CS3235 Tutorial for week 6
(Sept 15-Sept 19, 2003)

11th September 2003

1. **Question 2, Chapter 4 in notes:** Assuming that the data transferred has an entropy of 0.2, what is the maximum (information) bit transfer rate using 16 level data over a (noiseless) cable with a bandwidth of 1MHz?

2. **Question 3, Chapter 4 in notes:** Assuming that the signal-to-noise ratio of a communication system is 16:1, what is the maximum bit transfer rate over a cable with a bandwidth of 1MHz?

3. Consider a University department which is developing a system to provide on-line documentation. The system will use a secure web-based transfer of documents, with a secure login system for access to more critical documents. The documents are classified as either top secret, restricted or unrestricted, and the intended users of the system are the administrative staff $(a_1, a_2, \ldots)$, the teaching staff $(t_1, t_2, \ldots)$, students $(s_1, s_2, \ldots)$, and others $(o_1, o_2, \ldots)$. Top secret documents might be ones such as personnel or finance records, and are in general only available to relevant administrative staff. The restricted documents include various student and research projects which will be available to any of the teaching staff, and to relevant students. Outline the use of the BLP model to model such a system, specifying the subjects, security levels and sample categories, perhaps with brief examples.

4. **Exercise 5.8.2. in textbook:** Given the security levels `TOPSECRET`, `SECRET`, `CONFIDENTIAL` and `UNCLASSIFIED` (ordered from highest to lowest) and the categories `A`, `B` and `C`, specify what type of access (`read`, `write` or `both`) is allowed in each of the following situations. Assume that discretionary access controls allow anyone access unless otherwise specified: (a, b and c only)

   (a) Paul, cleared for `(TOPSECRET,{A,C})` wants to access a document classified `(SECRET,{B,C})`.

   (b) Anna, cleared for `(CONFIDENTIAL,{C})` wants to access a document classified `(CONFIDENTIAL,{B})`.

   (c) Jesse, cleared for `(SECRET,{C})` wants to access a document classified `(CONFIDENTIAL,{C})`.

5. **Exercise 5.8.7. in textbook:** Declassifiaction effectively violates the *-property of the Bell-LaPadula Model. Would raising the classification of an object violate any properties of the model? Why or why not?