CSE341: Programming Languages, Spring 2013

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Course Information

Syllabus
Academic-Integrity Policy
Challenge-Problem Policy
Relation to Coursera Course

Gradebook

Lecture: Monday, Wednesday, Friday 12:30-1:20 EEB 037
Section AA: Thursday 12:30-1:20, SIG 134
Section AB: Thursday 1:30-2:20, SIG 134

Office Hours:
Josiah Adams, Mondays 11:30-12:30, department labs CSE002 (Allen Center basement)
Dan Grossman, Tuesdays 11:00-Noon + appointment + try coming by *(please visit!)*, Allen Center 574
Amaris Chen, Wednesdays 2:30-3:30, department labs CSE002 (Allen Center basement)
Patrick Larson, Fridays 1:30-2:30, department labs CSE002 (Allen Center basement)

Contact Information

Course Email List (mandatory): You should receive email sent to the course mailing list regularly, roughly at least once a day. Any important announcements will be sent to this list.

Email sent to cse341-staff@cs.washington.edu will reach the instructor and all the TAs. For questions multiple staff members can answer, we encourage you to use this email so that you get a quicker reply and the whole staff is aware of points of confusion.

Course staff:
All staff: **cse341-staff@cs.washington.edu**
Instructor: Dan Grossman, djg and then at and then cs.washington.edu
TA: Amaris Chen, amarisch and then at and then cs.washington.edu
TA: Patrick Larson, palarson and then at and then cs.washington.edu
TA: Josiah Adams, josiaha and then at and then cs.washington.edu

Course Discussion Board (optional)

Anonymous Feedback (goes only to the instructor)

Course Materials

Material in the future naturally subject to change in terms of coverage or schedule

Unit 1: ML Functions, Tuples, Lists, and More Reading Notes Videos
- L1. Apr 1-3: Course Mechanics, ML Variable Bindings slides: pptx pdf pdf6up code: sml
- L2. Apr 3-5: Functions, Pairs, Lists slides: pptx pdf pdf6up code: sml
- S1. Apr 4: Emacs, SML Mode, Shadowing, Error Messages slides: pptx pdf code: errors errors fixed
- L3. Apr 5-8: Local Bindings, Options, Benefits of No Mutation slides: pptx pdf pdf6up code: sml

Unit 2: Datatypes, Pattern Matching, Tail Recursion, and More Reading Notes Videos
- L4. Apr 8-10: Records, Datatypes, Case Expressions slides: pptx pdf pdf6up code: sml
- L5. Apr 10: More Datatypes and Pattern Matching slides: pptx pdf pdf6up code: sml
- S2. Apr 11: Type Synonyms, Polymorphism, & More slides: pptx pdf code: sml
- L6. Apr 12-15: Nested Pattern-Matching, Exceptions, Tail Recursion slides: pptx pdf pdf6up code: sml

Unit 3: First-Class Functions and Closures Reading Notes Videos
- L7. Apr 15-17: First-Class Functions slides: pptx pdf pdf6up code: sml
- L8. Apr 19: Lexical Scope and Function Closures slides: pptx pdf pdf6up code: sml
- S3. Apr 18: Standard-Library Docs, Unnecessary Function Wrapping, Fold & More slides: pptx pdf code: sml
- L9. Apr 22: Function-Closure Idioms slides: pptx pdf pdf6up code: sml

Unit 4: ML Modules, Type Inference, Equivalence, & More Reading Notes Videos
- L10. Apr 24: ML Modules slides: pptx pdf pdf6up code: sml
- S4. Apr 25: Mutual Recursion, More Currying, More Modules slides: pptx pdf code: sml
- L11. Apr 26-29: Type Inference slides: pptx pdf pdf6up code: sml
- L12. Apr 29: Equivalence slides: pptx pdf pdf6up

Course-Motivation Interlude, May 1 slides pdf pdf6up Videos

Unit 5: Racket, Delaying Evaluation, Memoization, Macros Reading Notes Videos
- L13. Feb May 1-6: Racket Introduction slides: pptx pdf pdf6up code: rkt
- L14. Feb May 8: Thunks, Laziness, Streams, Memoization slides: pptx pdf pdf6up code: rkt

Some of the material in L14 is covered in S6 instead
- S6. May 9: More streams, memoization, etc. annotated code: rkt
- L15. May 10: Macros slides: pptx pdf pdf6up code: rkt

Unit 6: Structs, Implementing Languages, Static vs. Dynamic Typing Reading Notes Videos
- L16. May 13: Datatype-Style Programming With Lists or Structs slides: pptx pdf pdf6up code: rkt sml
- L17. May 15: Implementing Languages Including Closures slides: pptx pdf pdf6up code: rkt

Some of the material in L17 is covered in S7 instead
- S7. May 16: Legal ASTs, Macros as Functions, and More pptx: pptx pdf: pdf
- L18. May 15,17,20: Static vs. Dynamic Typing slides: pptx pdf pdf6up code: rkt sml

Unit 7: Ruby, Object-Oriented Programming, Subclassing Reading Notes Videos
- L19. May 20-22: Introduction to Ruby and OOP slides: pptx pdf pdf6up code: lec19_silly.rb lec19_example.rb
- S8. May 23: Ruby arrays, hashes, ranges, blocks, and more annotated code: rb
- L20. May 24: Arrays & Such, Blocks & Procs, Inheritance & Overriding slides: pptx pdf pdf6up code: rb

Some of the material in L20 is covered in S8 instead
- L21. May 24-29: Dynamic Dispatch Precisely, & Manually in Racket slides: pptx pdf pdf6up code: rb sml rkt

Unit 8: Program Decomposition, Mixins, Subtyping, and More Reading Notes Videos
- L22. May 29-31: OOP vs. Functional Decomposition; Adding Operators & Variants; Double-Dispatch
  slides: pptx pdf pdf6up code stage A: sml rb java code stage B: sml rb java code stage C: sml rb java
- S9. May 30: Double-Dispatch, Mixins, and Visitors slides: pptx pdf code: sml rb
- L23. May 31: Multiple Inheritance, Mixins, Interfaces, Abstract Methods slides: pptx pdf pdf6up code: rb
- L24. June 3-5: Subtyping slides: pptx pdf pdf6up
- L25. June 5: Subtyping for OOP; Comparing/Combining Generics and Subtyping slides: pptx pdf pdf6up
- S10. June 6: Review, Especially Subtyping slides: pptx pdf

L26. June 7: Course Victory Lap slides: pptx pdf pdf6up

Homework Assignments

Homework 0: on-line survey worth 0 points, "due" Wednesday April 3

Dropbox for homework turn-in

Homework 1 due Wednesday April 10, 11PM
Homework 2 due Friday April 19, 11PM provided code provided tests
Homework 3 due Monday April 29, 11PM provided code
Homework 4 due Tuesday May 14, 11PM provided code provided tests
sample image files: dan.jpg curry.jpg dog.jpg dog2.jpg
Homework 5 due Wednesday May 22, 11PM provided code provided tests
Homework 6 due Thursday May 30, 11PM
hw6graphics.rb hw6provided.rb hw6runner.rb hw6assignment.rb
Homework 7 due Friday June 7, 11PM
hw7.sml hw7.rb hw7testsprovided.sml hw7testsprovided.rb

Exams

Midterm: Friday May 3, in class unsolved solved
Sample midterms:
Winter 2013 unsolved solved
Fall 2011 unsolved solved
Spring 2011 unsolved solved
Spring 2008 unsolved solved
Winter 2008 unsolved solved

Final: Thursday June 13, 8:30-10:20 unsolved solved
Sample finals:
Winter 2013 unsolved solved
Fall 2011 unsolved solved
Spring 2011 unsolved solved
Spring 2008 unsolved solved
Winter 2008 unsolved solved

Software Installation and Use

Instructions for SML and Emacs, which is everything you need for the first half of the course.
Videos showing the software installation on Windows

Instructions for Racket and DrRacket

Instructions for Ruby and irb

Links to Other Resources

The course materials on this page (lectures, sections, homeworks, installation instructions, videos) are designed to provide what you need for the course except for some details that you can look up in standard-library documentation or users' guides for particular languages. Links for such information is below. We also provide links to useful books and tutorials that provide alternate explanations. We will not follow any textbooks closely, but you may still find them valuable. Suggestions for additional links are welcome.

SML resources:
www.smlnj.org (links to many things, including the next three resources)

user's guide
standard-library documentation
tutorials, books, and documentation
Elements of ML Programming, ML'97 Edition, Jeffrey D. Ullman, 1998.
This is a textbook that takes a different approach but does cover some of the same material.
Check the errata page to avoid bugs.
Approximately Chapters 2, 3.1-3.4, 5.1-5.5 (skip 5.2.5, 5.3.4, 5.4.4), 6.1-6.2, 7.1, 8.2, 8.5.5 overlap with the course material.

Racket resources:
The Racket Guide
Approximately Chapters 1-4.9.1 (skip 2.4.1-2.4.3, 3.5-3.12, 4.4.3, 4.4.4, 4.6.5), 5.1, 5.2, 6.1-6.5 (skip 6.3), 16.1-16.1.4 overlap with the course material. We might cover some of 7.1, 7.2, 15.1.
racket-lang.org, particularly the Documentation and Learning tabs

Ruby resources:
Programming Ruby 1.9: The Pragmatic Programmers' Guide (Facets of Ruby), Dave Thomas et al, 2009.
Check the errata page to avoid bugs.
Overlap with the course material is very roughly Chapter 1 through 9 except Chapter 7.
We will be using Ruby 1.9. While there are significant differences between 1.8 and 1.9 in the language, a 1.8 version of the book below is still a fine resource if that's the one you happen to have.
ruby-doc.org, including links for the library documentation and various books. You can even buy the t-shirt.
Ruby home page
list compiled by Stuart Reges for Spring 2010's CSE341, including lecture slides

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