CAS CS 112: Introduction to Computer Science II
Boston University, Summer I 2019

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.

**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, PSY 228B, 64 Cummington Mall)

**Teaching Fellow**
Laura Greige (lgreige@bu.edu)

**Meeting Times and Places**
Lecture: MTWTh, 11:00am-1:00 pm, EPC 207
lab: W 9:00-11:00 a.m., EPC 207

**Course Website:** [http://www.cs.bu.edu/courses/cs112](http://www.cs.bu.edu/courses/cs112)

**Requirements and Grading**
1. Exams: midterm exam (25%) and a final exam (40%)
2. Problem sets (25%)
3. Labs, Preparation and Participation (10%)

*To pass the course, you must earn a passing grade for each of these three 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 may 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 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 should 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 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

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).

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

Late problem sets: Problem sets must be submitted by the date and time listed on the assignment. **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.

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 for each class. In particular, you must participate in small-group activities during lecture in which you will discuss questions with your fellow classmates. 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.

The final grades are not curved. The performance of the class as a whole is taken into account when 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.

Course Materials

Textbook: You are not required to purchase a textbook. Instead, we will be assigning readings from freely available online resources. If you are interested in purchasing a Java reference book, we will recommend some possible titles in lecture.
### Schedule (tentative)

<table>
<thead>
<tr>
<th>Week</th>
<th>lecture dates</th>
<th>topics, exams, assignments, and special dates</th>
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| 1    | 5/21, 5/22, 5/23 | Course overview and introduction; Java basics: control structures, static methods, and data types; scope of variables  
**Problem Set 1 due on 5/27** |
|      | 5/28, 5/29, 5/30, 5/31* | Java Memory Model; Java Arrays; Object-oriented programming; Classes and Objects; Inheritance and Polymorphism; Array Bag C/Study  
**Problem Set 2 due on 5/30** |
|      | 6/3, 6/4, 6/5, 6/6 | **Problem Set 3, Part I due on 6/2**  
Recursion and Recursive Backtracking;  
**Problem Set 3, Part II due 6/4**  
Algorithmic Analysis; Sorting and algorithm analysis; Intro to Linked Lists  
**Problem Set 4 due 6/8** |
| 4    | 6/10 | List ADT; interfaces and iterators  
**Problem Set 5 Part I due 6/10**  
6/11, 6/12  
6/13* | Stack and Queue ADT; generic interfaces; Trees, an introduction.  
**Midterm Exam (on material through 6/10)**  
**Problem Set 5 Part II due 6/15** |
| 5    | 6/17, 6/18, 6/19, 6/20 | Binary Trees; Search Trees; Balanced Trees (2-3 trees, B-trees); Complete Trees, Heaps and priority queues;  
**Problem Set 6 due TBA** |
| 6    | 6/24, 6/25, 6/26  
6/27* | Hash Tables; Huffman Code; Review  
**Final Exam**  
**Problem Set 7 due (morning of) 6/27** |