

## COMSC343: Programming Languages

Lecture: TTh 10-11:15

4th Hour: M 8:30-9:20

Kendade 203

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Office Hours: M 9:30-10:30  
Th 11:15-12:15  
Clapp 221

### Course overview

This course introduces fundamental concepts in the study of programming languages. We will learn how different kinds of programming languages vary and how to adapt to programming in a new language. In order to understand core computer science concepts more deeply, we will explore them using a functional programming language called Racket, which differs in some key ways from languages like Python and Java.

The topics that we will cover in this class include the differences between different kinds of programming languages, the fundamentals of functional programming, recursion, higher-order functions, binding, and scope. We will investigate these topics in detail by building an interpreter for a significant fragment of Racket in Racket.

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### Schedule

#### **LABS DUE WEEKLY ON SUNDAY AT 10 PM**

<u>Week</u>	<u>Topic</u>	<u>Assignment</u>
1 (Sept. 5th)	Welcome and set up	None
2 (Sept. 10th-13th)	Introduction to Racket & functional programming	Lab 1
3 (Sept. 17th-20th)	Recursion	Lab 1 due Sept. 22nd
4 (Sept. 24th-27th)	Abstraction and Higher-order functions	Lab 2 due Sept. 30th
5 (Oct. 1st-4th)	Data representation and abstraction	Lab 3 due Oct. 7th
6 (Oct. 11th)	Case analysis	None
<b>NO CLASS MONDAY AND TUESDAY</b> (mid-semester break)		
7 (Oct. 15th-18th)	Hierarchical data structures	Lab 4 due Oct. 21st
8 (Oct. 22nd-25th)	Evaluation strategy and streams	Lab 5 due Oct. 28th
9 (Oct. 29th-Nov. 1)	Streams	<b>MIDTERM Nov. 1st</b>
10 (Nov. 5th-6th) 11th	Interpreters	Interpreter 1 due Nov.

11 (Nov. 12th-15th)	Evaluation	Interpreter 2 due Nov. 18th
12 (Nov. 19th-20th)	State	Interpreter 3 due Nov. 25th

**NO CLASS THURSDAY** (Thanksgiving)

13 (Nov. 26th-29th)	Principles of programming languages	Language project
14 (Dec. 3rd-6th)	Principles of programming languages	Language project

**Language project presentations in class**

15 (Dec. 10th-11th)	Wrap-up	None (study for exam)
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**NO CLASS THURSDAY**

Grading

Labs	40%
Interpreter project	20%
Language project	10%
Midterm exam	15%
Final exam	15%

Assignments

**Homework**

There will be 5 homework assignments during the first part of the course. Code for these assignments will be submitted through Moodle. Please upload your code there and contact the instructor promptly if there are any issues.

**Interpreter Project**

As part of this class, we will write an interpreter for a subset of the Racket language using Racket. This project will be broken up into several incremental homework assignments.

**Language Project**

We will wrap up the semester by learning about some other programming languages. Pairs of students will select a programming language and create a presentation about the its features.

Late Policy

Late labs will be accepted for **5 days after the due date**, but will be penalized by **15%**. **Labs will not be accepted if submitted later than 5 days** after the original due date. For prolonged illness or other unexpected hardship, other arrangements can be made; please contact the instructor as soon as you can to arrange fair accommodations.

Academic Integrity

In all your work for this class, it is very important for you to follow the Honor Code: *I will honor myself, my fellow students, and Mount Holyoke College by acting responsibly, honestly, and respectfully in both my words and my deeds.* If you are not sure how this applies in a particular context, please ask for clarification.

### **Collaboration:**

Collaboration on homework assignments is encouraged. However, when you write up your work, it is important that you only write what you understand, and that it is in your own words. In particular, **you may not share code with other students in the class for any reason.**

### **Fair internet use:**

One of the learning goals of this class is to gain experience in learning new programming languages. At times, we won't be using the most efficient solution or all of the language features that are available; this is in order to see how far we can get with just the basics of the language. While programmers 'in the real world' make use of all available resources, the assignments in this class are designed to require only the language features that have been taught in lecture. **Please do not look for code help online through forums like StackOverflow for the labs in class.** Copying code from any such source will be considered plagiarism.

Using the documentation pages for reference, such as <https://docs.racket-lang.org/> is acceptable and encouraged.

The policy for the language project is slightly different. You may look for example programs in the language online. However, **any code in your language presentation that you did not write must be properly attributed to the original authors.**

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### Materials

We will be using the Racket IDE, Dr. Racket, for this class. It is installed on the lab machines, but you can download it for your own computer here: <https://download.racket-lang.org/>

There are no required textbooks for this class, but we may use excerpts from the Racket Guide (<https://docs.racket-lang.org/guide>) and the **1st edition** of *Programming Languages: Application and Interpretation* (<http://cs.brown.edu/courses/cs173/2012/book/book.pdf>).

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### Accommodations

If you have a disability for which you require accommodations, please make an appointment to see the instructor within the first two weeks of classes so that we can make appropriate arrangements. You will need to have a letter from the Accessibility Services Office, located in Wilder Hall B4 (phone: 413-538-2634, [Accessibility-services@mtholyoke.edu](mailto:Accessibility-services@mtholyoke.edu)).

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### Bias incidents

Learning happens best in an environment that treats everyone fairly and respectfully. If you experience an incident of harassment or bias and would like to report it, you can find information on how to do so here: [www.mtholyoke.edu/diversity-and-inclusion/bias\\_incidents](http://www.mtholyoke.edu/diversity-and-inclusion/bias_incidents).