

UNIVERSITY OF MALTA
BOARD OF STUDIES FOR INFORMATION TECHNOLOGY/
FACULTY OF SCIENCE

Department of Computer Science & A.I.

B.Sc. I.T.(Hons.)/B.Sc.(Hons.) Year II

May/June 2007 Assessment Session

CSA2090: Systems Programming

1st June, 2007

09:15-11:45

Read ALL questions before starting. Choose two questions out of the three provided. Each question carries 50 marks of the total grade for this exam script.

1. (a) Explain the function of the `/etc/shadow` file and why it is readable only by root.

[10 marks]
- (b) Referring to (a) above, explain how certain commands that are executable by any user can still access the `/etc/shadow` file.

[15 marks]
- (c) Give an example of an application that would make use of the `select` system call.

[25 marks]
2. (a) Each device has its own particular access functions. How does the operating system guarantee that the right device driver is accessed when a program reads and writes to a particular device?

[10 marks]
- (b) Explain why every network communication happens in big endian format.

[10 marks]

- (c) In your own words explain a scenario where an iterative server should be used and another scenario where a concurrent server should be used.
[30 marks]
3. (a) Why should every system programmer make as few system calls as possible in the tools he builds?
[15 marks]
- (b) The *accept* system call returns a new socket for each new connection, yet the underlying ports remain the same. Explain how the operating system always knows to which process to forward incoming packets.
[10 marks]
- (c) Explain why signals might need to be masked and give a typical scenario where *sigsuspend* would be used.
[25 marks]
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