National College of Ireland

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B.Sc. in Computing – Year 1 (BSHC1, BSHCE1)
B.Sc. in Business Information Systems – Year 1 (BSHBIS1, BSHBISE1)
Higher Certificate in Computing (Applications and Support) - Year 1 (HCC1, HCCE1)

Semester Two Examinations – 2010/11

Monday 16th of May 2011
6:30 pm – 8:00 pm

Operating Systems

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Answer **QUESTION 1** and **ONE** other question

Duration of exam: 90 minutes
Attachments: Standard calculators **only** may be used in this exam

Question 1: **Answer all 10 parts. [60 marks - 6 marks for each part]**

1. Briefly present three main responsibilities of an Operating System. [6 marks]

2. Briefly describe three main characteristics (features) of an Windows NT type Operating System. [6 marks]

3. In the context of user interfaces, which class of user is each of the following: [6 marks]
   a) A software engineer preparing her monthly expense claim in Excel.
   b) A parent configuring Internet Explorer on a home PC.
   c) An accountant editing a .BAT file to schedule regular backups of his hard drive.

4. Define the term deadlock in the context of resource allocation. [6 marks]

5. Draw the resource allocation graph for the following scenario. [6 marks]
   Process P1 holds resource R2 and will request resource R1.
   Process P2 holds resource R3 and will request resource R2.
   Process P3 holds resource R1 and will request resource R3.

6. Define the term scheduler in the context of scheduling algorithms. [6 marks]

7. You are using the Ubuntu command line interface. You are currently located under your home folder. The file named osclass1.txt exists in your home folder. Write the command you would use in order to create a new file named osclass1backup.txt that represents an identical copy of the osclass1.txt file. [6 marks]

8. Provide an example of interruption type security treat that can affect the security of a computer system. [6 marks]

9. How would the chmod command be used in Unix to set write permission for all users, on a file named oslab.txt? [6 marks]

10. In the context of memory management, describe the principle of Best Fit placement algorithm used when memory space is allocated to a process. [6 marks]

Answer <u>One</u> of the following Two questions. Each question carries 40 marks.
Question 2: Security [40 marks]

1. Describe one way of attacking a hardware asset and one solution for protecting the hardware assess from a threat. [5 marks]

2. In the context of security, present the behavior of the Worm malicious software. [5 marks]

3. A user executes the command ls –l and gets the following result.
   - r w - r - - - - - 1 denise nci 34 June 14 12:30 modules
   Describe the permission rights associated with the modules file. [10 marks]

4. Present the password encryption routine used by Unix Operating System. Illustrate graphically the encryption mechanism. [20 marks]

Question 3: Operating System Architecture **[40 marks]**

1. Present the main role of the Kernel subsystem, part of the Unix architecture. [5 marks]

2. Present the role of the User Mode Layer, part of the Windows operating system architecture. [5 marks]

3. Present the Environment Subsystems part of the Windows architecture. [10 marks]

4. Unix Kernel is composed of five main subsystems. Present each subsystem in term of the data structure used. [20 marks]