

03-60-214: Computer Languages, Grammars & Translators (2008 Winter)

Instructors

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GAs: to be announced.

Times and places

Course web site: <http://cs.uwindsor.ca/~jlu/214>

Lecture time and place: Tuesday and Thursday 11:30-12:20, TC 104.

Labs time and place: Friday 10:00-11:20 (lab 51), 11:30-12:50 (labs 52), ER ????

Office hours: Tuesday 1:00-3:00.

Midterm I exam: Feb 5, Tuesday, 11:30-12:50.

Midterm II exam: March 13, Thursday, 11:30-12:50.

Final exam: Tuesday Apr 22, 08:30

Assignments due dates (tentative): February 1, February 22, March 14, and April 4.

Course Overview

This course covers both pragmatic and theoretical aspects of grammars, recognizers, and translators for computer languages. The theoretical aspect contains regular language, context free language, finite state machine, different parsing techniques including recursive descent parsing, LL(1), SLR, LALR, and LR(1) parsing. The practical aspect contains automatic generation of scanners using a scanner generator JLex, automatic parser generation using parser generator JavaCUP, and language translation techniques. The prerequisites are C- or better in 03-60-212 and 03-60-100. All the assignments will use Java, hence you should have a solid knowledge in Java programming. After this course, you will be able to understand grammars, write grammars, write parsers according to a grammar, and write a translator between different languages.

Attendance in lectures and labs is very important to be successful in this course - students who do not attend lectures and labs generally score very low on exams and assignments. You must keep up with the material as the semester progresses.

Marking Scheme

There are two midterm exams, one final exam, two on-spot quizzes, and 4 assignments. The weights of each assignment, lab exercise, and exam are listed below.

Exams	80%	Midterm 1	20%
		Midterm 2	20%

		Final	40%
Assignments	20%	assignment 1: regular expression	4%
		assignment 2: scanner generation using JLex	4%
		assignment 3: parser generation using JLex and Javacup	4%
		assignment 4: language transformation based on syntax tree	4%
On spot quizzes		Two unannounced quizzes will be given in classes, each 2%.	4%
Total	100%		100%

The only valid excuse for missing an exam is a documented medical emergency. A missed exam without medical documentation will result in a mark of zero.

The final letter grade will be given from the total raw score based on the following conversion rule:

0%	50%	53%	57%	60%	63%	67%	70%	73%	77%	80%	86%	93%
F	D-	D	D+	C-	C	C+	B-	B	B+	A-	A	A+

Lecture Schedule (tentative)

Lecture	Topics covered
Week 1	Course overview; Overview of compiler and grammar
Week 2	Lexical analysis, regular expression, Java Regex
Week 3	Finite automata, Deterministic Finite Automata (DFA), Non-deterministic Finite Automata (NFA), DFA simulation, NFA to DFA conversion
Week 4	Minimize DFA. Regular expression to DFA.
Week 5	Lexical generator JLex. Other issues in lexical analysis.
Week 6	Context Free Grammar (CFG), BNF, ambiguity in CFG
Week 7	Parser generator: JavaCup
Week 8	Top down parsing, recursive descent
Week 9	left recursion, left factoring. Predictive parsing, LL(1)

Week 10	Bottom up parsing LR(0), SLR Parsing
Week 11	LR(1) parsing
Week 12	LALR, practical consideration of parsing.
Week 13	Course review, sample questions

Labs

Supervised labs aim at putting into practice techniques and concepts seen during the lectures. Most of the labs will be used to help with your assignments. You **can attend different** lab sections. Specifications of lab will be posted in advance on our course web site at <http://cs.uwindsor.ca/~jlu/214>.

Teaching Evaluation

Student Evaluation of Teaching (SET) forms will be administered during the last two weeks of the class schedule.

Academic dishonesty

Plagiarism is not tolerated. We will run programs that can check the similarity between assignment submissions. Anyone found cheating on assignments or examination will be reported to the dean. Programming assignments must be strictly individual efforts. Discussion with other students must be limited to general discussion of the problem, and must never involve examining another student's source code or revealing your source code to another student.

Textbook

We will follow the first five chapters from the Dragon book:

(Dragon book) Alfred V. Aho, Monica S. Lam, Ravi Sethi, and Jeffrey D. Ullman. Compilers: Principles, Techniques, and Tools. 2nd edition. Addison-Wesley, 2006.

You can also use the first edition of the book.

Important note

Please note that no student is allowed to take a course more than two times without permission from the Dean.