

# Day 5 Student Exercises: Unsupervised and Reinforcement

Name: \_\_\_\_\_

Date: \_\_\_\_\_

*Formative, not graded. Predict before you run a cell; discuss with your neighbour where asked.*

## Part A: Predict before you run (during the labs)

1. **Elbow.** At which number of clusters  $k$  do you expect the sharpest drop in inertia? Why?  
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2. **Explained variance.** How many principal components do you think together explain more than 80% of the variance?  
\_\_\_\_\_
3. **Bandit.** Can a few noisy pulls reliably reveal the best asset? What must the agent do instead?  
\_\_\_\_\_
4. **No exploration.** What happens if the bandit always picks the current best and never explores (exploration rate 0)?  
\_\_\_\_\_
5. **Q-learning.** After training the corridor agent, which action has the higher value in every cell, left or right? Why?  
\_\_\_\_\_

## Part B: Discussion exercises

**EX-D5-1. Which distance, straight-line (Euclidean) or angle (cosine)?** Pick one for each and give a one-line reason.

- (a) two companies by absolute size (revenue and total assets in euros), to group similarly sized firms:  
\_\_\_\_\_
- (b) two earnings snippets by topic, regardless of how long each is:  
\_\_\_\_\_
- (c) two customers by total euros spent:  
\_\_\_\_\_

**EX-D5-2. Would you trade this bandit tomorrow?** Give three concrete reasons NOT to wire the simulated bandit to a real account.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

**EX-D5-3. Name the paradigm** (supervised, unsupervised, or reinforcement):

- (a) predict default from labeled past loans: \_\_\_\_\_
- (b) group 500 stocks with no categories: \_\_\_\_\_
- (c) learn a trade-execution policy from reward feedback: \_\_\_\_\_
- (d) find the three hidden factors driving a portfolio: \_\_\_\_\_

**EX-D5-4. Read the silhouette.** Clustering A scores 0.62, clustering B scores 0.28.

- (a) Which is cleaner, and what does the score measure?

\_\_\_\_\_

- (b) Could a high silhouette still be the wrong clustering for your purpose?

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*Exit ticket: name one thing you can do now that you could not this morning.* \_\_\_\_\_