

Semester One of Academic Year (2015---2016) of BJUT

《 Operating Systems》

Module Code: COMP2006J

Exam Paper

Exam Instructions: Answer 3 out of 5 questions

Honesty Pledge:

I have read and clearly understand the Examination Rules of Beijing University of Technology and University College Dublin and am aware of the Punishment for Violating the Rules of Beijing University of Technology and 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 would accept the punishment thereof.

Pledger: _____

Class No: _____

BJUT Student ID: _____

UCD Student ID _____

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Notes:

The exam paper has 1 part on 3 pages, with a full score of 99 points. You are Required to use the given Examination Book only.

Instructions for Candidates

Full marks will be awarded for complete answer to **All** questions.

Instructions for Invigilators

Candidates are allowed to use non-programmable calculators during this examination.

Obtained score

Part 1:**Question 1**

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 2

1. Explain what each of the following operating system components of a Kernel are
 - a. Memory Manager
 - b. I/O Manager
 - c. Inter-process communication Manager
 - d. Process Manager
 (12 points)
2. Discuss the following Operating System Goals
 - a. Interactivity
 - b. Robustness
 - c. Extensibility
 (9 points)
3. Describe with the use of diagrams and a short paragraph , the following Operating System Architectures
 - a. Monolithic
 - b. Layered
 - c. Microkernel
 (12 points)

Question 3

1. Describe Contiguous & Noncontiguous memory allocation with reference to fragmentation
(9 points)
2. Explain Address Binding and explain the different implementations on both modern Operating systems and how older Operating systems achieve this goal at compile and run time.
(12 points)
3. Briefly describe the following memory management techniques: fixed partitioning, variable partitioning, paging, and segmentation?
(12 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
(8 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

4. How can computers be interconnected to create a Distributed Operating system?
(9 points)
5. Give four issues that need to be address when creating a Distributed Operating system.
(12 points)
6. Give Advantages and disadvantages of a Distributed Operating system
(12 points)