CS 780: Compiler Design and Construction I

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CS 780 Compiler Design and Construction I

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- **Quarter** : Fall, 2010
- **Class Hrs** : MW, 6:05pm-7:20pm, 066 UH
- **Office Hrs** : MW, 3-4pm (395 Joshi) (or by appointment 395 Joshi)

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Course Description

This course deals with the theory and practice of compiler design. Topics emphasized are scanning and parsing. If time permits, semantic analysis will also be covered.

Prerequisites

- Formal Languages and Automata (CS466/CS666)
- Comparative Languages (CS480/CS680)

Required Texts

1. *Compiler Construction: Principles and Practice*, Kenneth C. Louden, PWS Publishing Company, 1997.

References

1. *lex & yacc, 2nd edition*, John R. Levine, Tony Mason & Doug Brown, O'Reilly & Associates, Inc, 1992.
2. *Modern Compiler Implementation in Java (2nd Ed.)*, Andrew Appel, Cambridge University Press, 2002.
3. *Compilers: Principles, Techniques, and Tools (2nd Ed.)*, Aho, Lam, Sethi and Ullman, Addison Wesley, 2007.
4. *The C++ Programming Language, Third Edition,* Bjarne Stroustrup, Addison Wesley, 1997.

Relevant Websites

- **ONLINE HELP**
  - Regular Expressions
  - Flex Online Manual
  - Bison Online Manual
  - SPIM Simulator Documentation
  - Unix Reference Documentation
  - xemacs Commands Reference
  - vi Commands Reference
  - gdb Commands Reference
  - GNU Manuals http://www.delorie.com/gnu/docs/

PROGRAMMING LANGUAGES AND COMPILERS ON THE WEB

- The Compiler Connection http://www.compilerconnection.com/

Course Load

The course load includes three programming assignments based on the COOL compiler project worth 35 points, a midterm worth 30 points and a final worth 35 points. Normally, exams are open book and open lecture notes.

Grading

The letter grades will be assigned using the following scale: A[90-100], B[80-90), C[70-80), D[60-70), and F[0-60). However, I reserve the right to adjust the scale somewhat to utilize the gaps in the distribution. Academic dishonesty will be "rewarded" with a grade of "F". "Sharing/reuse" of solutions to assignment problems is strictly prohibited.

Class Schedule, Syllabus and Lectures

	Topic	Readings
Class 1	Introduction to Compilers	Chapter 1
Class 2	Introduction to COOL	CoolAid
Class 3	Lexical Analysis	Chapter 2
Class 4	Implementing Lexer	
Class 5	FLEX	Chapters 1-2, 6 lex & yacc
Class 6	Context-free Grammars	Chapter 3
Class 7	Ambiguity; Abstract Syntax Trees	Attribute Grammars
Class 8	BISON	
Class 9	**Midterm Exam (Oct 11)**	
Class 10	Top-down Parsing	Chapter 4
Class 11	(continue)	
Class 12	Bottom-up Parsing	Chapter 5
Class 13	Bottom-up Parsing : Basics (ppt)	
Class 14	Bottom-up Parsing : Algorithms	
Class 15	(continue)	
Class 16	LR Parsing	
Class 17	(continue) (ppt)	
Class 18	Overview of Semantic Analysis	Chapter 6
Class 19	Type Checking and Inference	
Class 20	(WRAP-UP)	
	Final Exam (Nov 17) (8pm-10pm)	

ASSIGNMENTS (Fall 2010)

- Cool Compiler Project - Programming Assignment 1 (pdf)
- Cool Compiler Project - Programming Assignment 2 (pdf)
- Cool Compiler Project - Programming Assignment 3 (pdf)

RELATED DOCUMENTS

- CoolAid Manual (Alex Aiken) (ps) (pdf)
- A Tour of the Cool Support Code (Alex Aiken) (ps)(pdf)

EXAMINATIONS (Fall 2007)

- Midterm (pdf)

- Final (pdf)

Late Submission Policy

You will lose 5% for each day an assignment is submitted late; assignments will be accepted up to 4 days past the submission time. Late penalty is accrued on weekends just as during the week. For every 24 hour period (or fraction thereof) that the assignment is late, 5% is deducted from your score. Partial credit will be given to students who turn in partially completed assignments. Electronic submission will be used for all assignments.

Special considerations will be given for students who have a medical excuse for late submission (written notification from a doctor is required). These considerations may extend to medical emergencies involving children or other family members. Such consideration is at the discretion of the instructor. Special consideration may also be given for employment conflicts (e.g. military duty, travel) if brought to the attention of the instructor prior to the due date for an assignment.

Course requirements for other courses are NOT a valid reason for special consideration.

Collaboration vs Academic Misconduct

You are encouraged to exchange ideas regarding your programming assignments with your classmates. However, you must turn in your own work for each assignment (unless I explicitly assign a group project). As such, you should discuss programming assignments at the conceptual level only and should not share your code with your classmates. You should also never recycle printouts in public computer labs, never leave your workstation unattended without first locking the screen, always wait until your printouts have printed or delete them from the print queue when using public printers, always remove any files that you have downloaded to the PC in public PC labs, etc.

Submitting a program as your own, when some or all was written by someone else is an act of plagiarism and constitutes academic misconduct. The minimum penalty for such a misconduct is a score of 0 on the assignment. See your student handbook for more information on academic misconduct and its consequences. Misconduct will be handled in accordance with university policy.

T. K. Prasad (08/29/10 04:46:23 PM)