R1. What is meant by a control plane that is based on per-router control? In such cases, when we say the network control and data planes are implemented "monolithically," what do we mean?

The control plane is used to forward or exchange of routing and forwarding tables.

Monolithically means that each router has a routing component which helps communication with the other routers that are routing components to compute the value of the forwarding table.

R2. What is meant by a control plane that is based on logically centralized control? In such cases, are the data plane and the control plane implemented within the same device or in separate devices? Explain.

A control plane that is based on logically centralized control means that the functions of the control plane are performed on a single machine.

The data plane and the control plane are implemented within the same device.

R3. Compare and contrast the properties of a centralized and a distributed routing algorithm. Give an example of a routing protocol that takes a centralized and a decentralized approach.

In centralized routing algorithms, the central node in the network gets the entire information about the network topology. Then, the information is sent to the respective routers. However, in a distributed network, the node receives information from it neighboring nodes and then makes the decision about the path to send the packet along.

An example of centralized routing is Link-State routing and an example of decentralized routing is Distance Vectoring.

R6. Is it necessary that every autonomous system use the same intra-AS routing algorithm? Why or why not?

Every autonomous system does not need to use the same intra-AS algorithm because each of the system have their own administrative control for the sake of routing.

R8. True or false: When an OSPF route sends its link state information, it is sent only to those nodes directly attached neighbors. Explain.

False. Because OSPF does not send the link state info to nodes directly attached, it will send the information to all the routers in the system.

P3. Consider the following network. With the indicated link costs, use Dijkstra's shortest-path algorithm to compute the shortest path from x to all network nodes. Show how the algorithm works by computing a table similar to Table 5.1.

	X	Y	Z	T	U	V	W
X		6	8			**3**	6
V		6	8	4+3=7	3+3=6	**3**	6

P4. Consider the network shown in Problem P3. Using Dijkstra's algorithm, and showing your work using a table similar to Table 5.1, do the following: Compute the shortest path from t to all network nodes. Compute the shortest path from u and v to all network nodes.

	U	V	W	X	Y	Z
T	**2**	4			7	
U	**2**	**4**	2+3=5		7	
V			**2+3=5**	4+3=7	7	
W				4+3=7	7	
Y						7+12=19

P5. Consider the network shown below, and assume that each node initially knows the costs to each of its neighbors. Consider the distance-vector algorithm and show the distance table entries at node z.

Z as source

Z to v
Z to v = 6
Z to x to v = 5
Z to x to y to u to v = 8
Z to x
Z to x = 2
Z to v to x = 9
Z to v to u to y to x = 12

Z to y
Z to x to y = 5
Z to v to u to y = 9
Z to x to v to u to y = 8
Z to u
Z to x to y to u = 7
Z to x to v to u = 6
Z to v to u = 7