Register No : 21L31A05A7 Experiment No : 11 Date:

S.No	Component	Max. Marks	Marks Secured
1	Preparedness	2	2
2	Viva-Voce	2	2
3	Experiment	3	3
4	Analysis & Record	3	3
	Total	10	10
Date	25/4/24	Signature of Lab Teacher	25/4/24

EXPERIMENT-11

Aim: Implement Bit stuffing.

Description: Bit stuffing is the mechanism of inserting one or more non-information bits into a message to be transmitted, to breakup the message sequence for synchronization purpose.

Purpose: In Data link layer, the stream of bits from physical layer is divided into data frames. the data frames can be of fixed length or variable length.

So, a pattern of bits is used as a delimeter to mark the end of one frame and bigining of next frame.

2 common approaches are.

i) Byte - stuffing

ii) Bit stuffing

Register No : Experiment No : Date:

Program:

```
#include <stdio.h>
#include <string.h>
void bitStuffing( int N, int arr[])
{
    int brr[30];
    int i,j,k;
    i=0, j=0;
    while(i<N)
    {   if(arr[i]==1)
        {  int count=1;
           brr[j]=arr[i];
           for(k=i+1;
                  arr[k]==1 && k<N && count<5);
                        k++)
           {
              j++;
              brr[j]=arr[k];
               count++;
              if(count==5)
              { j++;
                brr[j]=0;
                i=k;
              }
           }
        else{
              brr[j]=arr[i];
            i++;
        j++;
}
```

OUTPUT:

1111101

Time Complexity: O(N)

Auxillary Space: O(N)

Register No : 21L31A05A7 Experiment No : 11 Date:

```
    for(i=0; i<j; i++)
        printf("%d", brr[i]);
}
// Driver Code
int main()
{ int N=6;
  int arr[] = {1,1,1,1,1,1};
   bitStuffing(N, arr);
    return 0;
}
```

Register No: 21L31A05A7 Experiment No: 12 Date:

S. No	Component	Max. Marks	Marks Secured
1	Preparedness	2	2
2	Viva-Voce	2	2
3	Experiment	3	3
4	Analysis & Record	3	3
	Total	10	10
Date	05/06/2024	Signature of the Lab teacher	8/6/24

EXPERIMENT-12

AIM: Implement the character stuffing:

Description: character stuffing is the technique used in computer programming to control data transmission between systems of devices. It involves adding special characters or sequences of characters to the data being transmitted to the mark the biginning and end of the data frame.

It is commonly used in data communication protocols to ensure the receiving system correctly interprets the transmitted data. It helps to easily identify the start and end of the frame.

PROGRAM

```
#include <stdio.h>
#include <string.h>
void characterstuffing(char* OriData, char* stuffed)
{ int OriLen = strlen(oriData);
  int stuffedLen = 0;
  for(int i=0; i<OriLen; i++)
  { if(oriData[i] == startchar || OriData[i] ==
       endChar || oriData[i] == escapechar)
    { stuffedData[stuffedLen++] = escapechar;
      stuffedData[stuffedLen++] = originalData[i];
    }
```

OUTPUT

Original Data : Hello World!

Stuffed Data : Hello World!

Destuffed Data : Hello World!

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```
    stuffedData[stuffedLen] = "\0";
}
void characterDestuffing(char* stuffedData, char*
        originalData, char* startchar, char* endchar, char* escapechar)
{
    int stuffedLen = strlen(stuffedData);
    int oriLen = 0;
    for(int i=0; i<stuffLen; i++)
    {
        if(stuffedData[i] == escapeChar){
            i++;
        originalData[oriLen++] = stuffedData[i];
    }
    OriginalData[oriLen] = "\0";
}
int main()
{
    char originalData[100] = "Hello World!";
    char stuffdData[200]; char destuffedData[100];
    char startChar = "<";
    char endchar = ">";
    char escapechar = "\\";
printf("Original Data: %s\n", originalData);
char characterStuffing(originalData, stuffedData, startcha
                        endchar, escapeChar);
printf("Stuffed Data: %s\n", stuffedData);
characterDestuffing(stuffedData, destuffedData,
                    startchar, endchar, escapechar);
printf("DestuffedData: %s\n", destuffedData);
    return 0;
}
```

Register No : 21L31A05A7 Experiment No : 13 Date:

Sl No	Component	Max. Marks	Marks secured.
1	Preparedness	2	2
2	Viva-Voice	2	2
3	Experiment	3	3
4	Analysis & Record	3	3
	Total	10	10

Date	05/06/2024	Signature of Lab Teacher

6/6/24

EXPERIMENT-13

Aim: Implementation of character count.

Description: Framing method uses a field in the header to specify the number of characters in frame. When the Data link layer at the destination sees the character count. It knows how many characters follow & hence where the end of the frame is

Program:

```
#include<stdio.h>
int main()
{
  char str[100];
  int n,i,j, c=0, co=0;
  printf("Enter string");
  scanf("%s",s);
  printf("Enter number of frames");
  scanf("%d",&n);
    int f[n];
```

OUTPUT:

Enter the frame size of frames:

Frame 0: 5

Frame 1: 5

Frame 2: 5

The no of frames : 3

The content of the frame 0: 10010

size of frame 0: 5

The content of frame 1: 10101

size of frame 1: 5

The content of frame 2: 01

size of the frame 2: 2

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```
printf("Enter the frame size of frames");
for(i=0;i<n;i++)
{ printf("frame: %d",i)
  scanf("%d",&f[i]);
}
printf("\n the no' of frames: %d\n",n);
for(i=0;i<n;i++)
{ printf("The content of the frame %d",i));
  j=0;
  while(c< strlen(str) && j<f[i])
  { printf("%c",s[c]);
    if(s[c]!='\0')
    { co++;
    }
    c++;
  j++;
}
printf("\n Size of frame %d: %d\n\n",
                              i, co);
}
```