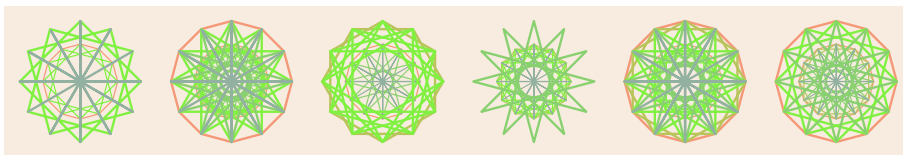


**Syllabus**  
**CSC144 Object-Oriented Programming**  
**Professor Leon Tabak**  
**Block 4**  
**November 28, 2022 to December 21, 2022**

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## 1 How we will communicate

We will use GitHub to share documents and [Piazza](#) for the exchange of questions and answers.

- My office is in West Hall 211.
- You may call me in my office at (319) 895–4294.
- You may send me electronic mail at [l.tabak@ieee.org](mailto:l.tabak@ieee.org).
- I will be in my office and available to meet with you in person or via Zoom Monday through Friday from 2:00 p.m. until 2:30 p.m.

Piazza will be our principal medium for class discussion. Use Piazza to ask and answer questions. Offer tips to your classmates. Recommend resources. Suggest exercises. Show your work. Congratulate classmates and take pride in your own accomplishments.

Please join us each day in West Science Hall:

	Where	When
Classroom/Laboratory	West Hall 201	09:00 a.m. to 11:00 a.m.
Classroom/Laboratory	West Hall 201	01:00 p.m. to 02:00 p.m.

## 2 Attendance

I will record your attendance each day. Cornell College now requires all instructors to record students' attendance. The law requires colleges to keep these records.

Software that we are using for our collaboration gives me an easier way of reviewing your work than I have had in the past. Because the software places timestamps on your work, I will be able to not only review the quantity and quality of your contributions, but also the frequency and regularity of your contributions.

## 3 Textbook

The *OCP: Java SE 11 Developer* course from uCertify will be our textbook.

We will also use free, online resources.

Check [Piazza](#) regularly for links to other resources. I will add items (including examples, notes, solutions to exercises, and maybe some things that are just for fun) to Piazza throughout the term.

We will use the Java JDK (Java Development Kit) and the [IntelliJ IDEA](#) Integrated Development Environment (IDE). We will also use Javadoc to document our software, JUnit to test our software, and git to track changes and move files to and from the cloud. We will access Javadoc, JUnit, and git from within IntelliJ IDEA.

The software that we will use is available at no cost on the Internet. Versions are available for computers that run the Microsoft Windows, Apple Macintosh OS X, and Linux operating systems.

## 4 Etiquette for the Classroom

Please show respect to your classmates, to your instructor, and to the seriousness of our enterprise by behaving courteously.

Courtesy is an important aspect of professionalism. Courteous and professional conduct will open for you opportunities to work with greater autonomy, to take on greater responsibility, to exercise greater creativity and leadership, and to solve more challenging problems and thereby serve your clients in more significant ways.

Let us develop the discipline and habits that will help us succeed in the work that will follow our studies at Cornell College.

How might we adapt rules for etiquette in a classroom and office for our online collaboration?

How can each of us be...

- a member of the team who delivers work in full and on time?
- a member of the team who delivers products of the highest quality?
- a member of the team to whom others turn for help?
- a member of the team whose critiques and suggestions others welcome?

Here are guidelines that I shared with my students in past years. I would like to hear your opinion: does this advice still apply in our new circumstance? Is there anything here that we should add or subtract?

- Please give your attention to whomever is speaking. You cannot view unrelated pages on the Web and be part of our class' discussion at the same time.
- You learn from your classmates. Be generous in offering help to classmates in the laboratory. Take interest in your classmates' work. Encourage them. Compliment them for work that is well done. Give them a good audience when they stand at the front of the room to present their work. Show these courtesies to all of your classmates.
- Please do not interrupt the class by late entries or early departures. If you anticipate a need to be absent from all or part of one of our meetings, please notify me in advance of your anticipated absence.

- You may listen to music while working in the laboratory so long as you are still able to hear your name when called and you do not disturb neighbors.

- Please refrain from bringing food or drink into the classroom or laboratory.

We can make reasonable exceptions for eating that is not noisy and foods that do not have strong smells.

Acceptable beverages and foods include water, tea, and granola bars. Bringing breakfast to class is not courteous.

Please clean up crumbs and spills. Please dispose of empty containers and leftovers.

- Please dress as you might for an employer in the software engineering industry. This does not mean fancy dress—you do not need to buy new clothes. The dress in most workplaces is casual. Just be neat.

Please keep your shoes on. Wearing hoods, hats, or sunglasses (except when there is a medical reason for shielding the eyes) that hide your face is not courteous.

- Imagine that you are seeking employment. How will you present yourself to your prospective employer?

Imagine that you are now employed in a software engineering firm. How will you speak to your teammates, the head of your team, and your company's clients?

Imagine that your grandmother has purchased the company for which you work. She has joined you in the company's conference room to hear and see you walk through the code that you have written for the company (her company).

Are there some words that you will keep out of your vocabulary during this hour?

## 5 Policies

Cornell College is committed to providing equal educational opportunities to all students. If you have a documented learning disability and will need any accommodation in this course, you *must* request the accommodation(s) from the instructor of the course no later than the third day of the term. Additional information about the policies and procedures for accommodation of learning disabilities is available on [Cornell College's Web site](#).

Please also familiarize yourself with the college's statement on [academic honesty](#) and its [policies for dropping courses](#).

## 6 Goals

You will become a more confident programmer through practice. You will learn object-oriented design, an important discipline in software engineering. This course will prepare you for a study of algorithms and data structures.

We will give special attention to three of Cornell College's **Educational Priorities and Outcomes**:

- Reasoning—You will learn how to apply reason in the design, development, and testing of software.
- Communication—You will present your work to your peers. You will learn how to communicate with clients and teammates.
- Ethical behavior—You will learn how ethical conduct helps define professional practice in software engineering. Our code is more than a list of thou-shall-nots. For example, our profession's code of conduct calls upon us to add to our skills and knowledge throughout our careers and to offer help to others generously.
- Vocation—You will learn how other people are using their knowledge of computer science to make a better world. Maybe you will see a path that you want to follow?

You will learn how to write programs with the Java language. You will learn how to use the Java API (application programming interface)—this is a library of components (classes, interfaces, methods, and constants) that you can use in your own programs.

You will gain experience using...

**IntelliJ IDEA** is a powerful IDE (integrated development environment).

**Javadoc** is software that will help us create uniformly formatted and cross-linked pages that describe our software. Our clients need documentation to use the products that we create for them. Our teammates need documentation so that they can design and build components that will work with our components of the software.

**JUnit** is software that will help us test our software.

**git** is a distributed version control system. It helps us track changes in our software, collaborate with teammates, and back up our work.

These kinds of tools are very important in the practice of software engineering. There are other IDEs and other tools for testing software, creating documentation, and tracking changes in software. What you learn in our course will make

you ready to quickly master the tools that a future instructor or employer might ask you to use.

Teamwork requires communication and responsibility. It means learning how to ask for help and learning how to offer help. You will gain a deeper understanding of the importance of teamwork in software engineering. You will gain a familiarity with important disciplines and tools for making teamwork productive.

## 7 Writing Exercises

In our writing exercises, you will begin to discover:

- the variety of careers that are open to people with the skills and knowledge you are acquiring through your study of computer science
- some of the most promising efforts to add to our understanding of computer science and some of the most exciting new applications of computer science

We will provide instruction in writing. We will do some of our writing together in class.

These writing exercises will also give you an opportunity to reflect upon your own aptitudes and goals. As you begin your major course of study, think about the kinds of academic choices that will get you to where you want to go.

Try to go beyond just summarizing what you read.

- Make connections among ideas—this might mean showing a relationship among ideas in a single article, ideas in several articles, or ideas that you encounter in this course and ideas that you encountered elsewhere.
- Explain, evaluate, and analyze.
- Make an argument.
- Reflect and respond.

I prefer to specify the length of writing exercises in powers of 2:  $2^7 = 128$  words and  $2^{11} = 2048$  words.

- **Daily writing**

- Post each day on Piazza during the first 3 weeks (15 days) of our course.

- Write about 128 words per post.
- I will share with you links to stories from software engineering organizations. These stories will include profiles of people who work in these organizations, descriptions of opportunities, and statements of the goals and ways of working that these organizations have adopted. Use some of your posts to share what you learn by reading these stories.
- You may also use your posts to share notes on your readings and our discussions.
- You may also use your posts to report problems you have encountered and discoveries that you have made in your programming.
- You may also use your posts to ask questions or to offer answers to questions that others have posted.

- **What will come next?**

- I will share with you links to stories from corporate, university, and government laboratories. By reading these stories, you will learn about research that is adding to our understanding of computer science and about the development of new applications of computing technologies.
- Select one of the projects that you discover in your reading.
- Propose a paper about your selected theme. Convince your readers that the work you propose to study is important. Convince your readers that you have found enough information to write your paper. Write about 256 words for your proposal.

**Due on Monday, December 05**

- Take notes on what you read. Write several pages of notes. Begin to organize your notes. Share your notes.

**Due on Friday, December 09**

- Share a first draft of your paper.

**Due on Wednesday, December 14**

- Produce a final draft that contains about 2048 words.

**Due on Monday, December 19**

## 8 Grades

I expect regular attendance. Notify me if you anticipate a need to be absent.

Experience presenting work to peers will be an important part of the course. Practice asking your teammates questions during their presentations, critiquing



their decisions, and suggesting improvements to their code will also be an important part of your education during this term. Daily work includes contributing to our in-class and online conversations.

I will collect and grade some of your writing and programming each week.

I encourage collaboration. Of course, in cases that you accept help, you must acknowledge that help.

There will be no graded examinations.

Activity	Points
Daily discussions & exercises in class	20
Daily writing on Piazza	20
Daily work on uCertify	20
Weekly programming projects	20
Writing project	20
	100

## 9 Calendar

	Mon	Tue	Wed	Thu	Fri
<b>Week 0</b>	28	29	30	01	02
<b>Week 1</b>	05	06	07	08	09
<b>Week 2</b>	12	13	14	15	16
<b>Week 3</b>	19	20	21	22	23

## 10 Schedule

### 10.1 Week 0

Learn how to use [IntelliJ](#) IDEA and git.

Read [A Conversation with James Gosling](#) and [Java's Forgotten Forebear](#).

Read the [IEEE-CS/ACM Joint Task Force on Software Engineering Ethics and Professional Practices](#). Contribute to an online discussion of how we can apply this code to our work in this class.

- Together we will write a program that defines and tests a class that con-

tains **static** searching and sorting methods.

- sequential search
- binary search
- selection sort
- insertion sort
- merge sort

#### 10.1.1 Monday, 28 November 2022

**Read/Write/Discuss:** In the *OCP: Java SE 11 Developer* course from uCertify, read Lesson 1: “Welcome to Java.” Answer the questions. Solve the problems. Come to class prepared to discuss.

Introduction to Moiré programming project.

**Return to calendar.**

#### 10.1.2 Tuesday, 29 November 2022

**Read/Write/Discuss:** In the *OCP: Java SE 11 Developer* course from uCertify, read Lesson 2: “Java Building Blocks.” Answer the questions. Solve the problems. Come to class prepared to discuss.

**Return to calendar.**

#### 10.1.3 Wednesday, 30 November 2022

**Read/Write/Discuss:** In the *OCP: Java SE 11 Developer* course from uCertify, read Lesson 3: “Operators.” Answer the questions. Solve the problems. Come to class prepared to discuss.

**Return to calendar.**

#### 10.1.4 Thursday, 01 December 2022

**Read/Write/Discuss:** In the *OCP: Java SE 11 Developer* course from uCertify, read Lesson 4: “Making Decisions.” Answer the questions. Solve the prob-

lems. Come to class prepared to discuss.

**Return to calendar.**

#### 10.1.5 Friday, 02 December 2022

**Read/Write/Discuss:** In the *OCP: Java SE 11 Developer* course from uCertify, read Lesson 5: “Core Java APIs.” Answer the questions. Solve the problems. Come to class prepared to discuss.

Moiré programming project due.

**Return to calendar.**

### 10.2 Week 1

Learn how to use Javadoc and JUnit.

Read the [Agile Manifesto](#).

Select a [license](#) for your software.

Together we will...

- ...write a program that defines and tests a class that models a vector in two dimensions.
- ...write a program that defines and tests a class that models a vector in three dimensions.
- ...write a program that defines and tests a class that models a  $2 \times 2$  matrix.
- ...write a program that defines and tests a class that models a  $3 \times 3$  matrix.

#### 10.2.1 Monday, 05 December 2022

**Read/Write/Discuss:** In the *OCP: Java SE 11 Developer* course from uCertify, read Lesson 6: “Lambdas and Functional Interfaces.” Answer the questions. Solve the problems. Come to class prepared to discuss.

Introduction to Mandelbrot/Julia sets programming project.

Paper proposal due.

**Return to calendar.**

#### 10.2.2 Tuesday, 06 December 2022

**Read/Write/Discuss:** In the *OCP: Java SE 11 Developer* course from uCertify, read Lesson 7: “Methods and Encapsulation.” Answer the questions. Solve the problems. Come to class prepared to discuss.

**Return to calendar.**

#### 10.2.3 Wednesday, 07 December 2022

**Read/Write/Discuss:** In the *OCP: Java SE 11 Developer* course from uCertify, read Lesson 8: “Class Design.” Answer the questions. Solve the problems. Come to class prepared to discuss.

**Return to calendar.**

#### 10.2.4 Thursday, 08 December 2022

**Read/Write/Discuss:** In the *OCP: Java SE 11 Developer* course from uCertify, read Lesson 9: “Advanced Class Design.” Answer the questions. Solve the problems. Come to class prepared to discuss.

**Return to calendar.**

#### 10.2.5 Friday, 09 December 2022

**Read/Write/Discuss:** In the *OCP: Java SE 11 Developer* course from uCertify, read Lesson 10: “Exceptions.” Answer the questions. Solve the problems. Come to class prepared to discuss.

**Mandelbrot/Julia sets programming project due.**

**Notes due.**

**Return to calendar.**

## 10.3 Week 2

Read Richard Hamming's essay, [You and Your Research](#).

- Write a program that defines classes that model vertices, edges, and polygons and uses these classes to draw a tessellation (a tiling of the plane).
- Discover Java's support for internationalization. Apply what you learn in your programming project.

### 10.3.1 Monday, 12 December 2022

**Read/Write/Discuss:** In the *OCP: Java SE 11 Developer* course from uCertify, read Lesson 11: "Modules." Answer the questions. Solve the problems. Come to class prepared to discuss.

Introduction to encryption programming project. We will look at the Caesar cipher, polyalphabetic ciphers, and the Playfair cipher.

[Return to calendar.](#)

### 10.3.2 Tuesday, 13 December 2022

**Read/Write/Discuss:** In the *OCP: Java SE 11 Developer* course from uCertify, read Lesson 12: "Java Fundamentals." Answer the questions. Solve the problems. Come to class prepared to discuss.

[Return to calendar.](#)

### 10.3.3 Wednesday, 14 December 2022

**Read/Write/Discuss:** In the *OCP: Java SE 11 Developer* course from uCertify, read Lesson 13: "Annotations." Answer the questions. Solve the problems. Come to class prepared to discuss.

**First draft due.**

[Return to calendar.](#)

#### 10.3.4 Thursday, 15 December 2022

**Read/Write/Discuss:** In the *OCP: Java SE 11 Developer* course from uCertify, read Lesson 14: “Generics and Collections.” Answer the questions. Solve the problems. Come to class prepared to discuss.

**Return to calendar.**

#### 10.3.5 Friday, 16 December 2022

**Read/Write/Discuss:** In the *OCP: Java SE 11 Developer* course from uCertify, read Lesson 15: “Functional Programming.” Answer the questions. Solve the problems. Come to class prepared to discuss.

**Encryption programming project due.**

**Return to calendar.**

### 10.4 Week 3

Read Fred Brooks’ *The Computer Scientist as Toolsmith II*.

- Experiment with bit-mapped graphics or image processing.

#### 10.4.1 Monday, 19 December 2022

**Read/Write/Discuss:** Final draft due.

**Return to calendar.**

#### 10.4.2 Tuesday, 20 December 2022

**Read/Write/Discuss:** **Return to calendar.**

#### 10.4.3 Wednesday, 21 December 2022

**Read/Write/Discuss:** **Return to calendar.**

#### 10.4.4 Thursday, 22 December 2022

**Block Break** We will not meet today.

There is no work due today.

**Return to calendar.**

#### 10.4.5 Friday, 23 December 2022

**Block Break** We will not meet today.

There is no work due today.

**Return to calendar.**