

## **SAMPLE OUTPUT**

### **1.a) SENDER – PERFECT (NO ERROR) IMPLEMENTATION**

```
Shyams-MacBook-Pro:~ Shyam$ gcc sender.c
Shyams-MacBook-Pro:~ Shyam$ ./a.out input.txt
```

USER INPUT

-----

```
1.Packet size
2.Timeout interval (in seconds)
3.Size of sliding window
4.Max sequece number (Min is 0)
5.Exit
Enter your choice:1
Enter the size of each packet:1024
```

USER INPUT

-----

```
1.Packet size
2.Timeout interval (in seconds)
3.Size of sliding window
4.Max sequece number (Min is 0)
5.Exit
Enter your choice:2
Enter the timeout interval:1
```

USER INPUT

-----

```
1.Packet size
2.Timeout interval (in seconds)
3.Size of sliding window
4.Max sequece number (Min is 0)
5.Exit
Enter your choice:3
Enter the size of the sliding window:6
```

USER INPUT

-----

```
1.Packet size
2.Timeout interval (in seconds)
3.Size of sliding window
4.Max sequece number (Min is 0)
5.Exit
Enter your choice:4
Enter the maximum sequence number:5
```

USER INPUT

-----

```
1.Packet size
```

2.Timeout interval (in seconds)  
3.Size of sliding window  
4.Max sequenece number (Min is 0)  
5.Exit  
Enter your choice:5  
Size of file:5407 bytes  
Number of packets needed:6

#### SITUATIONAL ERRORS

-----  
1.None  
2.Packet damaged (Random)  
3.Packet lost (Random)  
4.Ack lost (Random)  
5.Packet damaged (User input)  
6.Packet lost (User input)  
7.Ack lost (User input)  
Enter your choice:1  
Current window = [0,1,2,3,4,5]  
Packet 0 sent  
Packet 1 sent  
Packet 2 sent  
Packet 3 sent  
Packet 4 sent  
Packet 5 sent  
Ack 0 received  
Current window = [0,1,2,3,4,5]  
Ack 1 received  
Current window = [0,1,2,3,4,5]  
Ack 2 received  
Current window = [0,1,2,3,4,5]  
Ack 3 received  
Current window = [0,1,2,3,4,5]  
Ack 4 received  
Current window = [0,1,2,3,4,5]  
Ack 5 received

Number of packets sent:6  
Effective throughput:3242.86Bps  
Simulation time:1.67s

#### **1.b) RECEIVER – PERFECT (NO ERROR) IMPLEMENTATION**

Shyams-MacBook-Pro:~ Shyam\$ gcc receiver.c  
Shyams-MacBook-Pro:~ Shyam\$ ./a.out  
Current window = [0]  
Packet 0 received  
Checksum OK  
Ack 0 sent  
Current window = [1]

Packet 1 received  
Checksum OK  
Ack 1 sent  
Current window = [2]  
Packet 2 received  
Checksum OK  
Ack 2 sent  
Current window = [3]  
Packet 3 received  
Checksum OK  
Ack 3 sent  
Current window = [4]  
Packet 4 received  
Checksum OK  
Ack 4 sent  
Current window = [5]  
Packet 5 received  
Checksum OK  
Ack 5 sent

## **2.a) SENDER - DAMAGED PACKET IMPLEMENTATION**

### **SITUATIONAL ERRORS**

-----  
1.None  
2.Packet damaged (Random)  
3.Packet lost (Random)  
4.Ack lost (Random)  
5.Packet damaged (User input)  
6.Packet lost (User input)  
7.Ack lost (User input)  
Enter your choice:2  
Current window = [0,1,2,3,4,5]  
Packet 0 sent  
Packet 1 sent  
Packet 2 sent  
Packet 3 sent  
Packet 4 sent  
Packet 5 sent  
Ack 0 received  
Current window = [0,1,2,3,4,5]  
Packet 1 timed out  
Packet 1 re-transmitted  
Packet 2 timed out  
Packet 2 re-transmitted  
Packet 3 timed out  
Packet 3 re-transmitted  
Packet 4 timed out  
Packet 4 re-transmitted  
Packet 5 timed out

Packet 5 re-transmitted  
Ack 1 received  
Current window = [0,1,2,3,4,5]  
Ack 2 received  
Current window = [0,1,2,3,4,5]  
Ack 3 received  
Current window = [0,1,2,3,4,5]  
Ack 4 received  
Current window = [0,1,2,3,4,5]  
Ack 5 received

Number of packets sent:6  
Effective throughput:656.72Bps  
Simulation time:8.23s

## **2.b) RECEIVER – DAMAGED PACKET IMPLEMENTATION**

Current window = [0]  
Packet 0 received  
Checksum OK  
Ack 0 sent  
Current window = [1]  
Packet 1 received  
Checksum failed  
Current window = [1]  
Packet 2 received  
Packet 2 discarded  
Current window = [1]  
Packet 3 received  
Packet 3 discarded  
Current window = [1]  
Packet 4 received  
Packet 4 discarded  
Current window = [1]  
Packet 5 received  
Packet 5 discarded  
Current window = [1]  
Packet 1 received  
Checksum OK  
Ack 1 sent  
Current window = [2]  
Packet 2 received  
Checksum OK  
Ack 2 sent  
Current window = [3]  
Packet 3 received  
Checksum OK  
Ack 3 sent  
Current window = [4]  
Packet 4 received

Checksum OK  
Ack 4 sent  
Current window = [5]  
Packet 5 received  
Checksum OK  
Ack 5 sent

### **3.a) SENDER – LOST PACKET IMPLEMENTATION**

#### SITUATIONAL ERRORS

-----  
1.None  
2.Packet damaged (Random)  
3.Packet lost (Random)  
4.Ack lost (Random)  
5.Packet damaged (User input)  
6.Packet lost (User input)  
7.Ack lost (User input)  
Enter your choice:3  
Current window = [0,1,2,3,4,5]  
Packet 0 sent  
Packet 1 sent  
Packet 2 sent  
Packet 3 sent  
Packet 4 sent  
Packet 5 sent  
Ack 0 received  
Current window = [0,1,2,3,4,5]  
Packet 1 timed out  
Packet 1 re-transmitted  
Packet 2 timed out  
Packet 2 re-transmitted  
Packet 3 timed out  
Packet 3 re-transmitted  
Packet 4 timed out  
Packet 4 re-transmitted  
Packet 5 timed out  
Packet 5 re-transmitted  
Ack 1 received  
Current window = [0,1,2,3,4,5]  
Ack 2 received  
Current window = [0,1,2,3,4,5]  
Ack 3 received  
Current window = [0,1,2,3,4,5]  
Ack 4 received  
Current window = [0,1,2,3,4,5]  
Ack 5 received

Number of packets sent:6  
Effective throughput:744.42Bps

Simulation time:7.26s

### **3.b) RECEIVER – LOST PACKET IMPLEMENTATION**

```
Current window = [0]
Packet 0 received
Checksum OK
Ack 0 sent
Current window = [1]
Packet 2 received
Packet 2 discarded
Current window = [1]
Packet 3 received
Packet 3 discarded
Current window = [1]
Packet 4 received
Packet 4 discarded
Current window = [1]
Packet 5 received
Packet 5 discarded
Current window = [1]
Packet 1 received
Checksum OK
Ack 1 sent
Current window = [2]
Packet 2 received
Checksum OK
Ack 2 sent
Current window = [3]
Packet 3 received
Checksum OK
Ack 3 sent
Current window = [4]
Packet 4 received
Checksum OK
Ack 4 sent
Current window = [5]
Packet 5 received
Checksum OK
Ack 5 sent
```

### **4.a) SENDER – LOST ACKNOWLEDGEMENT IMPLEMENTATION**

```
Shyams-MacBook-Pro:~ Shyam$ gcc sender.c
Shyams-MacBook-Pro:~ Shyam$ ./a.out input.txt
```

USER INPUT

-----

- 1.Packet size
- 2.Timeout interval (in seconds)

3.Size of sliding window  
4.Max sequece number (Min is 0)  
5.Exit  
Enter your choice:1  
Enter the size of each packet:1024

#### USER INPUT

-----

1.Packet size  
2.Timeout interval (in seconds)  
3.Size of sliding window  
4.Max sequece number (Min is 0)  
5.Exit  
Enter your choice:2  
Enter the timeout interval:1

#### USER INPUT

-----

1.Packet size  
2.Timeout interval (in seconds)  
3.Size of sliding window  
4.Max sequece number (Min is 0)  
5.Exit  
Enter your choice:3  
Enter the size of the sliding window:4

#### USER INPUT

-----

1.Packet size  
2.Timeout interval (in seconds)  
3.Size of sliding window  
4.Max sequece number (Min is 0)  
5.Exit  
Enter your choice:4  
Enter the maximum sequence number:5

#### USER INPUT

-----

1.Packet size  
2.Timeout interval (in seconds)  
3.Size of sliding window  
4.Max sequece number (Min is 0)  
5.Exit  
Enter your choice:5  
Size of file:5407 bytes  
Number of packets needed:6

#### SITUATIONAL ERRORS

-----

1.None

```
2.Packet damaged (Random)
3.Packet lost (Random)
4.Ack lost (Random)
5.Packet damaged (User input)
6.Packet lost (User input)
7.Ack lost (User input)
Enter your choice:4
Current window = [0,1,2,3]
Packet 0 sent
Packet 1 sent
Packet 2 sent
Packet 3 sent
Ack 0 received
Current window = [1,2,3,4]
Packet 4 sent
Packet 1 timed out
Packet 1 re-transmitted
Ack 1 received
Current window = [2,3,4,5]
Packet 5 sent
Ack 2 received
Current window = [2,3,4,5]
Ack 3 received
Current window = [2,3,4,5]
Ack 4 received
Current window = [2,3,4,5]
Ack 5 received

Number of packets sent:6
Effective throughput:1840.67Bps
Simulation time:2.94s
```

#### **4.b) RECEIVER – LOST ACKNOWLEDGEMENT IMPLEMENTATION**

```
Shyams-MacBook-Pro:~ Shyam$ gcc receiver.c
Shyams-MacBook-Pro:~ Shyam$ ./a.out
Current window = [0]
Packet 0 received
Checksum OK
Ack 0 sent
Current window = [1]
Packet 1 received
Checksum OK
Ack 1 sent
Current window = [2]
Packet 2 received
Checksum OK
Ack 2 sent
Current window = [3]
Packet 3 received
```



Checksum OK  
Ack 3 sent  
Current window = [4]  
Packet 4 received  
Checksum OK  
Ack 4 sent  
Current window = [5]  
Packet 1 received  
Packet 1 discarded  
Current window = [5]  
Packet 5 received  
Checksum OK  
Ack 5 sent

## **5. MD5 CHECK**

```
Shyams-MacBook-Pro:~ Shyam$ md5 -r input.txt  
595e794e0f50cb9d9a3ff14ef2e7087d input.txt  
Shyams-MacBook-Pro:~ Shyam$ md5 -r output.txt  
595e794e0f50cb9d9a3ff14ef2e7087d output.txt
```