CAS CS 111: Introduction to Computer Science I  
Boston University, Spring 2021

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. Carries MCS divisional credit in CAS. This course fulfills a single unit in each of the following BU Hub areas: Quantitative Reasoning II, Creativity/Innovation, Critical Thinking. **No prerequisites.**

Instructors
A1/C1/D1: David G. Sullivan, Ph.D. (dgs@cs.bu.edu)
B1: Vahid Azadeh-Ranjbar, Ph.D. (vranjbar@bu.edu)

*See the course website for instructor, TA and CA office hours.*

Teaching Assistants (TAs)
Noah Cohen (nbcohen@bu.edu)
Ashby Hobart (ahobart@bu.edu)
Melissa Lopez (mlopez99@bu.edu)
Megan Mastrorilli (mmastro@bu.edu)
Rachel Peng (rvpeng@bu.edu)

Course Assistants (CAs)
We are fortunate to have a number of undergraduate course assistants (CAs) as members of the course staff. They will be assisting you in the labs and holding office hours each week. See the course website for their names and contact info.

Lectures and Labs

*lectures:* section A1: MWF, 10:10-11:00 am, CAS 522 or remotely (see below)
section B1: MWF, 11:15 am-12:05 pm, CAS 522 or remotely (see below)
section C1: MWF, 12:20-1:10 p.m., YAW 613A or remotely (see below)

*labs:* see your schedule for the time; fully remote on Zoom (see below)

*note:* the Wed evening time in your schedule is only for the midterm exams (see below)

In keeping with the University's *Learn from Anywhere* model:

- The lectures will be offered using a hybrid mode of instruction. Beginning with the second lecture, there will be in-person class meetings at the times listed in your schedule, but classes will also be live-streamed via Zoom for students who cannot attend in person.

- *The first day of lecture will be fully remote. All students should attend lecture on Zoom that day.* Links to the Zoom meetings for lecture will be provided on the course's *Blackboard Learn* site before the first lecture.

- To allow for social distancing, in-person lecture attendance will be managed using the *InClassLfA app*. Students who wish to attend class in person should use this app to indicate their preference for doing so.
• We encourage you to participate in the lectures either in person or on Zoom. However, if you cannot participate in a given lecture, there will be a recording that you can watch asynchronously. To avoid falling behind, you should watch the recording within 24 hours of the original lecture.

• The weekly lab sessions will be fully remote, and students are expected to attend their lab session on Zoom at the time at which it is held. Note that the letters of your lecture and lab do not need to match. For example, if you are in the A1 lecture, you can sign up for a B or C lab.

• Students who attend class in person or ask questions via audio on Zoom should be aware that they may be recorded. However, these recordings will only be shared with students and staff members who are part of the course.

COVID-19-Related Class Expectations
To promote a safe learning environment, those who attend lecture in person must:

• comply with University-mandated COVID-19 testing and health attestation requirements
• wear a face covering at all times during class, and when in other public spaces on campus
• maintain physical distancing of 6 feet from the nearest person at all times, including when entering and leaving the classroom
• contact Student Health Services at 617-353-3575 if you experience symptoms of COVID-19 (see https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html).

The instructors will follow the above guidelines, and students who choose to attend class in person must also adhere to them. Students who do not wish to follow these guidelines should take the class remotely.

Exams
The midterms and final exam will be administered online using an approach that we will announce later. You will be required to use a webcam and microphone during the exams. In addition, we strongly recommend that you have access to a mobile phone with a data connection in case of a Wi-Fi outage.

There will be two time options for each midterm exam. Students living in the US will be expected to take the midterms from 6:30-7:45 p.m. Eastern time on the Wednesday evenings mentioned in the schedule below (3/10 and 4/7). We will also schedule an alternate exam time for students whose time zone makes the Wednesday evening time impractical; this alternate time will be in the morning before the start of classes on either the day of the exam or the following day.

We will also offer two time options for the final exam, but we will not be able to determine them until midway through the semester. The initial exam information posted by the Registrar is likely to be incorrect. Make sure that you are available for the entire final-exam period (up to and including Saturday evening, May 8)!
Course Website: http://www.cs.bu.edu/courses/cs111
In addition, announcements and some course materials will be posted on the course's Blackboard Learn site.

Requirements and Grading
1. Weekly problem sets and final project (45% of the final grade)
2. Exams: two midterm exams (25%) and a final exam (25%)
3. Participation (5%; see below)

To pass the course, you must earn a passing grade on each of the first two components.

Collaboration Policy
You are strongly encouraged to collaborate with one another in studying the lecture materials and preparing for the exams. Problem sets will include:

- individual-only problems that you must complete on your own
- pair-optional problems that you may complete alone or with a partner.

For both types of problems, you may discuss ideas and approaches with others (provided that you acknowledge this in your solution), but such discussions should be kept at a high level, and should not involve actual details of the code or of other types of answers. You must complete the actual solutions on your own (or, in the case of a pair-optional problem, with your partner if you choose to use one).

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 (e.g., via a Zoom meeting) for every problem that you complete as a pair, and your solution must be a collaborative effort.
- You and your partner 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 by putting your partner's name at the top of the file.

Academic Misconduct
We will assume that you understand BU's Academic Conduct Code: http://www.bu.edu/academics/policies/academic-conduct-code
You should also carefully review the CS department's page on academic integrity: http://www.bu.edu/cs/undergraduate/undergraduate-life/academic-integrity

Prohibited behaviors include:

- copying all or part of someone else's work, even if you subsequently modify it; this includes cases in which someone tells you what to write for your solution
- viewing all or part of someone else's work (with the exception of work that you and your partner do together on a pair-optional problem)
- showing all or part of your work to another student (with the exception of work that you and your partner do together on a pair-optional problem)
- consulting solutions from past semesters, or those found online or in books
• posting your work where others can view it (e.g., online)
• receiving assistance from others or collaborating with others during an exam,
or consulting materials except those that are explicitly allowed.

Incidents of academic misconduct will be reported to the Academic Conduct Committee (ACC). The ACC may suspend/expel students found guilty of misconduct. **At a minimum, students who engage in misconduct will have their final grade reduced by one letter grade (e.g., from a B to a C).**

**Other Policies**

**Laptops:** Students taking CS courses are expected to have a laptop capable of running a currently supported version of Microsoft Windows, Mac OS X, or Linux. See this page for more info: [https://www.bu.edu/cs/undergraduate/undergraduate-life/laptops](https://www.bu.edu/cs/undergraduate/undergraduate-life/laptops)

**Late problem sets:** Problem sets must be submitted by the date and time listed on the assignment (typically by 11:59 p.m. Eastern time). There will be a 10% deduction for submissions 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 so you will have time to ask questions and obtain assistance from the course staff.

**Pre-lecture preparation:** To help you prepare for lecture, you will typically be required to watch one or two short videos and to complete a short online quiz. Your work on these quizzes will not typically be graded for correctness, but it should demonstrate that you have adequately prepared for lecture. The pre-lecture quizzes must be submitted by the specified date and time; **late submissions will not be accepted.** The participation portion of your grade will be based on your completion of the pre-lecture quizzes and other online questions based on the lectures, and on your consistent participation in the lab sessions on Zoom. You will receive full credit for participation if you answer at least 85% of the online lecture questions and if you participate in at least 85% of the lab sessions on Zoom. If you complete x% of the questions or participate in x% of the lab sessions for a value of x that is less than 85, you will get x/85 of the possible points.

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.

The final grades are not curved. The performance of the class as a whole is taken into account in assigning letter grades, but this can only improve your grade, not harm it. 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**

- **Required:** CS 111 Coursepack. This contains all of the lecture notes for the course. More detail will be provided in class and in Lab 0.
- **Optional:** *CS for All* by Alvarado, Dodds, Kuenning, and Libeskind-Hadas (Franklin Beedle, 2019). This book is not required.
- **Required:** We will be using the Top Hat Pro platform. More detail will be provided in class.

**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    | 1/25, 1/27, 1/29 | Course overview and introduction  
Computing fundamentals with Scratch  
Getting started in Python  
Data types and expressions  
No labs this week. |
| 1    | 2/1, 2/3, 2/5 | Strings and lists  
A first look at functions  
Making decisions (conditional execution)  
2/5: last day to add a class  
**Problem Set 0 (all) due on 2/4** |
| 2    | 2/8, 2/10, 2/12 | Functions (cont.)  
Local and global variables; the runtime stack  
Recursion  
**Problem Set 1, part I due on 2/11**  
**Problem Set 1, part II due on 2/14** |
| 3    | 2/16, 2/17, 2/19 | Higher-order functions and list comprehensions  
Recursive design  
*No lecture on 2/15 (Presidents’ Day)*  
*Lecture on 2/16 (Mon. schedule)*  
**Problem Set 2, part I due on 2/18**  
**Problem Set 2, part II due on 2/21** |
| 4    | 2/22, 2/24, 2/26 | Lists of lists; encryption and decryption  
Algorithm design  
Representing information  
**Problem Set 3, part I due on 2/25**  
**Problem Set 3, part II due on 2/28** |
| 5    | 3/1, 3/3, 3/5 | Digital logic and circuit design  
3/1: last day to drop without a 'W'  
**Problem Set 4, part I due on 3/4**  
**Problem Set 4, part II due on 3/7** |
| 6    | 3/8, 3/10, 3/12 | Digital logic and circuit design (cont.)  
Assembly language  
**Midterm 1 on 3/10 or 3/11** (see page 2 above)  
**Problem Set 5, part I due on 3/14** |
| 7    | 3/15, 3/17, 3/19 | Loops and imperative programming  
Cumulative computations  
Design using loops  
**Problem Set 5, part II due on 3/21** |
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<th>Week</th>
<th>Dates</th>
<th>Topics and Assignments</th>
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| 8    | 3/22, 3/24, 3/26 | Nested loops References; mutable vs. immutable data 2-D lists  
Problem Set 6, part I due on 3/25  
Problem Set 6, part II due on 3/28 |
| 9    | 3/29, 4/2    | Object-oriented programming  
File processing  
Classes: creating your own types of objects 3/31: No lecture (Wellness Day)  
4/2: last day to drop a class with a 'W'  
Problem Set 7, part I due on 4/1  
Problem Set 7, part II due on 4/4 |
| 10   | 4/5, 4/7, 4/9 | Classes: creating your own types of objects (cont.)  
Dictionaries  
Midterm 2 on 4/7 or 4/8 (see page 2 above)  
Problem Set 8 (all) due on 4/11 |
| 11   | 4/12, 4/14, 4/16 | Games and AI  
Inheritance  
Overview of the final project  
Finite-state machines  
Problem Set 9, part I due on 4/15  
Problem Set 9, part II due on 4/18 |
| 12   | 4/21, 4/23   | Finite-state machines (cont.)  
Algorithm efficiency  
No lecture on 4/19 (Patriots' Day)  
Labs will be held; Wed. is a Monday schedule  
Problem Set 10 (all) due on 4/23 (Friday) |
| 13   | 4/26, 4/28   | Algorithm efficiency (cont.)  
Problem "hardness"; Course wrap-up  
Final project due on 4/28  
4/30-5/3: Study period |
| 14   |             | Final exam: time and date TBD  
Please wait until your instructor informs you of the date. The initial date posted by the Registrar will not be correct.  
Make sure that you are available for the entire exam period – up to and including Saturday evening, May 8! |