Test

Course code & title	: EE3009 Data Communications and Networking
Date	: 23 April 2021
Time allowed	: 1 hour

Question 1 (5 marks)

A network with 3 routers connected as a triangle. Each router links with a number of hosts and forms a subnet. The subnets with hosts are A, B, and C. The subnets without hosts are D, E, and F.

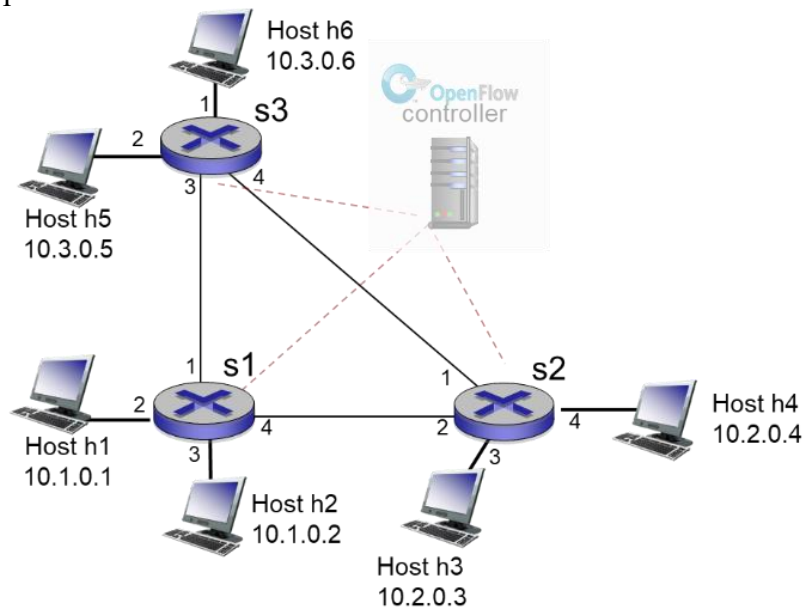
(a) Assign network addresses to each of these 6 subnets with the following constraints:

- all addresses must be allocated from 230.197.1**XY**/24 (**XY** are the last 2 digits of your student ID number in decimal)
- subnet A should have enough addresses to support 122 interfaces
- subnet B should have enough addresses to support 30 interfaces
- subnet C should have enough addresses to support 50 interfaces
- subnet D should have enough addresses to support 3 interfaces
- subnet E should have enough addresses to support 6 interfaces
- subnet F should have enough addresses to support 6 interfaces

(b) Using your answer in part (a), provide the forwarding tables for each of the 3 routers.

Question 2 (5 marks)

Consider the SDN OpenFlow network as shown below.



Suppose that the desired forwarding behavior for datagrams arriving at s3 is as follows:

- any datagrams arriving on input port 4 from hosts h3 or h4 that are destined to hosts h1 or h2 should be forwarded over output port 3
- any datagrams arriving on input port 3 from hosts h1 or h2 that are destined to hosts h3 or h4 should be forwarded over output port 4
- any arriving datagrams on input ports 3 or 4 and destined to hosts h5 or h6 should be delivered to the host specified
- hosts h5 and h6 should be able to send datagrams to each other

Specify the flow table entries in s3 that implement this forwarding behavior.

Question 3 (5 marks)

Let $g_1(x) = x^2 + 1$ and $g_2(x) = x^3 + x + 1$. Consider the information bits (1, 1, 0, 1, 1, 0).

(a) Find the codeword if $g_1(x)$ is used as the generating polynomial.

(b) Find the codeword if $g_2(x)$ is used as the generating polynomial.

(c) Find the codeword if $g(x) = g_1(x)g_2(x)$ is used as the generating polynomial.

(d) Suppose that the codeword in part (c) has a transmission error in the (**X**+1)th bit. **X** is the last digit of your student ID number in decimal. What does the receiver obtain when it does its error checking?

Submission:

Save the answers in a MS Word file or a pdf file. Name the file with your student ID number, e.g. 12345678.docx or 12345678.pdf. **One mark will be deducted for wrong file name.** Submit the file by e-mail (itklchan@cityu.edu.hk) at or before 8 pm. **1 mark/min will be deducted for late submission.**