

Assignment Submission Coversheet

Faculty of Science, Engineering and Built Environment

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Assignment Title:	Problem Solving Report 2		
Due Date:	August 30 th 2019	Assessment Item:	2
Course Code/Name:	S334 / Bachelor of Cyber Security		
Unit Code/Name:	SIT202 Computer Networks	Unit Chair / Campus Coordinator:	Prof Jinho Choi
Practical Group: (if applicable)			

If this assignment has been completed by a group or team:

1. Each student in the group must complete and sign a separate coversheet
2. The assignment will be returned to the student in the group nominated below

Assignment to be returned to: (Student name and Student ID number)	
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Signed:	Justin Bland	Date:	Friday, August 30, 2019
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COMMENTS					
Mark Awarded:		Assessor's Signature:		Date:	

Question-1 (Chapter 18): 12 marks

1. In current classful addressing, there are 5 classes as shown in Fig. 18.18 (p. 531 of the textbook). There are 5 classes with variable-length leading bits as follows:

Class A: 0; Class B: 10; Class C: 110; Class D: 1110; Class E: 1111

- Suppose that we wish to modify to accommodate 9 classes. What are 9 (variable-length) leading bits for them? [4 marks]

Class	Leading Bit
Class A	0
Class B	10
Class C	110
Class D (Reserved)	1110
Class E (Reserved)	1111
Class F	11110
Class G	11111
Class H	1111110
Class I	1111111

2. [8 marks] A classless address is given as 200.107.16.17/20

- Find the first and last addresses in the block (explain in detail how you can find them). [4 marks]

Address given in binary 11001000.01101011.0001 0000.00010001

The IP range for address given should always start with the first 20 bits so to find the first and last IP for this range we change all the bits after the 20th bit to all zeros for the first and all ones for the last address in the range.

First IP: 11001000.01101011.0001 0000.00000001 - 200.107.016.001

Last Usable IP: 11001000.01101011.0001 1111.11111110 - 200.107.031.254

Broadcast IP: 11001000.01101011.0001 1111.11111111 - 200.107.031.255

- Find the mask. [4 marks]

Mask: 11111111.11111111.1111 0000.00000000 - 255.255.240.000

Question-2 (Chapter 20): 20 marks

Consider the network consisting of 5 nodes.

1. Find the distance vectors for all the nodes. [8 marks]

	A	B	C	D	E
A	0	1	3	3	4
B	1	0	4	2	4
C	3	4	0	6	1
D	3	2	6	0	6
E	4	4	1	6	0

2. Can the maximum distance of the network (the maximum distance between any pair of different nodes, i.e., {A,C}, {A,D}, {B,C}, etc) be lowered if the distance between nodes B and E becomes 2? Please explain how you come to the answer (Yes or No). [4 marks]

If the distance between nodes B and E become 2, the distance between multiple nodes would be reduced, see adjusted distance vector table below

	A	B	C	D	E
A	0	1	3	3	3
B	1	0	3	2	2
C	3	3	0	5	1
D	3	2	5	0	4
E	3	2	1	4	0

3. Find the maximum distance of the network if the link between nodes A and C is removed. In addition, discuss what is the performance loss after losing the link between nodes A and C. [8 marks]

	A	B	C	D	E
A	0	1	6	3	5
B	1	0	5	2	4
C	6	5	0	7	1
D	3	2	7	0	6
E	5	4	1	6	0

Question-3 (Chapters 23 and 24): 13 marks

1. Choose “True” or “False” for each item [3 marks]

	True or False
In the transport layer, port numbers are used to identify local computers.	True
For flow control, we need two buffers: one at the sending transport layer and the other at the receiving transport layer.	True.
There are only connection-oriented protocols in the transport layer, while the network layer supports connectionless communication.	False

2. [6 marks] Suppose that the Go-Back-N protocol with $m = 3$ and the sending window of size 7 is used to send packets. Let $S_f = 31$, $S_n = 35$, and $R_n = 33$.

- What are the sequence numbers of the data packets in transit? [2 marks]
- what are the acknowledgement numbers of ACK packets in transmit? [2 marks]
- if the senders process sends two or more data packets to the sender’s transport layer and one ACK packet is received from the receiver’s transport layer, what are the updates values for S_f and S_n ? [2 marks]

3. [4 marks] The following is part of a TCP header in hexadecimal format:

93E2 B017 0AB2 0000 ...

What is the destination port number? [2 marks]

Destination Port	Hex	B0 17
	Dec	45079

What is the sequence number? [2 marks]

Sequence Number	Hex	0A B2 00 00
	Dec	179437568