Homework 4: Learning

DO NOT POLLUTE! AVOID PRINTING, OR PRINT 2-SIDED MULTIPAGE.

In this homework you will review some basic topics that you need to know in order to understand what is AI and how it works. You are not allowed to use AI systems like ChatGPT or Claude to answer these questions. Each problem is worth 10 points.

Problem 1. In the context of this course, explain in your own words what the function f is.

Problem 2. What is the main variable to the function f?

Problem 3. Explain in your own words what the function ℓ is.

Problem 4. What is the main variable of the function ℓ?

Problem 5. Explain in your own words what $\mathbf{W}$ is.

Problem 6. Explain in your own words what ℓ quantifies.

Problem 7. The data $\mathbf{X}$ is also present in the function ℓ. What role does it play?

Problem 8. Explain in your own words what $\mathbf{W}^\star$ is.

Problem 9. Explain in your own words how gradient descent searches for $\mathbf{W}^\star$.

Problem 10. Explain in your own words what a derivative is.

Problem 11. Explain in your own words three important things to remember about derivatives.

Problem 12. Explain in your own words what is the purpose of the learning process.

Problem 13. Explain in your own words how the learning process works.