In the name of beauty

Solution to the 5th series of the Com Net Course

Q1)

1. Based on the routing and forwarding concept and the subtle difference between them, before forwarding the packets through the routers from source to destination, a routing protocol is needed, once to determine the forwarding tables of the routers so as to be able to operate forwarding.
2. The phrase “Layer 3 Switch” is maintained for routers in marketing literature in which all the layers of 1 up to 3 are being implemented in them.

Q2)

Once an IP address is arrived at the input link interface of a router using the “Longest Prefix Matching” technique, it is forwarded for an output link interface with the most-resembled IP address in the forwarding table. Based on this explanation,

1. 1010 0110 is headed for the output 2 with IP address 1010 1111
2. 0010 0110 is headed for the output 9 with the IP address remaining still
3. 1011 0010 is headed for the output 3 with IP address 1011 0000

Q3) The HOL blocking occurs only when there are more packets at the aggregate of all the input link interfaces, than the capacity of the switch fabric at each time slot.

1. The minimum of the router switch fabric rate of transmission must be
2. The buffering delay occurs only if the input packets be 4 or 5 in number, each of which leading to a total delay of one time slot since the switch fabric is only enable to pass three packets in total at each time slot. Generally, an -tuple of packets is likely to happen with a probability of , so the total average of the desired delay becomes where is a single time slot duration (there is a slight assumption of considering the first time slot for solving the problem instead of a series of time slots and carry out a complicated burden of calculations in queuing theory!).

Q4) It is highly recommended to first allocate the IP addresses to the least-amount-of-demand subnet, namely the 3rd one here. This subnet is required to have IP addresses of a form 223.1.17.x/28. So, all the followings are valid cases for such and allocation to subnet 3:

223.1.17.x/28 when x is a multiple of 16

Subnet 1 is required to have IP addresses of the format 223.1.17.x/26 which leaves us with four choices:

223.1.17.0/26

223.1.17.64/26

223.1.17.128/26

223.1.17.192/26

and for subnet 2, we must have two types of IP addresses:

223.1.17.0/25

223.1.17.128/25

One possible choice is:

|  |  |  |
| --- | --- | --- |
| Subnet 1 | Subnet 2 | Subnet 3 |
| 223.1.17.128/26 | 223.1.17.0/25 | 223.1.17.64/28 |

Q5) A queue of length has a probability of . Once a newly arrived packet is arrived at the input of a queue with length 5 or more, a dropping procedure is executed. So the desired probability becomes: