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University Examinations 2013/2014

FIRST YEAR, SECOND SEMESTER EXAMINATION FOR THE DEGREE IN BACHELOR OF
COMPUTER SCIENCE

ICS 2103 – INTRODUCTION TO SYSTEMS PROGRAMMING

DATE: APRIL 2014

TIME: 2 HOURS

INSTRUCTIONS: Answer question *one* and any other *two* questions

QUESTION ONE – 30 MARKS

- (a) Define the following terms and explain how they are used in system operation. (8 marks)
- (i) Thread
 - (ii) Semaphores
 - (iii) File
 - (iv) Stub
- (b) Briefly explain how user program interact with operating system giving example in each case. (4 marks)
- (c) System API is broadly categorized into two classes. List the two classes and compare them in terms of file management functions. (6 marks)
- (d) Briefly explain how two user programs on different platform communicate with each other using Remote procedure call(RPC) (6 marks)
- (e) Explain how producer-consumer relationship is supported using shared memory mechanism. (6 marks)

QUESTION TWO –20 MARKS

- (a) Briefly describe any two data structure used by operating system. (3 marks)

(b) Using a simple diagram illustrate various thread states in multithreaded computing environment. (8 marks)

(c) Write a server program that creates multi files, each contains system information of the client. (9 marks)

QUESTION THREE – 20MARKS

(a) Explain the following terms and give examples in each case. (6 marks)

- i. Device driver
- ii. Message queue
- iii. Buffered IO

(b) Write function prototype for creating a process. Explain each parameter used. (6 marks)

(c) Using appropriate socket API illustrate how server program can respond to multiple clients simultaneously. (8 marks)

QUESTION FOUR – 20MARKS

(a) Explain giving reasons why it's important for a programming language to support multiple threads. (7 marks)

(b) Explain how semaphores are used to synchronize access to shared memory. Illustrate with an example. (7 marks)

(c) Briefly explain how user program larger than available main memory can be executed without degrading overall system performance. (6 marks)

QUESTION FIVE – 20 MARKS

(a) Briefly explain the following terms as used in operating system: (6 marks)

- (i) Threat
- (ii) Attack
- (iii) Distributed file system

(b) Using simple diagram illustrate various services provided by operating system. (8 marks)

(c) What is a system call? Discuss any three categories of system call. (6 marks)