



#1: Introduction

August 23, 2021 · G Carl Evans, Mattox Beckamn

Welcome to CS 225: “Data Structures”

Course Website: <https://courses.engr.illinois.edu/cs225/>
...or just Google Search: **cs225 uiuc**

Description: Data abstractions: elementary data structures (lists, stacks, queues, and trees) and their implementation using an object-oriented programming language. Solutions to a variety of computational problems such as search on graphs and trees. Elementary analysis of algorithms.

Instructors:

G Carl Evans <gcevans@>, T. Asst. Professor
Mattox Beckman <bradsol@>, T. Asst. Professor

Course Coordinator:

Thierry Ramais <ramais@>, Head of Course Logistics

Lab Sections: As part of registering for CS 225, you have also registered for a lab section. **Labs start this week** and are held by your contact TA – your lab TA is the first person who you should contact if you’re having any troubles with the course!

Coursework and Grading

A total of 1,000 points are available in CS 225, along with many opportunities to earn extra credit (capped at +100 points). The points are broken down in the following way:

- **120 points:** Weekly lab assignments (10 pts each)
 - There are 14 weeks -- extra credit for attendance starting week 3!
- **360 points:** MPs (60 pts each)
 - Early submissions of MPs earns up to +7 points /MP after MP1
- **300 points:** Exams (CBTF online)
 - 3 exams 100 points each
 - Exams in lecture time at about 6, 9, 12 weeks into the semester
- **220 points:** Final Project
- **Extra Credit:** Problems of the Day (POTD)
 - Short, fun programming exercises to keep you coding!
 - +1 extra credit point /POTD, maximum of +40 points

Final Course Grades

Your final course grade is determined by the number of points you earned during the semester:

| Points | Grade | Points | Grade | Points | Grade |
|------------|-------|------------|-------|------------|-------|
| [970, ∞)* | A+ | [930, ∞)* | A | [900, 930) | A- |
| [870, 900) | B+ | [830, 870) | B | [800, 830) | B- |
| [770, 800) | C+ | [730, 770) | C | [700, 730) | C- |
| [670, 700) | D+ | [630, 670) | D | [600, 630) | D- |
| | | (600, 0] | F | | |

* To get an A+ you need the score of 970 but you also need to have your final project or for some other work in this course to be seen as exceptional.

We never curve individual exam or assignment scores; instead, if necessary, we may lower the points required for each grade cutoff to be lower than the stated cutoff. However, this has not been necessary in recent semesters. In no case will we raise the cutoff.

Contacting Us:

We want to do everything we can to make sure you have a great time learning data structures. There’s a lot of ways to reach out if you get stuck:

1. **Admin Email:** cs225admin@lists.cs.illinois.edu this goes to Thierry, Mattox, and Carl and should be the first contact for course admin problems.
2. **Discord:** The course has a discord server that you can join at <https://discord.gg/YuEwhnR>
3. **Course Piazza Site:** Online Q&A discussion forum to ask and answers from your peers and course staff. Join it!
URL: <http://piazza.com/illinois/spring2021/cs225>
4. **Open Office Hours:** Course staff will be holding over 50 hours of office hours every week, starting next week. Great way to get help on MPs, labs, and technical content.
Location: Online
Times: Check CS 225’s website “Calendar” for times

- Lab TA:** Your Lab TA is your primary administrative contact for the course. You will see them each week in lab and can reach them via e-mail. Out of fairness, no coding assistance will be provided via e-mail (*use open office hours*).

Variables and Classes in C++

Every variable is defined by four properties:

- 1.
- 2.
- 3.
- 4.

And every variable is one of two types:

| | |
|---|--|
| | |
| <pre>int myFavoriteInt; char grade = 'A'; double gamma = 0.653;</pre> | <pre>Sphere myFavoriteSphere; Cube rubix; Grade courseGrade;</pre> |

Creating New Types

In data structures, we will be learning and creating new types of structures to store data. We will start simply – by the end, we will have types we built being the building blocks for new types!

Big Idea: Encapsulation

Encapsulation principles:

| Cube.h | | Cube.cpp | |
|--------|--|----------|--|
| 1 | | 1 | |
| 2 | | 2 | |
| 3 | | 3 | |
| 4 | | 4 | |
| 5 | | 5 | |

Our first class:

| Cube.h | | Cube.cpp | |
|--------|--------------|----------|----------------------------|
| 1 | #pragma once | 1 | #include "Cube.h" |
| 2 | | 2 | |
| 3 | class Cube { | 3 | double Cube::getVolume() { |
| 4 | public: | 4 | |
| 5 | | 5 | |
| 6 | | 6 | } |
| 7 | | 7 | |
| 8 | | 8 | |
| 9 | | 9 | |
| 10 | | 10 | |
| 11 | private: | 11 | |
| 12 | | 12 | |
| 13 | | 13 | |
| 14 | }; | 14 | |

Key Concepts in C++ Classes:

Every class will be made up of common key pieces:

1. _____
Cube.h:1
2. _____
Cube.h:3..14
3. _____
Cube.cpp:1
4. _____
Cube.cpp:3..6

CS 225 – Things To Be Doing:

1. Join the CS 225 Piazza
2. Visit our course website!
3. Attend lecture (every Monday, Wednesday, and Friday)
4. Attend your lab sections (lab sections start **this week!**)