DUBLIN INSTITUTE OF TECHNOLOGY

DT211C BSc. (Honours) Degree in Computer Science (Infrastructure)

Year 1

SUMMER EXAMINATIONS 2015/2016

INTRODUCTION TO OPERATING SYSTEMS [CMPU1015]

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FRIDAY 20TH MAY 4.00 P.M. – 6.00 P.M.

TWO HOURS

ANSWER *QUESTION ONE* & TWO OTHER QUESTIONS.

QUESTION ONE IS *COMPULSORY* & CARRIES 50 MARKS.

ALL OTHER QUESTIONS CARRY 25 MARKS.

Question 1

a) Define what is meant by the terms:
   i. Operating System
   ii. Process
   iii. Program
   iv. Trap
   v. Paging

(15 Marks)

b) Describes the following Computing environments
   i. Client-Server
   ii. Peer-to-Peer
   iii. Virtualization
   iv. What are some advantages of peer-to-peer systems over client-server systems?
   □

(15 Marks)

c) Describe the bootstrap sequence of running a Computer?

(10 Marks)

d) What is the purpose of interrupts? How does an interrupt differ from trap? Can traps be generated intentionally by a user program? If so, for what purpose ?

(10 Marks)

Question 2

An Operating System has the following partitions:
Partition 2 is busy. Partition 1: 100K, Partition 2: 200K, Partition 3:300K and Partition 4: 400K.

a) Name the method (scheme) of organisation given to this predetermined memory allocation above.

(3 marks)

b) If a 100K process is to be loaded into memory
   i. Which partition will be loaded under the first-fit memory allocation?

(3 marks)

   ii. Which partition will be loaded under the best-fit memory allocation?

(3 marks)

   iii. Which partition will be loaded under the worst-fit memory allocation?

(3 marks)

c) Explain the two biggest disadvantages of this memory scheme. *(8 marks)*

d) Explain what is 'compaction'. *(5 marks)*

Question 3

a) What are the five major activities of an operating system with regard to file management?

(5 marks)

b) What are the two models of **interprocess** communication? What are the strengths and weaknesses of the two approaches?

(10 marks)

c) The services and functions provided by an operating system can be divided into two main categories. Briefly describe the two categories and discuss how they differ ?

(10 marks)

Question 4

a) Suppose that the following processes in Figure 1, arrive for execution at the times indicated. Each process will run for the amount of time listed. In answering the following questions, use **nonpreemptive** scheduling, and base all decisions on the information you have at the time the decision must be made. □

Process	Arrival Time	Burst Time
P_1	0.0	8
P_2	0.4	4
P_3	1.0	1

Figure 1 Processes Arrival and Burst Time

I. What is the average turnaround time for these processes with the FCFS scheduling algorithm?
II. What is the average turnaround time for these processes with the SJF scheduling algorithm?

(15 marks)

b) Explain the difference between preemptive and **nonpreemptive** scheduling.

(10 marks)