

CAS CS 112: Introduction to Computer Science II

Boston University, Summer-I 2022

Syllabus

Description: The second course for computer science majors and anyone seeking a rigorous introduction. Covers advanced programming techniques and data structures using the Java language. Topics include searching and sorting, recursion, algorithm analysis, linked lists, stacks, queues, trees, and hash tables. Carries MCS divisional credit in CAS. Fulfills a single unit in the following BU Hub areas: Quantitative Reasoning II, Creativity/Innovation, Critical Thinking.

Prerequisites: CAS CS 111, or the equivalent. If you have not had significant prior experience with recursion, you are strongly encouraged to take CS 111 first.

Instructor

Christine Papadakis-Kanaris (cpk@cs.bu.edu)

See the course website for the schedule of instructor and TF office hours.

Teaching Assistants (TFs)

Timothy Jackman (tjackman@bu.edu)

Lucia (Lucy) Kisova (lkisova@bu.edu)

Meeting Times and Places

Lectures: section SA1: M-Th, 11:00 am-1:00 pm, CAS 226

section SA2: M-Th, 1:30-3:30 pm, HAR 210

labs: see your schedule for the time

COVID-19-Related Class Expectations

To promote a safe learning environment:

- comply with University-mandated [COVID-19 testing and health attestation requirements](#)
- 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>).

Information to be provided on our Course Website:

<http://www.cs.bu.edu/courses/cs112>

Requirements and Grading

1. Weekly problem sets (25% of the final grade)
2. Exams: one midterm exams (30%) and one final exam (35%)
3. Participation (10%; 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 quizzes and exams.

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 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** for every problem that you complete as a pair, and your solution must be a 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 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 you should 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>

Late problem sets: Problem sets must be submitted by the date and time listed on the assignment (typically by 11:59 p.m.). 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 ample 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 complete an assigned reading and/or watch one or two short videos. This preparation is not graded, but failing to complete it will make it more difficult for you to understand the material presented in lecture.

The *participation* portion of your grade will be based on your completion of online questions connected to the lectures, and on your consistent participation in **lecture** and **lab** sessions.

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

- You are *not* required to buy a textbook. Instead, we will provide detailed lecture slides and assign readings from freely available online resources.
- **Required:** We will be using the Top Hat Pro platform. More detail will be provided in class.

Schedule (tentative)

Week	lecture dates	topics, exams, assignments, and special dates
1	5/24 5/25 5/26 5/27	Course overview and introduction; Java Basics Control structures I (Java conditionals) Java Methods; Java Loops; Scope of Variables Java Memory Model
2	5/30* 5/31 6/1 6/2	Memorial Day – no class Java Arrays Classes and Objects Classes and Objects, a deeper look
3	6/6 6/7 6/8 6/9	ArrayBag case study; Introduction to recursion Recursion, and recursive backtracking (N-Queens problem) Algorithm Analysis and Big-O notation; Basic Sorting (selection, insertion) Divide and Conquer sorting algorithms
4	6/13 6/14 6/15 6/16	Primitives, references, and an introduction to Linked Lists Linked List, StringNode case study Linked List traversals List, Stack, Queue ADT
5	6/20* 6/21 6/22 6/23	Midterm exam Binary Trees, and Binary Search Trees Balanced Trees, 2-3 Trees Hash Tables
6	6/27 6/28 6/29 6/30	The Heap, Priority Queues Heapsort; Course review Final Exam