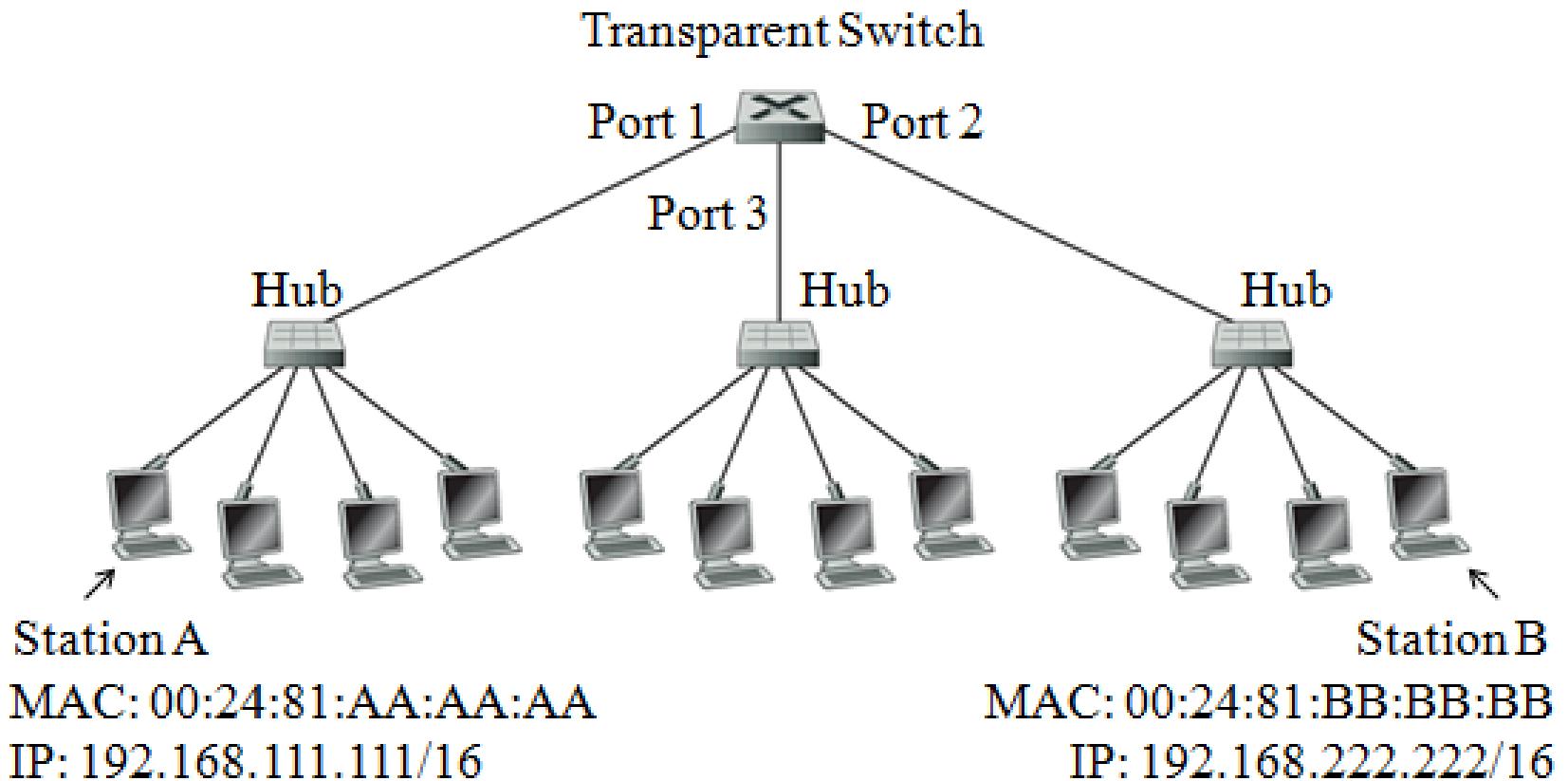


***CE3005/CZ3006/SC2008***  
***Computer Networks***

Tutorial 2-2

# Q1



# Q1: ping, ARP and switch operation

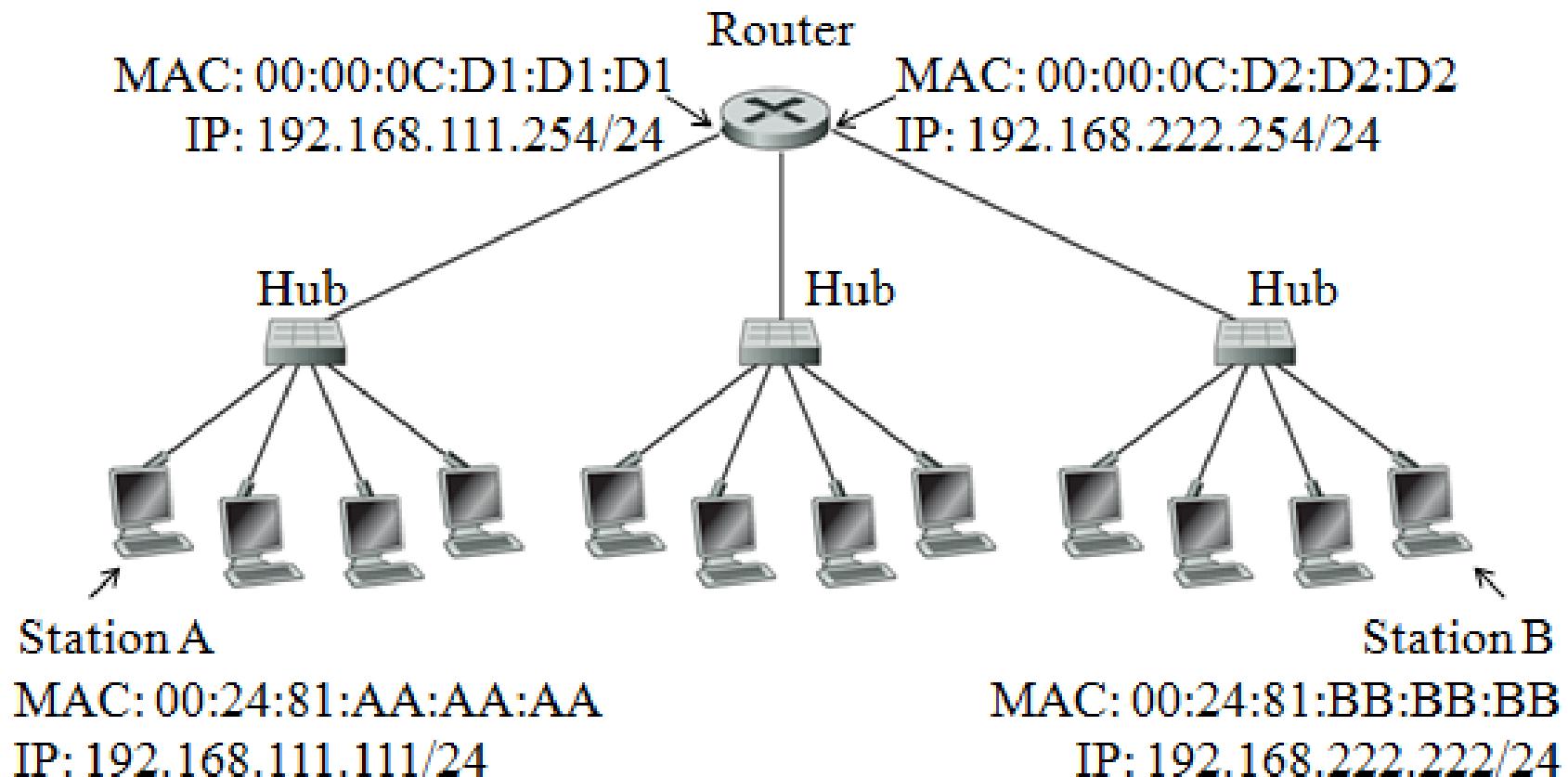
Frame	MAC Address		Purpose of Frame	Actions taken by Switch
	Source	Destination		
1.	00-24-81-AA-AA-AA	FF-FF-FF-FF-FF-FF	ARP request for 192.168.222.222	<ul style="list-style-type: none"> <li>- new entry forwarding table 00-24-81-AA-AA-AA/port 1/time</li> <li>- broadcast ARP request frame to both port 2, 3</li> </ul>
2.	00-24-81-BB-BB-BB	00-24-81-AA-AA-AA	ARP reply	<ul style="list-style-type: none"> <li>- new entry forwarding table 00-24-81-BB-BB-BB/port 2/time</li> <li>- forward ARP reply to port 1</li> </ul>

# Q1: ping, ARP and switch operation

Frame	MAC Address		Purpose of Frame	Actions taken by Switch
	Source	Destination		
3.	00-24-81-AA-AA-AA	00-24-81-BB-BB-BB	ping request for 192.168.222.222	- update forwarding table 00-24-81-AA-AA-AA/port 1/new time - forward ping request to port 2
4.	00-24-81-BB-BB-BB	00-24-81-AA-AA-AA	ping reply	- update forwarding table 00-24-81-BB-BB-BB/port 2/new time - forward ping reply to port 1

For simplicity, assume ping sends 1 packet instead of 4.

# Q2



# : ping, ARP and router operation

Frame	MAC Address		Purpose of Frame	Actions taken by Router
	Source	Destination		
1.	00-24-81-AA-AA-AA	FF-FF-FF-FF-FF-FF	ARP request for default gateway 192.168.111.111/00-24-81-AA-AA-AA	- new entry ARP cache 192.168.111.111/00-24-81-AA-AA-AA
2.	00-00-0C-D1-D1-D1	00-24-81-AA-AA-AA	ARP reply	- send ARP reply

# Q2: ping, ARP and router operation

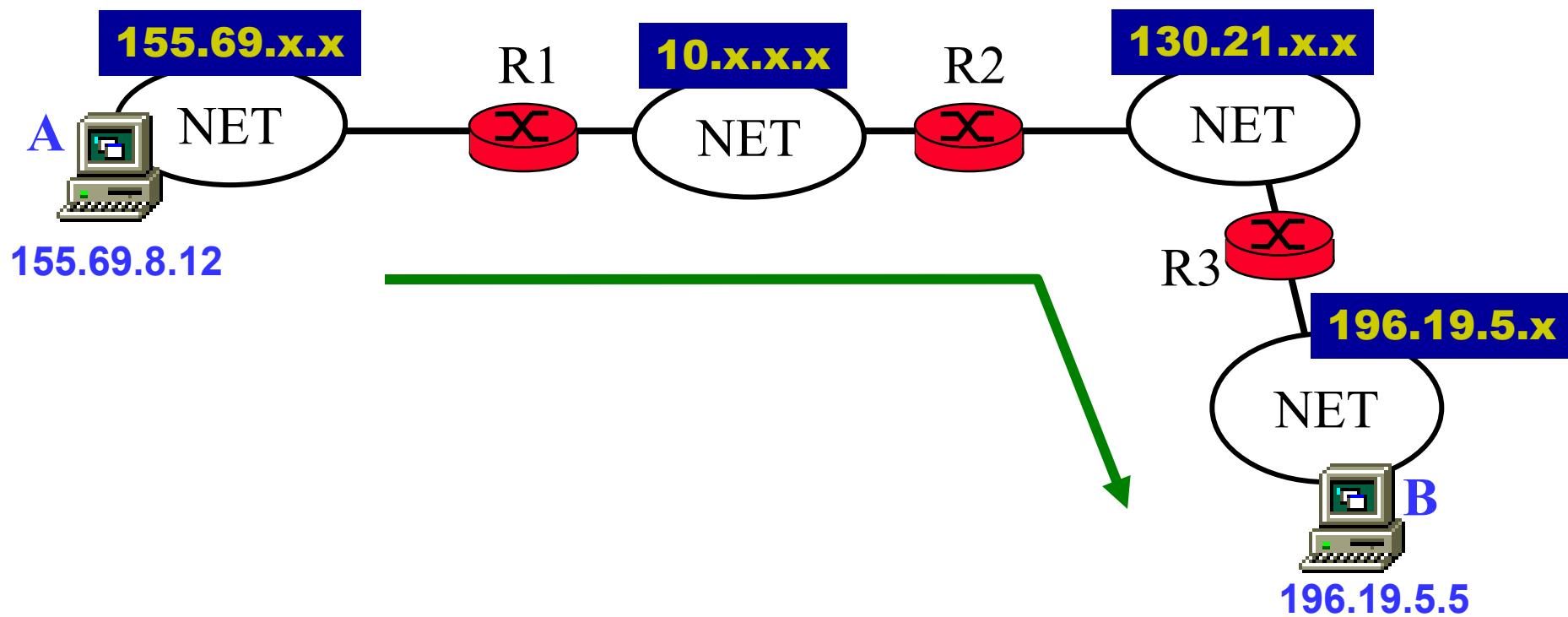
Frame	MAC Address		Purpose of Frame	Actions taken by Router
	Source	Destination		
3.	00-24-81-AA-AA-AA	00-00-0C-D1-D1-D1	ping request for 192.168.222.222	<ul style="list-style-type: none"> <li>- broadcast ARP request for 192.168.222.222 at subnet 192.168.222.0/24</li> <li>- receive ARP reply</li> <li>- new entry ARP cache 192.168.222.222/00-24-81-BB-BB-BB</li> <li>- forward ping request to 192.168.222.222</li> </ul>
4.	00-00-0C-D1-D1-D1	00-24-81-AA-AA-AA	ping reply	<ul style="list-style-type: none"> <li>- receive ping reply</li> <li>- forward ping reply to 192.168.111.111</li> </ul>

**For simplicity, assume ping sends 1 packet instead of 4.**

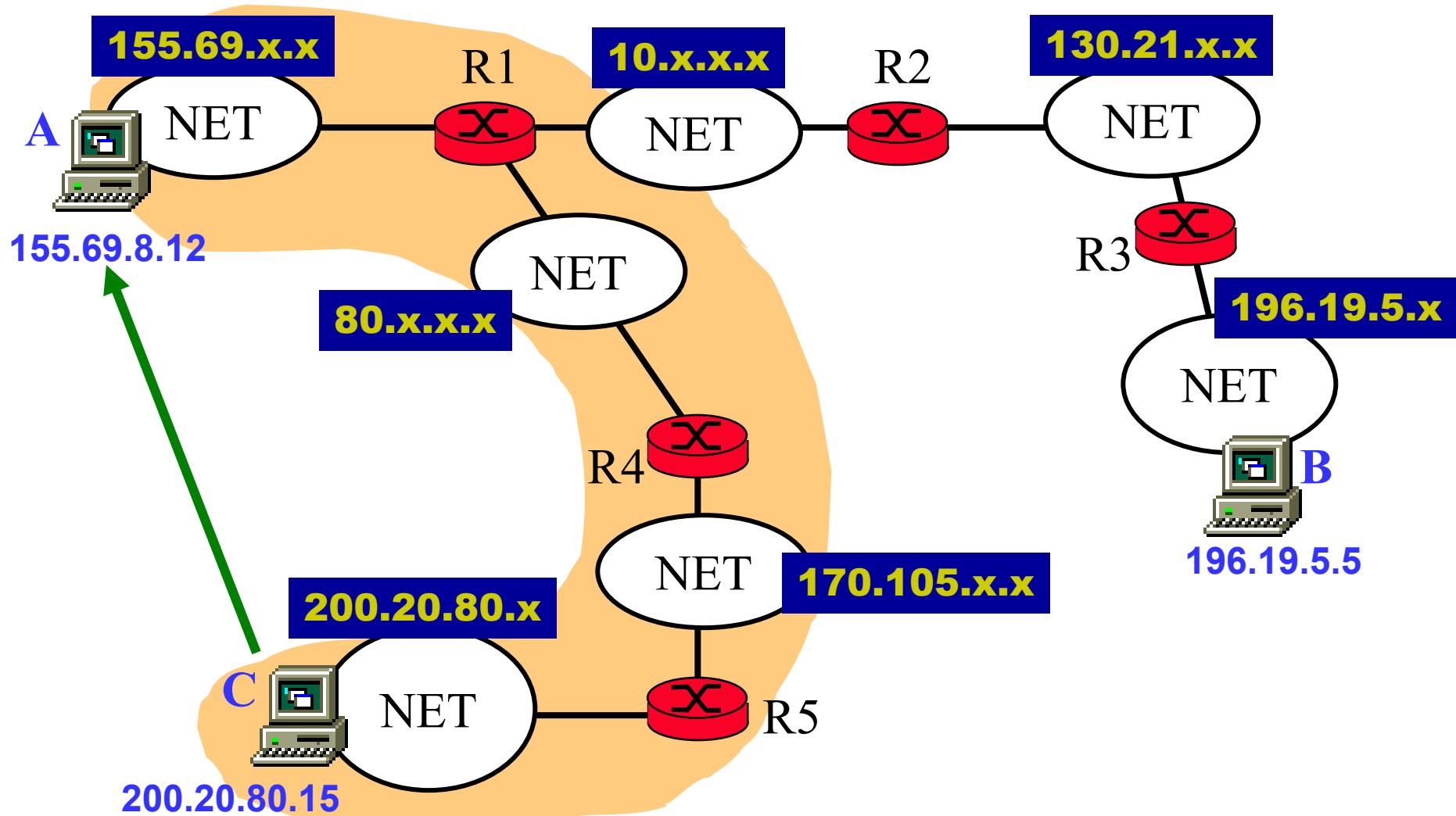
# **Q3**

From Station A to B	From Station C to A	From Station B to C
<b>155.69.8.10</b>	200.20.80.12	<b>196.19.5.104</b>
<b>10.203.20.10</b>	170.105.10.21	<b>130.21.80.90</b>
<b>130.21.10.30</b>	80.90.10.3	<b>90.80.120.10</b>
<b>196.19.5.5</b>	155.69.8.12	<b>170.105.10.20</b>
		<b>200.20.80.15</b>

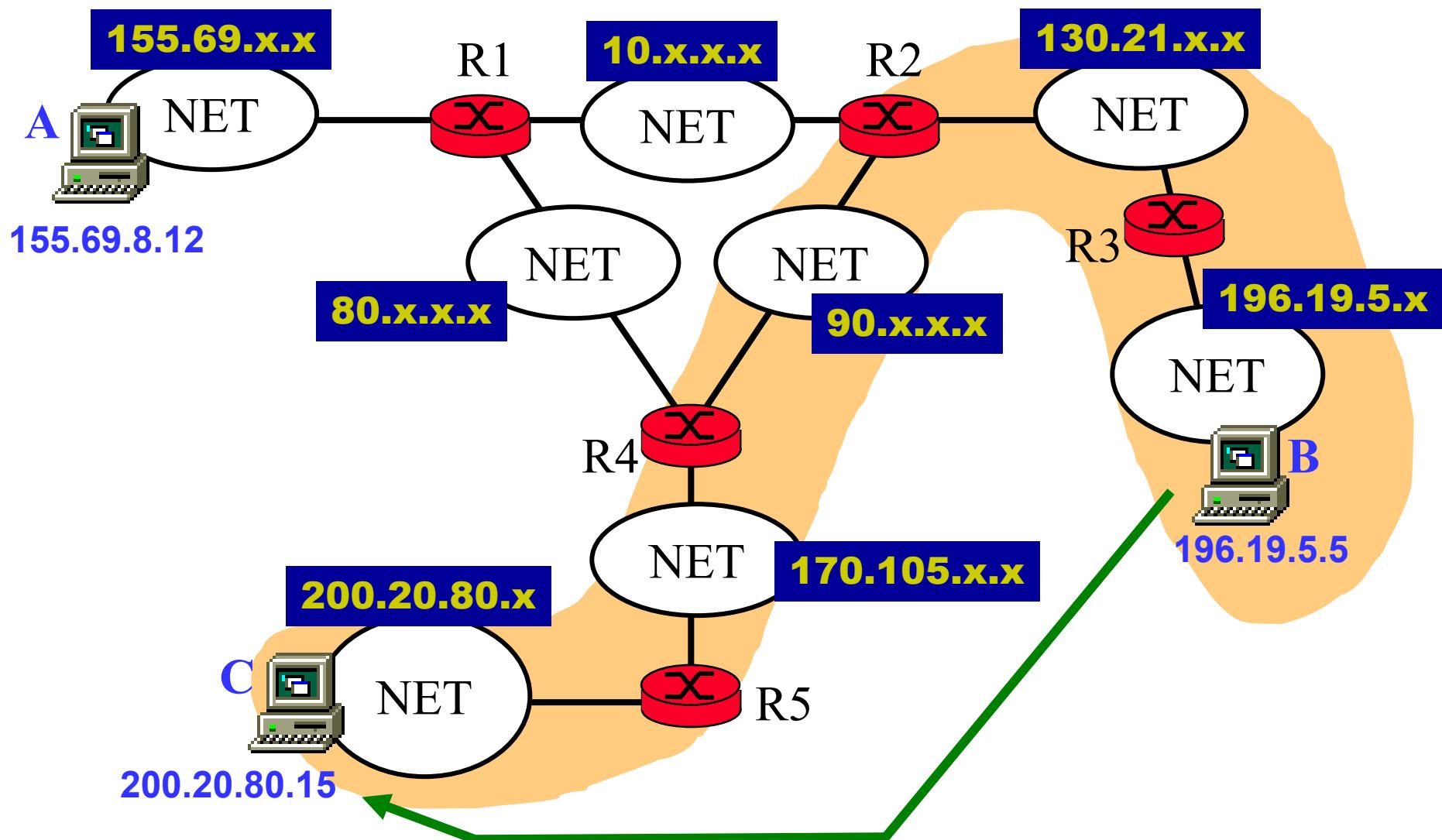
# Q3: tracert A→B



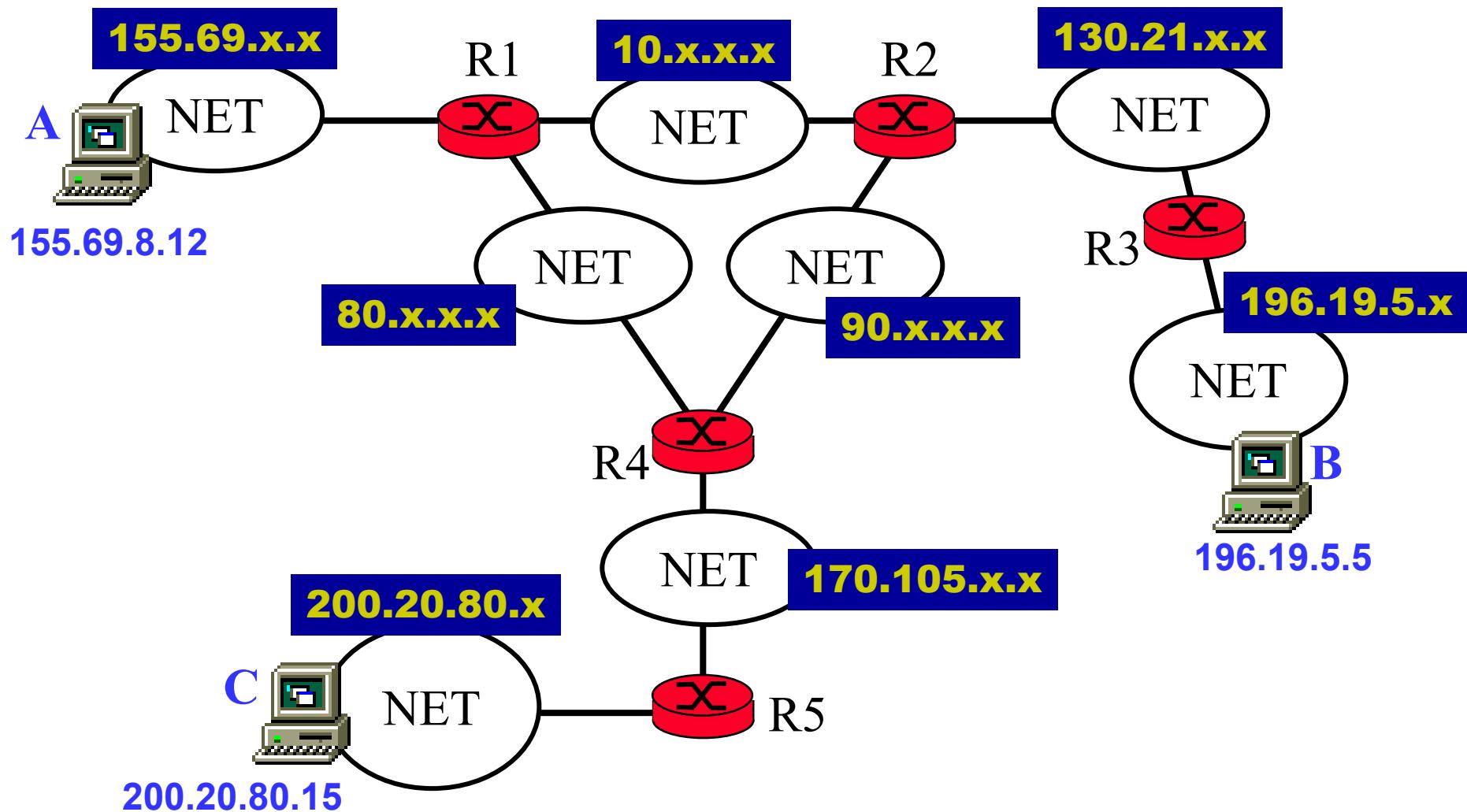
# Q3: tracert C→A



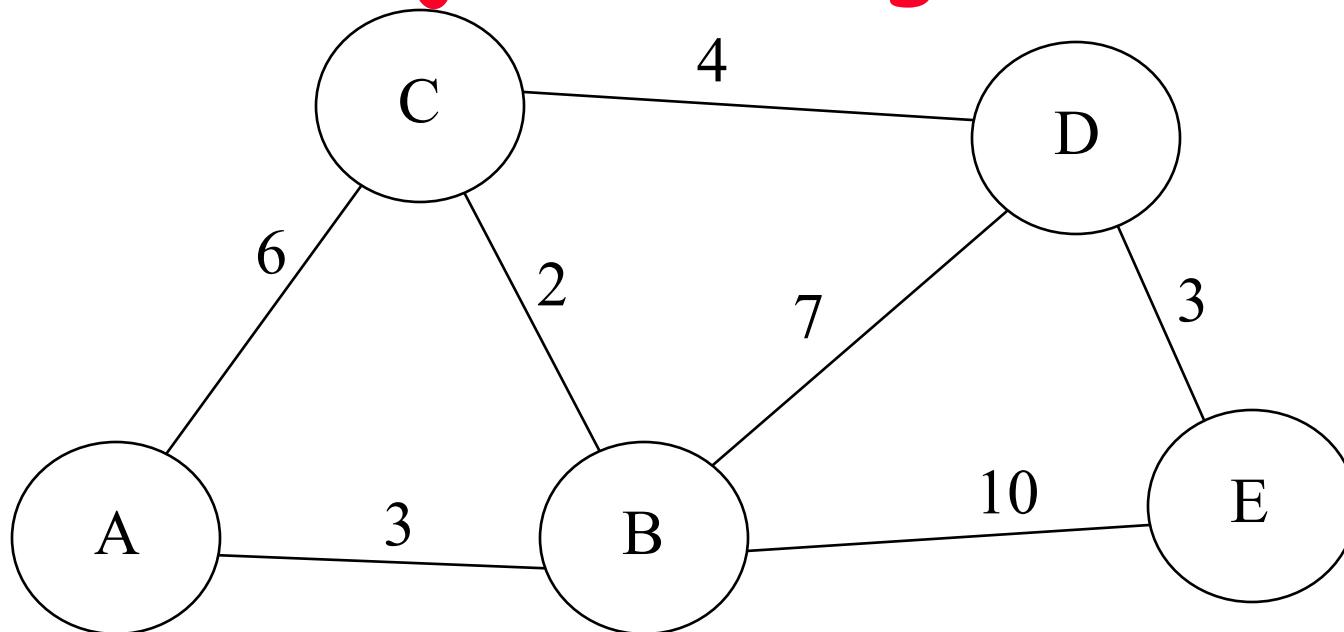
# Q3: tracert B→C



# Q3: tracert



# Q4: Link state routing protocol - Dijkstra's algorithm



LSA:

<b>A</b>
B=3
C=6

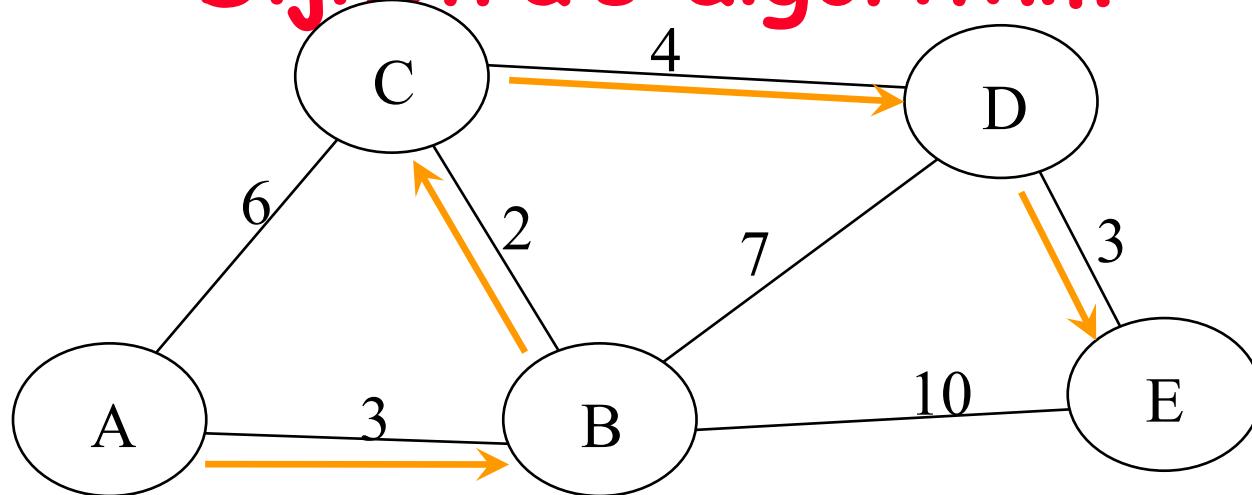
<b>B</b>
A=3
C=2
D=7

<b>C</b>
A=6
B=2
D=4

<b>D</b>
B=7
C=4
E=3

<b>E</b>
B=10

# Q4: Link state routing protocol - Dijkstra's algorithm



Iterations of the algorithm

	B	C	D	E
{A}	3✓	6	∞	∞
{A,B}	3	5✓	10	13
{A,B,C}	3	5	9✓	13
{A,B,C,D}	3	5	9	12✓
{A,B,C,D,E}	3	5	9	12