Exercise 1:

Chapter 1 introduces many important machine learning concepts. Within your group, choose one (or two) concept(s) from the list below. Explain the main idea in your own words (use the slides to guide you) and add your result to the shared whiteboard (see link in this week's etherpad on Moodle), including:

a) Group Name (e.g. your favorite animal)

b) Name of the concept

c) A few bullet points explaining the main idea

d) Name of the group member who will present your results

Concept list (pick one or two)

1) AI vs ML vs DL

2) Learning paradigms: supervised, unsupervised, reinforcement learning

3) Data in supervised learning: features vs target; labeled vs unlabeled; Iris example

4) Data types and encodings: numeric vs categorical; one-hot vs dummy; ordinal encodings

5) Data-generating process and the i.i.d. assumption

6) Tasks: regression vs classification

7) Predict vs explain

8) Models and hypothesis spaces (model class H)

9) Parameters, identifiability, and examples (linear, quadratic, RBF)

10) Learners (inducers): from data and controls to a fitted model

11) Loss functions (e.g., L1, L2; classification surrogates)

12) Risk minimization: theoretical vs empirical risk

13) Empirical Risk Minimization (ERM)

14) Optimization for learning (e.g., gradient descent, step size)

15) Components of supervised learning: hypothesis space + risk + optimization (plus regularization)