Ph.D. Comprehensive Examination

Computer Science Department
University of Miami

August 19, 2016

Student Name: Student Number:

Problem number	Points (10 max)
1	
2	
Total:	

1. **I.E Systems**

   (a) _____ linked libraries can support shared library code, allowing one copy of a library routine to be used by several different processes.

   absolute relative static dynamic none of these is correct

   (b) When it is not known at compile time where a process will reside in memory, _____ code must be generated.

   logical physical absolute relocatable

   (c) A UNIX process calls *fork()* to create a child process as shown: *pid = fork()*;

   i. What value will be assigned to pid in the parent process by the call to *fork()*?

   the parents process id the childs process id zero none of these

   ii. What value will be assigned to pid in the child process by the call to *fork()*?

   the parents process id the childs process id zero none of these

   (d) The Banker's algorithm is used for deadlock _____.

   denial prevention avoidance recovery

   (e) Belady's anomaly can affect the performance of the _____ page replacement algorithm.

   FIFO LRU optimal SJF

   (f) _____ access files are made of fixed length records that allow programs to read and write records in no particular order.

   sequential direct logical none of these is correct

   (g) When an I/O request is being handled for a users process, which term refers to the policy of returning control to the user process before the I/O is completed?

   synchronous I/O asynchronous I/O delayed I/O none of these

   (h) Which multithreading model requires that a new kernel thread be created for each new user thread?

   many-to-one one-to-one many-to-many none of these is correct

   (i) A process that does not affect, and is not affected by, another process is referred to as:

   static independent cooperating dynamic unbounded

2. **III.A Algorithms and complexity**

   Describe an algorithm that takes two input lists of integers $A = a_1, ..., a_n$ and $B = b_1, ..., b_m$ and delivers the list of all the elements that belong to A but not to B. A and B do not contain redundant elements, however, the elements of A and B might have a large range.

   The algorithm should run in $O(n \log m + m \log m)$ time.