

Practical 14 Congestion control protocols: Leaky Bucket.

* Objective

To simulate the Leaky Bucket algorithm for network traffic shaping, managing packet flow to avoid congestion by controlling the transmission rate and bucket size.

* Code

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

```
int main () {
```

```
    int i, packets[10], content = 0, newcontent,
        time, clk, bucket_size, output_rate;
```

```
    for (i = 0; i < 5; i++)
    {
```

```
        packets[i] = rand() % 10;
        if (packets[i] == 0)
            i--;
    }
```

```
    printf("\nEnter output rate of the bucket: ");
    scanf("%d", &output_rate);
```

```
    printf("\nEnter Bucket size: ");
```



```
scanf("%d", &bucket_size);
```

```
for (i = 0; i < 5; ++i)
```

```
{
```

```
    if (C_packets[i] + content > bucket_size)
```

```
    {
```

```
        if (C_packets[i] > bucket_size)
```

```
            printf("\nIncoming packet size %d  
greater than the size of the  
bucket\n", packets[i]);
```

```
        else
```

```
            printf("\nBucket size exceeded\n");
```

```
    }
```

```
else
```

```
{
```

```
    newcontent = packets[i];
```

```
    content += newcontent;
```

```
    printf("\nIncoming Packet: %d\n",  
        newContent);
```

```
    printf("Transmission left: %d\n",  
        content);
```

```
    time = rand() % 10;
```

```
    printf("Next packet will come at:  
%d\n", time);
```

```
    for (clk = 0; clk < time && content > 0;  
        ++clk)
```

```
    {
```

```
        printf("\nLeft time: %d", (time - clk));  
        sleep(1);
```



```
        if C content > 0 )
        {
            printf C "In Transmitted \n";
            if C content < output_rate )
                content = 0;
            else
                content -= output_rate;
            printf C "Bytes remaining : %d \n",
                content;
        }
        else
        {
            printf C "In No packets to send \n";
        }
    }
}

return 0;
```

* Output

Enter output rate of the bucket : 4

Enter Bucket size : 10

Incoming Packet : 6

Transmission left : 6

Next packet will come at : 5



Left time: 5

Transmitted

Bytes remaining: 2

Left time: 4

Transmitted

Bytes remaining: 0

Left time: 3

Left time: 2

Left time: 1

Incoming Packet: 3

Transmission Left: 3

Next packet will come at: 2

Left time: 2

Transmitted

Bytes remaining: 0

~~Left~~ Left time: 1

Incoming Packet: 8

Bucket size exceeded

Incoming Packet: 1

Transmission left: 1

Next packet will come at: 4

Left time: 4

Transmitted

Bytes remaining: 0



Left time : 3

Left time : 2

Left time : 1

Incoming Packet : 5

Transmission left : 5

Next packet will come at : 3

Left time : 3

Transmitted

Bytes remaining : 1

Left time : 2

Transmitted

Bytes remaining : 0

Left time : 1

* Learning Outcome

Simulate traffic shaping using the Leaky Bucket algorithm.