

Dept.: _____ Student#: _____ Name: _____

Division of Computer and Communication Engineering, Korea University

CNCE 461 – Communication Networks (통신네트워크)
Homework 1 Spring 2015

Deadline: Monday, April 20, 2015 12:59 PM; Maximum Points: 100pts

Solutions must be hand-written and submitted until the deadline. **NO LATE SUBMISSION!**

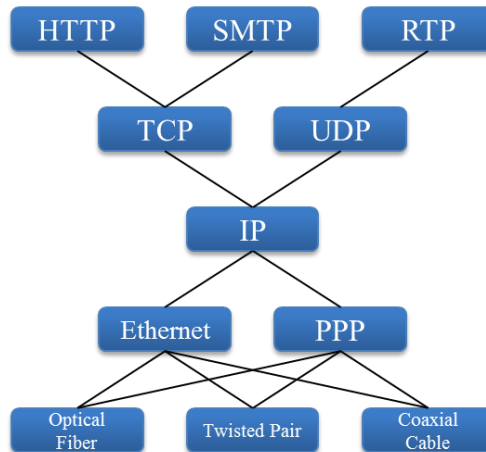
Problem 1 (5pts): Name servers (or DNS servers) are specialized servers on the Internet that handle queries or requests from your local computer about the location of a domain name's various services. To do this, they send back corresponding DNS messages/responses through UDP port 53 or TCP port 53. When is each protocol used, and why?

Problem 2 (10pts): “Compared with packet switching which needs to add packet headers with considerable sizes, circuit switching aims at real-time services and hence does not introduce any overhead at all in data transmissions. Accordingly, the utilization of assigned bandwidth in circuit switching is more efficient than that in packet switching.” Are these statements reasonable? Provide a detailed explanation. (*Hint: two flaws exist in these statements*)

Problem 3 (15pts): Arrival pattern of customers to a cafe operated by a single barista follows the Poisson distribution at a rate of eight per hour. The barista adopts the FCFS scheduling discipline for customers and only one customer gets service at a given time. In addition, the preparation time for serving an order is exponentially distributed and requires 6 minutes on average.

- a. What is the probability of finding more than 3 customers *waiting for* ordering?
- b. What is the expected value of customers in the waiting queue?
- c. What is the average waiting time?
- d. What is the expected value of customers in the whole queueing system?
- e. What is the average response time?

Problem 4 (10pts): The following figure illustrates the Internet architecture with 5 layers. As you can see, today's Internet architecture is in the shape of an h _ _ _ _ _ . (That is, what does it look like?) This distinguishing shape is closely related to the fast growth of the public Internet. Describe the relationship between the shape and the success of the Internet in detail.



Problem 5 (5pts): Read RFC 2119 (Best Current Practice) and summarize the meaning of the key words.

Problem 6 (20pts): Read RFC 1350 (TFTP Revision 2) carefully, and summarize the details of TFTP within this page. To get the full credit, do not add any extension beyond RFC 1350.

Problem 7 (15pts): In the C programming language, a function can have a set of parameters. Since the BSD socket API is written in the C programming language, functions given by the API also have a set of parameters. You can find the parameter list of a function in its man page, in other BSD socket API references such as Beej's Guide to Network Programming. Searching from any reference, list up the parameters of the following functions with brief descriptions.

- (1) `socket()`
- (2) `bind()`
- (3) `connect()`
- (4) `listen()`
- (5) `accept()`

Problem 8 (20pts): Depict the sequence of function calls for a client and a server participating in a TCP connection. Describe briefly the transaction between the client and the server.