CAS CS 111: Introduction to Computer Science I
Boston University
Spring 2015

Syllabus

Description: The first course for computer science majors and anyone seeking a rigorous introduction. Develops computational problem-solving skills by programming in the Python language, and exposes students to variety of other topics from computer science and its applications.

Prerequisites: none

Instructors
A1/C1: David G. Sullivan, Ph.D. (dgs@cs.bu.edu, PSY 228D, 64 Cummmington Mall)
B1: Aaron Stevens (azs@cs.bu.edu, PSY 228B, 64 Cummmington Mall)
See the course website for the schedule of instructor, TF and CA office hours.

Teaching Fellows/Assistants (TFs/TAs)
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Meeting Times and Places
lectures: section A1: MWF, 10-11, CAS 522
         section B1: MWF, 11-12, CAS 224
         section C1: MWF, 12-1, CAS B12
plus a weekly, one-hour lab session in the CS teaching lab, EMA 304.

Important: You must also be able to take the midterm exams, which will be held on two Wednesday evenings from 6:00-7:00 p.m. (see the schedule).
Course Website:  http://www.cs.bu.edu/courses/cs111
Course Discussion Site (Piazza):  https://piazza.com/bu/spring2015/cs111

Requirements and Grading
1. Weekly problem sets and final project (40% of the final grade)
2. Exams: two midterm exams (25%) and a final exam (25%)
3. Preparation and participation:
   a. pre-lecture reading quizzes (5%)
   b. attendance at and participation in both the lectures and labs (5%)

To pass the course, you must earn a passing grade for each of the three components.

Academic Conduct
Problem sets will include two types of problems:
- individual-only problems that you must complete on your own
- pair-optional problems that you may complete alone or with one other student.

General rules for collaboration:
- You may discuss the main ideas of a given problem with other students (provided that you acknowledge doing so in your solution), but you must complete the actual solution by yourself.
- You may not copy all or part of another person’s work, even if you subsequently modify it.
- You may not view all or part of another student's work.
- You may not show all or part of your work to another student.
- You may not consult solutions from past semesters, or those found in books or on the Web.

Rules for working with a partner on pair-optional problems:
- You may not work with more than one partner on a given assignment. (However, you are welcome to switch partners between assignments.)
- You may not split up the work and complete it separately.
- You must work together at the same computer for every problem that you complete as a pair. While you are working, the screen should be visible to both of you. One person should type, while the other person observes, critiques, and plans what to do next. You must switch roles periodically, and your solution should be a true collaborative effort.
- You must both submit the same solution to each problem that you did as a pair, and you must clearly indicate that you worked on the problem as a pair.
- Although you will look at your partner's work for pair-optional problems that you do together, the above rules for collaboration still apply to your interactions with students other than your partner.

Violations of the collaboration policy will result in a grade of 0 and will be reported to the Academic Conduct Committee (ACC). The ACC may suspend/expel students found guilty of misconduct. We will assume that you understand BU’s Academic Conduct Code: http://www.bu.edu/academics/policies/academic-conduct-code
Other Policies

*Late problem sets*: Problem sets must be submitted by the date and time listed on the assignment. There will be a 10% deduction for homework that is up to 24 hours late. **We will not accept any homework that is more than 24 hours late.** Plan your time carefully, and don’t wait until the last minute to begin an assignment. Starting early will give you ample time to ask questions and obtain assistance from members of the course staff.

*Pre-lecture reading quizzes*: To help you prepare for lecture, you will typically be required to complete an assigned reading and to answer a short online quiz based on the reading. Your answers do not need to be correct, but they should demonstrate that you have completed the assigned reading carefully and have attempted to understand it. The quizzes must be submitted by the date and time listed on the reading assignment. **No late reading-quiz submissions will be accepted.**

The **attendance/participation** portion of your grade will be based on your consistent attendance at the lectures and lab sessions, and on your participation in the activities that are part of each class. In particular, you must participate in small-group activities during lecture in which you will discuss questions with other students and use a clicker (see below) to "vote" on the answers. These activities are designed to deepen your understanding of the material, and you will be graded on your participation, **not** on the correctness of your answers. To accommodate unavoidable absences or lateness, you will receive full credit for participation as long as you make at least 85% of the votes over the course of the semester and attend 85% of the lab sessions. **Using a clicker for someone else is not allowed, and will result in a lowering of the participation grade of both of the students involved.**

The final exam will replace your lowest problem-set grade if doing so helps your final grade. (The final-project grade **cannot** be replaced.) The final exam will also replace your lowest midterm-exam grade if doing so helps your final grade.

Extensions and makeup exams will only be given in *documented* cases of serious illness or other emergencies.

You cannot redo or complete extra work to improve your grade.

Incompletes will not be given except in extraordinary circumstances.

Course Materials

*Textbook*: We will use the free online textbook *CS for All* by Christine Alvarado, Zachary Dodds, Geoff Kuenning, and Ran Libeskind-Hadas. It can be found here: [http://www.cs.hmc.edu/csforall/index.html](http://www.cs.hmc.edu/csforall/index.html)

*Clicker*: You will need a Turning Technologies Response Card RF clicker (ISBN 9781934931394) for use during lecture. They will be available for purchase at the BU Bookstore. If you have purchased a clicker for another BU course in the past, you should be able to use it for this course as well.
## Schedule (tentative)

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<th>week</th>
<th>lecture dates</th>
<th>topics, exams, assignments, and special dates</th>
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| 0    | 1/21, 1/23    | Course overview and introduction  
Computational problem-solving with Picobot  
No labs this week. |
| 1    | 1/26, 1/28, 1/30 | Getting started in Python  
Making decisions (conditional execution)  
Data types and expressions  
Strings and lists  
A first look at functions  
**Problem Set 0, part I due on 1/29**  
**Problem Set 0, part II due on 2/1** |
| 2    | 2/2, 2/4, 2/6 | Functions (cont.)  
Local and global variables; the runtime stack  
Recursion  
2/2: last day to add a class  
**Problem Set 1, part I due on 2/5**  
**Problem Set 1, part II due on 2/8** |
| 3    | 2/9, 2/11, 2/13 | Functions and recursion (cont.)  
Higher-order functions and list comprehensions  
Turtle graphics  
**Problem Set 2, part I due on 2/12**  
**Problem Set 2, part II due on 2/15** |
| 4    | 2/17, 2/18, 2/20 | More list comprehensions; lists of lists  
Algorithm design; encryption and decryption  
Representing information  
No lecture on 2/16 (President's Day)  
Lecture on 2/17 (Mon. schedule)  
No labs this week.  
**Problem Set 3, part I due on 2/19**  
**Problem Set 3, part II due on 2/22** |
| 5    | 2/23, 2/25, 2/27 | Digital logic and circuit design  
Machine organization  
2/24: last day to drop without a 'W'  
Midterm 1 on 2/25 from 6-7 p.m.  
**Problem Set 4 (all) due on 3/1** |
| 6    | 3/2, 3/4, 3/6 | Assembly language  
**Problem Set 5 (all) due on 3/5** |
| 7    | 3/16, 3/18, 3/20 | Loops and imperative programming  
Cumulative computations  
Nested loops  
**Problem Set 6, part I due on 3/19**  
**Problem Set 6, part II due on 3/22** |
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<th>Week</th>
<th>Dates</th>
<th>Topics</th>
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References; mutable vs. immutable data
2-D lists
**Problem Set 7, part I due on 3/26**
**Problem Set 7, part II due on 3/29** |
| 9    | 3/30, 4/1, 4/3  | Object-oriented programming (OOP)
File processing
**Problem Set 8, part I due on 4/2**
**Problem Set 8, part II due on 4/5**
4/3: last day to drop a class with a 'W' |
| 10   | 4/6, 4/8, 4/10  | Dictionaries
Overview of the final project
Games and AI; inheritance
**Midterm 2 on 4/8 from 6-7 p.m.**
**Problem Set 9 (all) due on 4/12** |
| 11   | 4/13, 4/15, 4/17| Games and AI (cont.)
Finite state machines
**Problem Set 10, part I due on 4/16**
**Problem Set 10, part II due on 4/19** |
| 12   | 4/22, 4/24      | Finite-state machines (cont.)
Turing machines
Problem "hardness"
*No lecture on 4/20 (Patriots' Day)*
*No labs this week*
**Problem Set 11 (all) due on 4/23** |
| 13   | 4/27, 4/29      | Uncomputability
Wrap-up
**Final project due on 4/29**

**Final exam:**
A1: Tuesday, 5/5, 9:00-11:00 a.m.
B1: Tuesday, 5/5, 12:30-2:30 p.m.
C1: Thursday, 5/7, 12:30-2:30 p.m.