Dear Students,

For the Project of DRL course, you need to choose a problem and fulfill all the requirements. Follow the explanations clearly as follows. For the projects, you can work independently or in groups of a maximum of two people. Note that the contribution of each group member must be clear and separated in the final presentation, and a low contribution can affect individual marks.

Important Dates:

✓ The final project's presentation is on **December 26th**, 2025 (after the exam on the 19th).

Project:

- Implement a DQL-based algorithm, with Open-AI gymnasium toolkit, based on a modified problem that you need to solve as follows.
- Read Gymnasium Documentation (and use Wrappers as explained) to modify one of the following environments, then solve it with Q-Learning, or DQL algorithm (see complexity of your problem).

Note for Wrappers: https://gymnasium.farama.org/introduction/create_custom_env/

Option (A): Taxi-driver problem:

✓ Add two (second random) passengers to the problem.
✓ Add one random danger state that damages the taxi if the car goes to that state (resets the env, since it means failing).
✓ Add another random danger state that partially damages the taxi if the car goes to that state (punishment on the reward function only).

Then, solve successfully pick and place for both passengers and report convergence plot, and video of demo of success for 5 trials.

Option (B): Cliff Walking Problem:

✓ Add one walking enemy over the cliff that moves to the left and right on the cliff (all the way left to right on the cliff).
✓ Add one bird on the two top rows, flying to the left and right.
✓ Add one more small food on the way to a random location (not a terminal state, but needs to add up to a reasonable reward).

Then successfully solve, find the food, and report the convergence plot, and video of the demo of success for 5 trials.

Important Note: Using any AI tools like Chat-GPT is only for learning, and they must not be used for writing code, reports, or papers. Duplicated projects from internet sources are not allowed.

Must Submit in Moodle: Python code, Word document of report. (Must not zip the files).