

**OLLSCOIL NA hEIREANN**  
**THE NATIONAL UNIVERSITY OF IRELAND, GALWAY**

**SEMESTER 1 EXAMINATIONS 1999**

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**HIGHER DIPLOMA IN SYSTEMS ANALYSIS**  
**(BUSINESS SYSTEMS DEVELOPMENT)**

***OPERATING SYSTEMS & SYSTEMS MANAGEMENT***

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Time allowed: TWO hours  
Answer 4 questions. All questions carry equal marks

- Q1. (a) (i) Define what is meant by the term "Operating System". (3)  
(ii) What are the main goals of an Operating System? (3)
- (b) Outline the main components of an Operating System and show the relationship between them using a block diagram. (8)
- (c) Describe briefly the services and functions that an Operating System provides to the computer user. (9)
- Q2. (a) In terms of Operating Systems, describe what is meant by a process, specifying how it differs from a program. (5)
- (b) Describe with the aid of a block diagram, the process life cycle, showing the various queues and states a process may enter. (12)
- (c) Briefly describe interprocess communication. (8)

- Q3. (a) Describe process synchronisation using semaphores. (12)
- (b) (i) What is meant by deadlock in process management? (4)  
(ii) What are the 4 necessary conditions for deadlock to occur? (4)  
(iii) Outline the 3 methods for handling deadlocks in an Operating System. (5)

- Q4. Write notes on 2 of the following (25)

- (a) Process Scheduling
- (b) Disk Space Allocation Methods
- (c) Simple Paging Memory Management
- (d) Page Replacement Algorithms

- Q5. (a) Distinguish between blocking and nonblocking I/O. (4)
- (b) Describe, with the aid of a block diagram, interrupt driven I/O. (9)
- (c) Given an I/O request queue for the following disk cylinders: (12)

94, 25, 112, 74

and an initial disk head position on cylinder 42, determine the total number of head movements, in cylinders, for the FCFS, SSTF and SCAN disk scheduling algorithms.

**Note:** For the SCAN algorithm, assume the head is moving towards the last cylinder on the disk (cylinder no. 120)

- Q6. (a) Why is security an important factor in computer operating systems? (6)
- (b) What steps can an administrator take to combat threats to an Operating System? (9)
- (c) Describe, using a diagram, how an Access Matrix provides protection in an Operating System. (10)