# Multiple Choice Questions for Lecture 5: Learning and Classification

## Learning in AI

1. What does “learning” in artificial intelligence mean?
   * 1. Computers reading textbooks
     2. AI systems acquiring knowledge from data or experience
     3. Programmers writing code for the AI
     4. AI watching educational videos

* Answer: B) AI systems acquiring knowledge from data or experience

1. What is the difference between a machine learning algorithm and a machine learning model?
   * 1. They are the same thing
     2. The algorithm is the method for learning; the model is the result after learning.
     3. The algorithm is created by humans; the model is created by computers.
     4. The algorithm is for simple tasks; the model is for complex tasks

* Answer: B) The algorithm is the method for learning; the model is the result after learning

1. Using the cooking analogy from the lecture, what would the “data” represent?
   * 1. The cook
     2. The recipe (instructions)
     3. The raw ingredients
     4. The kitchen

* Answer: C) The raw ingredients

## Types of Learning

1. In supervised learning, what is provided to the AI during training?
   * 1. Only input data
     2. Only output data
     3. Both input data and correct output (labels)
     4. No data at all

* Answer: C) Both input data and correct output (labels)

1. What type of learning is used when an AI learns to play a game by receiving points for winning?
   * 1. Supervised learning
     2. Unsupervised learning
     3. Reinforcement learning
     4. Semi-supervised learning

* Answer: C) Reinforcement learning

1. Which type of learning would be best for grouping customers into different categories without knowing the categories in advance?
   * 1. Supervised learning
     2. Unsupervised learning
     3. Reinforcement learning
     4. Structured learning

* Answer: B) Unsupervised learning

1. What is semi-supervised learning?
   * 1. Learning that happens halfway through training
     2. Learning that uses a small amount of labeled data and a large amount of unlabeled data
     3. Learning that is partly done by humans and partly by machines
     4. Learning that only works half the time

* Answer: B) Learning that uses a small amount of labeled data and a large amount of unlabeled data

## Learning an Unknown Function

1. What is the main goal when learning an unknown function in machine learning?
   * 1. To create a perfect copy of the function
     2. To discover a function that approximates the true function
     3. To discover the mathematical formula of the function
     4. To replace the function with a better one

* Answer: B) To discover a function that approximates the true function

1. What is the “ground truth” in machine learning?
   * 1. The actual correct outputs in the training data
     2. The earth beneath the computer
     3. The foundation of computer science
     4. The physical hardware the AI runs on

* Answer: A) The actual correct outputs in the training data

1. Why do we split data into training and test sets?
   * 1. To make the learning process faster
     2. To save memory space
     3. To evaluate how well the model works on unseen data
     4. Because we have too much data

* Answer: C) To evaluate how well the model works on unseen data

## Types of Prediction Problems

1. What is the main difference between classification and regression problems?
   * 1. Classification is easier; regression is harder
     2. Classification predicts categories; regression predicts numerical values
     3. Classification uses neural networks; regression uses decision trees
     4. Classification is supervised; regression is unsupervised

* Answer: B) Classification predicts categories; regression predicts numerical values

1. Which of these is an example of a classification problem?
   * 1. Predicting the price of a house
     2. Estimating a person’s age
     3. Determining if an email is spam or not
     4. Forecasting the temperature tomorrow

* Answer: C) Determining if an email is spam or not

1. Which of these is an example of a regression problem?
   * 1. Identifying if a picture contains a cat
     2. Predicting the temperature tomorrow
     3. Determining if a customer will buy a product
     4. Recognizing handwritten digits

* Answer: B) Predicting the temperature tomorrow

## Classification Process

1. What are the two main steps in the classification process?
   * 1. Data collection and data processing
     2. Model construction and model usage
     3. Training and validation
     4. Input and output

* Answer: B) Model construction and model usage

1. How is the accuracy of a classification model typically measured?
   * 1. By the speed of classification
     2. By the percentage of correct predictions
     3. By the size of the model
     4. By the number of features used

* Answer: B) By the percentage of correct predictions

## Decision Trees

1. What is a decision tree?
   * 1. A diagram showing the hierarchy in a company
     2. A diagram representing possible solutions to a decision
     3. A special type of neural network
     4. A tree that decides which data to use

* Answer: B) A diagram representing possible solutions to a decision

1. Why are decision trees popular in machine learning?
   * 1. They are very fast
     2. They are easy to understand and interpret
     3. They always give the best results
     4. They use very little memory

* Answer: B) They are easy to understand and interpret

1. In a decision tree, what happens at each non-leaf node?
   * 1. The data is stored
     2. A prediction is made
     3. A yes/no question is asked
     4. The learning rate is adjusted

* Answer: C) A yes/no question is asked

1. What is the goal when learning a decision tree?
   * 1. To make the tree as deep as possible
     2. To find a tree with small error on the training data
     3. To use as few features as possible
     4. To have exactly the same number of examples in each leaf

* Answer: B) To find a tree with small error on the training data

1. What does “purity” mean in the context of decision tree nodes?
   * 1. Nodes containing examples of only one class
     2. Nodes with no missing values
     3. Nodes that are easy to understand
     4. Nodes that use simple questions

* Answer: A) Nodes containing examples of only one class