Practical 7

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.

ALGORITHM:

Initialize Frames:

- Input the window size from the user.

- Input a message to be sent as a sequence of frames.

- Create a list of frames from the message, where each frame consists of:

    o A frame number (frame_no).

    o The data (a single character from the message).

    o An acknowledgment status (acknowledged), initially set to False.

Set Initial Variables:

- Set base to 0, representing the starting position of the sliding window.

- The window_size determines how many frames can be sent without
  waiting for acknowledgments.

 Loop Until All Frames are Sent:

- **Send Frames**:

    o Send up to window_size frames starting from the current base.

    o Display the frame numbers and data being sent.

    o Introduce a delay (2 seconds) to simulate transmission time.

- **Receive Acknowledgments**:

    o Simulate acknowledgment for each frame in the window:

        ▪ With an error probability of 20%, mark the frame as not
          acknowledged.

- Otherwise, mark the frame as successfully acknowledged.

  o Display the acknowledgment status for each frame (OK for success, ERROR for failure).

  o Introduce a delay to simulate acknowledgment processing time.

Update Window Base:

  o Shift the window (base) to the next unacknowledged frame:

    - Move base forward as long as frames at base are acknowledged.

    - If base has moved to the next set of unacknowledged frames, resend the remaining frames in the window.

Repeat Until All Frames are Acknowledged:

- Continue until base reaches the end of the frame list.

- If there are still frames left unacknowledged after a complete cycle, resend them.

- Introduce a delay for retransmission.

End Protocol:

- Print a confirmation message that all frames have been sent and acknowledged.

OUTPUT:

```
Enter window size: 3
Enter a message to send: Deepika

--- Sending Frames ---
Sent Frame 0: D
Sent Frame 1: e
Sent Frame 2: e
Frames sent, waiting for acknowledgments...


--- Receiving Frames ---
Received Frame 0: D [OK]
Received Frame 1: e [ERROR]
Received Frame 2: e [OK]

Resending unacknowledged frames...


--- Sending Frames ---
Sent Frame 1: e
Sent Frame 3: p
Frames sent, waiting for acknowledgments...


--- Receiving Frames ---
Received Frame 1: e [OK]
Received Frame 3: p [OK]

Resending unacknowledged frames...
```

```
--- Sending Frames ---
Sent Frame 4: i
Sent Frame 5: k
Sent Frame 6: a
Frames sent, waiting for acknowledgments...


--- Receiving Frames ---
Received Frame 4: i [OK]
Received Frame 5: k [OK]
Received Frame 6: a [OK]

All frames sent and acknowledged!
```