Programming Languages CS442
Overview and Organization

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University of Waterloo

Winter 2009
Course Outline

1. Imperative Programming Languages
   a.k.a. from while to “Modula-2/ADA” in three easy steps

2. Introduction to Denotational Semantics
   a.k.a. what are these loops really mean?

3. Functional Programming Languages
   • untyped \( \lambda \)-calculus (and computation)
   • types in \( \lambda \)-calculus
   • type inference, “practical” languages

4. Logic Programming
   • resolution proofs and unification
   • PROLOG
What is it NOT about

1 “a language a week” (or so):
   ⇒ focus on understanding underlying principles
   ... ok, I’ll talk about SML and Prolog

2 implementation techniques:
   ⇒ take Compilers CS444/644
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Instructor: David Toman
  e-mail: david@uwaterloo.ca
  phone: x34447 (use e-mail—much more reliable)

Classes: TT 11:30 – 1:50 MC 4063

Office: DC 3344 (Tue 3:30-5pm)

Class Info: http://db.uwaterloo.ca/~david/cs442

TA’s: Zhang, Chen

⇒ office hours, etc., TBA on the web site
Books, Lecture Notes, etc.

Required Textbook:

*Structure of Typed Programming Languages.*

Other Books:

*Types and Programming Languages.*


⇒ [out of print; pertinent parts available online]

"Semantics of Programming Languages."

Lecture Notes:

Additional *lecture notes and copies of transparencies* are/will be available from the class WWW page.
Assessment

- lectures (no influence on grade),
- homework assignments: 25% (15% for CS648)
- midterm exam: 32% (30% for CS642)
- final exam: 43% (40% for CS642)
  mark $\geq 50\%$ on the final is needed to pass.
- a project: 15% (CS642 only)

Fine print: the usual university policies on academic honesty, fair use of computing facilities, etc., apply by default.
Assignments

1. a **report** that analyzes an existing programming language with respect to various features/constructions discussed in the lectures.
   - you can analyze any language you want
     ⇒ I won’t be able to help with too esoteric choices
   - deliverables: a PDF file submitted electronically.

2. an **implementation** of a mini-ML functional language
   - again, you can use any language available on CSCF machines
     ⇒ I strongly suggest using SML/NJ