COP 6636 Concurrency Modeling

Credits: 3 credits

Text book, title, author, and year: Concurrency, State Models and Java Programs, by Jeff Magee and Jeff Kramer, 2nd Edition, Wiley, 2006. ISBN: 0-470-09356-0; Also download the LTSA software and run the Applets of several book examples at: http://www.doc.ic.ac.uk/~jnm/book/, Java – Learning to Program with Robots, by B. W. Becker, U of Waterloo, Canada, Thomson Course Technology, 2007. The book is available in PDF format, along with the robotics library (as a .jar file) at: http://www.learningwithrobots.com/ . The author has made all of it available free. You will be developing parallel and concurrent versions of the book examples, given certain constraints.

Reference materials: Hello, Android, by Ed Burnette, The Pragmatic Bookshelf, Raleigh, NC.

Specific course information

Catalog description: This course makes it practical and accessible to learn about concurrency and concurrent programming, and to combine theory and practice in one common environment. The course will allow students to verify and resolve concurrency issues at a high level of abstraction in a productive and efficient way.

Prerequisites: Prerequisites: COP 3530, Data Structures and Algorithms Analysis, or consent of instructor. By Topic **:**   Programming and introduction to Object Oriented design. Knowledge of Java or C++ is not a prerequisite (but most students now-a-days come with Java background).

Specific goals for the course: This course is designed to help students understand concurrency concepts and develop software that can effectively take advantage of concurrency concepts without incurring concurrency pertinent failures. The tools used help model the software at a high levels of abstraction and reason about safety and progress violations, and improve the model, and hence the code.

Brief list of topics to be covered:

1. (Lectures, Labs, and Hands-On Java Applet-based Demos)
2. Object Oriented Design;
3. Concurrency programming with Java (introduction);
4. Processes and Threads; FSP (Finite State Processes) for concurrency notation
5. Concurrent Execution;
6. Shared Objects and Mutual Exclusion;
7. Monitors and Condition Synchronization;
8. Deadlock;
9. Safety and Liveness Properties;