Final Project Instructions

For the final project, you will select **one research topic in deep learning** and review **3–5 representative papers published within the past three years**. Your goal is to write a report that clearly explains the key ideas, technical developments, and research trajectory in your chosen topic.

The report should be written in a **clean, accessible, and blog-style format**, similar to:

- An Introduction to Flow Matching · Cambridge MLG Blog
- Lilian Weng's blog
- Neural Circuits and Algorithms Blog

Topic Proposal (Due in Two Weeks)

Within the **first two weeks**, each student must **submit a topic proposal** that includes:

- Your **chosen topic**, and
- A list of **3–5 selected references** you plan to review

This allows feedback and approval before you begin writing the full report.

Suggested Topics

You may choose from (but are not limited to) the following research areas:

- World models and model-based agents
- Video generative models
- Reasoning in large language models
- Visual reasoning ("thinking with images")
- Language diffusion models
- Multimodal generative models
- Biological/mechanistic perspectives on LLMs
- Any other emerging deep learning topic of interest

Feel free to consult me if you are unsure whether a topic is appropriate.

Report Requirements

1. Content

Your final report should:

- Review **3–5 papers** (recent ≈ last three years)
- Explain each paper's **motivation**, **methods**, and **key contributions**
- Describe how the papers relate to each other and how the field is evolving
- Provide your insights on strengths, limitations, and future directions
- Be clearly structured and easy to follow

2. Writing Style

Aim for a high-quality, blog-style presentation:

- Clear narrative flow
- Intuitive explanations with diagrams/equations when helpful
- Minimal unnecessary jargon
- Cohesive storytelling across papers

3. Optional Coding (Bonus)

Coding **is not required**, but you may:

- Reproduce key experiments
- Include visualizations or small demos
- Explore empirical comparisons

Doing so will earn **bonus points**.

Example

A sample A+ project report from last semester is provided for reference. **Note**: last semester's projects included group work and a mandatory coding component; this semester emphasizes clarity, synthesis, and conceptual understanding.