

Electrical, Computer, and Systems Engineering  
ECSE-4670: CCN  
Fall 1999

**Problem Set 1- Due Tuesday, September 17th 1999**

<b>Your Name</b>	
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**Notes:**

1. Be brief.
2. A part of the homework credit is given to reading. Reading assignments will be quizzed in both informal and formal quizzes
3. Please write your answers on separate sheets and staple it along with the questions to facilitate easy grading.

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1	2	3	4	Total
20	10	10	10	50

TA Signature : \_\_\_\_\_

**1. Reading assignment:**

- Read the textbook (Tanenbaum) Chap 1. Summarize key concepts and issues NOT covered in class.

**2. Concepts: (Multiplexing)** What is multiplexing and how does it improve system design ?

Why is statistical multiplexing not good for systems whose load characteristics have no variation ? Why is packet switching more efficient than circuit switching ?

**3. Concepts: (Virtualization)** A switch, using a switching table, moves packets from one port to another. What is the virtualization provided by a switch ? Where are the 'multiplexing' and 'indirection' components required to provide this virtualization? Similarly describe the virtualization obtained when a labeled set of sources

**4. Problem: (Metrics/Parameters)** Metric  $m_1$  can be expressed as the following functions of parameters  $p_1$ ,  $p_2$  and  $p_3$ :

$$M_1 = (0.002 \cdot p_1 + 2 \cdot p_2 + p_3)$$

Where  $p_1$  has the range  $[0,1]$ ,  $p_2$  has the range  $[10,100]$  and  $p_3$  has the range  $[1000, 10,000]$ . Which is the most dominant parameter amongst  $p_1$ ,  $p_2$  and  $p_3$ , if I define 'dominant' as

- a) that parameter which affects  $M_1$  by a unit change in its value?
- b) that parameter which affects  $M_1$  by varying by the maximum amount in its range ?

Suppose  $M_1$  is 'response time' and I discover a design breakthrough which changes the coefficient of  $p_2$  to 1 (from 2). What is the maximum and minimum speedup I can attain, assuming  $p_1=0$  and  $p_3=1000$  ? (speedup = new  $M_1$ /old  $M_1$ )