Beijing-Dublin International College

SEMESTER I FINAL EXAMINATION - 2016/2017

School of Computer Science

COMP 2006J Operating Systems

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Asst Prof Abraham Campbell

Time Allowed: 120 minutes

Instructions for Candidates

All questions carry equal marks. The distribution of marks in the right margin shown as a percentage gives an approximate indication of the relative importance of each part of the question.

Answer 3 out of 5 Questions

BJUT Student ID: _____ **UCD Student ID:** _____

I have read and clearly understand the Examination Rules of both Beijing University of Technology and University College Dublin. I am aware of the Punishment for Violating the Rules of Beijing University of Technology and/or University College Dublin. I hereby promise to abide by the relevant rules and regulations by not giving or receiving any help during the exam. If caught violating the rules, I accept the punishment thereof.

Honesty Pledge： _____ **(Signature)**

Instructions for Invigilators

No rough-work paper is to be provided for candidates.

Question 1:

1. Why is multiprogramming so dependent on process scheduling and what advantages does it provide?

(9 points)

2. Describe what tasks the Long-term, Medium-term and Short-term scheduler performs in process scheduling

(7 points)

3. Why would you use *pre-emptive scheduling* ?

(7 points)

4. Briefly describe five Scheduling Algorithms

(10 points)

Question 2:

1. Why is protection such an important issue in operating systems?

(10 points)

2. Using diagrams with actors called Alice, Bob and Carol, describe four potential security attacks that Carol can perform on Alice and Bob's communication. For each diagram please write a short paragraph explaining the potential attack.

(8 points)

3. Discuss the need for secret information when you authenticating a user identity in an operating system.

(15 points)

Question 3:

1. What is Virtual Memory? Describe the features and explain the potential disadvantage of Virtual Memory if there are too many page faults.

(10 points)

2. How can you judge the effective memory access time of a system?

(7 points)

3. What is the sequence of events that occurs in a virtual memory system when a required address is not in main memory?

(7 points)

4. Briefly describe three Page Replacement Algorithms.

(9 points)

Question 4:

1. Explain the following terms
    a. Deadlock
    b. Starvation
    c. Mutual Exclusion

(12 points)

2. Explain the necessary four conditions for deadlock

(9 points)

3. Explain the Bankers Algorithm and give example of both a safe state and an unsafe state. The example should include two or more different resources and two or more different processes.

(12 points)

Question 5:

1. Why do we need File Management? Please explain with reference to the issues of volatility , information sharing and limited memory storage size

(9 points)

2. Describe the difference between a physical record and a logical record.

(7 points)

3. What information is stored in a Superblock?

(7 points)

4. Why is it important to backup data and how can this be achieved?

(10 points)