01 INTRODUCTION TO ML THEORY

* Machine Learning (ML) is the science of teaching computers to learn patterns from data and make decisions or predictions without being explicitly programmed.
* A model needs two things from our data:
  1. Features: Input variables for the model to learn from
  2. Target Variable: The value it will try to predict (only for supervised learning)
* Three categories of ML problems:
  1. Supervised Learning: The model is provided both features and correct answers.
  2. Unsupervised Learning: The model is provided with features only. It tries to discover patterns/structures within the data.
  3. Reinforcement Learning: No static data provided at all. The "agent" makes a sequence of decisions in an "environment" to learn through trial and error by receiving rewards or penalties.
* Parameters are values that the model learns on its own from the training data and adjusts by itself to minimize the cost function.
* Hyperparameters are the configuration settings that the data scientist must set BEFORE the training process begins, chosen based on experience, intuition, or a systematic tuning process.