# CS 6301: Special Topics in Computer Science—Concurrent Data Structures for Multi-Core Systems
# Section 003
# Programming Assignment 1

Instructor: Neeraj Mittal

Assigned on: Wednesday August 27, 2014
Due date: Monday September 15, 2014 (at midnight)

This is an individual assignment. Code sharing among students is strictly prohibited and will result in disciplinary action being taken.

## 1 Project Description

Implement a concurrent linked list that supports search, insert and delete operations using the following two approaches discussed in the class:

1. *Coarse-grained locking.*
2. *Fine-grained locking* using hand-over-hand locking technique.

Compare the performance of your two implementations experimentally with respect to *system throughput* using the following system parameters:

1. *Maximum size of the linked list:* this depends on the size of the key space. Use key space sizes of 100, 1,000 and 10,000.
2. *Relative distribution of various operations:* use the following three different types of workloads: (a) read-dominated: 90% search, 9% insert and 1% delete. (b) mixed: 70% search, 20% insert and 10% delete. (c) write-dominated: 0% search, 50% insert and 50% delete.
3. *Degree of concurrency:* this depends on the number of threads in the system. Vary the number of threads from one to twice the number of cores in the machine in suitable increments.

Average the results over several runs. Prepare a report that clearly describes the results of your experiments.

## 2 Submission Information

You will have to submit your project using eLearning. Submit all the source files necessary to compile the program and run it. Also, submit a README file that contains instructions to compile and run your program. Finally, submit the report describing your experimental results.