

City University of Hong Kong  
Department of Electronic Engineering

**EE3009 Data Communications and Networking**

**Tutorial 3**

1. A small ISP owns the following networks: 128.56.24.0/24, 128.56.25.0/24, 128.56.26.0/24, 128.56.27.0/24. Perform CIDR aggregation of these networks.
2. Consider a datagram network using 32-bit host addresses. Suppose a router has four links, numbered 0 through 3, and packets are to be forwarded to the link interfaces as follows:

Destination Address Range	Link Interface
11100000 00000000 00000000 00000000 through 11100000 00000000 11111111 11111111	0
11100000 00000001 00000000 00000000 through 11100000 00000001 11111111 11111111	1
11100000 00000010 00000000 00000000 through 11100000 00000011 11111111 11111111	2
otherwise	3

- a. Provide a forwarding table that has five entries, uses longest prefix matching, and forwards packets to the correct link interfaces.
  - b. Describe how your forwarding table determines the appropriate link interface for datagrams with destination addresses:  
11111000 10010001 01010001 01010101  
11100000 00000000 11000011 00111100  
11100001 10000000 00010001 01110111
3. Suppose a router receives an IP packet containing 600 data bytes and has to forward the packet to a network with maximum transmission unit of 200 bytes. Assume that the IP header is 20 bytes long. Show the fragments that the router creates and specify the relevant values in each fragment header (i.e., total length, fragment offset, and more bit).
4. Abbreviate the following IPv6 addresses:
  - a. 0000:0000:0F53:6382:AB00:67DB:BB27:7332
  - b. 0000:0000:0000:0000:0000:0000:004D:ABCD
  - c. 0000:0000:0000:AF36:7328:0000:87AA:0398
  - d. 2819:00AF:0000:0000:0000:0035:0CB2:B271

5. Suppose you have purchased a wireless router and connect it to your cable modem. Also suppose that your ISP dynamically assigns your connected device (that is, your wireless router) one IP address. Also suppose that you have five PCs at home that use WiFi to connect to your wireless router. How are IP addresses assigned to the five PCs? Does the wireless router use NAT? Why or why not?