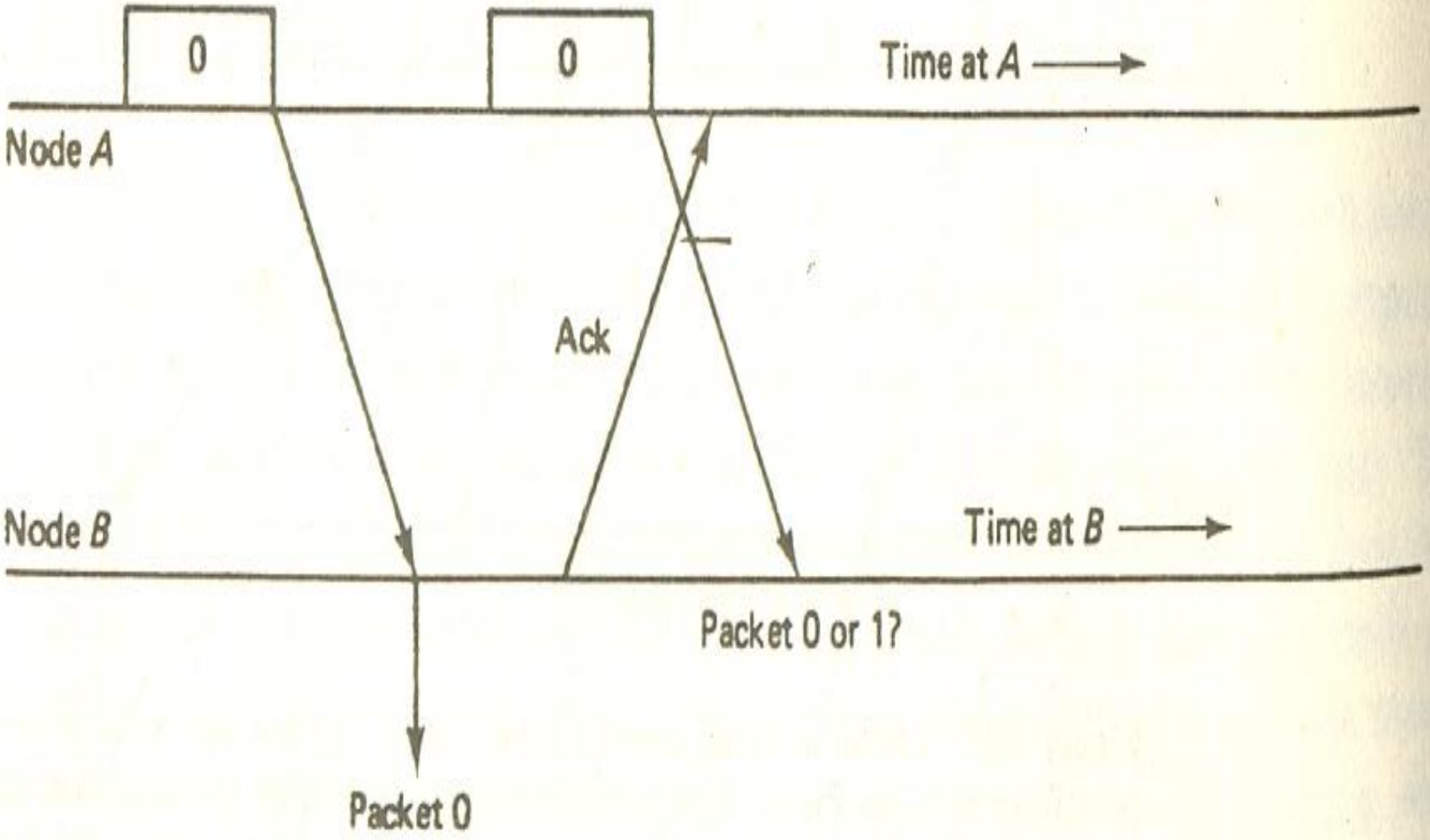
STOP AND WAIT ARQ



Continued…

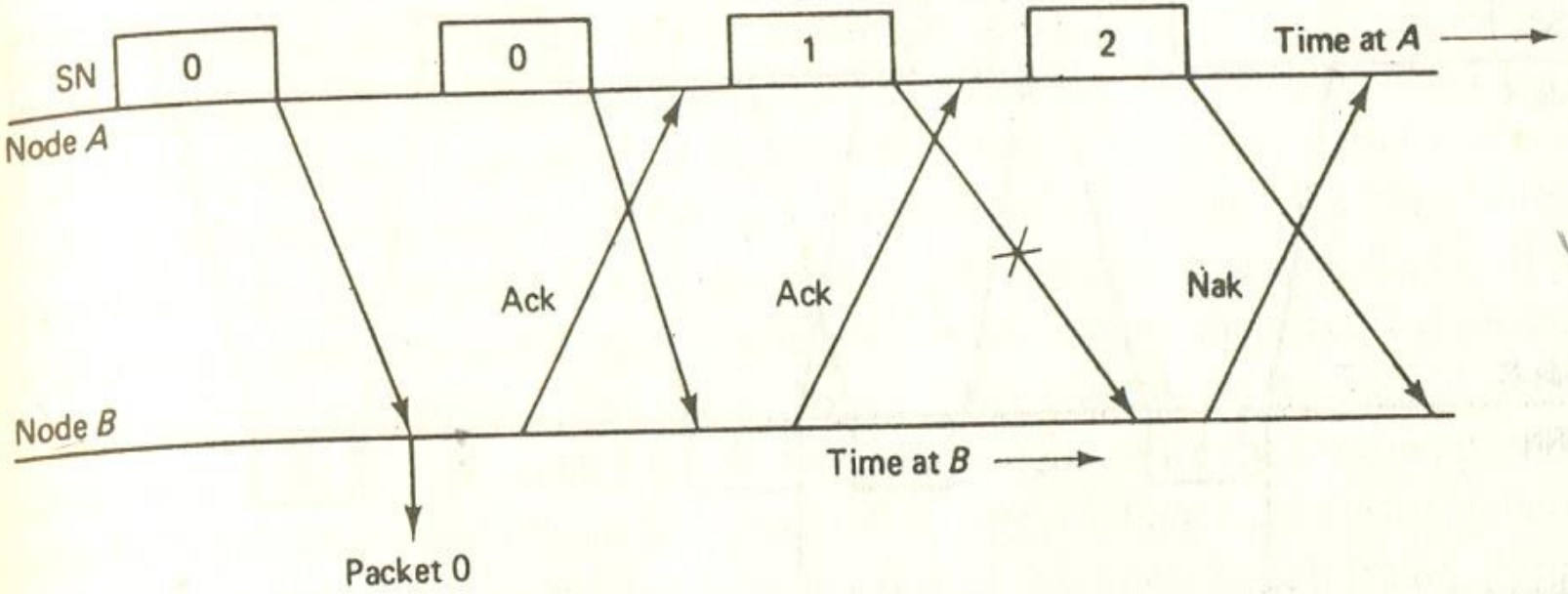


Figure 2.19 The trouble with unnumbered acks. If the transmitter at A times-out and sends packet 0 twice, node B can use the sequence numbers to recognize that packet 0 is being repeated. It must send an ack for both copies, however, and (since acks can be lost) the transmitter cannot tell whether the second ack is for packet 0 or 1.

Continued…

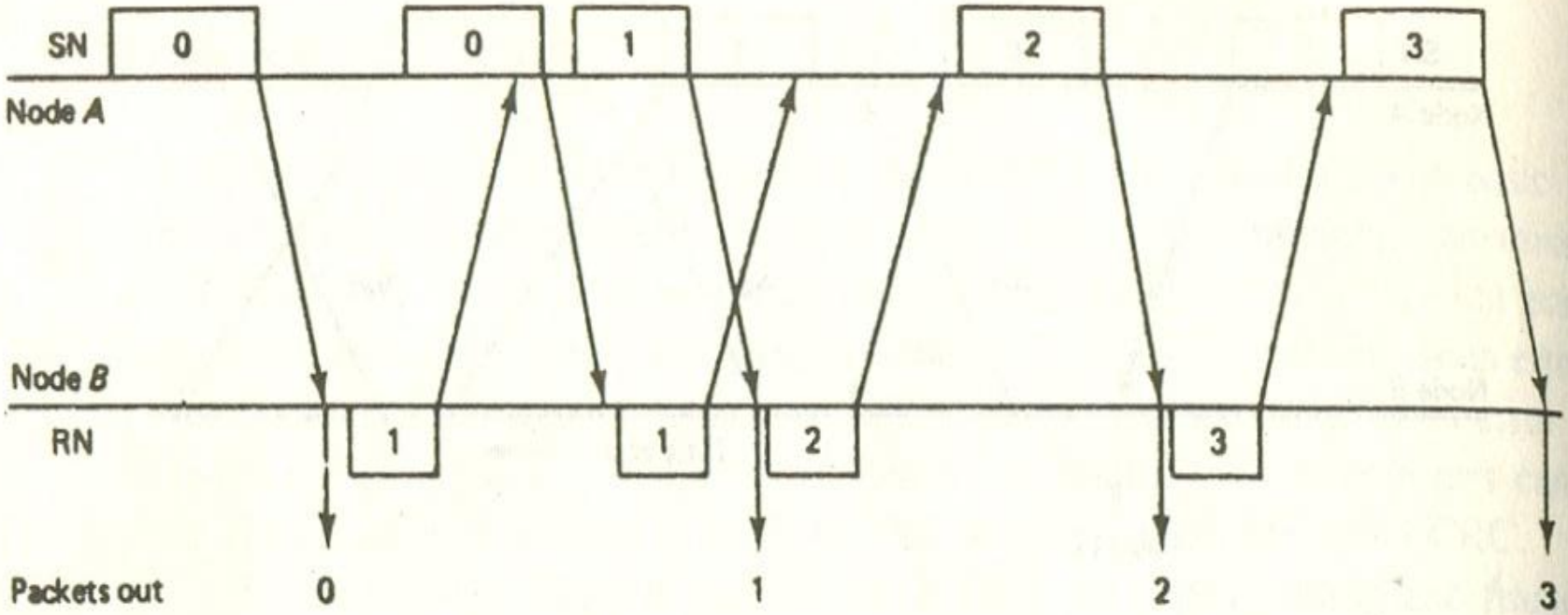
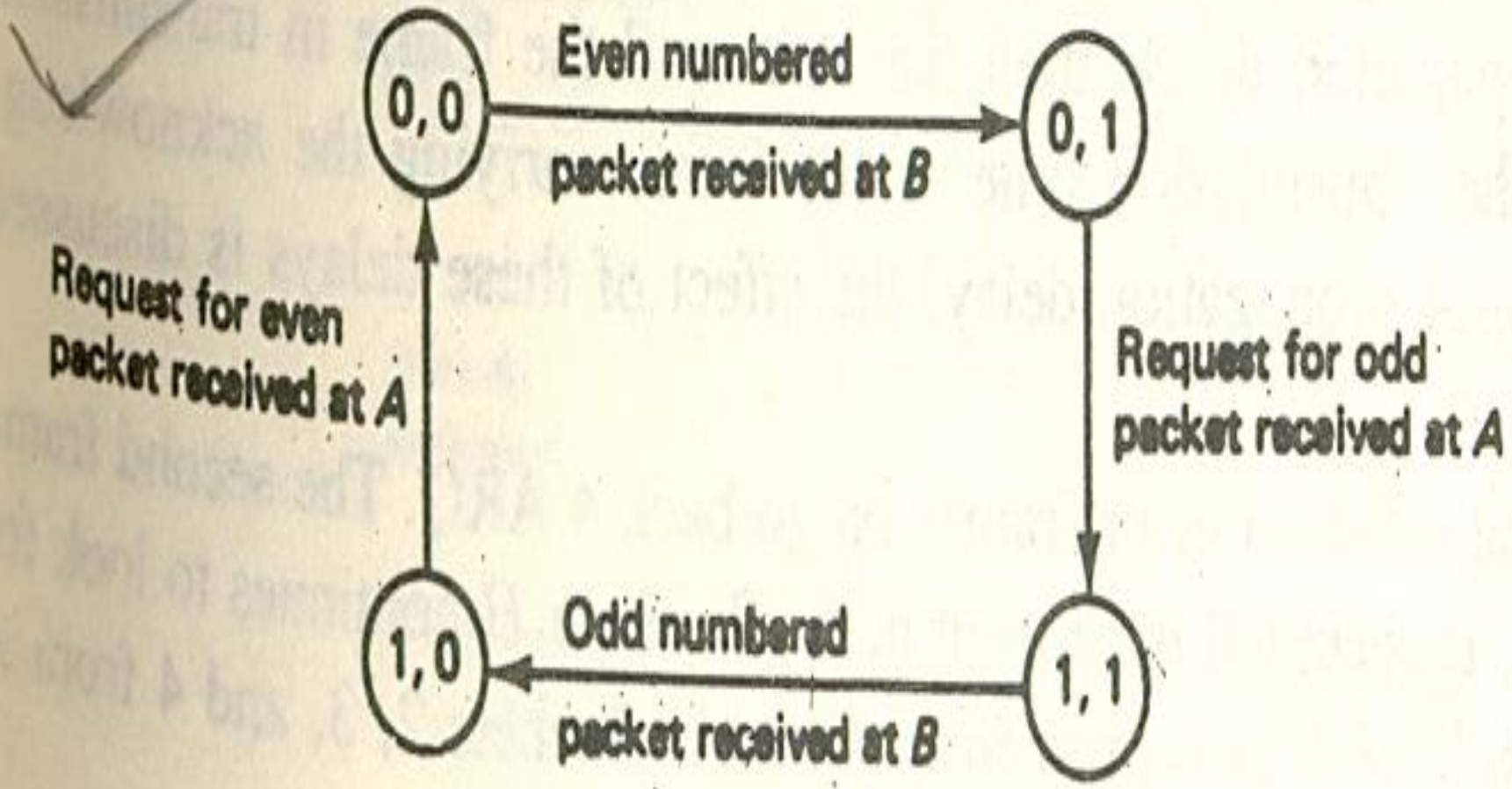
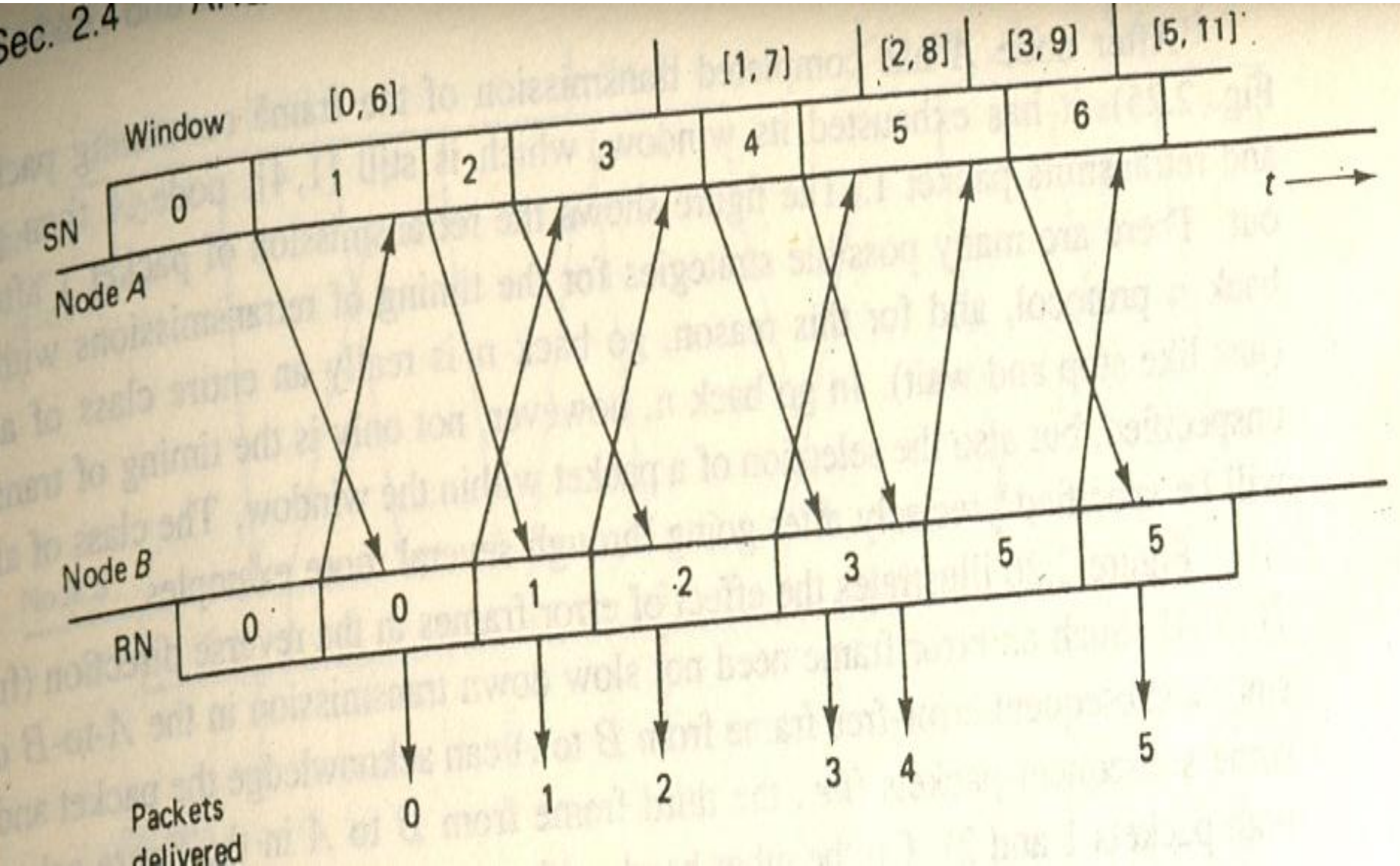


Figure 2.21 Example of use of sequence and request numbers for stop-and-wait transmission from *A* to *B*. Note that packet 0 gets repeated, presumably because node *A* times-out too soon. Note also that node *A* delays repeating packet 1 on the second request for it. This has no effect on the correctness of the protocol, but avoids unnecessary retransmissions.

Continued…


0, 0
Even numbered
packet received at B
0, 1
Request for even
packet received at A
Request for odd
packet received at A
1, 0
Odd numbered
packet received at B
1, 1

GO-BACK ARQ


Sec. 2.4
Window
[0, 6]
[1, 7]
[2, 8]
[3, 9]
[5, 11]
SN
0
1
2
3
4
5
6
t
Node A
Node B
RN
0
0
1
2
3
5
5
Packets delivered
0
1
2
3
4
5

Continued…

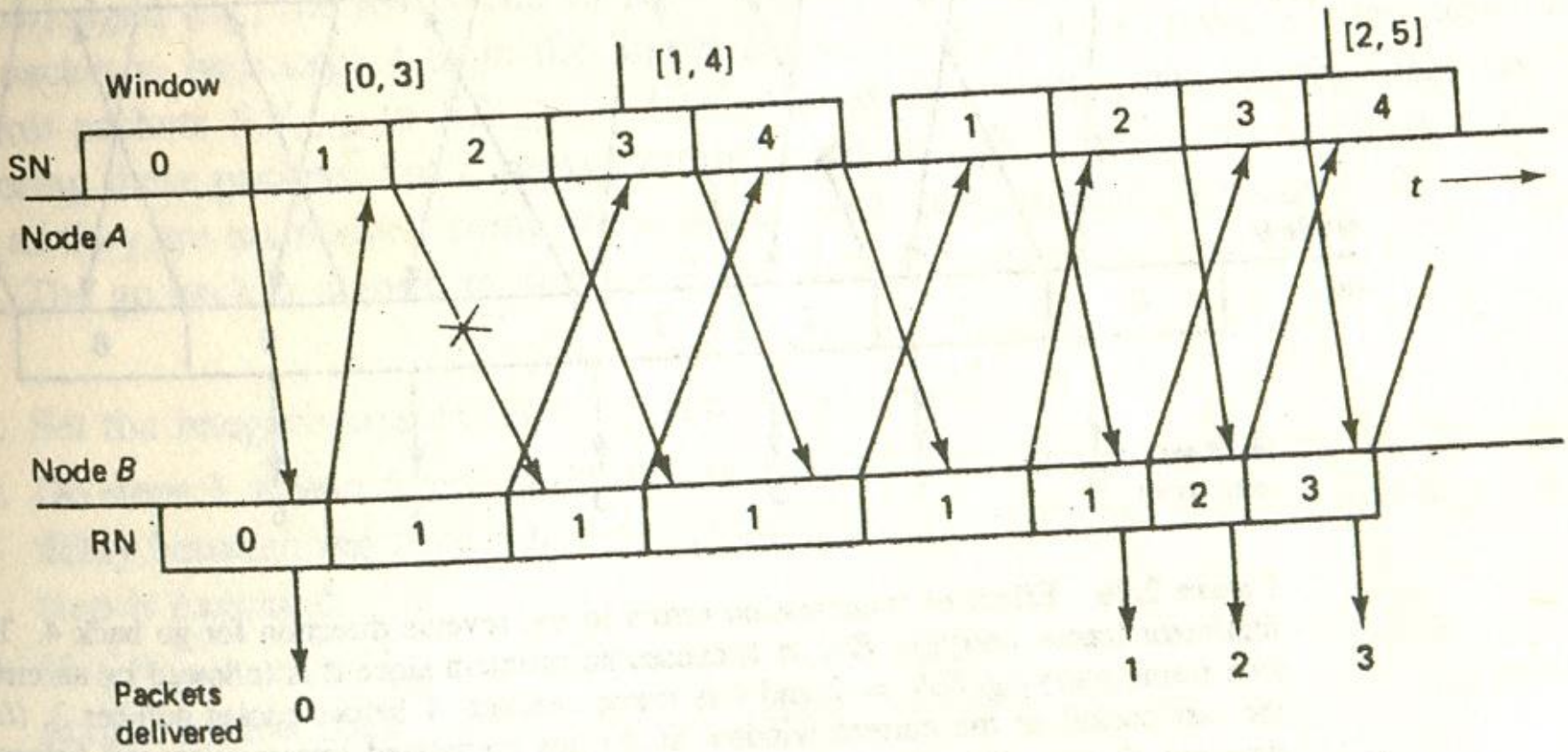
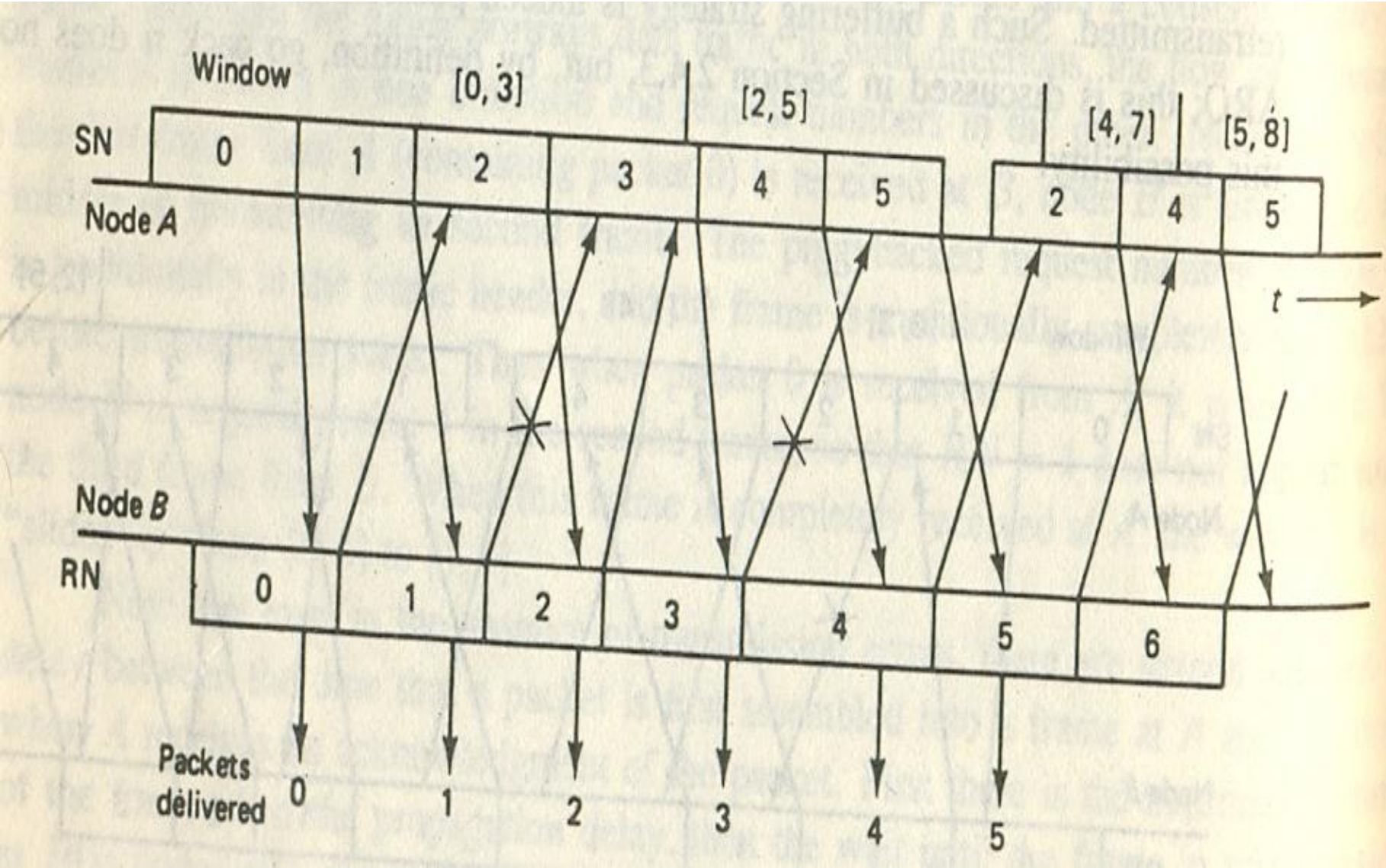
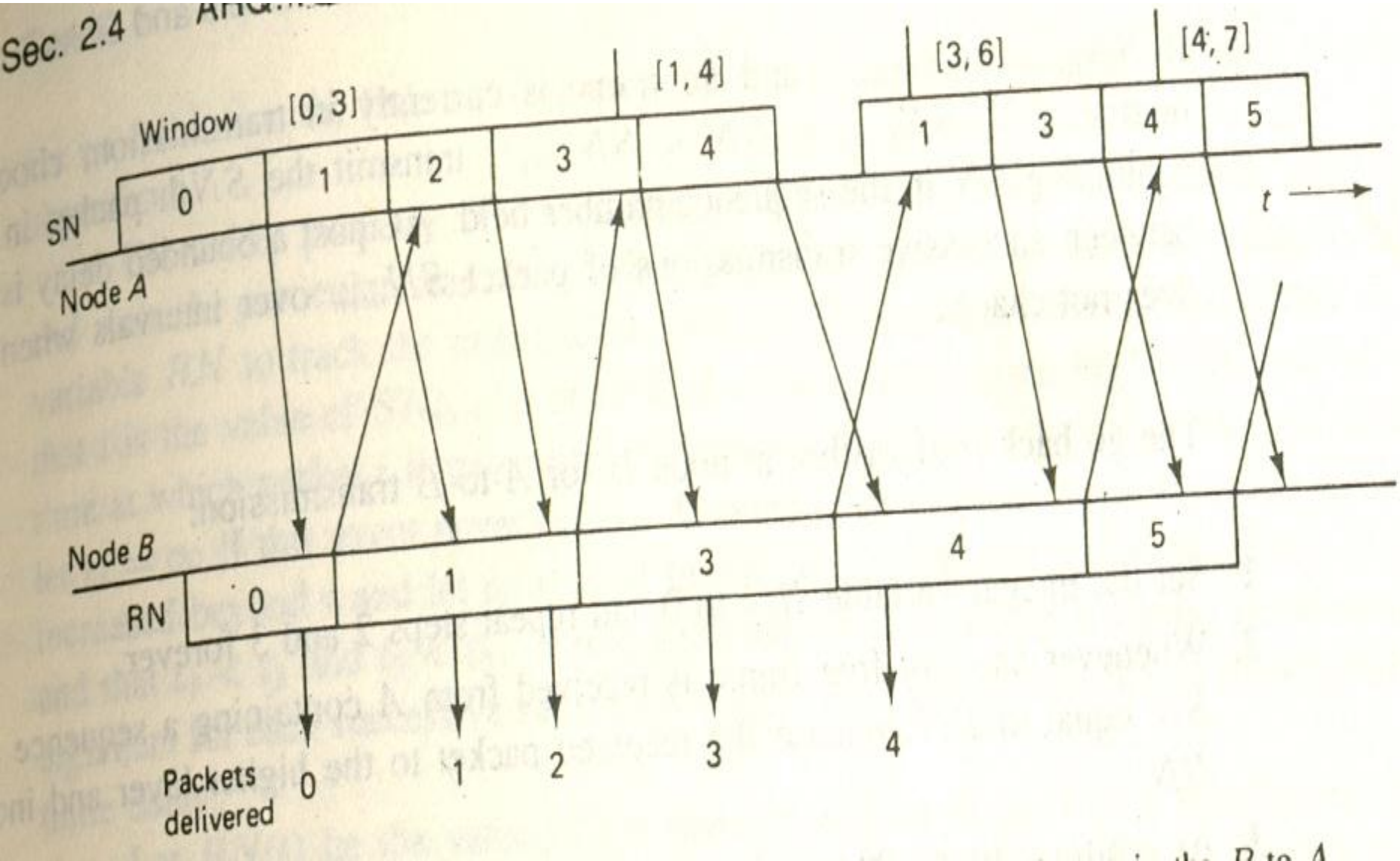


Figure 2.25 Effect of a transmission error on go back 4. Packet 1 is received in error at B, and node B continues to request packet 1 in each reverse frame until node A transmits its entire window, times-out, and goes back to packet 1.

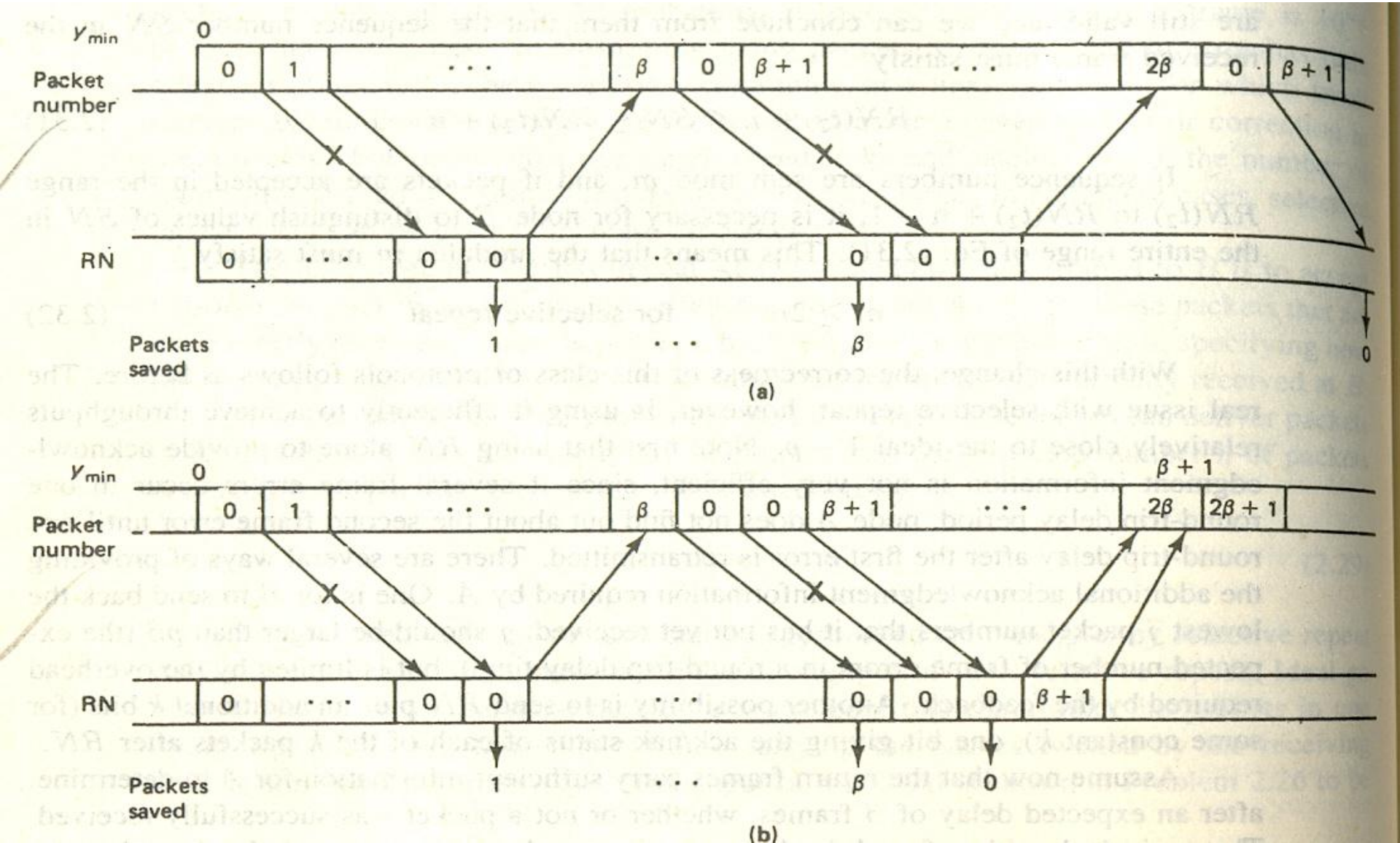
Continued…


Window
[0, 3]
[2, 5]
[4, 7]
[5, 8]
SN
0
1
2
3
4
5
Node A
2
4
5
t
Node B
RN
0
1
2
3
4
5
6
Packets delivered
0
1
2
3
4
5

Continued…


Sec. 2.4
Window
[0, 3]
[1, 4]
[3, 6]
[4, 7]
SN
0
1
2
3
4
1
3
4
5
t
Node A
Node B
RN
0
1
3
4
5
Packets delivered
0
1
2
3
4

SELECTIVE REPEAT ARQ



ARQ IN ARPANET