GoBack N Program:

```
import random

a = list(map(int,input("\nEnter the numbers in the frame in a sequence with blank spaces between two numbers: ").strip().split()))

n = int(input("Enter window size: "))

count = int(len(a) / 4)

i = 0

while i < len(a):
   j = 0
   for _ in range(n) :
      if i < len(a):
         print("Sent frame " + str(a[i]))
         i,j = i + 1,j+1
   i = i - j
   for _ in range(n) :
      x = random.randint(0,1)
      if x == 0 and count != 0 and i < len(a):
         print("Frame " + str(a[i]) + " not recieved.Transmit the frame again")
         count = count - 1
         break
      elif i < len(a) :
         print ("Acknowledgment recieved for Frame " + str(a[i]))
         i = i + 1
```

****

Output:

```
Enter the numbers in the frame in a sequence with blank spaces between two numbers: 1 2 3 4 5 6 7 8 9

Enter window size: 4

Sent frame 1

Sent frame 2
```

Sent frame 3

Sent frame 4

Frame 1 not recieved.Transmit the frame again

Sent frame 1

Sent frame 2

Sent frame 3

Sent frame 4

Acknowledgment recieved for Frame 1

Acknowledgment recieved for Frame 2

Frame 3 not recieved.Transmit the frame again

Sent frame 3

Sent frame 4

Sent frame 5

Sent frame 6

Acknowledgment recieved for Frame 3

Acknowledgment recieved for Frame 4

Acknowledgment recieved for Frame 5

Acknowledgment recieved for Frame 6

Sent frame 7

Sent frame 8

Sent frame 9

Acknowledgment recieved for Frame 7

Acknowledgment recieved for Frame 8

Acknowledgment recieved for Frame 9

****

Selective Repeat Program:

```
import random

a = list(map(int,input("\nEnter the numbers in the frame in a sequence with blank spaces between two numbers: ").strip().split()))

n = int(input("Enter window size: "))

count = int(len(a) / 2)

i = 0

while i < len(a):
   j = 0
   for _ in range(n) :
      if i < len(a):
         print("Sent frame " + str(a[i]))
         i,j = i + 1,j+1
   i = i - j
   for _ in range(n) :
      x = random.randint(0,1)
      if x == 0 and count != 0 and i < len(a):
         print("Frame " + str(a[i]) + " not recieved.Transmit the frame again")
         count = count - 1
         a.insert(i+n,a[i])
         i = i + 1
      elif i < len(a) :
         print ("Acknowledgment recieved for Frame " + str(a[i]))
         i = i + 1
```

****

Output:

Enter the numbers in the frame in a sequence with blank spaces between two numbers: 1 2 3 4 5 6 7 8

Enter window size: 4

Sent frame 1

Sent frame 2

Sent frame 3

Sent frame 4

Frame 1 not recieved.Transmit the frame again

Frame 2 not recieved.Transmit the frame again

Frame 3 not recieved.Transmit the frame again

Acknowledgment recieved for Frame 4

Sent frame 1

Sent frame 2

Sent frame 3

Sent frame 5

Frame 1 not recieved.Transmit the frame again

Acknowledgment recieved for Frame 2

Acknowledgment recieved for Frame 3

Acknowledgment recieved for Frame 5

Sent frame 1

Sent frame 6

Sent frame 7

Sent frame 8

Acknowledgment recieved for Frame 1

Acknowledgment recieved for Frame 6

Acknowledgment recieved for Frame 7

Acknowledgment recieved for Frame 8

****

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Assignment 3

Q1 Write a note on flow control and error control.

Ans **Flow Control :**

Co-ordinates the amount of data that can be sent before receiving an acknowlegement

- Important duty of data link layer.
- It makes sender wait for some sort of an acknowledgement before continuing to send data.

Error Control :

It's based on automatic repeat request.

- Refers to methods of error detection and retransmission.
- When error is detected, specified frame are retransmitted.

Q2 What is sliding window protocol ?

Ans Sliding window protocol are data link layer protocols for reliable and sequential delivery of data frames. Multiple frames can be sent by the sender at a time before receiving an ACK from receiver sliding window refers to imaginary boxes to hold frames.

There are two types of sliding window protocol

1] Go Back N ARQ

2] Selective Repeat ARQ.

Q3 Explain in brief selective repeat and go back N

Ans Selective Repeat ARQ:

It is data link layer protocol that uses a sliding window method. In this if any frame is corrupted or lost, only the lost frames are retransmitted. If the receiver receives a corrupt frame, it does not directly discard it It sends a negative acknowledgement to the sender. The sender sends the frame again on receiving the acknowlegement

Go Back N ARQ:

It is a data link layer protocol that uses a sliding window protocol. In this any frame is corrupted or lost, all subsequent frames have to sent again.