

CS417 : Introduction to Theory of Computation
Summer 2004 , MW 9:30am-12:20pm , EMS 295

Instructor: Wutnipong Sompamitr, sompami2@uwm.edu

Office hours: Mon Wed 12:30pm-13:30pm (EMS 275) or by appointment

Prerequisite: JR st; Math221(P) or 232(P); Grade of C or better in CS217. Level: U/G.

Class home page: <http://www.cs.uwm.edu/classes/cs417-011/>

Textbook: M.Sipser, *Introduction to the Theory of Computation*, PWS Publishing Company.

Errata: <http://www-math.mit.edu/~sipser/itoc-errs1.2.html>

Outline: Introduction to formal languages, grammars and automata, finite state automata, pushdown automata, turing machines, regular languages, context-free recursive and recursively enumerable languages, and Decidability. Many topics to be covered will be relevant to other CS courses (e.g. programming languages, compilers). Topics to be covered in this course are:

0.1 Automata, Computability, and Complexity
0.2 Mathematical Notions and Terminology
0.3 Definitions, Theorems, and Proofs
0.4 Types of Proof
1.1 Finite Automata
1.2 Nondeterminism
1.3 Regular Languages and Regular Expressions
1.4 Pumping Lemma and Nonregular Languages
2.1 Context-free Grammars
2.2 Pushdown Automata

2.3 Non-context-free Languages
3.1 Turing Machines
3.2 Variants of Turing Machines
3.3 The Definition of Algorithm
4.1 Decidable Languages
4.2 The Halting Problem
5.1 Reducibility
5.2 Simple Undecidable Problems
5.3 Mapping Reducibility

Grading: This is six-week summer session (June 2, 2004 to July 9, 2004). There are two exams in this class: Exam I (June 21, 2004) 50%, Exam II (July 7, 2004) 50%. All exams will be held during the class time, and they are closed books and notes. A: 90-100 , A-: 87-89 , B+: 84-86 , B: 80-83 , B-: 77-79 , C+: 74-76 , C: 70-73 , C-: 67-69 , D+: 64-66 , D: 60-63 , F: 0-59

Remarks:

- The list of suggested problems can be found at the class home page. I strongly recommend you to practice by trying to solve those problems on your own. Some of them will be discussed in the class. However, please feel free to stop by during my office hours or send me an email when you have troubles with those problems.
- If you have to miss an exam because of an emergency, please contact me at the **earliest** possible opportunity. If I am not reachable, please contact the department secretary at 229-4677 and leave a message. No arrangement will be made for missed exams, unless these rules are followed and an acceptable evidence of legitimate emergency is submitted.