

# Spring 2026– COSC481: Playful Thinking, Serious Coding

## Description

In this course you will learn how to create 2D games, in part by replicating seminal classic games. Our work will be grounded in game studies readings from the Playful Thinking series, as well as technical texts. Specifically, on the theoretical side, we will learn the vector math, coordinate systems and transformations, collision algorithms and physics that come into play in game mechanics. We will study the programming patterns that appear in games, with the game loop and event systems that handle events to keep the game responsive while maintaining smooth animation.

Students will put these concepts into a series of labs/projects during the first part of the semester. During the last part of the course, students will complete in group a capstone game project of their own creative design.

## Topics

Topics covered will include:

- Game Programming Fundamentals: game loop, and time
- Game Rendering: primitives, attributes, screens
- Interaction and Animation: control, interaction with window system, input devices, event-driven input
- Geometrical Objects and Transformations: homogeneous coordinates and matrix representation for 2D manipulation
- Game Programming Patterns: Model-view controller, Entity component system
- and more...

## Prerequisite knowledge

The pre-requisite knowledge you require is:

- a working knowledge of object-oriented programming in a high-level language.
- a good understanding of how memory works and is managed effectively.
- a grasp of mathematical concepts such as trigonometry, algebra, and geometry. Linear algebra and matrix mathematics are very advantageous.
- Git version control basics.

## Instructor

### Elodie Fourquet

You may call me: Elodie, or Professor Elodie

Bernstein 306

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## Logistic

### Meeting locations and times

Section	Location	Time
COSC481 A	Bernstein 214	TR 1:20 - 2:35
COSC481 B	Bernstein 214	TR 2:45 - 4:00
COSC481 LA	Bernstein 118	W 10:20 - 12:10
COSC481 LB	Bernstein 118	W 12:45 - 2:35

### Websites

- [\*\*Course schedule\*\*](#) with topics, pre-lecture activities and projects.
- [\*\*Moodle\*\*](#) to submit your work, get feedback and grade.

### My Open Student Hours (previously known as Office hours)

The days and times listed below are reserved in my schedule to meet with my students. All those hours are dedicated to support your learning, as well as your Colgate's education pursuit and goals and interests beyond. *Don't feel intimidated* and develop a habit to interact with your professors so as they know you personally and you know them. If those times are inconvenient for your overall schedule or in a particular week, please let me know and we will find another time that works for both of us.

Day	Time	Location	Day
M	2:30 - 4:00	Bernstein 306	M
W	2:45 - 4:00	Bernstein 306	W
F	1:00 - 2:30	Bernstein 306	F

### Labs

In conjunction with this course you are enrolled in a 2-hour weekly laboratory section, you are required to register for.

Please come to the lab prepared by having done the required readings, reviewed your notes, lecture activities and worksheets and reflections. Have all this material with you when you are in the lab: you will find them all useful. Show us you are following in class and making connections between the theory and the practice of computer science.

### Labs start: This Week

# Lecture Learning Community

Thanks to our course, we form a learning community.

## Pre-lecture Expectations

We prepare for each lecture, through a *shared reading, activity or topic/game to research* that will prime our discussion and enhance our collaborative learning. You should expect to spend 1 hour on preparation prior to each lecture between reviewing the prior work and doing small assigned work, given from one lecture to the next.

Your **best effort** is expected. There's not enough lecture time to cover everything in depth and practice problem solving. Also, for any topics discussed, there's a world of difference between seeing that content for the first vs. second time. To encourage you to practice active reading, and taking notes, any *reading quiz* will be open personal notebook (without including the reading print-out).

## In-lecture Expectations

In class, on one hand, you learn and practice formal and technical concepts of computer science; on another hand you develop professional skills, which include communication and collaborative practice as we solve problems together. The latter is developed with each other and in the classroom.

Each lecture includes discussion of the reading, technical material, followed by an activity.

You should be an active and collaborative participant as we work on them, referring to your prior notes. This work is integral to the lecture flow, and requires everyone's engagement.

In particular, I want to highlight the following three prominent expectations.

### 1. Manners and professionalism: Engage with the community and do not distract others.

- Attend every class your health permits. When you miss class, it is your responsibility
  - to communicate an explanation/excuse your absence and
  - to make up the lecture content by reaching out to a classmate, and communicate when you are absent.

Non-excused absences quickly become problematic.

- Be on time and stay in class for the duration of the lecture.
  - Our lectures are short and dynamic: 110 mins of varied activities.
  - We all need to be attentive and focused on the hard work.  
(On rare occasions, you know you will be late, or need to leave early for an obligation, let me know in advance, and sit near the door; I understand if you have to step out once in the semester due to special circumstances.)

*People that turn into a habit to arrive late/step out highly disturb the class attention.*

- Put away your phone and headphones as soon as you enter the classroom. It is rude to our community when we ignore each other. We might have learned to kill any micro-boredom moment with our device, but that is unfortunate. We are lucky to form a small community, physically together, and we can practice our social skills, which have a positive effect on our mental health. I recognized it might be hard and weird, but I want us to break from our comfortable isolation. If you are shy, bring a book and pretend to read instead or even prime your cognition by reviewing material.

- d. Before the lecture begins, I instead encourage you to review your notes, talk to your classmates. The goal is to get in the mental space that will help us transition to our activities.  
(Wandering on our cellphone in our virtual world is the opposite; let's make connections among us instead.)
2. **Note taking:** Do not use laptops or other electronic devices,<sup>1</sup> except when I ask or permit you. We will use the computer weekly during the lab section!
3. **Collaborative participant:** Participation of everyone is expected. It involves
  - asking questions and
  - answering question but also
  - **listening to everyone.**

The goal is for us to form an inclusive community, where everyone learns from each other. One important part of participation is observing the class: not everyone behaves the same. All of us should give space and we need to become comfortable *with silences*, as they are required for thinking.

Listening, raising your hand, contributing and helping each other improve the flow of the lecture. If you are timid or intimidated, you may give yourself a challenge to raise your hand and talk once a week in my class. I will ask many questions, poll the class and sometimes cold call. The contribution of everyone is required as we learn together: communicate with me as we develop practices and conventions for everyone learning, especially let me know if you are uncomfortable talking or not speaking up. Come to my open students' hours so we can discuss strategies that will help you develop this essential competence.

*Encouraging peers to talk and be involved in our reflective exchanges enhances everyone's learning.*

*No-one should dominate the conversation; we value our shared space and everyone's voice should be heard.*

As we will alternate between lecturing, discussing and problem solving exercises, you will be asked to work in pairs and in a small group. You should take turns and encourage each other to contribute. Solving it on your own is not the point when we practice teamwork. You can learn from each other, whatever your level of mastery is.

Your **prolonged best effort** is demanded for all these expectations and will contribute to a significant component to your course letter grade. No adhering to them will negatively influence your performance.

## Coursework

### Exams

The exams in this course are designed to assess your understanding of key concepts in computational thinking and programming, as well as your ability to apply these concepts to solve game problems. They will be handwritten and will involve a combination of reading, writing, and debugging code. Exams will be graded "traditionally", meaning that they will be assigned a percentage score based on accuracy and completeness, which will contribute directly to your final grade. **There will be one midterm and one final.**

<sup>1</sup> If you have trouble with this requirement or need an accommodation that benefits your learning, reach out to me so we find a work-around.

## Projects

There will be three projects during the semester: two during the semester, and one final one.

## Grading

The table below defines the letter grade criteria for the three main forms of assessment. You must satisfy all requirements to earn the corresponding grade; if any of the requirements at a given grade level are not satisfied, then a lower grade will be assigned.

	A	B	C	D	F
<b>Exams</b>					
midterm/final average	>= 88	>= 75	>= 65	>= 58	< 58
<b>Projects</b>					
Final Project	A	At least B	At least C	At least D	F
Two in-semester Projects	One A, one B or better	One B, one C or better	One C, one D or better	Two D	One F
<b>Reading/Activity Quiz</b>	Majority of ✓+	Majority of ✓+ and ✓	Majority of ✓ and ✓-	Majority of ✓-	

Based on the letter grade you obtain after the final exam is completed, **a plus (+) or a minus (-)** may be added to your grade. Specifically, you will gain a

- + because you supported the learning community, participating, listening and helping other to learn
- - because you were not an active member of the learning community

During the semester I will ask you to reflect in writing about your own assessment with respect to these requirements, so I can provide feedback on any disagreement.

My intent is to encourage everyone long-term learning and growth-mindset. Please reach out if you are in a difficult situation or falling behind. Don't avoid the issue. I am here to help you so we need to work together.

Finally note that if you fail the course, the maximum lab grade you may receive is a C+, so you can retake it.

## Help and Resources

The below sections outline options for getting help, academic or otherwise, at Colgate.

### Campus Resources

- Administrative Deans help you understand policy, navigate personal challenges, and work with faculty/parents.
- Information Technology Services (ITS) help desk consultants assist all students with problems concerning email, Portal, Moodle, or your personal laptop. Contact me if problems with your personal computer are affecting your ability to get your work done (the COSC department can often loan students laptops!)
- Office of Student Disability Service has a Director who supports students with reasonable and appropriate adjustments on a case-by-case basis. You may contact the Executive Director of Disability Services at 315-228-7375 to have access to Colgate's programs and services. The director also assists students in

identifying and managing the factors that may interfere with learning and in developing strategies to enhance learning.

- Student Health Services provides accessible, convenient, non-judgmental, and confidential care for all students.
- Counseling and Psychological Service staff are trained to help students manage a wide array of emotions. The counseling center meets with over half the student body at some point during their time at Colgate. They have walk-in hours Monday-Friday from 9 a.m.-noon and 1:30-4:30 p.m. After-Hours Call the counseling center at 315-228-7385, for an emergency dial #2.
- Haven is a sexual violence response center that provides confidential care, support, advocacy, and trauma-informed clinical services for survivors of sexual assault, intimate partner violence, child/family abuse, stalking, and/or harassment. You can call (315-228-7385) or visit during business hours.

## Academic Honesty

You are expected to abide by Colgate's academic honor code: "Colgate University defines academic dishonesty as any attempt to misrepresent one's performance on any academic exercise submitted for evaluation. [..]

In any situation where a student questions the appropriateness of representing a work as his or her own, it will be the student's responsibility to raise the question with the instructor."

Following our computer science department practice in this course while sharing ideas with classmates is generally fine, your final submitted work must be your own. In particular:

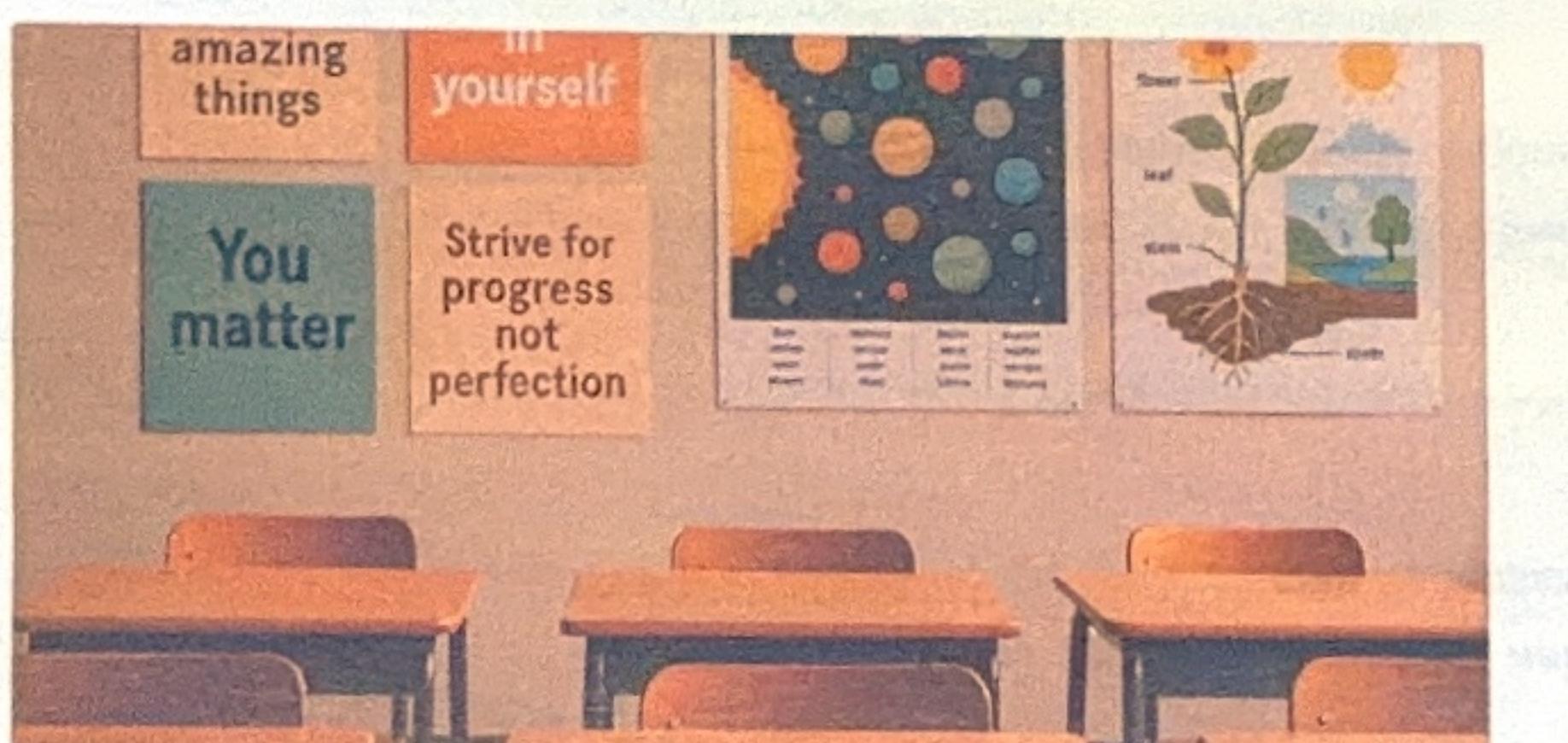
- Never possess (received verbally, electronically, physically, etc) or submit assignment code (in part or in full) that you did not write. This includes past/present students, online forums, instructor solutions, AI tools, etc.
- Do not submit work that you do not understand, i.e. that you can't explain.
- Do not code in parallel with someone else in open labs or elsewhere on non-group projects – you should understand your submitted code at the micro and macro level.
- Receive guidance from tutors, do not accept solutions. Generally you should expect course staff to answer your questions with questions!
- Do not post/share online (including repo like *GitHub/Quizzlet* or forums *Stack Overflow*) and offline course materials and instructor worksheets, written code, including starter code for homework or exams you filled. You do not have the intellectual property to do so. Doing so would be a breach of the Code of Student Conduct, and, in some cases, a violation of the Federal Education Rights and Privacy Act (FERPA).

As a rule of thumb if you cannot reproduce the submitted work on your own, it means you received an excessive amount of help which is a breach to Colgate's academic honor code as you are misrepresenting your knowledge.

# The Power of Priming: Enhance Student Learning Through Cognitive Preparation

Published: April 19, 2025

Author: Mind My Learning



Have you ever noticed how arriving early to class and reviewing your notes makes the lecture easier to follow? Or take notes here, skim through a chapter before reading it thoroughly to help you absorb the material better. That's not just good study habits — it's your brain experiencing the benefits of **priming effects**.

## What Is Priming in Education?

Priming is a cognitive process where exposure to one stimulus influences how we respond to a subsequent stimulus, often without our conscious awareness. In

educational contexts, priming prepares the brain to receive, process, and store new information more effectively.

*"Priming prepares students for upcoming information before they receive it, influencing their learning behavior later, without them necessarily being aware."*

According to cognitive psychology research, priming works by activating mental frameworks (schemas) stored in our long-term memory. When these schemas are activated, related information becomes more accessible, making learning more efficient.

## Three Essential Types of Priming for Students

### 1. Pre-exposure Priming

Pre-exposure involves introducing students to new content before in-depth learning occurs. This creates a mental framework that helps organize and understand information when it's formally presented.

**Effective pre-exposure strategies:**

- Reading chapter summaries before diving into textbooks
- Reviewing course syllabi to get an overview of upcoming topics
- Watching introductory videos on a subject before class
- Skimming slides or handouts before lectures
- Taking pre-tests to activate relevant knowledge networks

A psychology study conducted at Ohio State University demonstrated that participants who were incidentally exposed to new objects learned to categorize them faster when later taught to recognize them. The researchers concluded that "simply being exposed to new things makes an impression in our mind and leads us to be ready to learn about them later."

## 2. Activating Prior Knowledge

This form of priming connects new information with existing knowledge, creating stronger neural pathways and improved comprehension.

### Ways to activate prior knowledge:

- Starting classes with brief quizzes on previously covered material
- Asking students to write down everything they already know about a topic
- Creating concept maps showing relationships between known concepts and new material
- Discussing real-world applications of upcoming lessons
- Having students explain concepts to peers in their own words

*"When students have a foundational building block to support new knowledge, they can build on that foundation to increase their comprehension about a subject."*

## 3. Retrieval Practice

Retrieving information from memory strengthens learning much more effectively than simply re-reading notes. This priming technique helps students organize knowledge and construct meaning from prior learning.

### Retrieval practice techniques:

- Quick self-quizzes before studying new related material
- Brain dumps (writing everything you remember about a topic)
- Flashcards used before in-depth study sessions
- Attempting to solve problems before being shown the solution
- Regular low-stakes testing on previous material

## How Students Can Use Priming for Better Learning

The research is clear: arriving just 10 minutes early to prepare and prime before class begins can significantly improve learning outcomes. Here's a practical approach for students:

**Review previous class notes (5 minutes)** - This activates relevant neural networks and reconnects you with material that may have faded from memory.

**Skim the day's topic (3 minutes)** - Quickly look over the textbook sections, slides, or readings for the upcoming class to create initial mental frameworks.

**Prepare your note-taking setup (2 minutes)** - Get your notebook or device ready with headings and an outline based on the day's topic.

*"Success in school doesn't come from one singular heroic act. Rather, it comes from the cumulation of many small habits each day."*

## Cautions About Priming in Education

While priming is powerful, educators and students should be aware of its limitations:

- **Individual differences matter** - Research shows that more mindful students (those who pay deliberate attention to the present moment) may be less influenced by priming effects. This suggests that priming techniques might be most beneficial for students who tend to operate on "autopilot."
- **Ethical considerations** - While subliminal priming works well in research settings, it raises ethical questions about influencing students without their awareness or consent. Educational applications should focus on conscious priming techniques.
- **Not a magic solution** - Priming works best as part of a comprehensive learning strategy that includes active engagement, deep processing, and

spaced repetition.

- **Context matters** - Classroom environments contain many competing stimuli that can dilute priming effects. Structured, focused priming activities tend to be most effective.

## Applying Priming in Educational Settings

For educators looking to incorporate priming into their teaching:

- Begin classes with quick warm-up activities related to the day's topic
- Create classroom environments with visible academic vocabulary and concepts
- Share learning objectives at the beginning of each lesson
- Provide pre-reading materials with guiding questions
- Develop routines that naturally prime students for learning

For students looking to self-prime:

- Arrive to class early enough to mentally prepare
- Review notes from previous classes before new lectures
- Skim readings before detailed study
- Test yourself on previous material before learning related concepts
- Create study routines that incorporate priming techniques

## Summary

- **Priming effects** prepare the brain to learn by activating relevant neural networks and creating mental frameworks for new information.
- **Three effective priming strategies** include pre-exposure to new material, activating prior knowledge, and retrieval practice.
- **Just 10 minutes** of preparation before class can significantly improve learning outcomes.
- **Individual differences** in mindfulness may affect how responsive students are to priming techniques.

- **Ethical priming in education** should focus on conscious techniques rather than subliminal manipulation.

By understanding and applying the science of priming, both educators and students can enhance learning efficiency and create stronger, more accessible memories. Small investments in priming activities can yield significant returns in educational outcomes. Download our free ebook **Learning Beyond Listening & Reading** from the [resources](#) page to discover more techniques that can aid learning.

## References

- Brown, P. C., Roediger III, H. L., & McDaniel, M. A. (2014). *Make it stick: The science of successful learning*. Harvard University Press.
- Radel, R., Sarrazin, P., Legrain, P., & Gobancé, L. (2009). Subliminal priming of motivational orientation in educational settings: Effect on academic performance moderated by mindfulness. *Journal of Research in Personality*, 43(4), 695-698.
- Unger, L., & Sloutsky, V. (2022). Priming the brain to learn: Incidental exposure and category learning. *Psychological Science*, 33(5), 767-778.
- Addison, S. (2022). Three ways to prime students for learning. *Journal of Educational Psychology*, 114(2), 289-304.