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HW7

1.

a. There seems to be 2 subnets, each with one part of the router, a switch, and 2 end users. 2 possible subnet addresses (one for each), could be 111.111.111.112 for one address, and the other could be 222.222.222.220.

b. From host A to host B, the datagram needs to first go from router host A, through the switch, to router C, which then goes to the switch and host B. Host A has a MAC address of AA-AA-AA-AA-AA-AA and IP of 111.111.111.111, which sends to the MAC address of the router C of CC-CC-CC-CC-CC-CC and IP of 111.111.111.110. From router D (MAC is DD-DD-DD-DD-DD-DD and IP is 222.222.222.220), it hops to host B (Mac is BB-BB-BB-BB-BB-BB and IP is 222.222.222.222). The switch's job is to just check the destination MAC address given from the router and just forward the datagram to the correct host. The router checks the destination IP address, and forwards the datagram either to a switch or another router if necessary.
c. No it would not need to find out or even know the mac addresses of B anyway, since it is in a different subnet. A needs to find out the MAC of its own router, since it is the router that needs to deal with inter subnet communication.

2.

a. Since these are switches, there will be only one subnet. This is because if there are multiple subnets, a router is needed instead of a switch to be able to connect between subnets. A possible subnet address of this subnet could be 111.111.111.121.

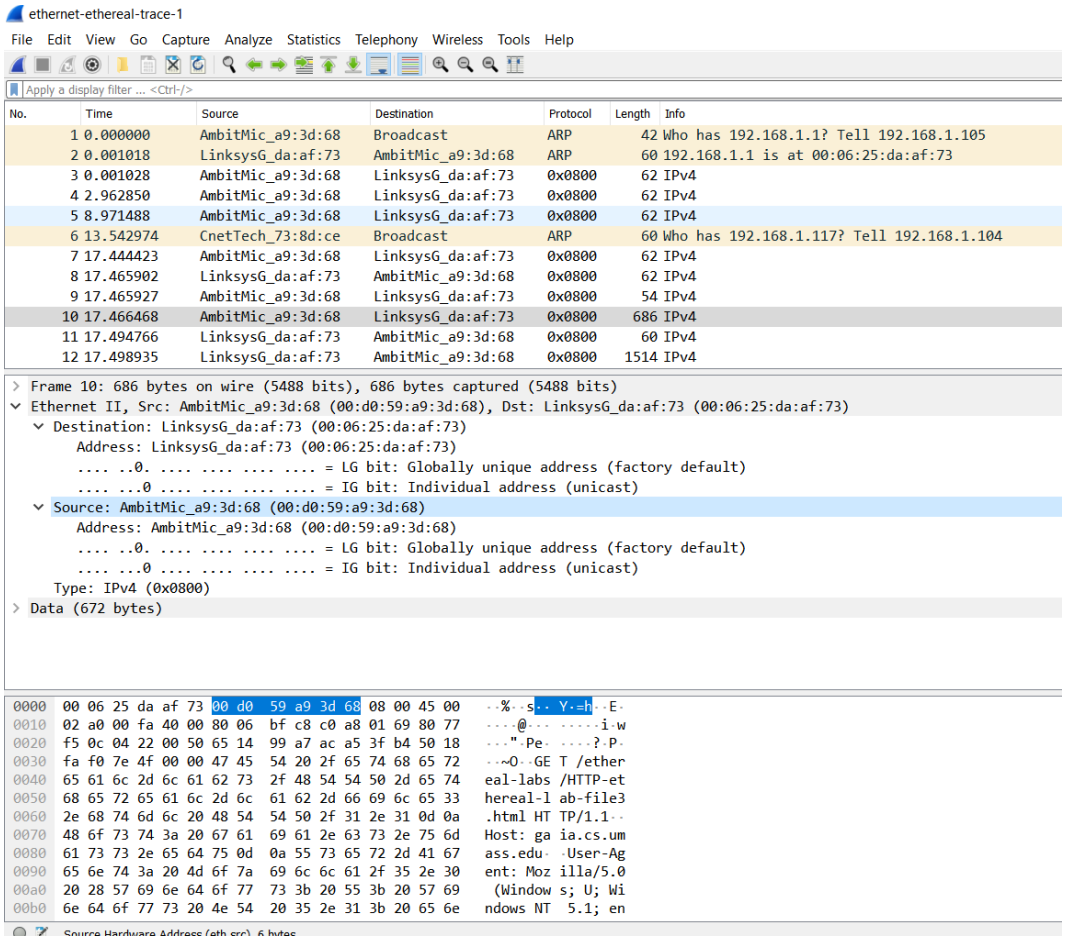
b1. Due to the fact that our ARP table is empty, we must query all MACs. Since our host A is the source, its MAC is AA-AA-AA-AA-AA-AA, and we don't know our destination MAC, so we query each MAC to find a corresponding IP. Meaning our destination is FF-FF-FF-FF-FF-FF. For each entry, the MAC and IP is added that exists in the subnet.

b2. The response from host B would be its MAC address BB-BB-BB-BB-BB-BB and the destination of A with AA-AA-AA-AA-AA-AA.Host A will update it's ARP table once it receives the datagram.

b3. The forwarding table becomes (A, 1) for all switches after the first switch receives a frame, where ARP replies with (B,2) for every switch at the forwarding table.

b4. Since each switch knows where to forward the datagram sent by A (because of their forwarding table), when the switch receives the data, it just forwards to the next switch or to host B. The source IP and MAC of host A is 111.111.111.111 and AA-AA-AA-AA-AA-AA, while the destination IP and MAC is 111.111.111.120 and BB-BB-BB-BB-BB-BB.

3.Answer the following questions, based on the contents of the Ethernet frame containing the HTTP GET message.



1. The source address of the ethernet trace of the computers happens to be 00:d0:59:a9:3d:68
2. The destination address happens to be 00:06:25:da:af:73 which is not the address of gaia.cs.umass.edu but in fact that address of a Linksys router. This is used in order to get off the local subnet of the system in order to send the data to the actual website destination.
3. The hex value for the Frame type field is 0x0800, which is also known as the IP protocol.
4. It appears 52 bytes from the start of the Ethernet frame, as there are 14 bytes of Ethernet frame, 20 bytes of IP header, then finally 20 bytes of TCP header before the HTTP data is encountered.