March 10, 2013

Spring 2013 Midterm Exam

Provide a document for each of the essays below in either DOC or PDF format that is single- spaced, 12-pt font including appropriately-sized diagrams and code samples. Provide such diagrams and code samples to completely clarify your essays. Any material used from printed or web content **must** be referenced properly using either inline references and/or footnotes. Plagiarism will not be tolerated and when identified will result in a grade of **zero** for the entire exam (see course syllabus for 'Code of Conduct and Ethics).

Essay One (40 points – 4 pages minimum)

Define *APIE* by describing each of the acronym's letters in detail as well as their relationships to one another. Provide details of how these casting techniques are used with the terms superclasses, subclasses, abstract classes and interfaces. Why are these techniques used? What does the keyword *final* have to do with inheritance? Describe static and dynamic polymorphism for object-oriented programming languages. Why is each important? Describe upcasting and downcasting. What is the difference between 'overloading' and overriding' OO methods? How does upcasting and downcasting relate to polymorphism? How does an object-oriented programming language differ from a procedural/imperative programming language. What can be the advantage of using an OOP language over a procedural language for application design?

Essay Two (30 points – 3 pages minimum)

Describe the two fundamental types of stream IO. What is a cascaded stream? What are buffered streams? Why are these types of streams useful? How are primitive data types streamed? What complications can arise when using such streams? What is object serialization/deserialization? How is it accomplished with streams and what is necessary when coding for it? What advantages does it provide? How does the term *persistence* relate to serialization capabilities? How does the keyword *transient* relate to serialization capabilities?

Essay Three (20 points – 2 pages minimum)

Discuss the differences between a process and a thread. Describe two ways to create a thread object. Which technique is better and why? Discuss a thread's lifecycle. Define the Producer/Consumer parallel pattern. What two ways are there to synchronize a multi-threaded application? What impact do shared resources have on multi-threaded programs.

Essay Four (10 points - 1 page minimum)

Discuss the importance of exceptions and exception handling in your applications. What is the class hierarchy of an Exception? an Error? What is the difference between these data types?

Submit a compressed file called ***YourName_midterm.zip*** (zip only) of all project code and documentation by 03/24/13, 23:59/CDT. Late midterms will lose many points. (**100 points**)