CS 161, Introduction to Automata Theory
Syllabus, Spring 2016

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Office hours: to be announced

Prerequisite: CSC-024, or permission of the professor

1 Overview

This course builds on Discrete Mathematics, and it can be considered the first course in theoretical computer science. In this course we study formal languages. Examples of formal languages are the set of all valid passwords for the Hofstra portal, the set of all grammatically correct English sentences, and the set of all valid Python programs. Here are some of the questions we will look at in this class:

- How can we develop a mathematical definition of a language that allows us to prove useful theorems about it?
- Once we have defined a language precisely, what kinds of problems would we like to be able to solve about that language on a computer? Is it always possible to do so?
- How can we compare the complexity of two languages?

Automata theory gives us one way to approach these questions. We focus on a system developed by Noam Chomsky that relates the complexity of a language to the complexity of the kind of machine (or “automaton”) that is needed to decide if a particular “word” is in the given language.
2 Grading Policy

Calculation of Grade:

- Exams: 65%;
- Quizzes: 35%.

There will be two midterm exams and one cumulative final. The exam grade will be calculated as follows: each midterm grade will be written down once, and the final exam grade will be written down twice. The lowest of these four grades will be dropped and the remaining three will be averaged. The lowest quiz grade will be dropped and the remaining grades will be averaged. You are allowed to bring index cards containing definitions only to all quizzes and exams.

Definitions and Homework: In order to succeed in this class you need to be able to understand and use precise mathematical definitions of the terms introduced. Each of you is required to keep a stack of index cards with the relevant definitions from the class and from the text. Each definition should be a complete sentence that incorporates the word being defined, and that avoids constructions like “is when”. You are encouraged to copy these definitions verbatim from class notes. You must not include any examples or theorems on your index cards. You are allowed to bring these index cards to every quiz and exam. You are not allowed to share index cards, and each student should prepare his or her own stack of index cards.

Homework will not be collected or graded, but most of the learning that happens in this class happens when you’re doing homework. You should spend at least 6 hours per week working on homework if you want to really conquer the material and perform well in the class. I encourage you to form study groups to help you allocate adequate time for homework and to make doing the homework fun. Homework questions will routinely appear on quizzes, either verbatim or modified slightly. Students are encouraged to ask questions about the homework in class and in office hours.
3 Policies

Makeup Policy: I never give makeup midterm exams or quizzes. If you miss an exam or quiz for any reason that will be the grade that is dropped. If you are in good standing at the end of the semester and you must miss the final due to a (documented) emergency, you must contact me before the final exam to arrange to take the final at the start of the next semester.

Every student will be assigned a “buddy”. The understanding is that you and your buddy are responsible for looking after each other should one of you be absent by giving each other all the materials you need, such as lecture notes, handouts and announcements. You must get this before the next class meeting. (Do not ask me for these materials in email, as I may well not be able to get back to you before the next class meeting.)

Email Policy: I prefer to answer as many questions as possible in office hours – this way we can ask each other questions and I can address your needs more effectively. All written work is handed in in hard copy at the start of class, not via email. If you miss a class, contact one of your fellow students to get all the notes and handouts; if you still have questions or if you need to schedule an appointment outside of office hours, please do email me.

Academic Honesty: Collaboration on quizzes and exams is forbidden. Failure to follow these guidelines constitutes cheating. Students who are found to be cheating will be reported to the dean, and they may receive a failing grade in the course. Note that students are encouraged to work together on homework and on their oral and written presentations.

Important Dates:

- Monday, February 22: Last day to drop without receiving a “W” on transcript
- Monday, April 11: Last day to withdraw from course