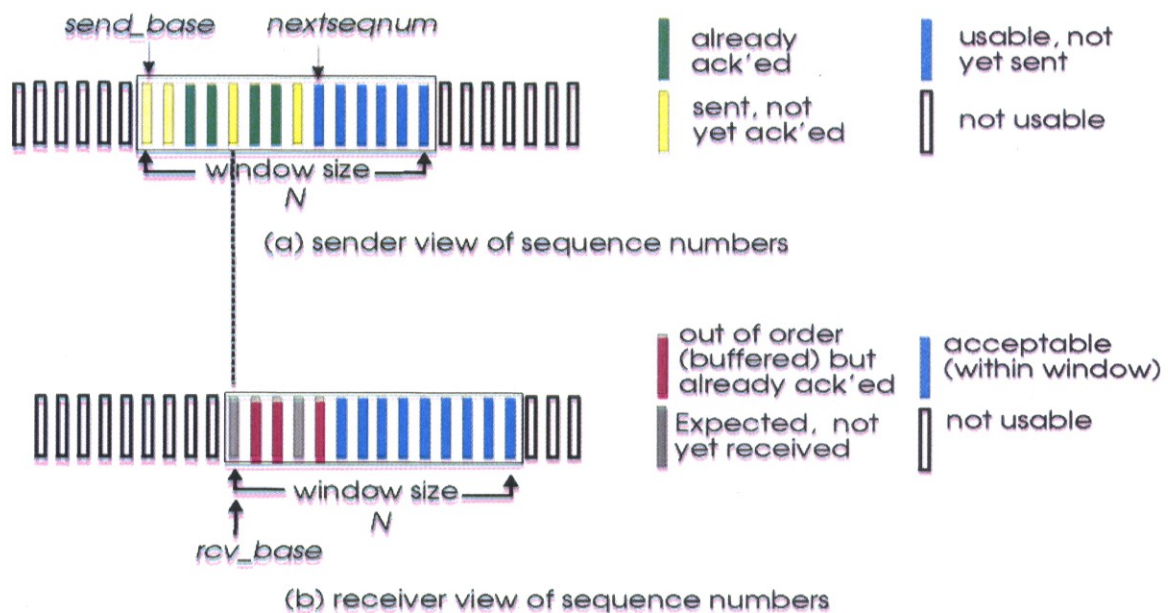
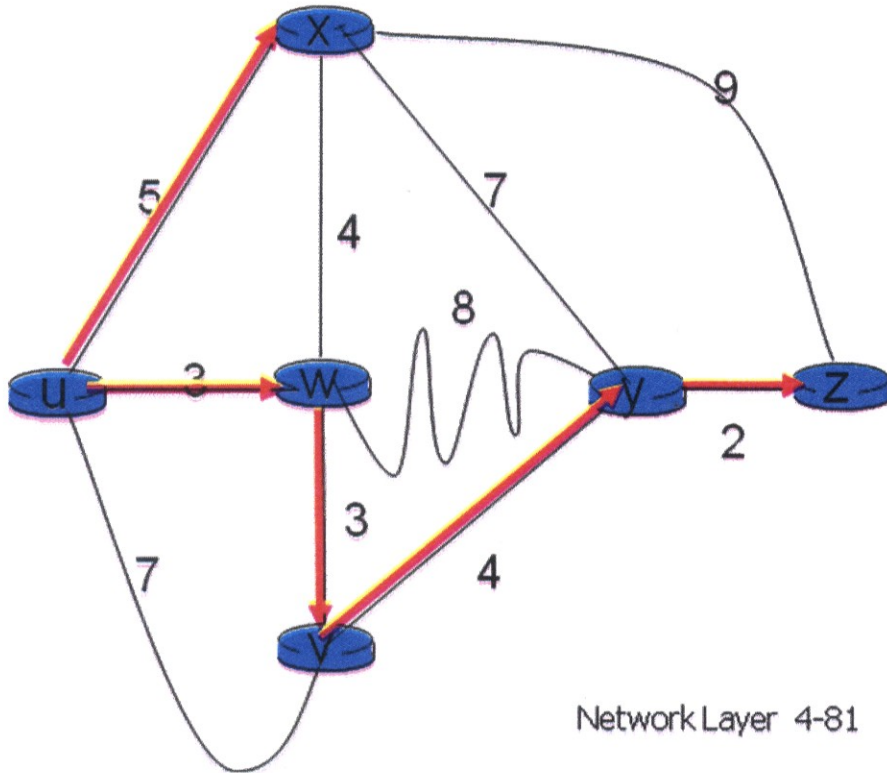


1. What is packet switching? What is circuit switching? Please compare the advantages and disadvantages of both. Please then briefly introduce network (internet) structure.
2. There are seven layers in ISO/OSI model. Please explain them briefly from application layer to physical layer. What are the advantages of dividing the network protocol into layers? What are the possible problems behind it? Please also compare it with today's internet protocol stack.
3. What is TCP? TCP supports flow control, connection-oriented transmissions and congestion control. Please explain how to support flow control, connection-oriented transmissions, and congestion control, respectively. What is UDP? Why are there both TCP and UDP?
4. TCP can realize reliable transmissions under the unreliable physical channel by utilizing ACKs, checksum, sequence number, retransmission, and timeout. Please draw pictures to explain the necessity to realize reliable transmissions for each of the above five mechanism.
5. Encapsulation is a technique used again and again by network designers. Please list and explain three scenarios on computer networks which we can utilize the encapsulation technique to realize.
6. Explain briefly what is CSMA/CD protocol in wired networks? Please draw a diagram to show the advantage of CSMA with collision detection (CD). What is CSMA/CD protocol in wireless networks? Please draw pictures to explain what is hidden terminal problem? And what is exposed terminal problem?
7. Are the following figures for selective repeat correct? Please explain the operations of selective repeat by using those two figures and identify and correct errors if there are.



8. A router consists of input ports, high-speed switching fabric, routing processor, and output ports. Please draw a block diagram for a router which include above mentioned modules and explain each module, respectively. Please don't forget to explain input port functions and output port functions which both consist of three main components.
9. Please use the link state (Dijkstra) algorithm to construct the routing paths step by step (beginning from u).



10. Please use the distant vector (Bellman-Ford) algorithm to construct cost table step by step for node X, node Y, and node Z.

