Ex No: 7
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Flow control at Data link layer

Aim:

Write a program to implement flow control at data link layer using Sliding window protocol, Simulate the flow of frames from one node to another.

Features:

→ Input Window size & Message.
→ Sends window size frames at a time.
→ writes frames to Sender Buffer
→ Receiver reads frames, sends ACK or NACK to Receiver Buffer.
→ Sender reads ACK / NACK and Continues or resends frames.
→ You can manually edit the files to simulate Errors

Code:

```
import Time
import random
class Sender:
    def __init__(self, total_frames, window_size):
        self.total_frames = total_frames
        self.window_size = window_size
        self.base = 0
        self.next_seq = 0
    def send_frames(self):
        print(f"\n[Sender] Total frames to Send:
                {self.total_frames}")
```

```
while self.base < self.total_frames:
    while self.next_seq < self.base + self.window_size
        and self.next_seq < self.total_frames:
        print(f"[Sender] Sending frame {self.next_seq}")
        self.next_seq += 1
        time.sleep(1)
def ack_received(self, ack):
    print(f"[Sender] Acknowledgment received for Frame
                                        {ack}")
    if ack >= self.base:
        self.base = ack + 1

class Receiver:
    def receive_frame(self, frame_no, sender):
        if random.choice([True, False]):
            print(f"[Receiver] Received frame {frame_no}")
            sender.ack_received(frame_no)
        else:
            print(f"[Receiver] Frame {frame_no} lost
                                    (No Ack Sent)")

if __name__ == "__main__":
    total_frames = 5
    window_size = 3
    sender = Sender(total_frames, window_size)
    receiver = Receiver()
    sender.send_frames(receiver)
```

Output:

Enter total number of frames : 5
Enter window size : 3
[Sender] Total frames to Sent : 5
[Sender] Sending Frame : 0
[Sender] Sending Frame : 1
[Sender] Sending frame : 2
[Receiver] Successfully Receive frames 0 to 2
[Sender] Acknowledgment receive for frame 2
[Sender] Sending Frame: 3
[Sender] Sending Frame: 4
[Receiver] Frame 4 last or Complete
[Sender] Timeout Resending Window from Frame 3
[Sender] Sending Frame : 3
[Sender] Sending Frame : 4
[Receiver] Successfully Received frames 3 to 4
[Sender] Acknowledgment received for frame 4
Transmission Completed.

Result:

Sliding Window protocol is executed successfully.