

## Semester One of Academic Year (2014---2015) of BJUT

### 《 Operating Systems      》      Exam Paper Repeat

**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**\_\_\_\_\_

.....  
Notes:

The exam paper has 2 parts on 3 pages, with a full score of 99 points. You are required to use the given Examination Book only.

|                   |
|-------------------|
| Obtained<br>score |
|                   |

**Part 1:****Question 1**

1. Why is security such an important issue in operating systems? In discussing this issue highlight the difference between security and protection.  
(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. Describe the importance of *user authentication* and describe how you would identify a user in an operating system  
(15 points)

**Question 2**

1. Describe memory management and justify its importance in speeding up multiprogramming systems in terms of CPU utilization  
(9 points)
2. Define the issues involved in *memory organization* and describe the different solutions to allocation of memory  
(8 points)
3. Describe, using separate diagrams, the techniques of *paging* and *segmentation* include a short paragraph to explain each diagram  
(16 points)

**Question 3**

1. Define the possible states in which a *process* may be in  
(8 points)
2. Explain the concept of a *Child* and *Parent* Process  
(7 points)
3. Describe two conditions in which a Process would terminate  
(9 points)
4. Describe why a process would potentially communicate through interprocess communication.  
(9 points)

|                   |
|-------------------|
| Obtained<br>score |
|                   |

**Part 2:****Question 4**

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 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)**