

CS 538

Introduction to the Theory and Design of Programming Languages

Charles N. Fischer

Spring 2002

<http://www.cs.wisc.edu/~fischer/cs538.html>

Class Meets

Mondays, Wednesdays & Fridays,
11:00 — 11:50

2535 Engineering Hall

Instructor

Charles N. Fischer

5397 Computer Sciences

Telephone: 262-6635

E-mail: fischer@cs.wisc.edu

Office Hours:

10:30 - Noon, Tuesdays &
Thursdays, or by appointment

Teaching Assistant

Nilofer (Nilu) Motiwala

3310 Computer Sciences

Telephone: 262-1721

E-mail: motiwal@cs.wisc.edu

Office Hours:

Monday: 2:30 - 4:00pm

Thursday: 9:00 - 10:30am

Key Dates

- February 22: Homework #1 (tentative)
- March 22: Programming Assignment #1 - Scheme (tentative)
- April 3: Midterm Exam (tentative)
- April 15: Programming Assignment #2 - Standard ML (tentative)
- May 1: Programming Assignment #3 - Prolog (tentative)
- May 10: Programming Assignment #4 - Pizza and Python
- May 17: Final Exam 2:45pm-4:45pm

Class Text

- Required text:
Programming Languages: Concepts & Constructs, Second Edition,
Ravi Sethi,
Addison-Wesley, 1996.
- Suggested supplemental Class Text:
Programming Language Pragmatics,
Michael L. Scott,
Morgan Kaufmann, 1999.
- Handouts and Web-based reading will also be used.

Reading Assignment

- Sethi: Chapters 1-3 (as background)
- Scott: Chapters 1-2 (as background)

Class Notes

- The transparencies used for each lecture will be made available prior to, and after, that lecture on the class Web page (under the "Lecture Nodes" link).

Instructional Computers

Departmental Unix Machines (nova1-nova60) have been assigned to CS 538. All necessary compiler, interpreters and tools will be loaded onto these machines.

You may also use your own PC or workstation. It will be *your* responsibility to load needed software (instructions on where to find needed software are included on the class web page).

The Systems Lab teaches brief tutorials on Unix if you are unfamiliar with that OS.

Academic Misconduct Policy

- You must do your assignments—*NO* copying or sharing of solutions.
- You may discuss general concepts and Ideas.
- All cases of Misconduct *must* be reported to the Dean's office.
- Penalties may be **severe**.

Program & Homework Late Policy

- An assignment may be handed in one, two, or three class periods late, but not any later.
- One late period will be debited 10%, two late periods will be debited 20%, three late periods will be debited 30%.
- All students will be given 4 “free” late periods. That is, the first 40% in late debits will be automatically forgiven.
- Your 4 free late periods may be used at any time, and in any combination.

Approximate Grade Weights

Homework 1	10%
Program 1 - Scheme	16%
Program 2 - ML	15%
Program 3 - Prolog	13%
Program 4 - Pizza & Python	6%
Midterm Exam	20%
Final Exam (non-cumulative)	20%

Programming Languages to be Considered in Detail

1. Scheme

A modern variant of Lisp.

A Functional Language: Functions are “first class” data values.

Dynamically Typed: A variable’s type may change during execution; no type declarations are needed.

All memory allocation and deallocation is *automatic*.

Primary data structures, lists and numbers, are *unlimited* in size and may grow without bound.

Continuations provide a novel way to suspend and “re-execute” computations.

2. ML (“Meta Language”)

Strong, compile-time type checking.

Types are determined by *inference* rather than declaration.

Polymorphic (one function declaration can be used with many different types).

Pattern-directed programming (you define patterns that are automatically matched during a call).

Typed exceptions are provided.

Abstract data types, with constructors, are included.