The CS2051 Exam

Lecture 18

The Rubric

CS2051 Two hours

UNIVERSITY OF MANCHESTER

Operating Systems

- Thursday, 28th January 1999, 09.45 - 11.45
- Answer any THREE questions
- The use of electronic calculators is not permitted.

Q1

- 1. Explain what is normally understood by the terms "real-time", "hard real-time" and "soft real-time" applied to computer systems. (8 marks)
- Why are most of your lab exercises not regarded as real-time, even though they are subject to hard deadlines? (2 marks)
- Describe a scheduling policy that might be suitable for scheduling predictable real-time processes. (10 marks)

Q2

- Describe how paging is implemented as a memory-management scheme, and identify its principal advantages and disadvantages. (7 marks)
- Describe how segmentation is implemented as a memory management scheme, and identify its principal advantages and disadvantages. (7 marks)
- How may the best features of segmentation and paging be combined into a single system? (6 marks)

Q3

- Describe all of the data structures that are stored on a disk drive by an operating system that implements a Unix-like hierarchical file system. (10 marks)
- How is each data structure accessed or altered by the Operating System when an application:
- a) opens a file for reading (2 marks)
- b) reads from a file (1 mark)
- c) creates a file for writing (3 marks)
- d) writes to a file (2 marks) e) changes the permissions on a file (2 marks)

Q4

- 4. a) Explain the roles that interrupts and program exceptions play in the operation of an Operating System. (3+3 marks)
- b) Describe the steps taken by hardware and/or software to ensure that interrupts and exceptions may be recognised and processed, allowing eventual return to the interrupted software. (7 marks)
- c) Why might an Operating System support multiple interrupt priority levels? Describe the detailed requirements for hardware and/or software to support multiple levels. (7 marks)