Models of Computation **CS 575**
Spring 2009 **Midterm Topics**

1. Regular languages:
   (a) DFAs: definitions, examples
   (b) NFAs: definitions, examples, equivalence to DFAs
   (c) Closure properties: union, concatenation, Kleene star, complement, intersection
   (d) Regular expressions: definition (recursive), examples, equivalence to DFAs
   (e) Non-regular languages: counting, pumping lemma, Myhill-Nerode theorem
2. Context free languages:
   (a) Context free grammars: definitions, examples, parse trees, ambiguity
   (b) Pushdown Automata: definitions, examples, equivalence to CFGs
   (c) Closure properties: union, concatenation, star
   Nonclosure: complement, intersection
   (d) Non-context free languages: counting, pumping lemma
3. Turing machines
   (a) Basic definitions, designing simple Turing machines
   (b) Decidability vs. recognizability
   (c) Variants: k-tape Turing Machines; Nondeterministic Turing machines; enumerators
   (d) Church-Turing thesis