CISC / CMPE 458
Programming Language Processors
Winter 2020

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
WLH 210

Website

http://www.cs.queensu.ca/~cordy/cisc458
All lectures, handouts, assignments, schedule, information, etc.
Frequent updates!
CISC / CMPE 458 - Winter 2020

Teaching Assistants

Karim Jahed  jahed@cs.queensu.ca
Joey Sun      jsun@cs.queensu.ca
Carson Cook  carson.cook@queensu.ca

Tutorials  (beginning next week, Thu Jan 16)

Thu evening 18:30-19:30, Botterell Hall B139
Attendance at tutorials is important!! (essential?)

Project Advising  (beginning Mon Jan 27)

Mon evening, time TBA, Goodwin Hall 230
Thu evening 19:30-20:30, Botterell Hall B139, following tutorial

Labs

There are no formal labs (the scheduled lab time is for tutorials and advising) - but you will need to spend at least three or four hours a week in unscheduled lab time with your project teammates!
Textbook


- 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)

*Specification of S/SL: Syntax/Semantic Language*  
(Cordy & Holt, Toronto 1980)

*A Tutorial Introduction to S/SL: Syntax/Semantic Language*  
(Holt, Cordy & Wortman, Toronto 1980)
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 20-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 29
  Quiz #2  Wed Feb 12
  Quiz #3  Wed Mar 11
  Quiz #4  Wed Apr 1
Course Project

- Understand and modify a small but real programming language compiler ("PT Pascal") to implement a new 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 four
- All work marked teamwise
- Will require significant joint laboratory time (unscheduled)
- Carried out in four phases - Scanner/Screener Wed Feb 5
  Parser Wed Feb 26
  Semantic Analyzer Wed Mar 18
  Code Generator Wed Apr 8
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 (DSLs) 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[123456].caslab.queensu.ca) in PT Pascal, using the Unix command line toolset (no choice)

Lateeness

- All work is due electronically, by midnight 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 the text)
Fair Warning

• This is a challenging and technically difficult course
• Involves a lot of independent lab work, and a fair amount of frustration and 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.”
Prerequisites - A Reminder

• This is an advanced 4th year course that will assume and make use of everything you have learned in your first three years

CISC 458

• Required:  CISC 121, 221, 223
• Highly Recommended:  CISC 124, 220, 327

CMPE 458

• Required:  CISC 121 / CMPE 212 / ELEC 279,  ELEC 274
• Highly Recommended:  ELEC 278, CMPE 223, 327
Next

• The adventure begins ...

Any Questions?