocket ss=new ServerSocket(8080);
       Socket s=ss.accept();
```

```
          sessionkey=generateSessionKey();
          System.out.println("sessionkey" +new String(sessionkey));
          DataOutputStream dos=new
DataOutputStream(s.getOutputStream());
          Cipher cipher=Cipher.getInstance("DES");
            cipher.init(Cipher.ENCRYPT_MODE,senderkey);
            encryptedsessionkey=cipher.doFinal(sessionkey);
            cipher.init(Cipher.ENCRYPT_MODE,receiverkey);
            byte[]
encryptedreceiverid=cipher.doFinal(receiverid.getBytes());
            byte[]
encryptedsenderid=cipher.doFinal(senderid.getBytes());
            byte[]
encryptedsessionkeyclient=cipher.doFinal(sessionkey);

            dos.writeInt(encryptedsessionkey.length);
            dos.write(encryptedsessionkey,0,encryptedsessionkey.length);

            dos.writeInt(encryptedsenderid.length);
            dos.write(encryptedsenderid,0,encryptedsenderid.length);

            dos.writeInt(encryptedreceiverid.length);
            dos.write(encryptedreceiverid,0,encryptedreceiverid.length);

            dos.writeInt(encryptedsessionkeyclient.length);

      dos.write(encryptedsessionkeyclient,0,encryptedsessionkeyclient.l
ength);


    }
    public static byte [] generateSessionKey() throws Exception
      {
            sessionkey=new byte[8];
            SecureRandom random = new SecureRandom();
            random.nextBytes(sessionkey);
            return sessionkey;
      }
}
```

prg5_server.java

```
package dissertation;
import java.io.DataOutputStream;
import java.io.DataInputStream;
import java.net.ServerSocket;
import java.net.Socket;
import javax.crypto.Cipher;
import javax.crypto.spec.SecretKeySpec;

public class prg5_server {
     static String senderid;
      static SecretKeySpec senderkey;
      static byte[]
encryptedreceiverid,encryptedsenderid,encryptedsessionkeyclient;
    public static void main(String[] args) throws Exception{
           System.out.println("Server");
```

```
        senderid="sender123";
        senderkey=new SecretKeySpec("87654321".getBytes(),"DES");
        getSessionInfoServer();
        ServerSocket ss=new ServerSocket(9090);
      Socket s=ss.accept();
      DataOutputStream dos=new DataOutputStream(s.getOutputStream());
      dos.writeInt(encryptedsenderid.length);
      dos.write(encryptedsenderid,0,encryptedsenderid.length);

      dos.writeInt(encryptedreceiverid.length);
      dos.write(encryptedreceiverid,0,encryptedreceiverid.length);

      dos.writeInt(encryptedsessionkeyclient.length);
      dos.write(encryptedsessionkeyclient,0,encryptedsessionkeyclient.l
ength);

    }
    public static void getSessionInfoServer() throws Exception
      {
            Socket s=new Socket("localhost",8080);
            DataInputStream dis=new DataInputStream(s.getInputStream());

            byte[] encryptedsessionkey=new byte[dis.readInt()];
                dis.readFully(encryptedsessionkey);

            encryptedsenderid=new byte[dis.readInt()];
                dis.readFully(encryptedsenderid);

            encryptedreceiverid=new byte[dis.readInt()];
            dis.readFully(encryptedreceiverid);


            encryptedsessionkeyclient=new byte[dis.readInt()];
                dis.readFully(encryptedsessionkeyclient);

            Cipher cipher=Cipher.getInstance("DES");
            cipher.init(Cipher.DECRYPT_MODE,senderkey);
            byte[] sessionkey=cipher.doFinal(encryptedsessionkey);
            System.out.println("serversessionkey" +new
String(sessionkey));
      }
}
```