

2003 Paper 11 Question 6

Operating System Foundations

- (a) By means of an example, show why concurrency control, comprising both mutual exclusion and condition synchronisation, is needed in operating systems. [4 marks]
- (b) Explain why, in general, forbidding interrupts is not appropriate as a basis for implementing concurrency control. [2 marks]
- (c) How can a “read-and-clear” machine instruction be used as a basis for mutual exclusion and condition synchronisation? [4 marks]
- (d) Define *semaphores* and discuss how they can be implemented. [6 marks]
- (e) How can semaphores be used to achieve mutual exclusion and condition synchronisation? [4 marks]