

資訊網路與多媒體研究所

資格考試科目：高等計算機網路

1. (20%) Circuit switching vs. packet switching
 - a. What advantage does a circuit-switched network have over a packet-switched network?
 - b. Given a 1Gbps link, users are generating data at a rate of 100kbps when busy, but are busy generating data only with probability $p=0.1$. Consider packet switching and a user population of M users. Give a formula (in terms of p , M , N) for the probability that more than N users are sending data.
2. (10%) Layering of Internet
 - a. Why do we need the layering concept for Internet?
 - b. Please elaborate on the pros and cons of the Layering.
3. (5%) Why do HTTP, FTP, SMTP, and POP3 run on top of TCP rather than on UDP?
4. (10%) Suppose Alice, with a Web-based e-mail account (such as Hotmail or gmail), sends a message to Bob, who accesses his mail from his mail server using POP3. Discuss how the message gets from Alice's host to Bob's host. Be sure to list the series of application-layer protocols that are used to move the message between the two hosts.
5. (15%) TCP slow start and TCP futures
 - a. Describe the basic operation of TCP slow start. What are the main advantages of TCP slow start that have made it a success in Internet?
 - b. Why are new versions of TCP for high-speed transmission needed?
6. (10%) Compare inter-AS routing protocol with intra-AS routing protocols in the Internet.
7. (10%) How should the Internet evolve to better support multimedia? Please elaborate based on the three kinds of the solution philosophy, i.e., (i) integrated services philosophy, (ii) differentiated services philosophy, and (iii) laissez-faire.
8. (10%) Why could 802.11 WEP encryption be easily broken? Please explain your reason as detailed as possible.
9. (10%) Please compare the public-key and symmetric-key for network security.