

2007 Paper 10 Question 12

Operating System Foundations

Operating systems are integrated closely with the hardware on which they run.

- (a) Distinguish the hardware and software involved in interrupt-driven I/O. [4 marks]
- (b) Describe *three* uses of the interrupt mechanism in addition to device I/O. [3 marks]
- (c) Give examples of how the privilege state bit in a CPU's status register is used. [2 marks]
- (d) (i) What could go wrong in a system that does not make use of a timing device in process scheduling? [1 mark]
- (ii) What class of scheduling algorithms would be impossible to implement without a timing device? [2 marks]
- (e) What is the main advantage of using half the virtual address space of a process for the operating system and half for applications? [1 mark]
- (f) Explain memory-mapped I/O. [2 marks]
- (g) In a paging system, would you expect every page of the operating system address space to be:
- (i) mappable in the Translation Lookaside Buffer (TLB)? [2 marks]
- (ii) capable of being cached? [1 mark]
- Explain your answers.
- (h) How do DMA (Direct Memory Access) devices operate? [2 marks]