INFORMATION THEORY AND ITS USES IN COMPUTER SCIENCE

Final Project: Expectations

November 3, 2026

The project is an opportunity to learn about an advanced topic and tell your classmates what makes it interesting. It is intended to be fun. You can explore cryptography, complexity, coding, compression, learning, or another connection to information theory. The goal is to understand a focused topic and explain it clearly.

I encourage you to use AI tools to go deeper: explore examples, ask follow-up questions, and develop proof ideas. Be ambitious and try to prove a new result! New results are welcome, but they are **neither required nor expected**.

Choose a manageable topic

You may work individually or in a group of two or three. Discuss ideas with me in office hours or by email; I can help narrow the topic and find readings. The accompanying topic guide offers starting points. Choose one result, construction, question, or small family of ideas, from the guide or elsewhere.

Deliverables

- A **proposal email** to marshall@cs.nyu.edu.
- A **5–10 minute presentation** for your classmates.
- A **written report of at least three pages**.

Deadlines and the presentation schedule will be announced separately.

The proposal email

Briefly address the following questions in your email:

- Who is working on the project?
- What topic are you proposing, and what specific question or result will you focus on?
- Why is it interesting? What problem does it address?
- What do you propose to read? Give titles and links where available.

You do not need to have mastered the material before proposing it. Use the email to settle on a topic and identify readable sources: book chapters, surveys, lecture notes, recorded talks, or research papers.

The presentation and report

Both should give your classmates a clear account of your selected focus:

- **Context and motivation:** What is the problem, and why do we care?
- **Definitions and model:** What is the object or task? Explain the assumptions and the relevant notion of error, security, or efficiency.
- **Results and ideas:** State one or a few fundamental results. Where useful, describe the construction and explain the main proof idea.

Aim for a coherent story that classmates can follow with the course background. Explain the central ideas and include references to your sources. Discussion of open questions and recent progress is welcome but optional.