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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: DECEMBER 2013

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. (8Marks)
- (i) Process
 - (ii) Semaphores
 - (iii) File
 - (iv) Stub
- (b) Briefly explain how user program request for services from operating system give an example of any services and an example. (4Marks)
- (c) System API is broadly categorized into two classes. List the two classes and compare them in terms of file management functions. (6Marks)
- (d) Briefly explain how client program running on dot net framework communicate with server program running on JVM using Remote Procedure Call (RPC). (6Marks)
- (e) Explain how producer-consumer relationship is supported using shared memory mechanism. (6Marks)

QUESTION TWO –20 MARKS

- (a) What is virtual machine from program point of view? (3Marks)
- (b) Explain similarities and differences between Java virtual machine (JVM) and Microsoft.net framework. (8Marks)
- (c) Write a server program that creates multi files, each contains system information of the client. (9Marks)

QUESTION THREE – 20MARKS

- (a) Explain giving reasons why it is important for a programming language to support multiple threads. (7Marks)
- (b) Explain how semaphores are used to synchronize access to shared memory. Illustrate with an example. (7Marks)
- (c) Briefly explain how user program larger than available main memory can be executed without degrading overall system performance. (6Marks)

QUESTION FOUR – 20MARKS

- (a) Explain the following terms and give examples in each case.
 - (i) Device driver API
 - (ii) Segmentation
 - (iii) Buffered IO (6Marks)
- (b) Illustrate how circular buffers address processor high speed and input/output low speed difference. (6Marks)
- (c) Using appropriate socket API illustrate how server program can respond to multiple client simultaneously. (8Marks)

QUESTION FIVE – 20 MARKS

- (a) Explain the following terms: (8Marks)
 - (i) Device driver
 - (ii) Signal
 - (iii) Port
- (b) Briefly explain how dynamic partitioning minimizes internal and external fragmentation. (8Marks)
- (c) Write a program that create file named account .doc and populate it with your fees balance. (6Marks)