Com S 342: Principles of Programming Languages

Iowa State University

Fall 2018

Lectures: T Th 11:00am-12:15pm Carver 0101

Instructor: Wei Le (weile@iastate.edu: please preface all email subjects with "CS 342: ")
Office Hours: Th 2:00pm-4:00pm Atanasoff 210

TAs: Nguyen Jiang (gnguyen@iastate.edu), Danilo Perez (danilo0@iastate.edu), Olukorede Fakorede (fakorede@iastate.edu) and Xuan Lu (xuanlu@iastate.edu)
Office Hours: M W 10:00-11:00 am Pearson 145
Recitation: M 12:10pm-1:00pm Carver 0160, T 10:00am-10:50am Carver 0074 or W 9 :00-9:50am Town 0206

Homework assignments and submissions, grades, lecture notes, announcements: Canvas, COM S 342 fall 2018
Questions: Piazza, COM S 342 fall 2018

1 Course Description

Study of concepts in programming languages and major programming paradigms, especially functional programming. Special emphasis on design tradeoffs that enable students to make sound choices of programming languages for a given software development task. Programming projects—-from Iowa State University course catalog.

2 Course Objectives

After successfully completing this course, students will be able to:

- know terminologies of programming languages
- write programs in different programming paradigms
- compare and implement programming language design decisions on both syntax and semantics
- understand theoretical foundations of programming languages such as grammar, formal semantics and lambda calculus

"This course encourages students to think about and solve programming problems from new perspectives, exemplified by different languages. This course gets students to think what a programming language means and how to implement it, which then can help them select and use programming languages more effectively [1]."

[1] `http://www.pl-enthusiast.net/2018/07/24/teaching-programming-languages/`

3 Prerequisites

Minimum of C- in

- COM S 228 Introduction to Data Structures
- COM S 230 Discrete Computational Structures or CPR E 310 Discrete Math

4 Textbooks and Resources

- Lecture notes and the reading list available at Canvas
- Programming Languages: Design, Semantics, and Implementation by Hridesh Rajan (will be uploaded with lecture notes)
- Concepts of Programming Languages by Robert W. Sebesta, published by Pearson, ISBN 9780133943023.
- Racket (Scheme) language: `https://racket-lang.org/`
- SWI-prolog: `www.swi-prolog.org`
- ANTLR parser generator: `https://www.antlr.org`
- λ-calculus: `http://www.inf.fu-berlin.de/lehre/WS03/alpi/lambda.pdf`

5 Tentative Topics

Week	Topic	Reading	Homework Assignment
1	Overview	Rajan Ch 1	
2	Grammar		HW1: context free grammar
3	Arithmetic	Rajan Ch 2	HW2: arithlang
4	Variable	Rajan Ch 3 and 4	HW3: varlang
5	Function	Rajan Ch 5	HW4: funclang
6	Functional programming		HW5: racket programming
7	Midterm review and exam		
8	Lambda caculus		HW6: lambda caculus
9	Reference	Rajan Ch 7	HW7: reflang
10	Type	Rajan Ch 10	HW8: typelang
11	Formal semantics		HW9: semantics
12,13	Logic programming		HW10: logic programming
14	Advanced Topics		
15	Final Review		

6 Course Work and Evaluation

- Lecture attendance: We will not take attendance; however, you are expected to attend all lectures. You are responsible for all the material presented in lecture as well as the announcements made there. During office hours and on Piazza, we will give priorities to questions that are not answered in lecture.
- Homework (50%):

  - Each homework has an early submission deadline and a regular submission deadline. If you meet the early submission deadline, you will receive 5% extra credit over your homework score. But if you miss your regular submission deadline, your homework will not be graded. START EARLY. Note that if you submit to the early deadline, you cannot resubmit a modified version to the regular deadline, as TAs will grade your homework as soon as you submit it to meet early deadline.
  - For any grading related issues, please talk to TAs first. If the problem cannot be resolved between you, three of us (you, TA and me) can schedule a meeting to discuss it.
  - We scheduled 10 homework assignments. In the past, some students ask to do more homework to improve their grades, especially towards the end of the semester. We do not have such extra homework available.

- Exams (50%):
  - Midterm (20%): Oct 4th or 9th
  - Final (30%): the week of Dec 10th

7 Academic Integrity

Regarding programming assignments, you are expected to write, debug and submit your own code. You should not copy the code from your classmates or from the Internet. You should not share your code, or edit and debug other people's code. You may discuss the approaches and algorithms with your classmates. You also can ask questions on Piazza and in office hours.

Iowa State University's policy on academic dishonesty: Suspected academic misconduct will be reported to the dean of students office http://www.dso.iastate.edu/ja/academic/misconduct.html

8 Accommodations for Disabilities

We would like to hear from you if you have a disability that may require some modification of seating, testing, or other class requirements. If so, please request that the Disability Resources staff send a Student Academic Accommodation Notification form verifying your disability and specifying the accommodation you will need. Then bring the Accommodation Notification form along and talk to the instructor as soon as possible so appropriate arrangements may be made.