



University of M'sila, Algeria

Computer science department

1st year undergraduate (2025/2026)

Introduction to Artificial intelligence

Lab 3 (Learning from data)

Q. In Lab 2, where was the intelligence located?

Q. What problems appeared when the number of rules increased?

Task 1:

Consider the following dataset of student situations and advice:

```
examples = [  
    ("exam tomorrow", "study"),  
    ("very tired", "rest"),  
    ("many deadlines", "plan")  
]
```

Read the examples carefully.

Q. Are these rules or examples?

Q. Do these examples explain *why* the advice is given?

Task 2:

```
situation = input("Describe your situation: ").lower()  
  
if "exam" in situation:  
    print("Advice: study")  
elif "tired" in situation:  
    print("Advice: rest")  
else:  
    print("Advice: plan")
```

Test the program with different inputs.

Q. Is the program reasoning, or matching patterns?

Q. Where is the decision logic located?

Task 3:

Now modify **only the examples**, not the structure of the program.

Try:

- adding a new example,
- removing an example,
- changing the advice linked to an example.

Run the program again.

Q. Did the program's behavior change?

Q. Did you modify the algorithm itself?

Task 4:

```
examples = [
    ("exam tomorrow", "study"),
    ("final exam soon", "study"),
    ("very tired", "rest"),
    ("no sleep last night", "rest"),
    ("many deadlines", "plan"),
    ("too many tasks", "plan")
]
```

Observe:

- different sentences can lead to the same advice,
- similar words appear across many examples.

```
situation = input("Describe your situation: ").lower()

study_score = 0
rest_score = 0
plan_score = 0

if "exam" in situation:
    study_score += 1
if "tired" in situation or "sleep" in situation:
    rest_score += 1
if "deadline" in situation or "task" in situation:
    plan_score += 1

if study_score >= rest_score and study_score >= plan_score:
    print("Advice: study")
elif rest_score >= plan_score:
    print("Advice: rest")
else:
    print("Advice: plan")
```

Q. Is the program using one rule or combining information?

Q. What happens when several patterns appear at the same time?

Q. Does this feel closer to learning than earlier versions?

Task 5:

You are given a dataset with two features and a label

```
data = [  
    (165, 38, "F"),  
    (170, 39, "F"),  
    (158, 37, "F"),  
    (175, 41, "M"),  
    (180, 42, "M"),  
    (172, 40, "M"),  
    (168, 39, "F"),  
    (178, 43, "M"),  
]
```

Each row represents:

- height (cm)
- shoe size (EU)
- a label (dataset label Male=M , Female=F)

Q. Are these rules or examples?

Q. Where is the knowledge stored now?

Run the following program:

```
import math  
  
h = int(input("Enter height (cm): "))  
s = int(input("Enter shoe size (EU): "))  
  
best_label = None  
best_dist = None  
  
for dh, ds, label in data:  
    dist = math.sqrt((h - dh)**2 + (s - ds)**2) #Euclidean Distance  
    if best_dist is None or dist < best_dist:  
        best_dist = dist  
        best_label = label  
  
print("Prediction:", best_label)  
print("Closest distance:", best_dist)
```

Test several inputs.

Q. Did you write decision rules like in Lab 2?

Q. What determines the prediction?

Modify **only the dataset**:

- add new rows,
- remove some rows,
- change some labels.

Test the same input again.

Q. Did the prediction change?

Q. Did the algorithm change?

Q. Where is the intelligence now: code or data?

Try inputs that fall “in between” examples.

Q. Does the system ever hesitate?

Q. Is it forced to choose even when the situation is unclear?

Q. Where is the “intelligence” located in this system?

Q. Is this still an example of **weak AI**? Explain.

Q. How is this different from expert systems?

Q. What is this system still unable to do?