Badji-Mokhtar university Annaba

Departement of computer science

21/06/2025

Duration : 01H30

Introduction to Artificial Intelligence (IAI)

MIAGE L1

Exercise 1 (5 points): Choose the correct answer(s):

Q1. Which of the following are steps in the machine learning workflow?
A) Data collection and preprocessing
B) Model deployment
C) Programming in Python
D) Model evaluation

Q2 :Which component is not typically part of the AI workflow?
A) Data collection
B) Feature engineering
C) Hardware repair
D) Model evaluation

Q3 :In the data science workflow, what steps typically come before model training?
A) Data acquisition
B) Model evaluation
C) Feature engineering
D) Data cleaning and preprocessing

Q4 :What distinguishes supervised learning from unsupervised learning?
A) Supervised learning requires no data.
B) Unsupervised learning uses labeled data.
C) Supervised learning uses labeled data to predict outcomes.
D) Both are identical.

Exercise 2 (8 points): A bank is developing a basic AI system to decide whether to approve personal loan applications. The dataset is as follows:

Applicant	Income	Employment	Loan approvel
A1	High	Yes	Yes
A2	Low	No	No
A3	Medium	Yes	Yes
A4	Low	Yes	No
A5	High	No	Yes
A6	Medium	No	No

1. Identify the type of machine learning problem and the target variable.
2. Calculate the entropy of the dataset.

3. Compute the information gain for the attributes Income and Employment.
4. Determine the best attribute to use at the root node of the decision tree

Exercise 3 (7 points): A startup company is studying the relationship between the number of online ads clicked by users and the amount of money they spend on the website (in DZD). The following data was collected from six users:

User	Number of Clicks(X)	Money spent (DZD)
U1	5	150
U2	8	220
U3	12	310
U4	15	400
U5	18	470
U6	22	560

1. Plot the data on a graph where : X-axis: Number of ads clicked and Y-axis: Money spent (in DZD)
2. Calculate the slope (m) and intercept (b) of the linear regression line using the least-squares method.
3. Write the regression equation in the form: $Y = mX + b$
4. Use your model to predict the spending for a user who clicked: 10 ads and 20 ads