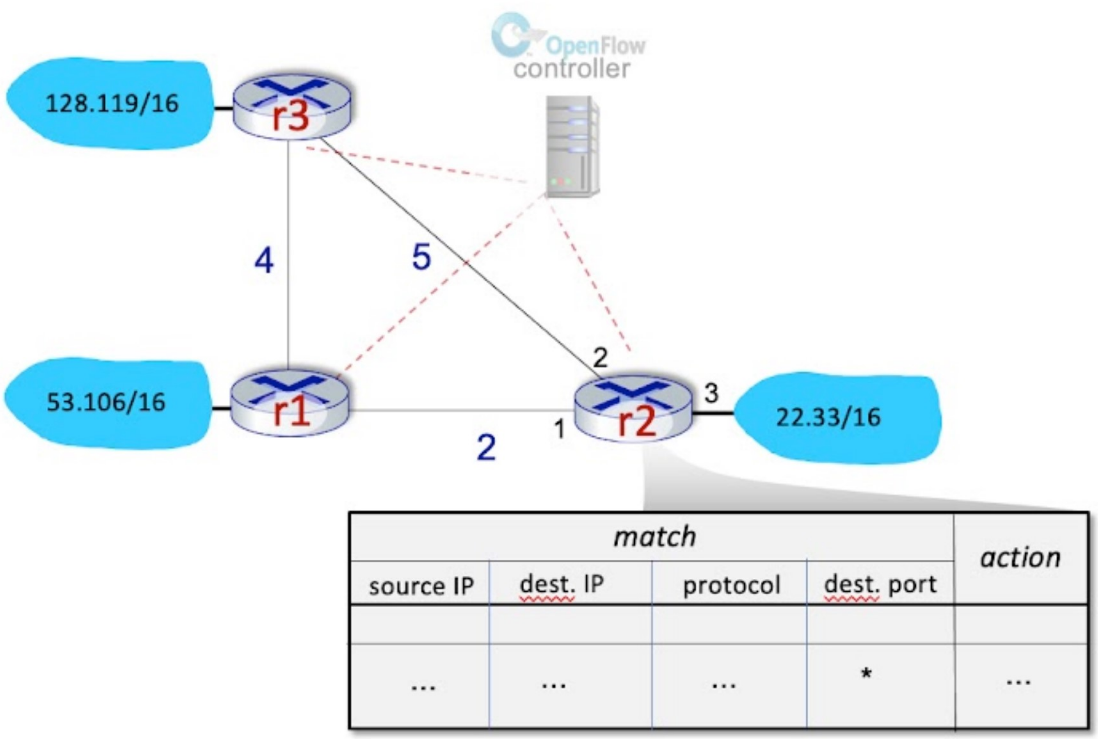
Consider the three-node network below, that uses flow-based generalized forwarding (e.g., as in OpenFlow) in the network's routers. In the question below, we'll want to create match+action entries in the flow table at router r2, with three ports labelled 1,2,3 (in black). In the question, matches are constrained to be over only four fields: the IP source address, the IP destination address, the upper-layer protocol field of the IP datagram, and the destination port number of the transport-layer segment. The actions are either to drop or to forward(*i*), that is, to forward a matching packet on port *i*. The default action (*unless stated otherwise*) is that if a packet doesn't match a rule, it will be dropped.

Suppose we want to implement the following rule: r2 should act as a firewall, only allowing TCP traffic into the 22.33/16 network from any network. Specify a single flow table row entry to implement this rule, indicating the column entries for the row below. The * is a wildcard match, which matches everything.



match				action
source IP	dest. IP	protocol	dest. port	
...	...	...	*	...

- [x] In the "source IP" column, the flow table entry should be: *
- [ ] In the "source IP" column, the flow table entry should be:128.119/16
- [ ] In the "dest. IP" column, the flow table entry should be: *
- [x] In the "dest. IP" column, the flow table entry should be: 22.33/16

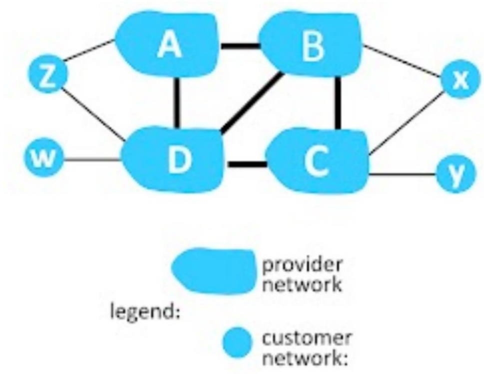
Select all statements that are True for a network 234.1.2.0/23

- [ ] There can be at most 254 hosts with unique IP address in this network.
- [x] 234.1.1.0/26, 234.1.2.0/26, and 234.1.3.0/26 are three valid subnets of this network
- [x] To broadcast a message in this network, a host can use an IP address 255.255.255.255 as one of the choices.
- [ ] 234.1.0.0/23 is an example of a Class A address.

The time to live (TTL) field in the IPv4 header

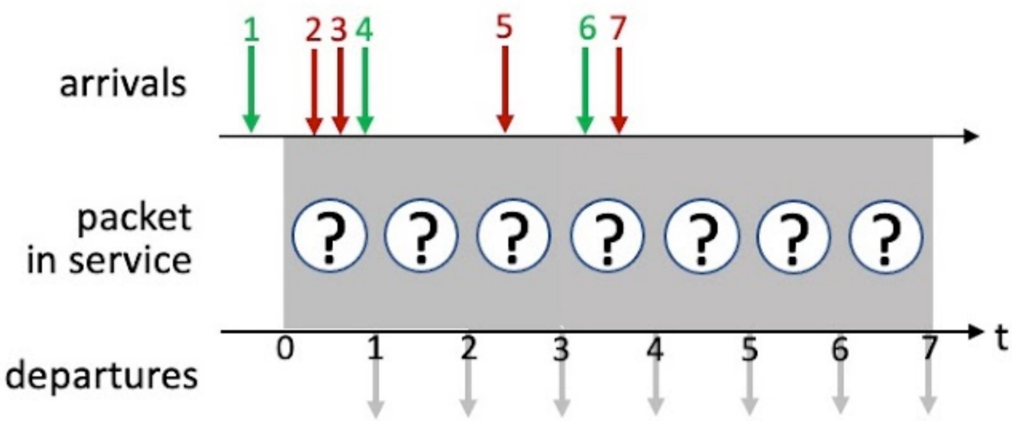
- [ ] is always set to 0 for TCP ACK packets
- [x] prevents a packet from looping in the network
- [x] is used by the internet control message protocol
- [ ] is incremented by the router when a packet passes though that router

BGP advertisement policy. Consider the network below, and assume that a provider network only wants to carry traffic to or from its customer networks. Which of the following statements are true?



- [ ] B will advertise a route Bx to only one of peers A, C and D, since that will force all route traffic to x to be routed via that single peer, allowing B to peer with fewer provider networks.
- [ ] B will advertise a route Bx to A and D but not C, since it knows that C is also a provider for x
- [x] B will advertise a route Bx to A, C and D, since A, C and D need to know how to route to B's customer network x.
- [ ] B will advertise a route Bx to D but not to A, since B knows that D can reach both w and z.

Consider the pattern of red and green packet arrivals to a router's output port queue, shown below. Suppose each packet takes one time slot to be transmitted, and can only begin transmission at the beginning of a time slot after its arrival.



- [x] Under FCFS scheduling, the departing sequence will be 1 2 3 4 5 6 7
- [ ] For FCFS scheduling, the order in which the packets leave cannot be determined based on the the information provided in the question
- [ ] Under priority scheduling (where red packets have priority over green packets), the departing prder will be 1 2 3 4 5 6 7
- [ ] Under priority scheduling (where red packets have priority over green packets), the departing prder will be 2 3 5 7 1 4 6

The Distance Vector routing algorithm runs on a node when

- [x] The cost of the link associated with that node changes.
- [ ] The cost of any link that is not associated with the node changes.
- [ ] After that node sends a distance vector update message to its neighbors.
- [x] After neighbor sends a distance vector update message to that node.

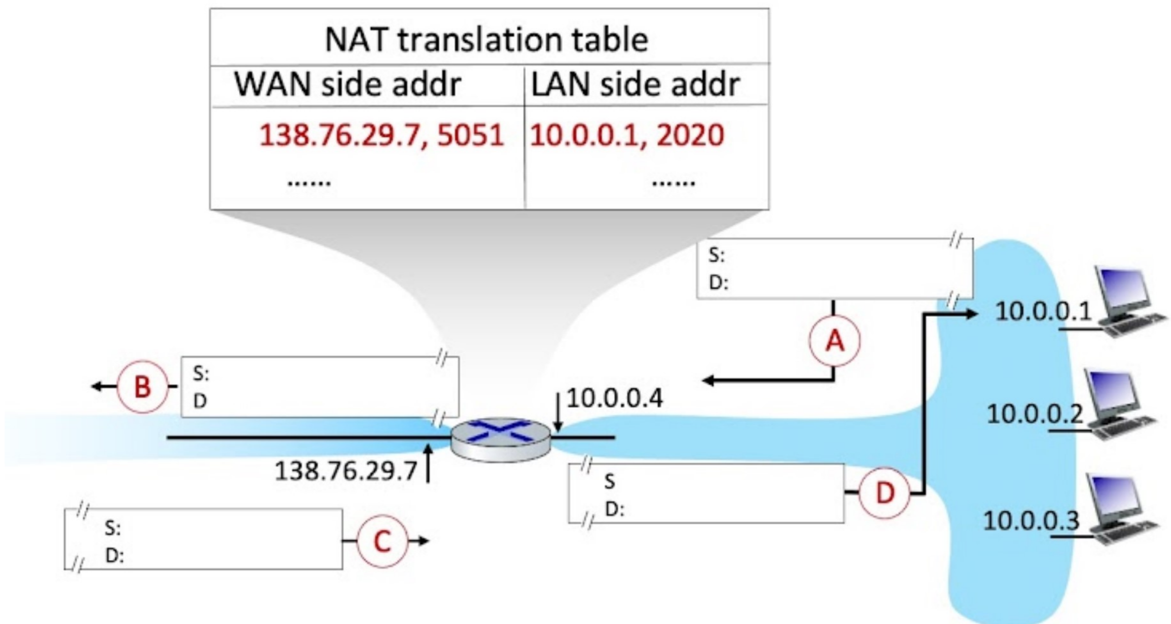
Select all the statements that are TRUE about DHCP

- [ ] DHCP server can prevent an unauthorized node from obtaining an IP address.
- [x] DHCP server allows nodes to automatically obtain an IP address.
- [x] DHCP server can issue the same IP address to two different hosts who join at different times and leave before the other host joins.
- [ ] DHCP server notifies a node only of its assigned IP address. The node has to take additional steps to identify the gateway router.

Select all the statements that indicate problems with the IP fragmentation process

- [x] An entire datagram has to be re-transmitted even if one fragment is not delivered.
- [ ] Intermediate routers are burdened with reassembling the datagram process if their outgoing link MTU is larger than the current fragment size.
- [x] Intermediate routers are burdened with fragmention of the datagram if their outgoing link MTU is smaller than the current fragment size.
- [ ] Routers are burdened with identification of other routers which might also have fragments of the same packet

Consider the following scenario in which host 10.0.0.1 is communicating with an external web server at IP address 128.119.40.186. The NAT table shows the table entry associated with this TCP flow. What are the source and destination IP address and port numbers at point ***A?***



- [x] The source IP address is: 10.0.0.1
- [ ] The source IP address is: 138.76.29.7
- [ ] The destination IP address is 10.0.0.4
- [x] The destination IP address is 128.119.40.186

For the following datagram forwarding table, select all the answers that are TRUE

Destination Address Range	Link Interface
11001000 00010111 001***** ********	0
11001000 00010111 00110*** ********	1
11001000 00010111 001110** ********	2
11001000 00010111 00111000 ********	3

- [x] Datagram with destination address 200.23.55.227 will be forwarded to interface 1
- [ ] Datagram with destination address 200.23.55.227 will be forwarded to interface 0
- [ ] Datagram with source address 200.23.55.227 will be forwarded to interface 1
- [x] Datagram with destination address 200.23.39.151 will be forwarded to interface 0

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