CISC 458* / 858*
Programming Language Processors
Winter 2015

Professor
J.R. Cordy 624 Goodwin Hall 533-6054
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Office hours: Wed, 2:00 - 3:00 pm
(and other times by email appointment)

Lectures
Wed Evening 18:30 - 21:30
Walter Light Hall 210

Website
http://www.cs.queensu.ca/~cordy/cisc458
All lectures, handouts, assignments, schedule, information, etc.
Frequent updates!
Teaching Assistant

Doug Martin  doug@cs.queensu.ca

Tutorials

TBA, tentatively Thu evening 18:00-19:00, place TBA
(not yet - beginning next week)

Attendance at tutorials is highly recommended!! (essential?)

Project Advising

TBA, beginning with project assignments, tentatively
Tue evening 18:00-19:00, place TBA

Labs

There are no scheduled labs - but you will need to spend at
least three or four hours a week in unscheduled lab time with
your project teammates!
Textbook

*Introduction to Compiler Construction Using the Syntax/Semantic Language*, 5th Edition (Cordy, Queen's 2006)

- Lectures follow the book closely - they present and extend text material using slides, examples and discussion on blackboard (so not everything will be in the text or web notes!)

References (appendices in the text!)

*PT: A Pascal Subset* (Rosselet, Toronto 1980)


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Marking

4 Quizzes 20%  Team Project 40%  Final Exam 40%

• There is no “examination only” option in this course
• You must pass the final examination to pass this course
• To get “A” in this course you must get at least “B” on the exam

Quizzes

• Four 15-minute in-class quizzes on lecture material
• Main purpose: To help you keep track of whether you are keeping up with the lecture material
• Held at beginning of lecture - Quiz #1 Wed Jan 28
  Quiz #2 Wed Feb 11
  Quiz #3 Wed Mar 11
  Quiz #4 Wed Mar 25
Course Project

- Understand and modify a small but real programming language compiler ("PT Pascal") to implement a different language
- All programming done in Pascal using the PT Pascal compiler itself (!)
- Using the S/SL compiler construction tools (like IBM)
- Done in teams of three (two, if in 858)
  - all work marked teamwise
- Will require significant joint laboratory time (unscheduled)
- Carried out in four phases - Scanner/Screener Wed Feb 4
  - Parser Wed Feb 25
  - Semantic Analyzer Wed Mar 18
  - Code Generator / Interpreter Fri Apr 3
Course Project

- Hands-on practical work, with
  - Use of real software engineering tools
  - Maintenance and enhancement of existing software systems
  - Component-based software engineering and multi-phase software systems
  - Compiler / interpreter construction techniques and table-driven software
  - Domain-specific languages (DSL’s) and model-driven engineering
  - Virtual machines and bytecodes
  - Software testing and quality assurance
Computing System

- All project work will be done on CASLab Linux (linux[1234].caslab.queensu.ca) in PT Pascal, using the Unix command line toolset (no choice)

Lateness

- All work is due electronically, by 4pm on the due date
- Work handed in late will not be marked without a convincing and documented explanation
Course Outline

I. Introduction, Overview, Basic Concepts, Compiler Structure
II. S/SL - Syntax/Semantic Language
III. Lexical and Syntactic Specification of Programming Languages
IV. Scanning and Screening
V. Parsing
VI. Runtime Model
VII. Semantic Analysis
VIII. Implementing the Runtime Model
IX. Storage Allocation
X. Code Generation
XI. Bytecode Interpretation (new, not in text)
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Fair Warning

• This is a challenging and technically difficult course
• Involves a lot of independent lab work, and a fair amount of struggling with practical details

But History Shows That ...

• If you plan to go on in the software industry, this may be the most valuable course you will ever take
• You will get great satisfaction out of this course, and you will learn more about practical software engineering than in any other course
Some Quotes (after a few years ...)

- “I took CISC 458 way back in winter 1996. Bar none, this is the most important course I ever took. Now I work on ECMAScript (JavaScript) systems at PageMail.”

- “CISC 458 was one of the most challenging (and yet fun) courses I have ever taken. Here at Microsoft, starting next week I will be working on the test team for all of the components of the Xbox compiler. One of the influencing factors was the fun I had in CISC 458.”

- “Without a shadow of a doubt the most useful course I took.”
The adventure begins ...

Any Questions?