

Register No :

21L31A05A7

Experiment No :

1011

Date:

S.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	25/4/24	Signature of Lab Instructor 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 delimiter to mark the end of one frame and beginning 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[7])
{
    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: $O(N)$

Auxiliary Space: $O(N)$

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```
for (i=0; i<j; i++)  
    printf ("%d", brr[i]);
```

}

// Driver Code

```
int main()
```

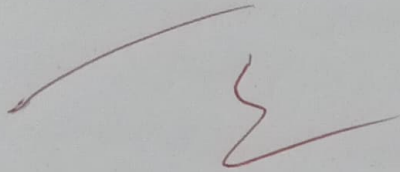
```
{ int N=6;
```

```
int arr[] = {1, 1, 1, 1, 1, 1};
```

```
bitStuffing (N, arr);
```

```
return 0;
```

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1	Preparedness	2	2
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Date	05/06/2024	Signature of the Lab teacher	

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 mark the beginning 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 character stuffing (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++] = OriData[i];
    }
}
```

OUTPUT

Original Data : Hello World!

Stuffed Data : Hello World!

Detuffed Data : Hello World!

stuffed Data [stuffed len] = "10";

```
3 void characterDestuffing (char* stuffedData, char*  
    ginal char** OriData, startchar, char* endchar, char* (scapichen))
```

```
int stuffedLen = strlen( stuffedData );
```

```
int OriLen = 0;
```

```
for (int i=0; i<stufflen; i++)
```

if (stuffedData[i] == escapeChar) {

3 1 + + ;

original Data [oriLen++] = stuffedData[i];

Original Data[OriLen] = "\0";

```
int main ()
```

```
char oriData[100] = "Hello World!";
```

char stuffedData[200]; char destuffedData[100];

```
char startChar = "<"
```

```
char endchar = '>';
```

char escapechar = "\\",

```
printf ("Original Data: %s\n", OriginalData);
```

char^{acter} Stuffing (Original Data, Stuffed Data, startchar
endchar, escapechar);

```
printf ("Stuffed Data: %s \n", stuffedData);
```

Character Destuffing (~~stuffed~~ Data, Destuffed Data,
startchar, endchar, escapechar);

```
printf("DestuffedData: %s\n", destuffedData);
```

```
return 0;
```


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3	Experiment	3	3
4	Analysis & Record	3	3
Total		10	10
date		05/06/2024	Signature of Lab Teacher

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 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 : 1 0 0 1 0

size of frame 0 : 5

The content of frame 1 : 1 0 1 0 1

size of frame 1 : 5

The content of frame 2 : 0 1

size of the frame 2 : 2

```
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')
```

```
    { c++;
```

```
    }
```

```
    c++;
```

```
    j++;
```

```
}
```

```
printf("\n Size of frame %d: %d\n\n",
```

```
i, c0);
```

