$\preceq$ COMP 335 Principles of Programming Languages $\succeq$

M-W Lecture 12:30-1:50 (csLab SC1315)

Who:	Michael Gousie
Where:	Science Center 1325
When:	Mon 3:00-4:00; Tue 2:30-4:00; Fri 12:30-1:30 and by appointment
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Content:

This is not *primarily* a course to teach you how to program in various languages, although you will write some interesting software. Instead, this course provides an introductory theoretical study of the principles that govern the design and implementation of programming languages. To this end, we will examine language syntax using tools such as BNF notation and parsing. We will delve into programming language constructs and compare how different languages implement those constructs. Finally, we will look at different language paradigms, comparing procedural, functional, object oriented, and logic programming languages.

The course is split between theoretical ideas and practical applications. There will be written homework assignments taken from programming language texts and other sources, as well as projects in different programming languages, such as Bash, C, and Prolog. A major component of the course is the coverage of Java.

Recommended Texts:

- Liang, Y. Daniel, *Introduction to Java: Programming and Data Structures*, 11^{th} Edition. (Pearson, 2017)
- Bloch, Joshua. *Effective Java*, 3^{rd} Edition. (Addison-Wesley, 2017).

Additional material will be taken from:

- Scott, M. L. *Programming Language Pragmatics*, 4^{th} edition (Morgan Kaufmann, 2014).
- Sebesta, R.W. *Concepts of Programming Languages*, 9^{th} edition (Addison Wesley, 2010).
- Kernighan and Ritchie. *The C Programming Language*, 2^{nd} edition (Prentice-Hall, 1988). **THE** book on C.
- Aho, Lam, Sethi, and Ullman. *Compilers: Principles, Techniques, and Tools*, 2^{nd} edition (Addison Wesley, 2006).
- Key, S. *Prolog: Programming Success in a Day* (Lulu.com, 2015).
- Touretzky, D. *LISP: A Gentle Introduction to Symbolic Computation* (Harper & Row, 1984). A link to a 1990 Common LISP version will be on the course page.[1]

[1] There is also a 2013 version of this book, but it's essentially the same, with a couple of added chapters. LISP hasn't changed much!

- Links on course web page
- Lots of Googling.

Requirements:

There will be two exams during the semester and a final exam. The exams will comprise 42% of your grade. You will write five programs in different languages for a total of 50%. Because the programming projects will be of varying length and difficulty, they will not be evenly weighted (see below). Some projects can be done in small groups; the details will be explained in each program specification. Programs will be written on the Linux machines using compilers/interpreters available or freely obtainable or using a suitable laptop (running Linux or Mac OS). The remaining 8% will be the average of a few written homeworks/short programs.

Grading:

Grades will be assigned according to the following scale:

A = 93-100, A− = 90-92, B+ = 87-89, B = 83-86, B− = 80-82, C+ = 77-79, etc.

Exam Schedule:

Exam	Weight	Date
Exam 1	12%	October 6
Exam 2	15%	November 10
Final	15%	December 14 @ 9:00 AM

Assignment Schedule:

Program	Weight	Language Type	Topic (Subject to change)	Duration (Approx.)
PL1	7%	Scripting	Bash scripts	1 week
PL2	7%	System Tools	A little C	2 weeks
PL3	20%	Procedural	Parsing using C	4 weeks
PL4	6%	Logic	Prolog	1 week
PL5	10%	OOP	Java	2 weeks

Course Policies:

- You are responsible for all material covered in class.
- You are responsible for all reading as assigned/handed out in class. There will be significant material needed for projects that is not covered in class.
- Programming projects will be coded in various languages. All compilers/interpreters will be available on Linux (because they're all FREE!) in csLab, although you may use any platform and software you wish. However, the projects will be tested in Linux using the tools described in class, so at the very least you should test your finished projects in csLab/Linux.
- If you must miss a quiz or exam for any reason, you must inform me BEFORE the test. Except in the case of emergency, illness (almost death), or you've fallen off one of Wheaton's spires, makeup exams will not be given.
- Written homeworks should be neat and done on loose-leaf or plain paper. Program code as part of a written homework should be typed. Do not tear pages out of a notebook so the resulting paper has "fringes" on it. Staple multiple pages together.

- Assignment due dates are **firm**.
  - All programming projects must be submitted electronically by 11:59:59 PM on the due date unless otherwise noted. Projects submitted on the following day will receive a 15% penalty. Anything turned in later will receive a 0. Hard copy must be submitted at the beginning of class on the next day or as instructed on the specification sheet.
  - Written homeworks/papers must be submitted at the beginning of class on the due date. There is no provision for homework turned in late.
  - The policy for turning in paper homework/projects may change depending on factors related to the pandemic.
- You are expected to adhere to the Honor Code (see http://wheatoncollege.edu/about/honor-code/).
  - Although *discussion* of assignments is encouraged, the *implementation* of programs is to be the result of your own work. Any copying of programs or portions of programs that is not fully documented and discussed as such will also engender penalties.
  - Written homework/papers should absolutely be your own work.
  - Collaboration on exams is prohibited.
  - Any violation of the above guidelines will result in substantial consequences, such as a 0 for the assignment/exam or worse, that none of us want to deal with.
- Unless specified, the use of laptops or other computers is **not allowed** during lecture. Special arrangements may be made if necessary.
- The use of cell phones, iPods, iPads, iPlops, iFlops, and other personal electronic devices is prohibited during class, labs, and exams.
- No eating during class, as per campus COVID rules.
- Plan your restroom breaks so that you will not disrupt class.[2]
- Accommodations for disabilities:

> *Wheaton is committed to ensuring equitable access to programs and services and to prohibit discrimination in the recruitment, admission, and education of students with disabilities. Individuals with disabilities requiring accommodations or information on accessibility should contact Autumn Grant, Associate Director for Accessibility Services at the Filene Center for Academic Advising and Career Services.*
>
> *∼ accessibility@wheatoncollege.edu or (508) 286-8215 ∼*

[2] You can take a break from your phone for the duration of the class.

Course Schedule (subject to change):

Wk #	Week Begin	Topic	Reading
1	Aug 29	**Introduction** What are we doing? Linux	Handout
2	Sep 5	**System Programming** No class on Monday (Labor Day) Bash Scripting	Online resources
3	Sep 12	**System Programming** More Bash Programming in C	Online resources and/or text on C
4	Sep 19	**C** Parameter passing Compiler basics	Online resources and/or text on C
5	Sep 26	**Syntax** BNF notation Scanning Parsing	Online BNF notes
6	Oct 3	**Compare-n-Contrast** Scope Binding Exam 1 on Oct 6	Handouts
7	Oct 10	**OOP** No class Monday (October Break) Overview Features/problems Basic Java (Oct 14 - MAP Day)	Java text and/or online resources
8	Oct 17	**Java** Arrays Objects and classes	Java text and/or online resources

Wk #	Week Begin	Topic	Reading
9	Oct 24	**Logic Programming** Prolog - mind blown! Java inheritance	TBD
10	Oct 31	**Control** Expressions Selection Java lists, stacks, and queues	Notes; Java text
11	Nov 7	**More Control** Iteration and recursion Exam 2 on Nov 10	Online examples
12	Nov 14	**Types** Meaning of “type” Type checking Differences in languages	Notes
13	Nov 21	**More Java** Implementing lists No class Wednesday (Thanksgiving)	Java text; Cranberry Sauce
14	Nov 28	*TBD* Catch up... TBD	TBD
15	Dec 5	**Functional Programming** Party with LISP	Online LISP text
16	Dec 12	**Final Exam Week** Final Exam on December 14 @ 9:00 AM	