PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING

Final Examination: Semester II   Academic Year: 2012
Date: 22 February 2013   Time: 9.00-11.00 (2 hrs)
Subject: 241-553, 242-553 High Speed and Broadband Integrated Networks Room: S817, A401

o   In this exam paper, there are 10 questions,
o   No notes and books are allowed,
o   Answers could be either in Thai or English,
o   All electronic devices are not allowed,
o   Try to attempt answering all questions.

1. Please describe the mechanism given in Figure 1 including what it is used for, and how it works
    (HUNT Mode, PRESYNC Mode, and SYNCH Mode) (10 marks)
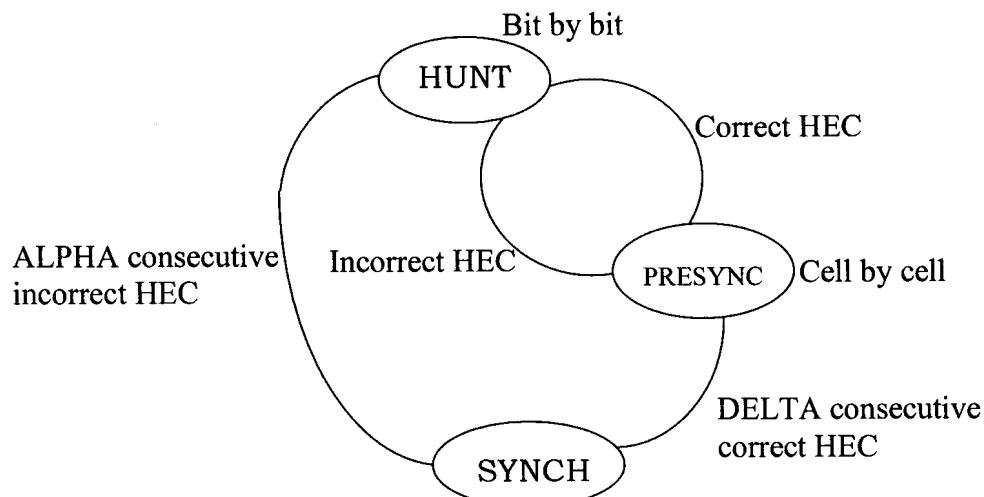
Figure 1 for question 1

Answer

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2. What are the differences between, in terms of their mechanisms, the advantages and disadvantages between:

        (a) open loop, and closed loop flow controls (please show the figures illustrating both mechanisms) (10 marks)

        (b) preventive, and reactive flow controls (please show the graph of working region of both mechanisms) (10 marks)

<u>Answer</u>

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3. Below is a diagram demonstrating window flow control. Given a window size, W (the time to transmit data) as shown in Figure 2, the maximum transmission rate of the source is determined by the value of W in relation to the round-trip time delay D. If the service rate of the source is $1/R$, answer the following questions:

    a. What is the maximum rate of information transmission of the source? (4 marks)

    b. What is the minimum rate of the source (in relation to $1/R$, W, and D)? (4 marks)

    c. What is the maximum rate of the source if W is larger than D? (4 marks)

    d. What is the optimal value of W? (4 marks)

    e. Assuming that the time-out mechanism is activated after T, if an acknowledgement signal from downstream is missing. What is the system throughput (in relation to $1/R$, W, D, and T)? (4 marks)

Figure 2 Windows flow control demonstration diagram used for question 3
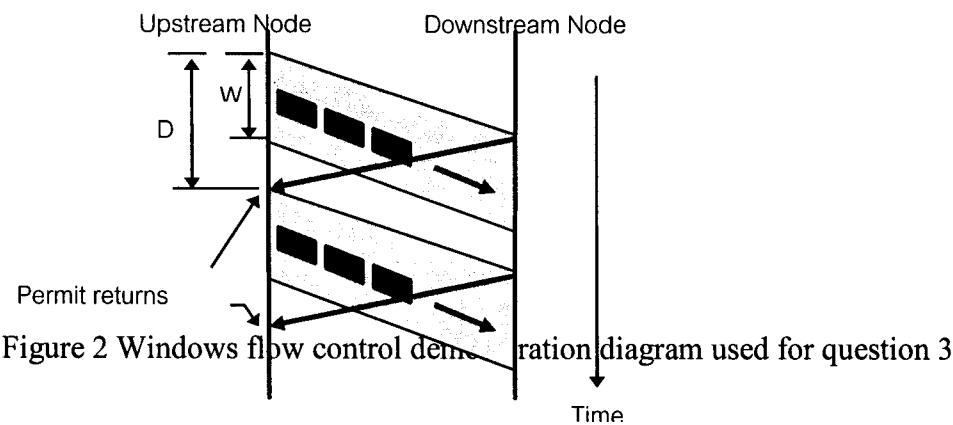
Answers

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4.

    4.1   The diagram below is multi stage Delta Network, please answer the following questions:

a. From the given information, please complete the diagram. There are 4 missing connection lines between stage 2 and stage 3. (5 marks)

b. After completing all connection lines, considert input information with routing value 111. Please draw a routing line from stage 1 to stage 3. (5 marks)
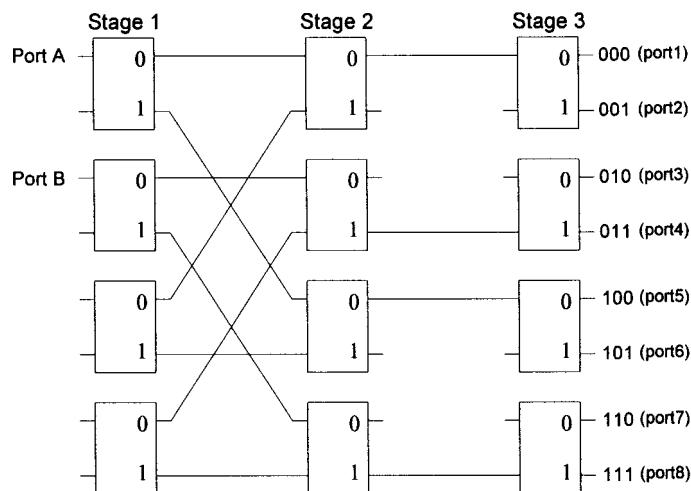

Answer (draw the answer on the given figures below)

a)

b)
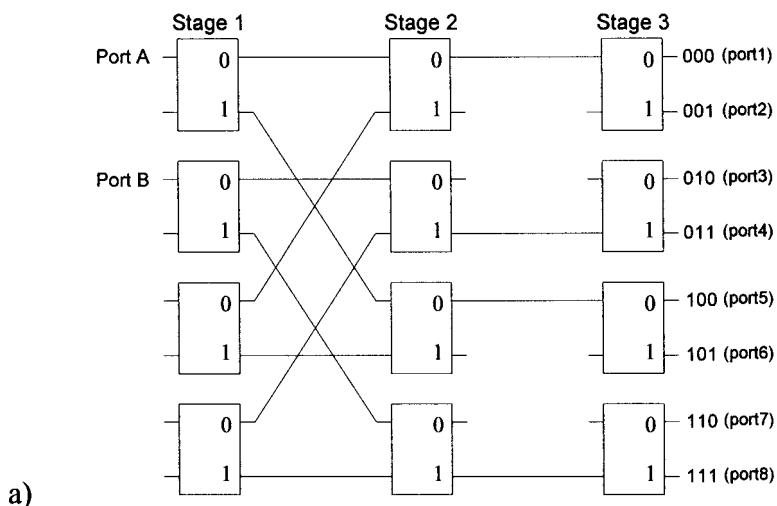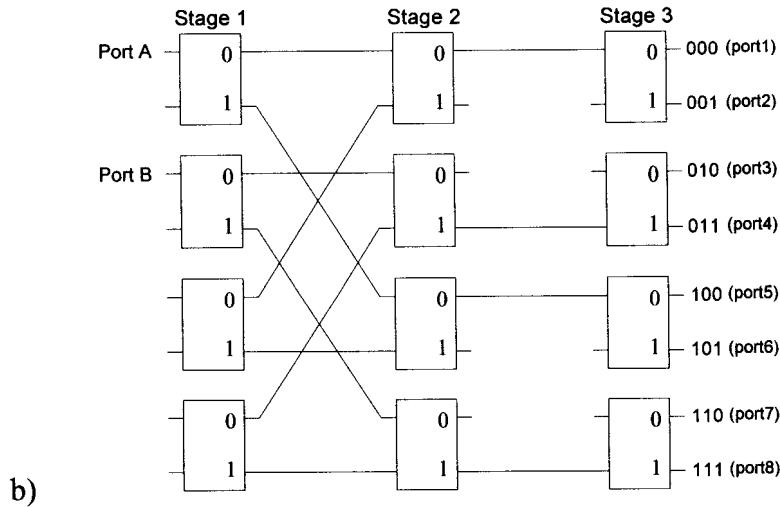
4.2   3-stage delta network (10 marks)

Cell A, B, and C enter to ATM switch as shown in the picture below. ATM switch architecture is a 3 Stages of Delta Network. Routing table of ATM switch is assigned below.

3 Stages of Delta Network
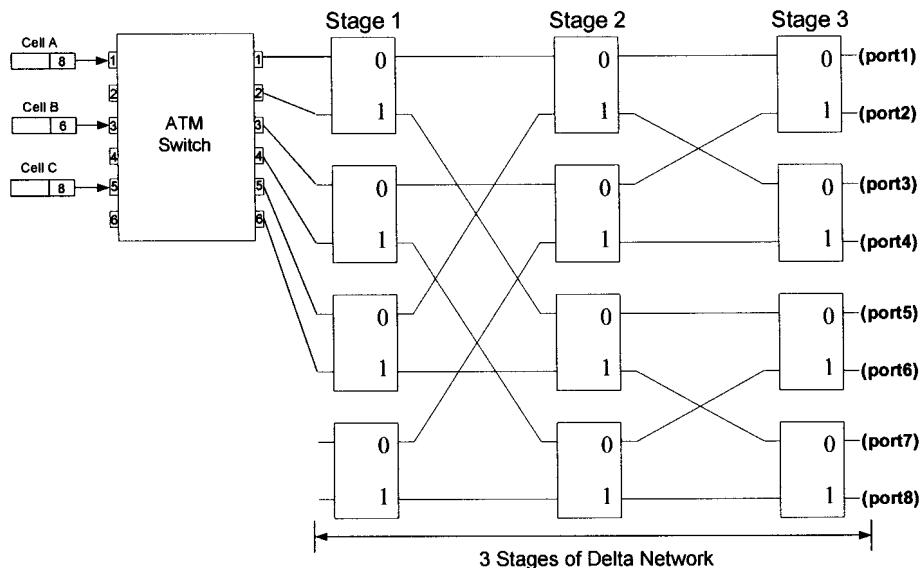
Port In	VCI In	VCI Out	Port Out	internal header
1	6	10	1	0,1,1
1	8	15	2	1,1,1
3	6	18	3	1,0,1
3	8	20	4	0,1,0
5	6	22	5	0,0,1
5	8	18	6	1,0,0

Table 1 Cell routing table in ATM Switch

i.   What are the output ports of cells A, B and C?

Answer:

3 Stages of Delta Network
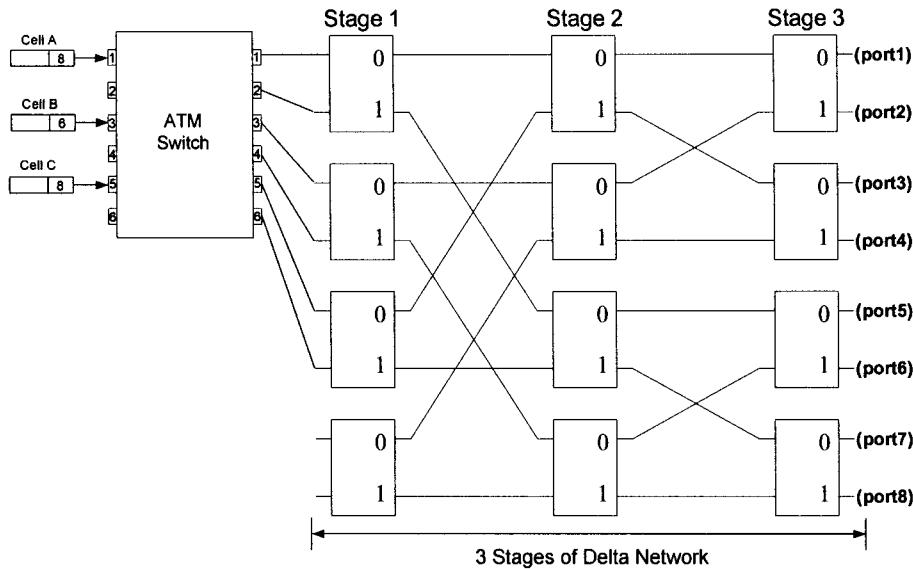
        ii. If we want cell A routed to output port number 7, what should the internal header values for cell A be?

Answer:

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5. The Figure below shows a Shuffle exchange network, please draw a switching routed path for input port 2 routed to output port 7 (10 marks)
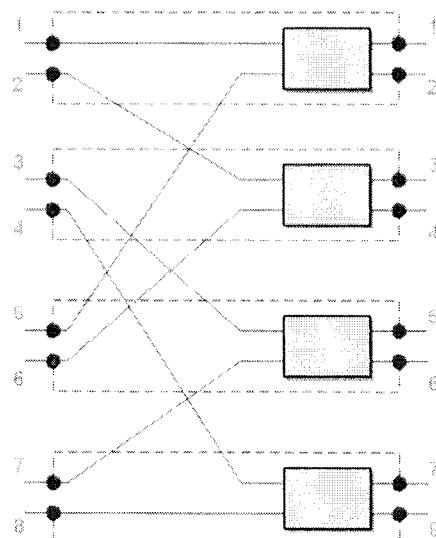
Answer (use the figure below)
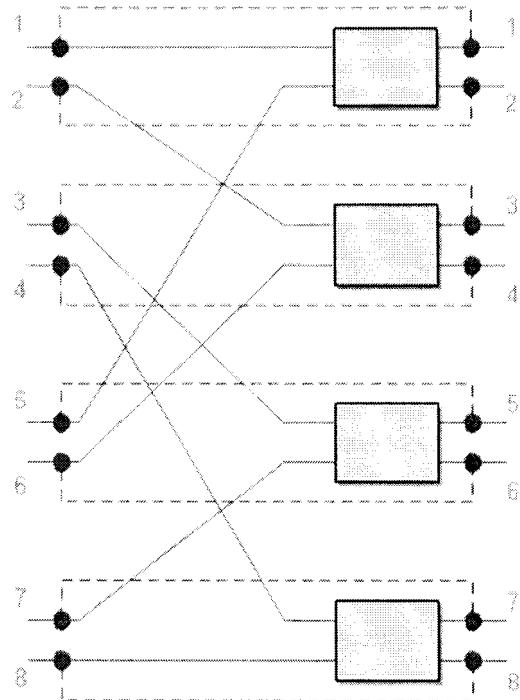
6. Mobile IP

6.1 A car is connecting to the Internet. What happens when the car is moving? In cases of:
- Change of point of attachment,
- Change of IP sub-network.

In such cases, what are the problems? (5 marks)

Answer

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6.2 Please give 3 reasons why we need HA (Home Agent) in MIPv6. (5 marks)

Answer

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6.3 Please give your analysis of how many round trips are needed during hand over period until MN can communicate with CN. (5 marks)

Answer

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7 The picture shows a scenario of NEMO happening where a Mobile Router (MR) moved from its Home Link to a Foreign Link. Please describe the steps of establishing a connection between Mobile Nodes (MNN) and CN. (10 marks)
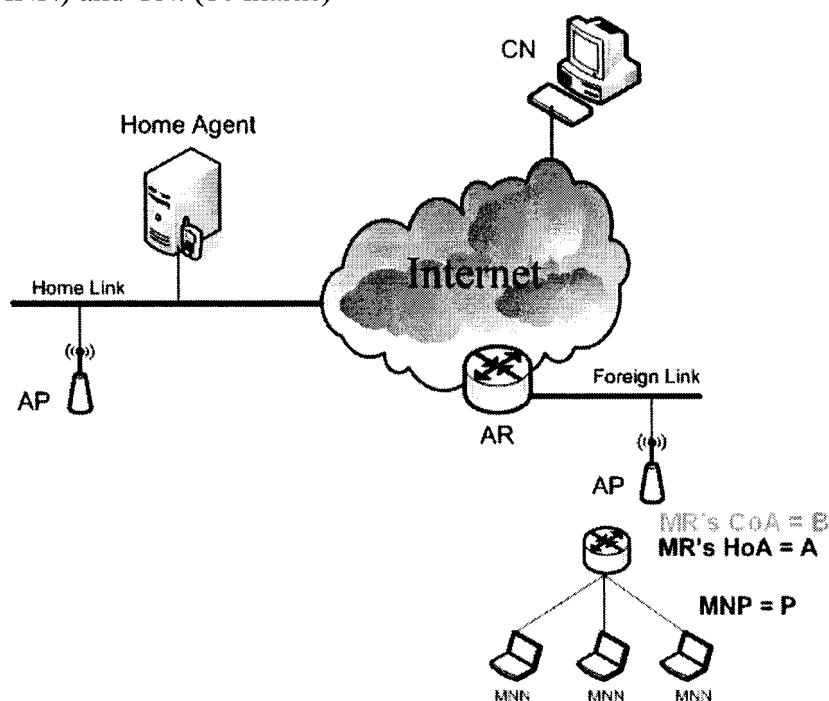
Answer

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8. This question is based on NEMO. Please draw the link paths between MNN3 and CN (where pinball routing problem occurs). (10 marks)
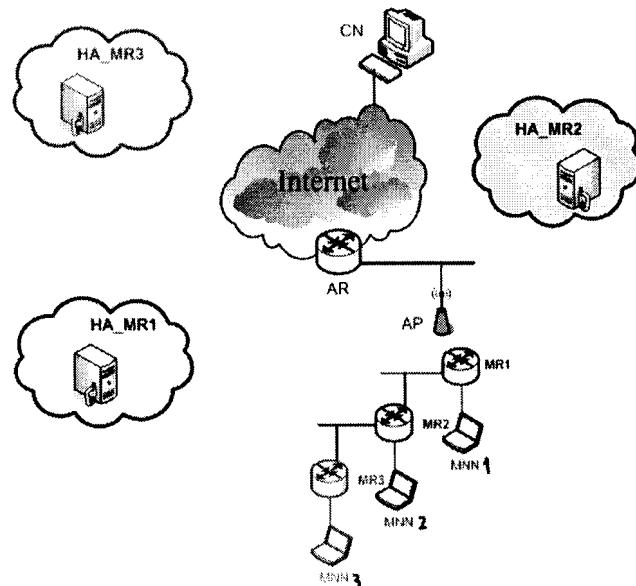
<u>Answer</u>
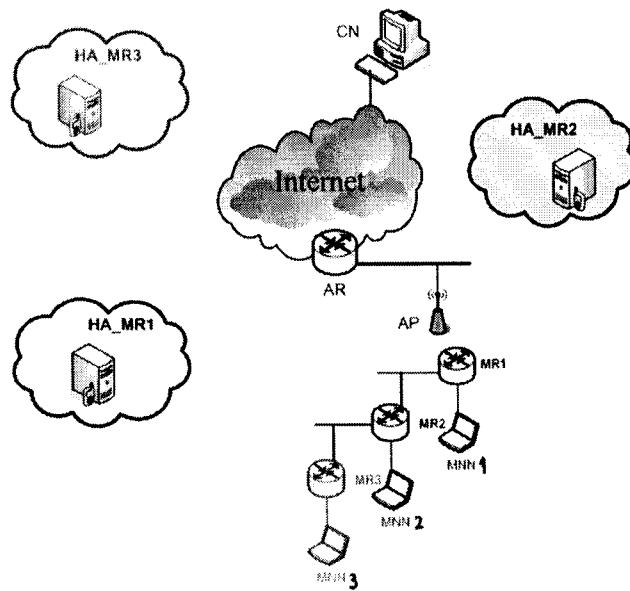
9. Propose a method to handle the case where a MN cannot reach its HA and/or CN cannot contact HA? Please give a signal flow diagram to express your idea (15 marks)

Answer

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