Theory of Programming Languages

CMPT 331 • FALL 2019

Background

When and where

Wednesdays at 8AM and Fridays at 11AM in Hancock 1021

Required Text

Concepts of Programming Languages, by Robert W. Sebesta, some recent edition
Published by Addison Wesley – ISBN 978-0-13-139531-2

Web site

http://www.labouseur.com/courses/tpl

Instructor

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Office hours are posted.

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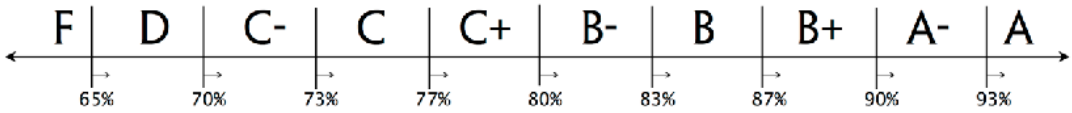
Grades

Letter Grades



You can earn up to 1000 points, broken down as follows:

SE-Radio Episode Summary	10.0%	100 points	[1, 2]
Programming In The Past	15.0%	150 points	[1, 2]
Fun with Lambda Calculus	10.0%	100 points	[1, 2, 5]
Functional Programming	15.0%	150 points	[1, 2]
Mid-term Exam	15.0%	150 points	[1, 2, 5]
Final exam	15.0%	150 points	[1]
Your Own Language	15.0%	150 points	[1]
Attendance & Participation	2.5%	25 points - for quality and quantity	[1]
Laziness & Whining	2.5%	25 points - for not (lazy or whining)	[1]

Themes, Objectives, and Assessment

Assessment methods include assignments, quizzes, exams, discussions, presentations, peer review, and projects.

[References] refer to Department of Computing Technology Goals available at http://www.labouseur.com/courses/goals.pdf

In this course I hope that you will . . .

- learn about and practice programming language criticism based on four domain-in-specific categories and use this knowledge and practice to better understand today's software development environment. [1, 2]
- explore the concepts of many historical programming languages and their impact on the languages of today, remembering that those who forget the mistakes of history are doomed to repeat them. [1, 2]
- avail yourself of the opportunity to develop small programs in many historical programming languages. [1, 2]
- engage in the philosophy of programming languages. [1, 2]
- evolve critical debugging skills by developing programs in many languages. [1, 2]
- enhance your continuing education skills, realizing that capable problem solvers never stop learning. Additionally, preparation and presentation of the projects, as well as participation in class discussions and assignments, requires at least a little research, so there's that to look forward to. [1, 2, 5]
- have fun with programming. [1, 2]

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Planned Schedule

#	Week	Chapter	Topic	Due Friday
0	8/28 8/30	1	Introduction • Criteria for programming language evaluation Issues and tradeoffs in programming language design	—
1	9/4 9/6	2	A brief history of programming languages	—
2	9/11 9/13	2 3	A brief history of programming languages Describing syntax • Fruit flies • Chomsky • Grammars • Sheep	*SE-Radio Summary*
3	9/18 9/20	3 4	Derivations • Parse trees • Grammar ambiguity Lexical Analysis and Parsing • Compiler phases	—
4	9/25 9/27	3	Beginning semantics • The need for context-sensitive grammars Attribute grammars • Operational Semantics (and Java bytecodes)	—
5	10/2 10/4	3	Axiomatic Semantics	*Programming In The Past*
6	10/9 10/11	3	Axiomatic Semantics • Review for the Mid-term	—
7	10/16 *10/18*	—	**Mid-term Exam** in class — Study sheet permitted; some restrictions apply. *No class — Fall Break*	—
8	10/23 10/25	15	Lambda calculus, part λf x . (f x)	—
9	10/30 11/1	15	Lambda Calculus, part λf x . (f (f x))	—
A	11/6 11/8	15 16	Functional programming with LISP and ML Logic programming with Prolog • Unification	Fun with λ Calculus
B	11/13 11/15	15 5, 6	Functional programming with Erlang Data types • Names and binding • Scope • Type checking	—
C	11/20 11/22	9, 10 13	Subprograms • Parameter passing Concurrency • Threads	*Functional Programming*
D	*11/27* *11/29*	—	*No class meetings this week — Thanksgiving*	—
E	12/4 12/6	—	Review for Final Exam **Final Exam** in class — study sheet permitted; some restrictions apply.	—
F	Dec. 11th 8:00am	—	Show off your awesome new language.	*Your Own Language*

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