

OLLSCOIL NA hÉIREANN
THE NATIONAL UNIVERSITY OF IRELAND

COLÁISTE NA hOLLSCOILE, CORCAIGH
UNIVERSITY COLLEGE, CORK

Summer Examinations 2011

BSc (Single Honours) II
Computer Science
CS2506 Operating Systems II

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Answer all questions

Time 1 1/2 Hours

1. Process scheduling is an important service of the operating system kernel.
 - a. Consider the following set of processes with their execution time: a(40), b(55), c(20), d(60), e(35). Use this set of processes to explain the scheduling strategy of “shortest process first”. What is the turnaround time of this set of processes for the order given initially and then after using shortest process first ? [10 marks]
 - b. Present how two-level scheduling is working, explaining the benefits of using this strategy in terms of system resources economy. [5 marks]
 - c. In a multi-core system, one goal of the scheduler is to balance the cores’ load such that there is no idle core while other cores are overloaded. What is domain scheduling and how does it work ? [5 marks]
2. While managed by the operating system, a process switches between different states during its lifecycle.
 - a. TinyOS is an operating system for sensors. Define its program model and features. [5 marks]

- b. Draw and discuss the Android application lifecycle. Start by considering the three intervals: the entire lifetime, the visible lifetime and the foreground lifetime and then discuss the sequence of states. [10 marks]
- c. What is load balancing and when is it applied ? [5marks]
3. Memory allocation to processes is an important function of the operating system.
- a. Explain the Buddy system of memory allocation. [10 marks]
- b. What is page swapping ? [5 marks]
- c. In the context of swapping, present two page replacement policies, pointing out their features. [10 marks]
4. The files system is part of the data management in any computing system.
- a. Explain the notion of file system metadata and how this is useful to the file system management. [5 marks]
- b. How is the free bitmap used to manage the free space ? [5 marks]
- c. Present the way a directory is implemented. [5 marks]