

Implement framing technique - Bit stuffing

Theory

Bit stuffing is a synchronization technique that involves inserting/stuffing one or many non-information bits into a message to break overall message sequencing. The physical layer's stream of bits is split into data frames in the Data Link layer. The length of the data frames can be fixed or changeable. The size of each frame to be transmitted may be changeable in variable-length framing. The size of each frame to be sent may differ in variable-length framing. As a result, a pattern of bits is utilized as a delimiter (a character that indicates the start or end of a unit of data) to distinguish between one frame and the next. If the pattern appears in the message, then, measures must be implemented to avoid this circumstance.

Implementation

```
#include<stdio.h>
#include<stdlib.h>

int main()
{
    char *a,*b;
    char temp;
    char in[100];
    char stuff[100];
    char destuff[100];

    int count=0;

    printf("enter the input character string (0's and 1's
only):\n");
    scanf("%s",in);

    a=in;
    b=stuff;

    while(*a!='\0')
    {
        if(*a=='0')
        {
            *b=*a;
            b++;
        }
    }
}
```

```

        a++;
    }
else
{
    while(*a=='1' && count!=5)
    {
        count++;
        *b=*a;
        b++;
        a++;
    }

    if(count==5)
    {
        *b='0';
        b++;
    }
    count=0;
}
}
*b='\0';
printf("\nthe stuffed character string is");
printf("\n%s",stuff);
a=stuff;
b=destuff;
while(*a!='\0')
{
    if(*a=='0')
    {
        *b=*a;
        b++;
        a++;
    }
else
{
    while(*a=='1' && count!=5)
    {
        count++;
        *b=*a;
        b++;
    }
}
}

```

```

        a++;
    }
    if (count==5)
    {
        a++;
    }
    count=0;
}
}
*b='\0';
printf("\nthe destuffed character string is");
printf("\n%s\n",destuff);
return 0;
}

```

UI Implementation

HTML

```

<!DOCTYPE html>

<html>

<head>

    <title>Bit Manipulation</title>
    <link rel="stylesheet"
href="https://stackpath.bootstrapcdn.com/bootstrap/4.5.2/css
/bootstrap.min.css"
integrity="sha384-JcKb8q3iqJ61gNV9KGb8thSsNjpSL0n8PARn9HuZOn
IxN0hoP+VmmDGMN5t9UJ0Z" crossorigin="anonymous">

    <script src="index.js"></script>

<body>

    <div class="container" style="align-content:center;
margin-left:10cm; background-color:white;">
        <div style="text-align:left; color:#000000;
margin-left:0cm; font-size:30px; font-weight:bold;">Bit

```

Manipulation</div>

<div>Enter Input</div>

<input type="text" id="bit" placeholder="In the form of 0 and 1 only" style="width: 15cm;color: Blue">

<div>

<button type="button1" class="btn btn-primary" onclick="stuffing()" style="background-color:Black; margin-left:5.3cm; color:white; font-weight:bold;">Stuff</button>

<button type="button2" class="btn btn-primary" onclick="destuffing()" style="background-color:black;color:white; font-weight:bold;">Destuff</button>

</div>

<input type="text" class="form-control" id="res" style="width: 15cm; align-content: center;margin-top: 0.5cm;color:blue">

</div>

</body>

</head>

</html>

JavaScript

```
function stuffing(data){
    var bit = document.getElementById("bit").value;

    var count = 0;
```

```

var ans = "";

for (let index = 0; index < bit.length; index++) {

    if(bit.charAt(index) == '0'){

        count = 0;

    }else{

        count++;

    }

    ans = ans+bit.charAt(index);

    if(count == 5){

        ans = ans + '0';

        count = 0;

    }

}

document.getElementById("res").value = "Stuffed - " + ans;

}

function destuffing(data){

    var bit = document.getElementById("bit").value;

    var count = 0;

    var ans = "";

    for (let index = 0; index < bit.length; index++) {

```

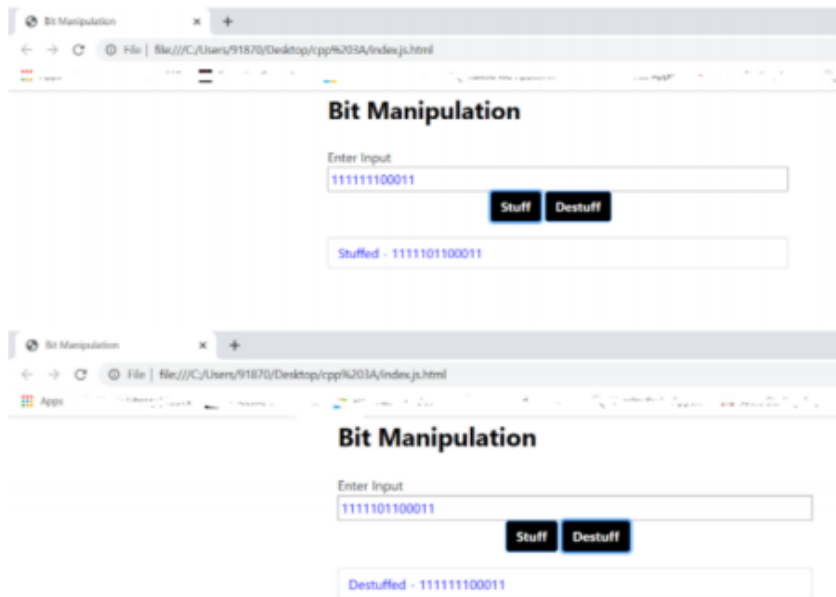
```
if(bit.charAt(index) == '0'){  
  
    if(count==5){  
  
        count = 0;  
  
        continue;  
  
    }  
  
    count = 0;  
  
}else{  
  
    count++;  
  
}  
  
ans = ans+bit.charAt(index);  
  
}  
  
document.getElementById("res").value = "Destuffed - "+ ans;  
  
}
```

Output

```
C:\Users\91870\Desktop\bit.exe
enter the input character string (0es & 1es only):
111111100011

the stuffed character string is
1111101100011
the destuffed character string is
111111100011

-----
Process exited after 10.21 seconds with return value 0
Press any key to continue . . .
```



Learning

In this program, we learnt about the framing technique i.e. bit stuffing. It is the process of inserting non-information bits into data to break up bit patterns to affect the synchronous transmission of information. For the UI of this application, HTML, CSS and Javascript is used.