Instructor: Masaaki Mizuno

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Course Notes:

- Download from KSOL

Course Objectives:

1. To understand run-time behaviors of multi-threaded programs
2. To gain skills to develop professional level multi-threaded programs, including techniques to handle exceptions and termination
3. To learn the most advanced features and future directions of concurrent primitives, using .NET as an example
4. To learn a formal methodology to develop concurrent programs, using Greg Andrew's global invariant approach

Course contents:

1. Part1: .NET 4 Concurrent Programming in C# (new features in .NET 4.5 will be added)
   1. Concurrent Programming Basics
      - Process and thread
      - Basics of mutual exclusion and condition synchronization
   2. Review of C# and .NET Framework
      - Delegate, anonymous method, and lambda expressions
      - Captured variables
   3. Thread class and ThreadStart delegate
   4. Asynchronous delegate
   5. BackgroundWorker components
   6. Task parallel library (TPL) and Task class
   7. Application: Picture Viewer Program
   8. Monitor in C#
   9. Concurrent Collections
2. Part 2: Formal Method to Develop Concurrent Programs
   1. Greg Andrew's Global Invariant Approach
      * Coarse-grained solutions
      * Fine-grained solutions and code weaving
   2. Pattern-based Global Invariant Approach

**Grading:**

- There will be two or three large programming assignments, two or three exams, several small assignments, and possibly some quizzes
  1. Exam: 50-60%
  2. Large Programming Assignments: 30-40%
  3. Small Assignments: 5-10%
  4. Quizzes: 0-5%
- To pass the course, you must take all exams and complete all large programming assignments.
- I reserve the right to determine the final weight distribution.

**Read "NoteOnGradebook.html" in this site**

**Statement Regarding Academic Honesty**

Kansas State University has an Honor System based on personal integrity, which is presumed to be sufficient assurance that, in academic matters, one's work is performed honestly and without unauthorized assistance. Undergraduate and graduate students, by registration, acknowledge the jurisdiction of the Honor System. The policies and procedures of the Honor System apply to all full and part-time students enrolled in undergraduate and graduate courses on-campus, off-campus, and via distance learning. The honor system website can be reached via the following URL: www.ksu.edu/honor. A component vital to the Honor System is the inclusion of the Honor Pledge which applies to all assignments, examinations, or other course work undertaken by students. The Honor Pledge is implied, whether or not it is stated: "On my honor, as a student, I have neither given nor received unauthorized aid on this academic work." A grade of XF can result from a breach of academic honesty. The F indicates failure in the course; the X indicates the reason is an Honor Pledge violation.

**Statement for Academic Accommodations for Students with Disability**

Any student with a disability who needs a classroom accommodation, access to technology or other assistance in this course should contact Disability Support Services and/or the instructor. DSS serves students with a wide range of disabilities including, but not limited to, physical disabilities, sensory impairments, learning disabilities, attention deficit disorder, depression, and anxiety.

**Statement Defining Expectations for Classroom Conduct**

All student activities in the University, including this course, are governed by the Student Judicial Conduct Code as outlined in the Student Governing Association By Laws, Article VI, Section 3, number 2. Students who engage in behavior that disrupts the learning environment may be asked to leave the class.
For more information, visit the web page on K-State Course Syllabi Statements at: http://www.k-state.edu/provost/policies/course.htm

Also read "AcademicHonesty.html" in this site.

K-State Online:

All course materials will be distributed via K-State Online. Grade information may be accessed there, and announcements will be posted there from time to time. Important class messages will be emailed to your KSU email accounts and posted as announcements. You must be enrolled in the course to access K-State Online.