

Professor Andy van Dam, Brown University

Tues./Thurs. 2:30 - 3:50, Salomon 101

Course website: cs.brown.edu/courses/cs015

Questions? Email cs015headtas@cs.brown.edu

1 Course Announcement

This course introduces principles of computer science, emphasizing object-oriented design and programming in Java, an effective modern technique for producing modular, reusable, and internet-aware programs. It also introduces interactive 2D computer graphics, user interface design and some fundamental data structures and algorithms. A sequence of successively more complex graphics programs, including Tetris and culminating in a significant final project, helps provide a serious introduction to the field. This course is intended for both potential concentrators and those who may take only a single course. *No prerequisites and no prior knowledge of programming are required.*

2 Course Description

CS15 is a standalone course which introduces computers, systematic analysis of problems, and object-oriented design and programming techniques. The course may be taken by anyone, with or without previous computing experience. No math background beyond basic algebra is required. CS15 will teach you object-oriented design and programming in Java and the use of graphical user interfaces. It will also introduce you to some of the important concepts in computer science, such as data structures and computational efficiency. In doing so, the course takes an interactive, graphical approach to programming assignments and an equally interactive approach to lectures. Andy's lectures are supplemented by skits performed by the UTAs (Undergraduate Teaching Assistants) to teach course concepts and to make the class fun and enjoyable! This year, we'll be adding iClicker questions during lecture to encourage interactivity.

3 Course Format

CS15 lectures are during K hour (Tuesday and Thursday, 2:30pm - 3:50pm). You are expected to attend all class hours. You are responsible for everything said in class. Andy's notes and audio-annotated Powerpoint slides for every lecture can be found on the CS15 website.

There will be no tests, quizzes, papers, or final examinations in CS15. Instead, you will be assessed primarily on your implementation of 7 programming projects and 2 written homework assignments. In addition, students will complete 5 brief design supplements and attend 5 one-hour design discussions, each corresponding to one of the later projects.

Finally, CS15 requires 9 90-minute labs. Because we don't have tests or quizzes, we have a strict collaboration policy for programming assignments, summarized below.

Important tip: CS15 requires that you start working consistently from the time an assignment is handed out. Assignments are closely spaced and each assignment uses concepts from previous work. This makes it very difficult to fall behind on one assignment and still complete the next one. *Starting early is the key to successful programming in CS15.*

Typically, students find that CS15 requires about 15 hours of coursework a week, in addition to attending lectures.

4 Collaboration Policy and Grading

CS15 has a Collaboration Policy that provides specific guidelines for what you can and cannot do in regard to working with other students. This policy is based on Brown's Academic Code of Conduct, but it is specific to CS15. A copy of the full policy is available on the course website and you are responsible for reading and understanding it in detail. In short, while students may discuss concepts in the context of the lecture material and written homework assignments, **collaboration on any stage of a programming assignment (e.g. designing, coding or debugging) is a violation of our policy.**

The course staff takes violations of the collaboration policy very seriously and will prosecute them with the standing committee on the academic code as necessary.

Like many courses in the Computer Science department, CS15 relies heavily on the role of its Undergraduate Teaching Assistants. In addition to holding 180 TA office hours per week and facilitating programming labs, the CS15 Undergraduate TAs also grade all student work (with supervision from the Head TAs and Andy). TA hours, held by your undergraduate peers who know the course and the assignments intimately, are there to insure that you get targeted help with your problems.

5 Lecture Topics

Throughout the semester, CS15 will cover Object-Oriented Programming Fundamentals, Arithmetic and Flow of Control, Data Structures and Algorithms, and other advanced topics. Below are the specific topics for each lecture.

1. 9/8/16: A Gateway to Computer Science - Welcome to CS15
2. 9/13/16: Calling and Defining Methods in Java
3. 9/15/16: Introduction to Parameters and Math
4. 9/20/16: Working with Objects
5. 9/22/16: Interfaces/Polymorphism

6. 9/27/16: Inheritance/Polymorphism
7. 9/29/16: Math and Making Decisions
8. 10/04/16: Introduction to 2D Graphics in JavaFX
9. 10/06/16: Building Your Own Custom Graphics
10. 10/11/16: 2D Graphics, Part III
11. 10/13/16: Loops
12. 10/18/16: Arrays and ArrayLists
13. 10/20/16: Design Patterns and Tradeoffs
14. 10/25/16: Recursion
15. 10/27/16: Big-O Complexity and Sorting
16. 11/01/16: Linked Lists
17. 11/03/16: Stacks and Queues
18. 11/08/16: Trees
19. 11/10/16: Hashing
20. 11/15/16: Final Project Overview
21. 11/17/16: Final Project Help Sessions
22. 11/29/16: Computer History, Programming Languages, and Computer Architecture
23. 12/01/16: Computer Graphics
24. 12/06/16: (Head TA Lecture) Unix Features and Additional Topics

6 Required Reading

If you decide to take CS15 (and we hope you do!), you will also be held responsible for all of the information in the documents in the 'Required Reading' section of the website, including our course missive and collaboration policy, and for any class announcements made in lecture or via email.