Computer Network Lab

B-Tech Computer engineering

Semester - 5th

Code : CEN-593

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Write a program to show encryption decryption using **Caesar cipher** technique .

```
import java.util.Scanner;

public class ceasercipher {
    public static void main(String[] args) {
        Scanner s = new Scanner(System.in) ;
        hrkhan();
        System.out.println("Enter the Msg to encript  : - ");
        String Msg = s.nextLine() ;
        System.out.println("Enter the Key ");
            int key =s.nextInt() ;
            String encript= encription(Msg,key);
            System.out.println("the encripted msg is  :- " + encript);
            System.out.println("the decrited Msg is    " + decription(encript,key));
        }


        public  static String encription(String Msg , int key)
    {
        String encript = "";
        for (int i = 0; i <Msg.length() ; i++) {
            char ch = Msg.charAt(i);
            if (Character.isUpperCase(ch))
            {
                encript+=(char)((ch + key - 'A' )%26 + 'A' );
            }
            else if (Character.isLowerCase(ch))
            {
                encript+=(char)((ch + key -'a')%26 + 'a' ) ;
            }
            else if(Character.isDigit(ch))
            {
                encript+=(char)((ch + key - '0')%10 + '0' ) ;
            }
            else
            {
                encript+=ch ;
            }
        }

        return encript;
    }
```

```
    public  static String decription(String Msg , int key)
    {
        String decript = "";
        for (int i = 0; i <Msg.length() ; i++) {
            char ch = Msg.charAt(i);
            if (Character.isUpperCase(ch))
            {
                decript+=(char)((ch - key - 'A' + 26)%26 + 'A' );
            }
            else if (Character.isLowerCase(ch))
            {
                decript+=(char)((ch - key -'a' + 26)%26 + 'a' ) ;
            }
            else if(Character.isDigit(ch))
            {
                decript+=(char)((ch - key - '0' + 30 )%10 + '0' ) ;
            }
            else
            {
                decript+=ch ;
            }
        }

        return decript;
    }
    public static void hrkhan()
    {
        System.out.println("Name : - Habiburrahman");
        System.out.println("Roll no :- 17BCS071 ");
        System.out.println("B-Tech 5th Semester ");
        System.out.println();
    }

}
```

```
Habiburrahman-khans-MacBook-Pro:src habiburrahmankhan$ javac ceasercipher.java
Habiburrahman-khans-MacBook-Pro:src habiburrahmankhan$ java ceasercipher
Name : - Habiburrahman
Roll no :- 17BCS071
B-Tech 5th Semester

Enter the Msg to encript  : -
MyComputer123
Enter the Key
11
the encripted msg is  :- XjNzxafepc234
the decrited Msg is    MyComputer123
```

Write a program to show encryption decryption using **Vernam Cipher** technique .

```
import java.util.Scanner;

public class vernercipher {
    public static void main(String[] args) {
        Scanner s = new Scanner(System.in) ;
         hrkhan();
        System.out.println("Enter the Msg to encript   ");
        String Msg = s.nextLine() ;
        String key = getkey(Msg.length());
        System.out.println("Random key generated and  the Key is  " + key);
        String encript= encription(Msg,key);
        System.out.println("the encryption msg is   " + encript);
        System.out.println("the decryption Msg is    " + decription(encript,key));
    }


    private static String getkey(int length) {
        String key="";
        for (int i = 0; i < length; i++) {
            int m = (int)(Math.random()*(26 -1));
           key+=(char)(m + 'A');
        }
        return key;
    }

    private static String encription(String msg, String key) {
        String encript="";
        for (int i = 0; i <msg.length(); i++) {
            int m = ((msg.charAt(i)- 'A') + (key.charAt(i) -'A'));
            encript+=(char)(m%26 + 'A');
        }
```

```
        return encript;
    }
    private static String decription(String encript, String key) {
        String decript="";
        for (int i = 0; i <encript.length() ; i++) {
            int m = ((encript.charAt(i)- 'A') - (key.charAt(i) -'A') + 26);
            decript+=(char)(m%26 + 'A');
        }
        return decript ;
    }
    public static void hrkhan()
    {
        System.out.println();
        System.out.println("Name : - Habiburrahman");
        System.out.println("Roll no :- 17BCS071 ");
        System.out.println("B-Tech 5th Semester ");
        System.out.println();
    }
}
```

```
Name : - Habiburrahman
Roll no :- 17BCS071
B-Tech 5th Semester

Enter the Msg to encript
ATTACKATDAWN
Random key generated and  the Key is  CRCCPEHGHEPJ
the encryption msg is   CKVCROHZKELW
the decryption Msg is    ATTACKATDAWN

Process finished with exit code 0
```

Write a program to show encryption decryption using **Vigenère cipher** technique .

```
import java.util.Scanner;

public class vaganesecipher {
    public static void main(String[] args) {
        Scanner s = new Scanner(System.in) ;
        hrkhan();
        System.out.println("Enter the Msg to encript  : - ");
        String Msg = s.nextLine() ;
```

```
    System.out.println("Enter the Key ");
    String key =s.next() ;
    String encript= encription(Msg,key);
    System.out.println("the encryption  msg is  :- " + encript);
    System.out.println("the decryption  Msg is    " + decription(encript,key));
}
public static String encription(String Msg , String key) {
    String newkey = "", encript = "";
    for (int i = 0; i < Msg.length(); i++) {
        newkey += key.charAt(i % key.length());
    }
    System.out.println(newkey);


    char matrix[][] = new char[26][26];
    for (int i = 0; i <26 ; i++) {
        for (int j = 0; j < 26; j++) {
            matrix[i][j]=(char)((j+i)%26 + 'A' );
        }
    }
    for (int i = 0; i <26 ; i++) {
        for (int j = 0; j < 26; j++) {
            System.out.print(matrix[i][j] + "  ");

        }
        System.out.println();
    }
    for (int i = 0; i <Msg.length() ; i++) {
        int row = Msg.charAt(i) - 'A' ;
        int col = newkey.charAt(i) - 'A' ;
        encript+=matrix[row][col];
    }
    return encript;
}

public static String decription(String Msg , String key) {
    String newkey = "", decript = "";
    for (int i = 0; i < Msg.length(); i++) {
        newkey += key.charAt(i % key.length());
    }
    for (int i = 0; i <Msg.length() ; i++) {
        int row = Msg.charAt(i) - 'A' ;
        int col = newkey.charAt(i) - 'A' ;
        decript+=(char)((row-col + 26 )%26 + 'A');
    }
    return decript;
}
public static void hrkhan()
```

```
    {
        System.out.println();
        System.out.println("Name : - Habiburrahman");
        System.out.println("Roll no :- 17BCS071 ");
        System.out.println("B-Tech 5th Semester ");
        System.out.println();
    }
}
```

```
/Library/Java/JavaVirtualMachines/jdk-11.0.1.jdk/Contents/Home/bin/java "-javaagent:/App

Name : - Habiburrahman
Roll no :- 17BCS071
B-Tech 5th Semester

Enter the Msg to encript  : -
ATTACKATDAWN
Enter the Key
LEMON
LEMONLEMONLE
A  B  C  D  E  F  G  H  I  J  K  L  M  N  O  P  Q  R  S  T  U  V  W  X  Y  Z
B  C  D  E  F  G  H  I  J  K  L  M  N  O  P  Q  R  S  T  U  V  W  X  Y  Z  A
C  D  E  F  G  H  I  J  K  L  M  N  O  P  Q  R  S  T  U  V  W  X  Y  Z  A  B
D  E  F  G  H  I  J  K  L  M  N  O  P  Q  R  S  T  U  V  W  X  Y  Z  A  B  C
E  F  G  H  I  J  K  L  M  N  O  P  Q  R  S  T  U  V  W  X  Y  Z  A  B  C  D
F  G  H  I  J  K  L  M  N  O  P  Q  R  S  T  U  V  W  X  Y  Z  A  B  C  D  E
G  H  I  J  K  L  M  N  O  P  Q  R  S  T  U  V  W  X  Y  Z  A  B  C  D  E  F
H  I  J  K  L  M  N  O  P  Q  R  S  T  U  V  W  X  Y  Z  A  B  C  D  E  F  G
I  J  K  L  M  N  O  P  Q  R  S  T  U  V  W  X  Y  Z  A  B  C  D  E  F  G  H
J  K  L  M  N  O  P  Q  R  S  T  U  V  W  X  Y  Z  A  B  C  D  E  F  G  H  I
K  L  M  N  O  P  Q  R  S  T  U  V  W  X  Y  Z  A  B  C  D  E  F  G  H  I  J
L  M  N  O  P  Q  R  S  T  U  V  W  X  Y  Z  A  B  C  D  E  F  G  H  I  J  K
M  N  O  P  Q  R  S  T  U  V  W  X  Y  Z  A  B  C  D  E  F  G  H  I  J  K  L
N  O  P  Q  R  S  T  U  V  W  X  Y  Z  A  B  C  D  E  F  G  H  I  J  K  L  M
O  P  Q  R  S  T  U  V  W  X  Y  Z  A  B  C  D  E  F  G  H  I  J  K  L  M  N
P  Q  R  S  T  U  V  W  X  Y  Z  A  B  C  D  E  F  G  H  I  J  K  L  M  N  O
Q  R  S  T  U  V  W  X  Y  Z  A  B  C  D  E  F  G  H  I  J  K  L  M  N  O  P
R  S  T  U  V  W  X  Y  Z  A  B  C  D  E  F  G  H  I  J  K  L  M  N  O  P  Q
S  T  U  V  W  X  Y  Z  A  B  C  D  E  F  G  H  I  J  K  L  M  N  O  P  Q  R
T  U  V  W  X  Y  Z  A  B  C  D  E  F  G  H  I  J  K  L  M  N  O  P  Q  R  S
U  V  W  X  Y  Z  A  B  C  D  E  F  G  H  I  J  K  L  M  N  O  P  Q  R  S  T
V  W  X  Y  Z  A  B  C  D  E  F  G  H  I  J  K  L  M  N  O  P  Q  R  S  T  U
W  X  Y  Z  A  B  C  D  E  F  G  H  I  J  K  L  M  N  O  P  Q  R  S  T  U  V
X  Y  Z  A  B  C  D  E  F  G  H  I  J  K  L  M  N  O  P  Q  R  S  T  U  V  W
Y  Z  A  B  C  D  E  F  G  H  I  J  K  L  M  N  O  P  Q  R  S  T  U  V  W  X
Z  A  B  C  D  E  F  G  H  I  J  K  L  M  N  O  P  Q  R  S  T  U  V  W  X  Y
the encryption  msg is  :- LXFOPVEFRNHR
the decryption  Msg is    ATTACKATDAWN

Process finished with exit code 0
```

Write a program to show encryption decryption using **Hill Cipher** technique .

```
import java.util.Scanner;
public class hillcypher {

        public static void main(String[] args) {
            Scanner s = new Scanner(System.in) ;
             hrkhan();
            System.out.println("Enter the Msg to encript  : - ");
            String Msg = s.nextLine() ;
            System.out.println("Enter the Key ");
            int mat[][] = new int[3][3] ;
            for (int i = 0; i <3 ; i++) {
                for (int j = 0; j < 3; j++) {
                    mat[i][j]=s.nextInt();
                }
            }
            String encript= encription(Msg,mat);
            System.out.println("the encripted msg is  :- " + encript);
          //  System.out.println("the decrited Msg is    " + decription(encript,mat));
        }



    private static String encription(String msg, int[][] mat) {
            String encript="" ,newmsg=msg;
            if (msg.length()%3!=0)
            {
                int m = msg.length()%3;
                while(m==0)
                {
                    newmsg+='x';
                    m--;
                }
            }
            int matmsg[][] = new int[3][1];
            int matfinal[][] = new int[3][1];
        for (int i = 0; i <newmsg.length()-2 ; i+=3) {
                matmsg[0][0] = (int)(newmsg.charAt(i) - 'A' );
                matmsg[1][0] = (int)(newmsg.charAt(i+1) - 'A') ;
                matmsg[2][0] = (int)(newmsg.charAt(i+2) - 'A');
            for (int j = 0; j < 3 ; j++) {
                for (int k = 0; k < 1; k++) {
```

```
                for (int l = 0; l < 3  ; l++) {
                    matfinal[j][k]+=matmsg[l][k]*mat[j][l];
                }
            }
        }
        for (int j = 0; j <3 ; j++) {
            encript+=(char)(matfinal[j][0]%26 + 'A') ;
        }


    }

    return encript ;
}
public static void hrkhan()
{
    System.out.println();
    System.out.println("Name : - Habiburrahman");
    System.out.println("Roll no :- 17BCS071 ");
    System.out.println("B-Tech 5th Semester ");
    System.out.println();
}
//  private static String decription(String encript, int[][] mat) {
//
//  }
}
```

```
/Library/Java/JavaVirtualMachines/jdk-11.0.1.jdk/Contents/Home/bin/java "-javaagen

Name : - Habiburrahman
Roll no :- 17BCS071
B-Tech 5th Semester

Enter the Msg to encript  : -
ATTACKATDAWN
Enter the Key
6 24 1 13 16 10 20 17 15
the encripted msg is  :- HAKNCMEYQZMN

Process finished with exit code 0
```

Write a program to show encryption decryption using **rail fence cipher** technique .

```
import java.util.Scanner;

public class RailFenceCipher {
    public static void main(String[] args) {
        Scanner s = new Scanner(System.in) ;
         hrkhan();
        System.out.println("Enter the Msg to encript  : - ");
        String Msg = s.nextLine() ;
        System.out.println("Enter the Key ");
        int key =s.nextInt() ;
        String encript= encription(Msg,key);
        System.out.println("the encryption  msg is  :- " + encript);
        System.out.println("the decryption  Msg is    " + decription(encript,key));
    }



    private static String encription(String msg, int key) {
        String encript="";
        int k = 0 ;
        boolean flag = true ;
        char matrix[][] = new char[key][msg.length()] ;
        for (int i = 0; i <msg.length() ; i++) {
            matrix[k][i]=msg.charAt(i);
            if (flag)
            {
                k++;

            }
            else
            {
                k--;
            }
            if (k==0)
            {
                flag=true;
            }
            if (k==(key-1))
            {
                flag=false;
```

```
        }
    }
    for (int i = 0; i <matrix.length ; i++) {
        for (int j = 0; j < matrix[i].length; j++) {
            System.out.print(matrix[i][j] + "  ");
        }
        System.out.println();
    }
    for (int i = 0; i <matrix.length ; i++) {
        for (int j = 0; j < matrix[i].length; j++) {
            if (matrix[i][j]!=0)
            {
                encript+=matrix[i][j];
            }

    }
        System.out.println();
    }

    return encript;
}
private static String decription(String msg, int key) {
    String decript="";
    int k = 0 ;
    boolean flag = true ;
    char matrix[][] = new char[key][msg.length()] ;
    for (int i = 0; i <msg.length() ; i++) {
        matrix[k][i]='*';
        if (flag)
        {
            k++;

        }
        else
        {
            k--;
        }
        if (k==0)
        {
            flag=true;
        }
        if (k==(key-1))
        {
            flag=false;
        }
```

```
        }
//        for (int i = 0; i <matrix.length ; i++) {
//            for (int j = 0; j < matrix[i].length; j++) {
//                System.out.print(matrix[i][j] + "  ");
//            }
//            System.out.println();
//        }
        k=0;
        for (int i = 0; i <matrix.length ; i++) {
            for (int j = 0; j < matrix[i].length; j++) {
                if (matrix[i][j]=='*')
                {
                    matrix[i][j] = msg.charAt(k);
                    k++;
                }

            }
        }
        k=0;
        for (int i = 0; i <msg.length() ; i++) {
            decript+=matrix[k][i];
            if (k==0)
            {
                flag=true;
            }
            if (k==(key-1))
            {
                flag=false;
            }
            if (flag)
            {
                k++;

            }
            else
            {
                k--;
            }

        }
        return decript;
    }
    public static void hrkhan()
    {
        System.out.println();
```

```
        System.out.println("Name : - Habiburrahman");
        System.out.println("Roll no :- 17BCS071 ");
        System.out.println("B-Tech 5th Semester ");
        System.out.println();
    }
}
```

```
/Library/Java/JavaVirtualMachines/jdk-11.0.1.jdk/Contents/Home/bin/java "-javaagent:/App

Name : - Habiburrahman
Roll no :- 17BCS071
B-Tech 5th Semester

Enter the Msg to encript  : -
ATTACKATONCE
Enter the Key
3
A □ □ □ C □ □ □ O □ □ □
□ T □ A □ K □ T □ N □ E
□ □ T □ □ □ A □ □ □ C □


the encryption  msg is  :- ACOTAKTNETAC
the decryption  Msg is    ATTACKATONCE

Process finished with exit code 0
```

Write a program to show encryption decryption using **Playfair Cipher** technique .

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

public class PlayFairCipher {
    public static void main(String[] args) {
        Scanner s = new Scanner(System.in) ;
         hrkhan();
        System.out.println("Enter the Msg to encript  : - ");
        String Msg = s.nextLine().toUpperCase() ;
        System.out.println("Enter the Key ");
        String key =s.next().toUpperCase() ;
        String encript= encription(Msg,key);
        System.out.println("the encryption  msg is  :- " + encript);
        System.out.println("the decryption  Msg is    " + decription(encript,key));
    }
    private static char[][] matrixgeneration(String key)
```

```
    {
        HashMap<Character , Integer> map = new HashMap<>();
        int k =0 , charalpha = 0 ;
        char matrix[][] = new char[5][5] ;
        for (int i = 0; i <matrix.length ; i++) {
            for (int j = 0; j <matrix[i].length ;) {
                if (k<key.length())
                {
                    if (!map.containsKey(key.charAt(k))) {
                        matrix[i][j] = key.charAt(k);
                        map.put(key.charAt(k) , 1);
                        j++ ;
                    }
                }
                else
                {
                    if (!map.containsKey((char)('A'+charalpha)) && ('A' + charalpha)!
='J')
                    {
                        matrix[i][j]=(char)('A'+charalpha) ;
                        j++;
                        map.put((char)('A'+charalpha),1);
                    }
                    charalpha++;
                }
                k++;
            }
        }
        for (int i = 0; i <matrix.length ; i++) {
            for (int j = 0; j <matrix[i].length ; j++) {
                System.out.print(matrix[i][j] + "   ");
            }
            System.out.println();
        }
        return matrix ;

    }
    private static String encription(String msg, String key) {

       char[][] matrix = matrixgeneration(key);
        String encript="";
        //Algo
        String newMsg =msg;
        for (int i = 0; i <msg.length()-1 ; i++) {
            if (msg.charAt(i)==msg.charAt(i+1))
```

```
        {
            newMsg=newMsg.substring(0,i+1) + 'X' + newMsg.substring(i+1);
        }
    }
    if (newMsg.length()%2!=0)
    {
        newMsg+='X';
    }
   // System.out.println(newMsg);
    for (int i = 0; i <newMsg.length()-1;i+=2) {
        char ch1 =newMsg.charAt(i);
        char ch2 =newMsg.charAt(i+1);
        int row1=0,row2=0,col1=0 ,col2=0;
        for (int j = 0; j <matrix.length ; j++) {
            for (int l = 0; l <matrix[j].length ; l++) {
                if (matrix[j][l]==ch1)
                {
                    row1=j;
                    col1=l;
                }
                if (ch2==matrix[j][l])
                {
                    row2=j;
                    col2=l;
                }
            }
        }
        if (row1==row2)
        {
            encript+=matrix[row1][(col1+1)%5] +""+ matrix[row1][(col2+1)%5] ;
        }
        else if(col1==col2)
        {
            encript+=matrix[(row1 + 1)%5][col1] +""+ matrix[(row2+1)%5][col2] ;
        }
        else
        {
            encript+=matrix[row1][col2] +""+ matrix[row2][col1] ;
        }
    }
    return  encript ;
}
private static String decription(String msg, String key) {
    String decript="";
    char[][] matrix = matrixgeneration(key);
```

```
        //Algo
        for (int i = 0; i <msg.length()-1;i+=2) {
            char ch1 =msg.charAt(i);
            char ch2 =msg.charAt(i+1);
            int row1=0,row2=0,col1=0 ,col2=0;
            for (int j = 0; j <matrix.length ; j++) {
                for (int l = 0; l <matrix[j].length ; l++) {
                    if (matrix[j][l]==ch1)
                    {
                        row1=j;
                        col1=l;
                    }
                    if (ch2==matrix[j][l])
                    {
                        row2=j;
                        col2=l;
                    }
                }
            }
            if (row1==row2)
            {
                decript+=matrix[row1][(col1-1 + 5)%5] +""+ matrix[row1][(col2-1 +
5)%5] ;
            }
            else if(col1==col2)
            {
                decript+=matrix[(row1 - 1+ 5)%5][col1] +""+ matrix[(row2-1 + 5)%5]
[col2] ;
            }
            else
            {
                decript+=matrix[row1][col2] +""+ matrix[row2][col1] ;
            }
        }

        while(true)
        {
            int n = decript.indexOf('X' , 0);
            if (n==-1)
            {
                break;
            }
            decript=decript.substring(0,n) + decript.substring(n+1);
        }
        return  decript ;
```

```
    }
    public static void hrkhan()
    {
        System.out.println();
        System.out.println("Name : - Habiburrahman");
        System.out.println("Roll no :- 17BCS071 ");
        System.out.println("B-Tech 5th Semester ");
        System.out.println();
    }
}
```

```
/Library/Java/JavaVirtualMachines/jdk-11.0.1.jdk/Contents/Home/bin/java "-javaagent:/Applic

Name : - Habiburrahman
Roll no :- 17BCS071
B-Tech 5th Semester

Enter the Msg to encript  : -
hello
Enter the Key
cryptography
C   R   Y   P   T
O   G   A   H   B
D   E   F   I   K
L   M   N   Q   S
U   V   W   X   Z
the encryption  msg is  :- GIQUUD
C   R   Y   P   T
O   G   A   H   B
D   E   F   I   K
L   M   N   Q   S
U   V   W   X   Z
the decryption  Msg is    HELLO

Process finished with exit code 0
```

Write a program to show encryption decryption using **Columnar Transposition Cipher** technique .

```
import java.util.* ;

public class transposition
{
        public static void main(String[] args) {
                Scanner s = new Scanner(System.in) ;
                 hrkhan();
                System.out.println("Enter the Msg to encript  : - ");
```

```
                String Msg = s.nextLine() ;
                System.out.println("Enter the Key ");
                String key =s.next() ;
                String encript= encription(Msg,key);
                System.out.println("the encryption  msg is  :- " + encript);
                System.out.println("the decryption  Msg is    " +
decription(encript,key));
        }
        public static String encription(String encript , String key)
        {
       int row , k =0;
       String encriptMsg = "";
       if (encript.length()%key.length()==0) {
        row = encript.length() /key.length();
       }
       else
       {
        row = (encript.length() /key.length()) + 1;
       }
     char[][] chararr = new char[row][key.length()];
         for (int i = 0 ; i< chararr.length ; i++ ) {
                for (int j = 0; j < chararr[i].length ;j++ ) {
                        if (k >=encript.length()) {
                                chararr[i][j] = '$' ;
                        }
                        else
                        {
                                chararr[i][j]=encript.charAt(k);
                        }

                         k++;
                }
            }
       boolean flag[] = new boolean[key.length()];
       char[] key1 = key.toCharArray() ;
        k = 0 ;
       Arrays.sort(key1);
       for (int i = 0 ;i <key.length();i++) {
        for (int j = 0;j< key.length() ;j++ ) {
                if (key.charAt(j)==key1[i]) {
                        k=j ;
                        break ;
                }
        }
         for (int j = 0 ; j<chararr.length ;j++ ) {
```

```
            encriptMsg+=chararr[j][k];
    }
  }



for (int i = 0 ; i< chararr.length ; i++ ) {
            for (int j = 0; j < chararr[i].length ;j++ ) {
                        System.out.print(chararr[i][j] + "   ");
            }
            System.out.println();
       }
      return encriptMsg;
   }

   public static String decription(String encript , String key)
   {
            int row , k =0;
            String decriptMsg = "";
            if (encript.length()%key.length()==0) {
                        row = encript.length() /key.length();
            }
            else
            {
                        row = (encript.length() /key.length()) + 1;
            }
            char[][] chararr = new char[row][key.length()];
            boolean flag[] = new boolean[key.length()];
            char[] key1 = key.toCharArray();
            Arrays.sort(key1);
            k=0;
            int m = 0 ;
            for (int i = 0 ;i <key.length();i++) {
                        for (int j = 0;j< key.length() ;j++ ) {
                                    if (key.charAt(j)==key1[i]) {
                                                k=j ;
                                                break ;
                                    }
                        }
                        for (int j = 0 ; j<chararr.length ;j++ ) {
                                    chararr[j][k]=encript.charAt(m);
                                    m++;
                        }
            }
```

```
            for (int i = 0 ; i< chararr.length ; i++ ) {
                for (int j = 0; j < chararr[i].length ;j++ ) {
                    if(chararr[i][j]!='$')
                    {
                        decriptMsg+=chararr[i][j];
                    }
                }
            }
            return decriptMsg;
        }
        public static void hrkhan()
        {
            System.out.println();
            System.out.println("Name : - Habiburrahman");
            System.out.println("Roll no :- 17BCS071 ");
            System.out.println("B-Tech 5th Semester ");
            System.out.println();
        }
}
```

```
/Library/Java/JavaVirtualMachines/jdk-11.0.1.jdk/Contents/Home/bin/java "-javaagent:/Appl

Name : - Habiburrahman
Roll no :- 17BCS071
B-Tech 5th Semester

Enter the Msg to encript  : -
sendmeonemillondollar
Enter the Key
hack
s   e   n   d
m   e   o   n
e   m   i   l
l   o   n   d
o   l   l   a
r   $   $   $
the encryption  msg is  :- eemol$noinl$smelordnlda$
the decryption  Msg is    sendmeonemillondollar

Process finished with exit code 0
```

Write a program to transfer normal Message **(Client-Server chat-box) .**

Client code : -

```
import java.io.BufferedReader;
import java.io.InputStreamReader;
import java.io.OutputStreamWriter;
import java.io.PrintWriter;
import java.net.Socket;
import java.util.Scanner;

public class chatClientMsg {
    public static void main(String[] args) throws Exception{
        hrkhan();
        String ip  ="localhost";
        int port = 9999;
        Socket soc = new Socket(ip , port);

        OutputStreamWriter os = new
OutputStreamWriter(soc.getOutputStream());
        InputStreamReader in = new InputStreamReader(soc.getInputStream());
        PrintWriter out = new PrintWriter(os);
        BufferedReader br = new BufferedReader(new
InputStreamReader(System.in));
        BufferedReader brmsg = new BufferedReader(in );
          String clientMsg="" ,serverMsg="" ;
        while(!clientMsg.equals("bye")) {
            System.out.println("Enter Msg");
            clientMsg = br.readLine();
            out.println(clientMsg);
            os.flush();

            serverMsg  = brmsg.readLine();
            System.out.println("Server  says   : " + serverMsg);
        }
    }
    public static void hrkhan()
    {
        System.out.println();
        System.out.println("Name : - Habiburrahman");
```

```
        System.out.println("Roll no :- 17BCS071 ");
        System.out.println("B-Tech 5th Semester ");
        System.out.println();
    }
}
```

Server code :-

```
import java.io.*;
import java.net.ServerSocket;
import java.net.Socket;
import java.util.Scanner;

public class chatServerMsg {
    public static void main(String[] args) throws Exception {
        hrkhan();
        ServerSocket ss = new ServerSocket(9999);
        System.out.println("server started ");
        Socket soc =ss.accept();
        System.out.println("client conneected ");
        InputStreamReader in = new InputStreamReader(soc.getInputStream());
        OutputStreamWriter os = new
OutputStreamWriter(soc.getOutputStream());
        PrintWriter out = new PrintWriter(os);
        BufferedReader brmsg = new BufferedReader(in);
        BufferedReader br = new BufferedReader(new
InputStreamReader(System.in));

        String clientMsg="" ,serverMsg="" ;

        while(!serverMsg.equals("bye")) {
            serverMsg =brmsg.readLine();
            System.out.println("client says    : " + serverMsg);
            System.out.println("Enter Msg");

            clientMsg = br.readLine();
            out.println(clientMsg);
            os.flush();
        }
    }
    public static void hrkhan()
    {
        System.out.println();
        System.out.println("Name : - Habiburrahman");
        System.out.println("Roll no :- 17BCS071 ");
        System.out.println("B-Tech 5th Semester ");
```

```
        System.out.println();
    }
}
```

Client output :-

```
/Library/Java/JavaVirtualMachines/jdk-11.0.1.jdk/Contents/Home/bin/java "-javaagent:/Applicat

Name : - Habiburrahman
Roll no :- 17BCS071
B-Tech 5th Semester

Enter Msg
hi how r you
Server  says   : im fine and u
Enter Msg
fine i m busy
Server  says   : bye
Enter Msg
bye
Server  says   : bye

Process finished with exit code 0
```

Server output :-

```
/Library/Java/JavaVirtualMachines/jdk-11.0.1.jdk/Contents/Home/bin/java "-javaage

Name : - Habiburrahman
Roll no :- 17BCS071
B-Tech 5th Semester

server started
client conneected
client says   : hi how r you
Enter Msg
im fine and u
client says   : fine i m busy
Enter Msg
bye
client says   : bye
Enter Msg
bye

Process finished with exit code 0
```

Write a program to Message transfer between Computer **(Client-Server chat-box).**

Client code : –

```
import java.io.*;
import java.net.Socket;
import java.util.Scanner;

public class chatclient {
    public static void main(String[] args) throws Exception{
        hrkhan();
        String ip  ="192.168.1.113";
        int port = 8080;
        Socket soc = new Socket(ip , port);
        System.out.println(soc);
        Scanner s= new Scanner(System.in);
       DataInputStream din = new DataInputStream(soc.getInputStream());
        DataOutputStream dout = new DataOutputStream(soc.getOutputStream());

            while(true)
            {
                System.out.println("enter Msg ");
                dout.writeUTF(s.nextLine());
                System.out.println("Server  says   : " + din.readUTF());
            }

        }
    public static void hrkhan()
    {
        System.out.println();
        System.out.println("Name : - Habiburrahman");
        System.out.println("Roll no :- 17BCS071 ");
        System.out.println("B-Tech 5th Semester ");
        System.out.println();
    }
    }
```

Server code : –

```
import java.io.*;
import java.net.InetAddress;
import java.net.ServerSocket;
import java.net.Socket;
import java.util.Scanner;
```

```
public class chatserver {
    public static void main(String[] args) throws Exception {
        hrkhan();
        Scanner s = new Scanner(System.in);
        InetAddress ip  = InetAddress.getByName("192.168.1.103") ;
        ServerSocket ss = new ServerSocket(8080 , 0 , ip);
        System.out.println("server started ready to connect ..... ");
        Socket soc =ss.accept();
        System.out.println("client conneected  to my server ");
        System.out.println(soc);
        DataInputStream din = new DataInputStream(soc.getInputStream());
        DataOutputStream dout = new DataOutputStream(soc.getOutputStream());
        while(true) {
            System.out.println("client says  : - " + din.readUTF());
            System.out.println("enter msg ");
            dout.writeUTF(s.nextLine());
        }
    }
    public static void hrkhan()
    {
        System.out.println();
        System.out.println("Name : - Habiburrahman");
        System.out.println("Roll no :- 17BCS071 ");
        System.out.println("B-Tech 5th Semester ");
        System.out.println();
    }
}
```

When My I become Client : -

```
/Library/Java/JavaVirtualMachines/jdk-11.0.1.jdk/Contents/Home/bin/java "-javaagent:/Applications/IntelliJ

Name : - Habiburrahman
Roll no :- 17BCS071
B-Tech 5th Semester

Socket[addr=/192.168.1.113,port=8080,localport=64268]
enter Msg
hiii
Server  says   :
hi habib

enter Msg
okk bye
Server  says   :
byeeee
```

When My I become Server : -

```
/Library/Java/JavaVirtualMachines/jdk-11.0.1.jdk/Contents/Home/bin/java "-javaagent:/Applications/

Name : - Habiburrahman
Roll no :- 17BCS071
B-Tech 5th Semester

server started ready to connect .....
client conneected  to my server
Socket[addr=/192.168.1.113,port=50248,localport=8080]
client says  : - Hello Habibur Rahman
enter msg
hi tanzilur rahman
client says  : - okay bye
enter msg
okay bye
```

Write a program to File transfer between Computer **(Client-Server File Transfer).**

```
import java.net.*;
import java.util.Scanner;
import java.io.*;

public class SocketFileClient {

    public final static String FILE_TO_RECEIVE = "./sample_file2.txt";

    public static void main(String[] args) throws FileNotFoundException {
        hrkhan();
        Scanner kin = new Scanner(System.in);
        String message;
        String serverName =kin.nextLine();
        int port = kin.nextInt();

        byte[] file_recieved = new byte[3084959];
        FileOutputStream fos = new FileOutputStream(FILE_TO_RECEIVE);
        BufferedOutputStream bos = new BufferedOutputStream(fos);

        int readBytes = 0;

        try {
            Socket client = new Socket(serverName, port);
            System.out.println("Connecting to " + serverName + " at port " + port);

            System.out.println("Connected to server " + serverName);

            OutputStream outputToServer = client.getOutputStream();
```

```
            DataOutputStream out = new DataOutputStream(outputToServer);
            InputStream inFromServer = client.getInputStream();
            DataInputStream in = new DataInputStream(inFromServer);

            int fileSize = Integer.parseInt(in.readUTF());
            System.out.println("File size = " + fileSize);
            while (true) {
                // recieve file byte by byte
                for (int i = 0; i < fileSize; i++) {
                    file_recieved[i] = in.readByte();
                  //  System.out.println(i);
                }

                // write to file
                bos.write(file_recieved, 0, fileSize);
                bos.flush();

                System.out.println("FILE RECIEVED SIZE = " + fileSize);
                break;

            }
            // client.close();
            // kin.close();
        } catch (Exception e) {
            System.out.println("FILE READ ERROR----------------");
            e.printStackTrace();
        }
    }
    public static void hrkhan()
    {
        System.out.println();
        System.out.println("Name : - Habiburrahman");
        System.out.println("Roll no :- 17BCS071 ");
        System.out.println("B-Tech 5th Semester ");
        System.out.println();
    }
}



import java.io.*;
import java.net.*;
import java.util.Arrays;
import java.util.Scanner;
```

```
public class SocketFileServer {

    public final static String FILE_TO_SEND = "/Users/habiburrahmankhan/Desktop/
oops/src/sample_file.txt"; // address to file

    public static void main(String[] args) throws IOException {
        hrkhan();
        Scanner  s = new Scanner(System.in);
        InetAddress ip = InetAddress.getByName(s.nextLine());
        int port =s.nextInt();
        ServerSocket serverSocket = new ServerSocket(port, 0, ip);
        System.out.println("Waiting for client on " + serverSocket.getLocalPort() +
serverSocket.getInetAddress());
        Socket server = serverSocket.accept();
        System.out.println("Connected to : " + server.getRemoteSocketAddress());
        DataInputStream in = new DataInputStream(server.getInputStream());
        DataOutputStream out = new DataOutputStream(server.getOutputStream());

        File myFile = new File(FILE_TO_SEND);
        byte[] file_byte_array = new byte[(int) myFile.length()];

        FileInputStream fis = new FileInputStream(myFile);
        BufferedInputStream bis = new BufferedInputStream(fis);
        bis.read(file_byte_array, 0, file_byte_array.length);

        while (true) {

            out.writeUTF(""+file_byte_array.length);

            try {

                System.out.println("Sending file in 3 seconds \n");

                for (int i = 0; i < 3; i++) {
                    System.out.println(".\n");
                    Thread.sleep(1000);
                }

                System.out.println("Tranferring now bytes = "+file_byte_array.length);

                // tranfer file byte by byte
                for (int i = 0; i < file_byte_array.length; i++) {
                    out.writeByte(file_byte_array[i]);
                }
                break;
                // server.close();

            } catch (SocketTimeoutException e) {
```

```
            System.out.println("Server timed out");
        } catch (EOFException e) {
            server.close();
        } catch (Exception e) {
            e.printStackTrace();
            break;
        }
      }
   }
   public static void hrkhan()
   {
      System.out.println();
      System.out.println("Name : - Habiburrahman");
      System.out.println("Roll no :- 17BCS071 ");
      System.out.println("B-Tech 5th Semester ");
      System.out.println();
   }
}
```

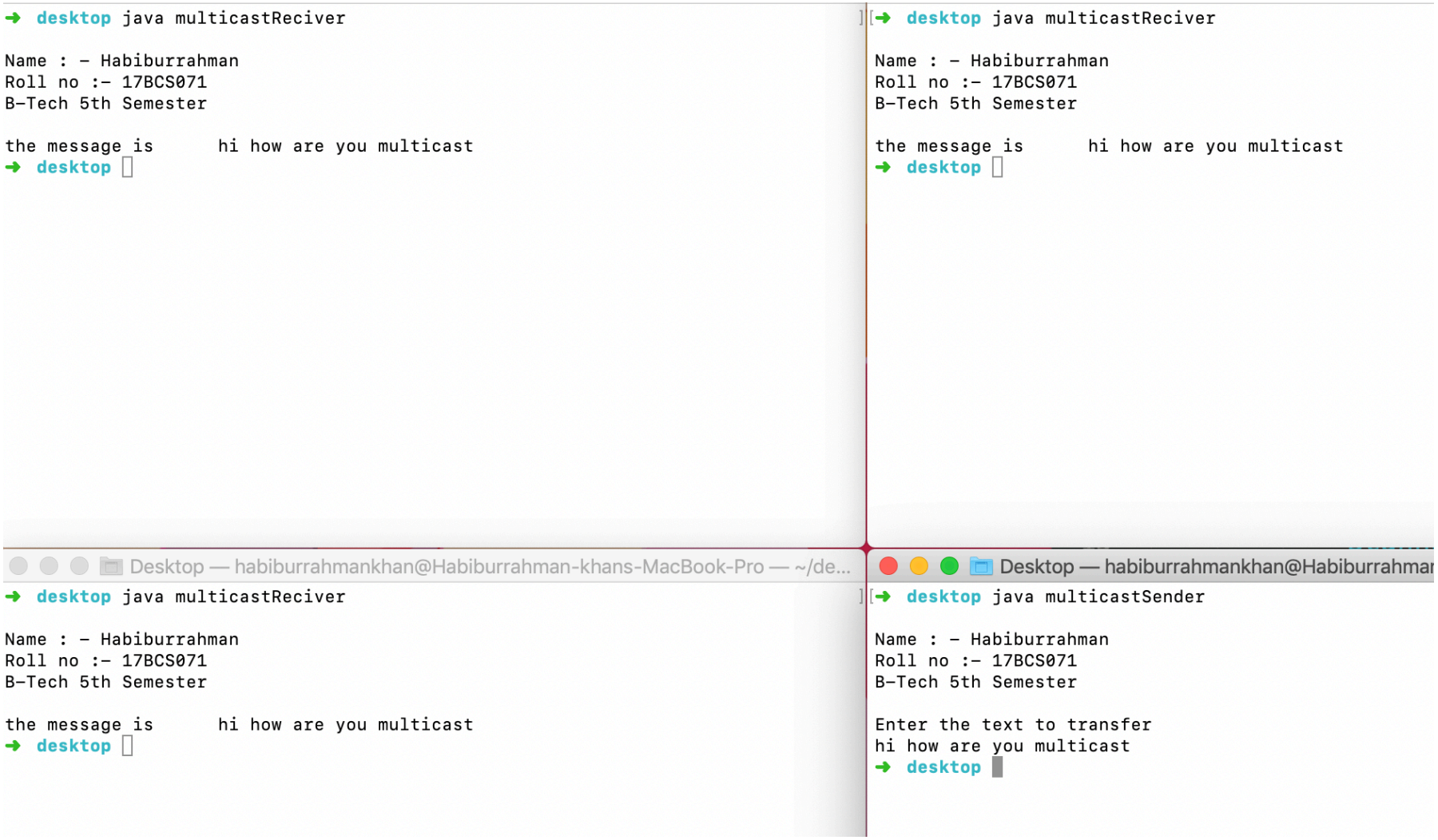
```
/Library/Java/JavaVirtualMachines/jdk-11.0.1.jdk/Contents/Home/bin/java "-javaagent:/Appl

Name : - Habiburrahman
Roll no :- 17BCS071
B-Tech 5th Semester

192.168.1.103
8088
Connecting to 192.168.1.103 at port 8088
Connected to server 192.168.1.103
File size = 38
FILE RECIEVED SIZE = 38

Process finished with exit code 0
```

```
/Library/Java/JavaVirtualMachines/jdk-11.0.1.jdk/Contents/Home/bin/java "-javaagent:/Application

Name : - Habiburrahman
Roll no :- 17BCS071
B-Tech 5th Semester

192.168.1.103
8088
Waiting for client on 8088/192.168.1.103
Connected to : /192.168.1.103:64476
Sending file in 3 seconds

.

.

.

Tranferring now bytes = 38

Process finished with exit code 0
```

Write a program to multicast **(One Sender Multiple Reciever)** And BroadCast **.**

```
import java.io.IOException;
import java.net.DatagramPacket;
import java.net.InetAddress;
import java.net.MulticastSocket;
import java.net.UnknownHostException;
import java.util.Scanner;

public class multicastSender {
    public static void main(String[] args) {
        hrkhan();
        try {
            InetAddress group
=InetAddress.getByName("225.4.5.6");
           MulticastSocket multicastsock = new
MulticastSocket();
            System.out.println("Enter the text to transfer
");
            Scanner s = new Scanner(System.in);
            String message = s.nextLine();
            DatagramPacket packet = new
DatagramPacket(message.getBytes() , message.length() ,
group , 3456);
            multicastsock.send(packet);
            multicastsock.close();
        } catch (Exception e) {
            e.printStackTrace();
        }
    }
    public static void hrkhan()
    {
        System.out.println();
        System.out.println("Name : - Habiburrahman");
        System.out.println("Roll no :- 17BCS071 ");
        System.out.println("B-Tech 5th Semester ");
        System.out.println();
    }
}
```

```
import java.net.DatagramPacket;
import java.net.InetAddress;
import java.net.MulticastSocket;
import java.util.Scanner;

public class multicastReciver {
    public static void main(String[] args) {
        hrkhan();
        try {
            InetAddress group
=InetAddress.getByName("225.4.5.6");
            MulticastSocket multicastsock = new
MulticastSocket(3456);
            multicastsock.joinGroup(group);
            byte[] buffer = new byte[100];

            DatagramPacket packet = new
DatagramPacket(buffer, buffer.length);
            multicastsock.receive(packet);
            String message = new String(buffer);
            System.out.println("the message is      " +
message);
            multicastsock.close();
        } catch (Exception e) {
            e.printStackTrace();
        }
    }
    public static void hrkhan()
    {
        System.out.println();
        System.out.println("Name : - Habiburrahman");
        System.out.println("Roll no :- 17BCS071 ");
        System.out.println("B-Tech 5th Semester ");
        System.out.println();
    }
}
```

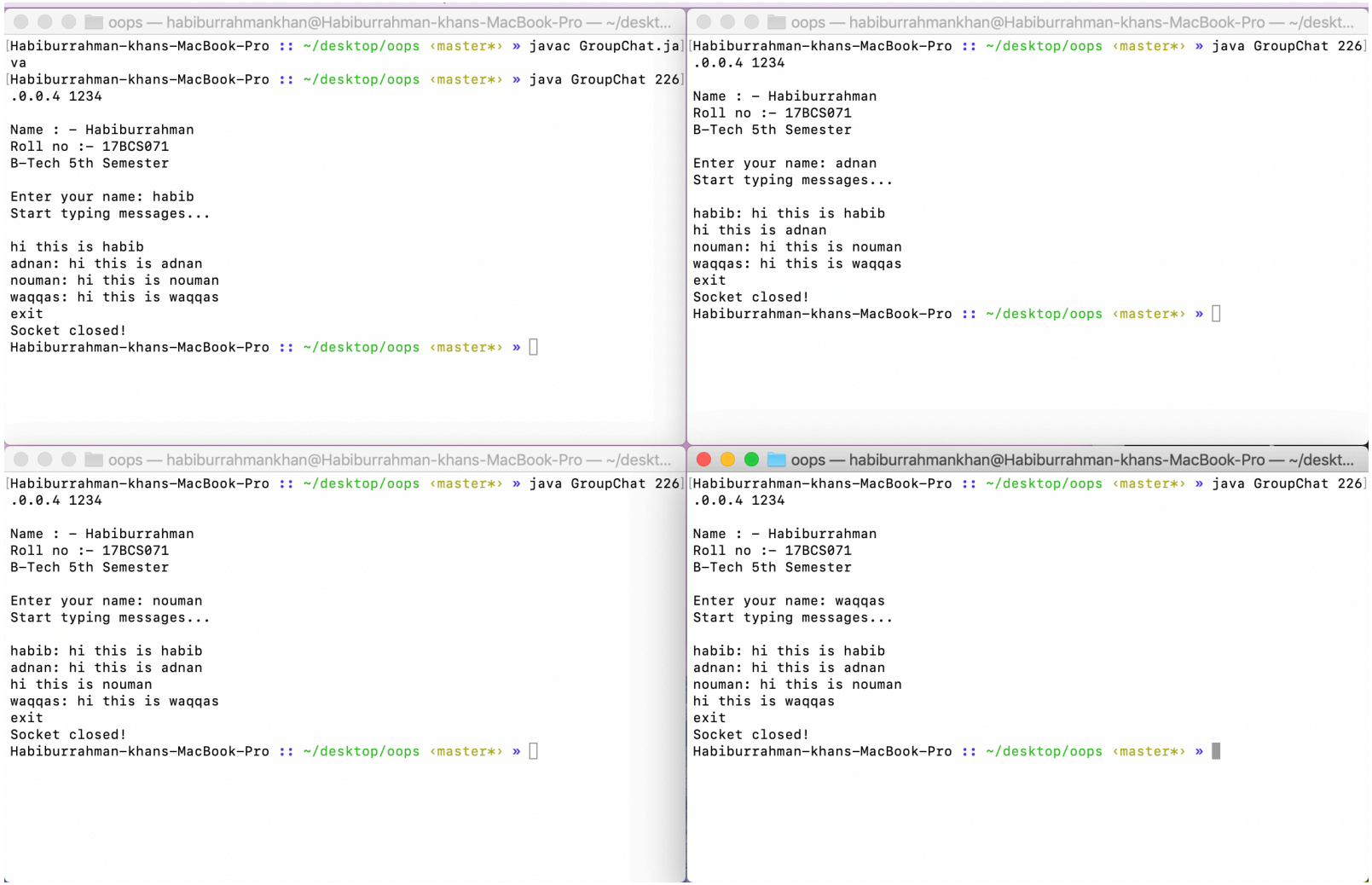

➜ desktop java multicastReciver
Name : - Habiburrahman
Roll no :- 17BCS071
B-Tech 5th Semester
the message is hi how are you multicast
➜ desktop
➜ desktop java multicastReciver
Name : - Habiburrahman
Roll no :- 17BCS071
B-Tech 5th Semester
the message is hi how are you multicast
➜ desktop
Desktop — habiburrahmankhan@Habiburrahman-khans-MacBook-Pro — ~/de...
➜ desktop java multicastReciver
Name : - Habiburrahman
Roll no :- 17BCS071
B-Tech 5th Semester
the message is hi how are you multicast
➜ desktop
Desktop — habiburrahmankhan@Habiburrahman
➜ desktop java multicastSender
Name : - Habiburrahman
Roll no :- 17BCS071
B-Tech 5th Semester
Enter the text to transfer
hi how are you multicast
➜ desktop

Write a program to make chat room **(Client-Server chat-room).**

```
import java.net.*;
import java.io.*;
import java.util.*;
public class GroupChat
{

    private static final String TERMINATE = "Exit";
    static String name;
    static volatile boolean finished = false;
    public static void main(String[] args)
    {
        hrkhan();
        if (args.length != 2)
            System.out.println("Two arguments required:
<multicast-host> <port-number>");
        else
        {
            try
            {
                InetAddress group =
InetAddress.getByName(args[0]);
                int port = Integer.parseInt(args[1]);
                Scanner sc = new Scanner(System.in);
                System.out.print("Enter your name: ");
                name = sc.nextLine();
                MulticastSocket socket = new
MulticastSocket(port);


socket.setTimeToLive(0);
                socket.joinGroup(group);
                Thread t = new Thread(new
                ReadThread(socket,group,port));
                                t.start();
System.out.println("Start typing messages...\n");
                while(true)
                {
                    String message;
                    message = sc.nextLine();
```

```
if(message.equalsIgnoreCase(GroupChat.TERMINATE))
                    {
                        finished = true;
                        socket.leaveGroup(group);
                        socket.close();
                        break;
                    }
                    message = name + ": " + message;
                    byte[] buffer = message.getBytes();
                    DatagramPacket datagram = new

DatagramPacket(buffer,buffer.length,group,port);
                    socket.send(datagram);
                }
            }
            catch(SocketException se)
            {
                System.out.println("Error creating
socket");
                se.printStackTrace();
            }
            catch(IOException ie)
            {
                System.out.println("Error reading/
writing from/to socket");
                ie.printStackTrace();
            }
        }
    }
     public static void hrkhan()
    {
        System.out.println();
        System.out.println("Name : - Habiburrahman");
        System.out.println("Roll no :- 17BCS071 ");
        System.out.println("B-Tech 5th Semester ");
        System.out.println();
    }
}
class ReadThread implements Runnable
{
    private MulticastSocket socket;
    private InetAddress group;
    private int port;
    private static final int MAX_LEN = 1000;
```

```
    ReadThread(MulticastSocket socket,InetAddress
group,int port)
    {
        this.socket = socket;
        this.group = group;
        this.port = port;
    }

    @Override
    public void run()
    {
        while(!GroupChat.finished)
        {
                byte[] buffer = new
byte[ReadThread.MAX_LEN];
                DatagramPacket datagram = new

DatagramPacket(buffer,buffer.length,group,port);
                String message;
            try
            {
                socket.receive(datagram);
                message = new
                String(buffer,
0,datagram.getLength(),"UTF-8");
                if(!message.startsWith(GroupChat.name))
                    System.out.println(message);
            }
            catch(IOException e)
            {
                System.out.println("Socket closed!");
            }
        }
    }


}
```


oops — habiburrahmankhan@Habiburrahman-khans-MacBook-Pro — ~/deskt...
Habiburrahman-khans-MacBook-Pro :: ~/desktop/oops ‹master*› » javac GroupChat.java
Habiburrahman-khans-MacBook-Pro :: ~/desktop/oops ‹master*› » java GroupChat 226.0.0.4 1234
Name : - Habiburrahman
Roll no :- 17BCS071
B-Tech 5th Semester
Enter your name: habib
Start typing messages...
hi this is habib
adnan: hi this is adnan
nouman: hi this is nouman
waqqas: hi this is waqqas
exit
Socket closed!
Habiburrahman-khans-MacBook-Pro :: ~/desktop/oops ‹master*› »
oops — habiburrahmankhan@Habiburrahman-khans-MacBook-Pro — ~/deskt...
Habiburrahman-khans-MacBook-Pro :: ~/desktop/oops ‹master*› » java GroupChat 226.0.0.4 1234
Name : - Habiburrahman
Roll no :- 17BCS071
B-Tech 5th Semester
Enter your name: adnan
Start typing messages...
habib: hi this is habib
hi this is adnan
nouman: hi this is nouman
waqqas: hi this is waqqas
exit
Socket closed!
Habiburrahman-khans-MacBook-Pro :: ~/desktop/oops ‹master*› »
oops — habiburrahmankhan@Habiburrahman-khans-MacBook-Pro — ~/deskt...
Habiburrahman-khans-MacBook-Pro :: ~/desktop/oops ‹master*› » java GroupChat 226.0.0.4 1234
Name : - Habiburrahman
Roll no :- 17BCS071
B-Tech 5th Semester
Enter your name: nouman
Start typing messages...
habib: hi this is habib
adnan: hi this is adnan
hi this is nouman
waqqas: hi this is waqqas
exit
Socket closed!
Habiburrahman-khans-MacBook-Pro :: ~/desktop/oops ‹master*› »
oops — habiburrahmankhan@Habiburrahman-khans-MacBook-Pro — ~/deskt...
Habiburrahman-khans-MacBook-Pro :: ~/desktop/oops ‹master*› » java GroupChat 226.0.0.4 1234
Name : - Habiburrahman
Roll no :- 17BCS071
B-Tech 5th Semester
Enter your name: waqqas
Start typing messages...
habib: hi this is habib
adnan: hi this is adnan
nouman: hi this is nouman
hi this is waqqas
exit
Socket closed!
Habiburrahman-khans-MacBook-Pro :: ~/desktop/oops ‹master*› »