

1999 Paper 10 Question 8

Operating System Foundations

An operating system contains event management and process management modules. The interface of the former includes WAIT (*event*) and SIGNAL (*event*) operations to achieve hardware–software synchronisation. The interface of the latter includes BLOCK (*process*) and UNBLOCK (*process*).

- (a) Outline the data structures you would expect to find in these modules to support event and process management. [6 marks]
- (b) Describe the interactions between these modules as the system runs. [4 marks]
- (c) Discuss the problems that can arise if concurrent invocation of the event management module is possible. [5 marks]
- (d) Describe how these problems may be avoided if the operating system is guaranteed to run on a uniprocessor. [2 marks]
- (e) Describe how these problems can be solved for a multiprocessor implementation. [3 marks]