

91.301 Organization of Programming Languages, Spring 2006

Syllabus

Contact Information

Prof. Holly Yanco
Office: Olsen 206
Lab: Olsen 304
E-mail: holly@cs.uml.edu (best way to reach me)
Phone: 978-934-3642

Class Meetings

Tuesday and Thursday, 10:00 – 11:15, Olsen 401

Office Hours

Tuesdays 11:30 to 12:30 in Olsen 206
Thursdays 11:30 to 12:30 in Olsen 206
 2:15 to 3:15 in Olsen 304
and by appointment.

Course Description

We will study programming languages using Scheme. You'll learn about salient semantic features of various programming language paradigms including the imperative, functional, logical, and object-oriented approaches. Key concepts include: building abstractions, computational processes, higher-order procedures, compound data, data abstractions, controlling interactions, generic operations, self-describing data, inheritance and message passing, streams and infinite data structures, meta-linguistic abstraction, interpretation of programming languages, machine model, compilation, and embedded languages.

Textbook

Structure and Interpretation of Computer Programs, Second Edition. Harold Abelson and Gerald Jay Sussman with Julie Sussman. MIT Press, 1996

The full text of the book is available on the web at
<http://mitpress.mit.edu/sicp/full-text/book/book.html>

Course Website

<http://www.cs.uml.edu/~holly/91.301>

Software

For the course, we will use Dr. Scheme, which is available as a free download (info about downloading is on the course web site).

Exam Dates

Exam 1: **Thursday, 2 March 2006**, in class

Exam 2: **Thursday, 13 April 2006**, in class

Final Exam: To be determined by the Registrar

Grading

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|------------|-----|
| Homework | 30% |
| Exam 1 | 20% |
| Exam 2 | 20% |
| Final Exam | 30% |

Collaboration Policy

You must do the homework assignments individually. You may discuss the questions with your classmates away from a computer, but you must sit at a computer and program by yourself. To learn, you'll need to actually program in Scheme, not watch another person do it.

Turning in identical (or nearly identical) code violates the collaboration policy. You may not input code into a single file, then turn it in for more than one person. Coding yourself is the only way to learn.

Homework Policy

Assignments must be turned in on the date they are due in order to receive full credit. Assignments may be passed in up until the next scheduled class meeting to receive 50% credit. After the next class meeting, no credit will be received for assignments, but you may turn them in to have your code read and commented upon.

Class Schedule

| Date | Topic | Reading | Assignment |
|---------|--|----------|---------------|
| T 1/24 | Course overview Introduction to Scheme | 1.1 | |
| Th 1/26 | More Scheme intro Substitution model | 1.1 | 1 out |
| T 1/31 | Orders of growth Recursion and iteration | 1.2 | |
| Th 2/2 | Higher-order procedures | 1.3 | 1 due, 2 out |
| T 2/7 | Compound data Data abstraction | 2.1 | |
| Th 2/9 | Aggregate data: lists | 2.2 | 2 due, 3 out |
| T 2/14 | Aggregate data: trees | 2.2 | |
| Th 2/16 | Henderson picture language | 2.2.4 | 3 due, 4 out |
| T 2/21 | No class: Monday schedule | | |
| Th 2/23 | Symbolic data | 2.3 | |
| T 2/28 | Data structures | 2.3, 2.4 | 4 due |
| Th 3/2 | Exam 1, includes material from lectures through 2/23 | | |
| T 3/7 | Multiple representations of data | 2.4 | 5 out |
| Th 3/9 | Generic operators | 2.5 | |
| T 3/14 | Spring Break | | |
| Th 3/16 | Spring Break | | |
| T 3/21 | State | 3.1 | 5 due, 6 out |
| Th 3/23 | Environment model | 3.2 | |
| T 3/28 | Object-oriented programming | Handout | 6 due, 7 out |
| Th 3/30 | Mutable data | 3.3 | |
| T 4/4 | More mutation | 3.3 | 7 due, 8 out |
| Th 4/6 | Streams | 3.5 | |
| T 4/11 | Streams | 3.5 | 8 due |
| Th 4/13 | Exam 2, includes material from lectures through 4/4 | | |
| T 4/18 | Metacircular evaluator: Overview and adding expressions | 4.1 | 9 out |
| Th 4/20 | Metacircular evaluator: Variables and environments | 4.1 | |
| T 4/25 | Metacircular evaluator: Syntactic analysis | 4.1.7 | |
| Th 4/27 | Lazy evaluation | 4.2 | 9 due, 10 out |
| T 5/2 | Amb evaluation | 4.3 | |
| Th 5/4 | Memory management and garbage collection | 5.3 | |
| T 5/9 | Review | | 10 due |
| Th 5/11 | No class: Friday schedule | | |
| TBD | Final Exam | | |