

INSTITUTE OF TECHNOLOGY BLANCHARDSTOWN

Year	Year 2
Semester	Semester 1 Repeat
Date of Examination	Thursday 18th August 2011
Time of Examination	10.00am - 12.00pm

Prog Code	BN002	Prog Title	Higher Certificate in Science in Computing	Module Code	COMP H2028
Prog Code	BN013	Prog Title	Bachelor of Science in Computing in Information Technology	Module Code	COMP H2028
Prog Code	BN104	Prog Title	Bachelor of Science (Honours) in Computing	Module Code	COMP H2028

Module Title	Operating Systems (Client)
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Internal Examiner(s): *Ms. Marie Brennan*
External Examiner(s): *Dr. Richard Studdert*
Mr. John Dunnion

Instructions to candidates:

- 1) To ensure that you take the correct examination, please check that the module and programme which you are following is listed in the tables above.
- 2) Candidates should attempt ALL parts of question One in Section A
- 3) Candidates should attempt ONE question from Section B and ONE question from Section C.
- 4) This paper is worth 100 marks.
- 5) Question one is worth 40 marks and all other questions are worth 30 marks each.

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SECTION A: COMPULSORY QUESTION

Question 1: Answer all parts of this question (4 marks for each part)

- a) Describe the operation of the *Highest Response Ratio Next (HRRN)* scheduling algorithm.
- b) Distinguish between a *process* and a *program* in an operating system.
- c) In relation to types of process scheduling algorithms, explain the terms pre-emptive and a non-pre-emptive.
- d) Briefly describe the function of the *long-term, medium-term and short-term scheduler* in an operating system.
- e) Explain the terms *Translation Look-aside Buffer* and *Associative Mapping*.
- f) Describe the purpose of, and method of usage of the **top** command in a Linux system.
- g) Distinguish between *user mode* and *kernel mode* in an Operating System
- h) With reference to the Linux Operating System, distinguish between the **/etc/passwd** file and the **/etc/shadow** file.
- i) Explain the following terms with regard to Process Management:
READY, RUNNING, BLOCKED.
- j) In relation to file management systems, briefly explain the terms *stream-block translation* and *record-stream translation*.

Total (40 Marks)

SECTION B: ANSWER QUESTION 2 OR QUESTION 3

Question 2

- a) List **four** items that might be found in a Process Control Block (PCB).
(4 marks)
- b) With reference to Linux, describe the usage of the **ps** command with **two** of its options, and the information obtained about processes in each case.
(5 marks)
- c) Describe the *First-Come First-Served* scheduling algorithm by addressing the following questions:
i. Is it Pre-emptive or Non-pre-emptive
ii. What are the uses of this algorithm?
iii. What are the disadvantages of this algorithm?
(9 marks)
- d) Explain the following terms in relation to process management: context Switch, process states, process creation, process termination.
(12 marks)

Total (30 Marks)

Question 3

- a) What is thrashing?
(4 marks)
- b) In relation to memory management, explain the following terms:
Fragmentation, segmentation, page fault, resident set, working set.
(10 marks)
- c) With regards to *virtual memory* based on paging, explain how the translation of a *virtual address* to a *physical address* is implemented and how it differs from simple paging.
(8 marks)
- d) With the aid of a diagram explain the allocation problems associated with the following historical methods:
i. Fixed partition memory Allocation.
ii. Variable partition memory allocation
(8 marks)

Total (30 marks)

SECTION C: ANSWER QUESTION 4 OR QUESTION 5

Question 4

- a) What information is contained in the following root filesystem: **/media**
(4 marks)
- b) According to the *Filesystem Hierarchy Standard*, what is the purpose of the *root filesystem*? What are the subdirectories, or symbolic links to subdirectories, which are required to exist in the *root directory* according to the terms of the *FHS*?
(4 marks)
- c) Describe of the *File system Hierarchy Standard (FHS)*. In your answer include the following:
i. Its advantages?
ii. What is its purpose?
iii. How is it achieved?
iv. Its target audience.
(12 marks)
- d) With reference to the Linux Operating System, describe the **/proc** file under the following headings:
i. What is its purpose?
ii. What does it contain?
(10 marks)

Total (30 Marks)

Question 5

- a) What information does the following log file contain: **/var/log/wtmp**
(8 marks)
- b) In relation to Linux discuss the UID number under the following headings:
i. Rules
ii. Maintenance
(8 marks)
- c) Describe the steps involved in the procedure of adding a new user to a Linux system. Your answer should include a description of:
i. The steps required by the system
ii. The steps that establish a useful environment for the new user, and
iii. The steps need for the convenience of the administrator
(8 marks)
- d) With reference to the Linux Operating System, describe the **/etc/group** file.
(6 marks)

Total (30 Marks)