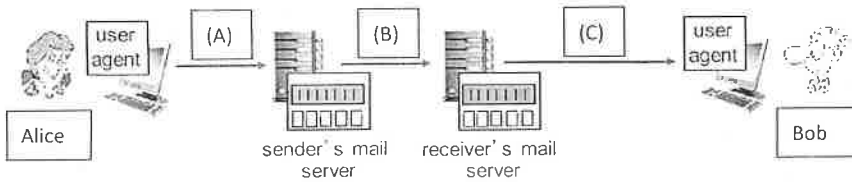


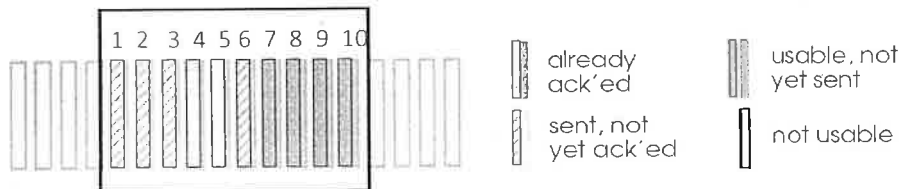
1, (10%) Suppose Alice sends a message to Bob as shown in the following figure. Discuss how the message gets from Alice's host to Bob's host? What are the protocols for (A), (B), and (C)?



2, (10%) For the client-server application over TCP. Why must the server program be executed before the client program? For the client-server application over UDP, why may the client program be executed before the server program?

- 3, (15%) Consider sending a large file from a host to another over a TCP connection that has no loss.
- Suppose TCP uses AIMD for its congestion control without slow start. Assuming $cwnd$ increases by 1 MSS every time a batch of ACKs is received and assuming approximately constant round-trip times, how long does it take for $cwnd$ increase from 6 MSS to 12 MSS (assuming no loss events)?
 - What is the average throughput (in terms of MSS and RTT) for this connection up through time = 6 RTT?

4, (15%) Assume currently TCP CWND (with select repeat) at a sender side is shown below. Then, the sender receives two packets with ack number 2 and 3, respectively. (a) After the sender receives the two packets, how does the TCP CWND move? (b) Then, the sender receives a packet with ack number 1, how does the TCP CWND move? (Please draw the new position of TCP CWND)



考試時間	月	日	上午	下午第	節	份數	任課教師
	(星期)						

國立臺灣科技大學

107 學年度第 一 學期 傳訊系 考試命題用紙

第 一 頁 共 一 頁

考試科目：Computer Networks

- 研究所
 大學部
 工程在職進修

傳訊系
資格考
系班別

5. (15%) Address Resolution Protocol, or ARP, is a communication protocol used for discovering the link layer address, such as a MAC address, associated with a given network layer address, typically an IPv4 address.
- (a) Illustrate the process how one computer may find the MAC address of another computer via ARP.
- (b) At what situation one computer might want to query for the corresponding IP address by MAC address? And what protocol solves this purpose?
6. (15%) A router has the following (CIDR) entries in its routing table
- | Address/mask | Next hop |
|-----------------|-------------|
| 140.118.56.0/22 | Interface 0 |
| 140.118.60.0/22 | Interface 1 |
| 192.53.40.0/23 | Router 1 |
| default | Router 2 |
- For each of following IP Address, what does the router do if a packet with that packet arrives?
- (a) 192.53.40.7
 (b) 192.53.56.7
 (c) 140.118.63.10
 (d) 140.118.57.14
 (e) 140.118.52.2
7. (10%) A network on the Internet has a subnet mask of 255.255.240.0 . What is the maximum number of hosts it can handle? Suppose that instead of using 16 bits for the network part of a class B address originally, 20 bits had been used. How many class B networks would there have been?
8. (10%) Please briefly describe the protocols of CSMA/CD in Ethernet and CSMA/CA in 802.11 as well as line out their advantages and their disadvantages.