

Spring 2014 Computer Networks CMPE323

Quiz 2

Questions	Points
Q1	/80%
Q2	/20%

Student name:

Student ID:

Question 1:

Consider Figure 1 where the network is correctly configured to allow PC1 and PC2 to communicate.

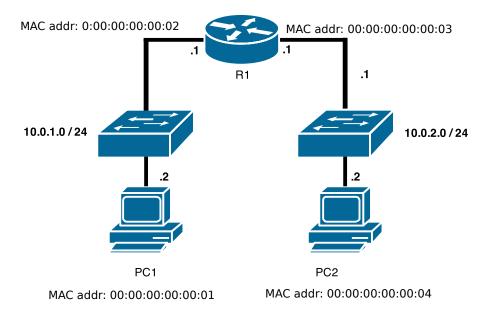


Figure 1: Two PCs in two broadcast domains that are interconnected by a single router.

Additionally, suppose that PC1 initiated some TCP connection against PC2's port 80. The dynamically chosen source port number by PC1 was 40,000. The TCP three-way hand-shake has progressed so far as depicted in Figure 2.

	PC 1				PC 2
1.	CLOSED				LISTEN
2.	SYN-SENT	>	<seq=1><ctl=syn></ctl=syn></seq=1>	>	SYN-RECEIVED
3.	ESTABLISHED	<	<seq=300><ack=2><ctl=syn,ack></ctl=syn,ack></ack=2></seq=300>	<	SYN-RECEIVED
4.	ESTABLISHED	>	???	>	ESTABLISHED

Figure 2: TCP's three-way hand-shake for connection establishment between PC1 and PC2.

The question is: what data should PC1 send to PC2 in order to complete the TCP three-way hand-shake (i.e. step 4 from Figure 2). Answer this question by filling the Figures 3, 4 and 5 in the next page as follows:

- Only fill fields that are marked by an asterisk "*", and ignore the others.
- The protocol type for IP is 0x0800.
- The protocol type for TCP is 0x06.

Grading scheme: every field that is correctly filled rewards you with 5 points. I.e. correctly filling all of the 16 fields will give you $5 \times 16 = 80$ points.

0	1	2	3
		5 6 7 8 9 0 1 2 3	
	+-+-+-+-+-+-+-+- AC address	+-+-+-+-+-+-+-+	-+-+-+-+-+-+-++
+		+-+-+-+-+-+-+	-+-+-+-+-+-+
1		*Destination M	IAC address
+-+-+-+-+-	+-+-+-+-+-+-+-	+-+	+
1			
*Type	+-+-+-+-+-+-+-+-	+-+-+-+-+-+-+-+ +-+	-+-+-+-+-+-+
Figure 3: Eth asterisk "*").	ernet frame (only fil	the value of fields th	nat are marked with an
0	1	2	3
0 1 2 3 4 5	6 7 8 9 0 1 2 3 4	5 6 7 8 9 0 1 2 3	4 5 6 7 8 9 0 1
+-+-+-+-+-	+-+-+-+-+-+-+-	+-+-+-+-+-+-+	-+-+-+-+-+-+
Version I	HL Type of Servi	ce Total	Length

Figure 4: IPv4 header (only fill the value of fields that are marked with an asterisk "*").

0		1		2		3
0 1 2 3	4 5 6 7 8	9 0 1 2 3	4 5 6 7	8 9 0 1 2	3 4 5 6 7 8	9 0 1
+-						
1	*Source Port *Destination Port					
+-						
1	*Sequence Number					
+-+-+-+	+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-					
1	*Acknowledgment Number					
+-						
1 1		* * *	* *			1
Data		U A P R	S F			1
Offset	Reserved	R C S S	Y I	W	indow	1
1 1		G K H T	' N N			1
1 1		I I I I				1
+-+-+-+	-+-+-+-+	-+-+-+-	+-+-+-	+-+-+-+-	+-+-+-+-+-	+-+-+
1	Checksu	ım		Urgei	nt Pointer	1
+-						

Figure 5: TCP header (only fill the value of fields that are marked with an asterisk "*").

Question 2:

Following the scenario in Figures 1 and 2, and in the context of TCP communication, how would PC2 behave if it did not receive an ACK message from PC1 for a relatively long time period?