THE UNIVERSITY OF AUCKLAND

SECOND SEMESTER, 2005
Campus: City

COMPUTER SCIENCE
Software Security
(Time allowed: TWO hours)

NOTE: Attempt **ALL** questions in the 12-page script book provided, using approximately **25** words to answer each 5-mark question, **50** words to answer each 10-mark question, and approximately **75** words to answer each 15-mark question. Total possible: **100 marks.**

A. There are three security goals in the common "CIA" taxonomy: Confidentiality, Integrity, Availability. Some authors, including Butler Lampson in his article "Computer Security in the Real World", include a fourth goal of Accountability. Lampson identifies three basic mechanisms for implementing security: Authentication (of principals), Authorisation (of access), and Auditing (of the guard's decisions).

   1. Draw a picture to illustrate the operation of the three basic security mechanisms in a computer system, when an end-user named Alice attempts to make a read-access to a file named "payroll.xls". To obtain full credit, your picture must clearly show the interactions between its elements, which must include the security mechanisms, Alice, the guard, and the file. Your picture must also have an appropriate caption of approximately 50 words, in which you very briefly explain each of its elements and their interactions. **[10 marks]**

   2. Consider the article by Crampton and Loizou entitled "Administrative Scope: A Foundation for Role-Based Administrative Models". Write a brief (25-word) synopsis of this paper. For full credit, your synopsis should indicate which *one* of the basic security goals or mechanisms is the primary focus of this article. **[5 marks]**

   3. Briefly describe how Administrative Scope (as described in the Crampton-Loizou article) could be constructively applied to the LOCK system (as described in the O'Brien-Rogers article); alternatively, briefly describe a fundamental conflict in these two approaches to computer security which would make it difficult – or even impossible – to use Administrative Scope in a LOCK system. The first part of your answer should be a very brief synopsis of the O'Brien-Rogers article. **[5 marks]**

B. (Other questions…). **[80 marks]**