

University of Swaziland
Faculty of Science
Department of Computer Science

Final Examination, 2006

Title of Paper: Operating Systems

Course Number: CS442

Time Allowed: Three (3) hours

Instruction: Answer all questions. Every question carries the same maximum mark.

You are reminded that in assessing your work, account will be taken of the accuracy of the material, of the language used and the general quality of expression, together with the layout and presentation of your answer. Remember full answers will usually *define, explain and exemplify*.

Special Requirement:

Calculators are prohibited.

This examination paper should not be opened until permission has been granted by the invigilator.

Question 1. [20]

Describe a typical boot sequence on a PC, indicating where these typical messages might occur, and what they mean:

<a single beep>
C000 ROM ERROR
Diskette Boot Record Error
Error loading OS
Invalid partition table
Missing OS
No boot sector or drive
Non-system disk or disk error
<several beeps, long and short>
XXXX ROM ERROR

Question 2. [20]

- a) Describe the WSClock memory management algorithm.
- b) The Least Recently Used memory management algorithm can be implemented in hardware using a matrix. Describe this method and use as your example the following sequence of page faults: 1, 5, 2, 3, 4

Question 3. [20].

- a) The ISO9660 file system has a file name in bytes 4 to 15 of the directory entry. The format of a file name allowed is:

<base>.<ext>;<version>

Verify that this is possible by giving examples of all possible different filename combinations.

- b) What other restriction is placed by ISO9660 on file names, and why has this been imposed?
- c) What problem does the checksum seek to solve in the long file name format of Windows98 directory entries?
- d) Windows uses file systems it calls FAT<n>. What are the values of n, and what do they signify?

Question 4. [20]

- a) Give the state diagram for the priority scheduling algorithm - in adequate detail without supplying any further (textual) explanation.
- b) A manager is deciding on scheduling algorithms for use in the central general access machine at a university. What should s/he choose, and why?

Question 5. [20]

Describe the lost update problem for three users A, B and C, in accessing a resource of your choice, called Z.

Question 6. [20]

In figure 1, three process states are shown.

a) Insert these four transitions onto the diagram:

- 1 - process blocks for input
- 2 - scheduler picks another process
- 3 - scheduler picks this process
- 4 - input becomes available

b) In theory, with three states, there could be six transitions, two out of each state. However, only four transitions have been mentioned in (a). Are there any circumstances in which either or both of the missing transitions might occur?

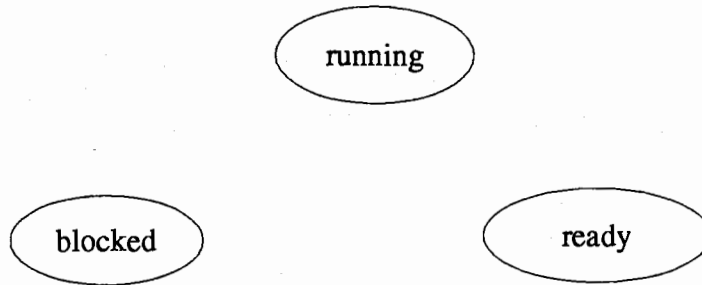


Figure 1: Incomplete process diagram.

End of examination paper.