

[2CEIT503 COMPUTER NETWORKS]

Practical: 4

AIM- Write a program to implement various framing techniques.

- a. Bit Stuffing
- b. Byte Stuffing



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1. BYTE STUFFING

CODE:

```
import java.util.*;

public class Main {
    public static void main(String[] args) {

        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the Message to be Sent : ");
        String data = sc.nextLine();
        System.out.println("Enter the Flag : ");
        char flag = sc.next().charAt(0);
        System.out.println("Enter the Escape Character : ");
        char esc = sc.next().charAt(0);
        String res = new String();

        data = flag + data + flag;
        for (int i = 0; i < data.length(); i++) {

            if (data.charAt(i) == flag && i != 0 && i != (data.length() - 1))
                res = res + esc + data.charAt(i);

            else if (data.charAt(i) == esc)
                res = res + esc + data.charAt(i);
            else
                res = res + data.charAt(i);
        }

        System.out.println("The data being sent (with byte stuffed) is : " + res);
        String out = new String();
        for (int i = 1; i < res.length() - 1; i++) {
            String ch = String.valueOf(res.charAt(i));

            if (data.contains(ch) && res.charAt(i) != 'E' )||| res.charAt(i) == 'F')
                out = out + res.charAt(i);

            else if (res.charAt(i) == esc && res.charAt(i + 1) == esc) {
                out = out + esc;
                i++;
            }
        }
    }
}
```

```
        System.out.println("The Destuffed Message is : " + out);  
    }  
}
```

OUTPUT:

```
"C:\Program Files\Java\jdk-18.0.2.1\bin\java.exe" "-javaagent:  
Enter the Message to be Sent :  
DDEDFFDE  
Enter the Flag :  
F  
Enter the Escape Character :  
E  
The data being sent (with byte stuffed) is : FDDEEDEFEFDEEF  
The Destuffed Message is : DDEDFFDE
```

2. BIT STUFFING

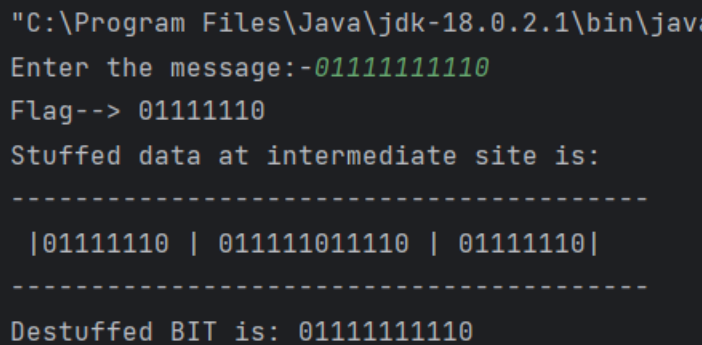
CODE:

```
import java.util.Scanner;  
public class Bit_Stuffing {  
    public static void main(String[] args) {  
        Scanner sc=new Scanner(System.in);  
        System.out.print("Enter the message:-");  
        String d1 = sc.nextLine();  
        String remaining = new String();  
        String output=new String();  
        int counter = 0;  
        for(int i=0;i<d1.length();i++)  
        {  
            if (d1.charAt(i)!='1' && d1.charAt(i)!='0')  
            {  
                System.out.println("Enter valid Binary values");  
                return;  
            }  
            if(d1.charAt(i) == '1')  
            {  
                counter++;  
                remaining = remaining + d1.charAt(i);  
            }  
        }  
    }  
}
```

```
        else
        {
            remaining = remaining + d1.charAt(i);
            counter = 0;
        }
        if(counter == 5)
        {
            remaining = remaining + '0';
            counter = 0;
        }
    }
    System.out.println("Flag--> 01111110");
    String new1="|01111110 | "+remaining+" | 01111110|";
    System.out.println("Stuffed data at intermediate site is:");
    for(int k=0;k<=(28+d1.length());k++)
    {
        System.out.print("-");
    }
    System.out.println();
    System.out.println(" "+new1);
    for(int k=0;k<=(28+d1.length());k++)
    {
        System.out.print("-");
    }
    System.out.println();
    counter=0;
    for(int i=0;i<remaining.length();i++)
    {
        if(remaining.charAt(i) == '1')
        {
            counter++;
            output = output + remaining.charAt(i);
        }
        else
        {
            output = output + remaining.charAt(i);
            counter = 0;
        }
    }
    if(counter == 5)
    {
        if((i+2)!=remaining.length())
        {
            output = output + remaining.charAt(i+2);
        }
        else
```

```
        {
            output=output + '1';
        }
        i=i+2;
        counter = 1;
    }
}
System.out.println("Destuffed BIT is: "+output);
}
}
```

OUTPUT:



```
"C:\Program Files\Java\jdk-18.0.2.1\bin\java
Enter the message:-0111111110
Flag--> 01111110
Stuffed data at intermediate site is:
-----
|01111110 | 011111011110 | 01111110|
-----
Destuffed BIT is: 0111111110
```