AIE1901 Assignment 1 (Fall 2025)

Grade: This assignment will be graded for 50 points and will be converted to 10% of the course grade.

Submission: This is an individual assignment. Submit your completed assignment in a pdf document (named as "AIE1901_Assignment1_X.pdf" where X should be your student ID) in the Blackboard -> Assessment Scheme -> Assignment 1.

Due Date: Thursday Oct 16, 2025 by 11:59pm (midnight)

1. **(20 points) Ask the question below to at least four different LLMs listed below (Hint: Please use https://cloud.siliconflow.cn/me/playground/chat to chat with different LLMs):**

   - Owen2.5-7B-Instruct, Kimi-K2-Instruct-0905, DeepSeek-R1, DeepSeek-V3, Ling-flash 2.0

   - Prompt: *A geothermal power plant has three geothermal wells (A, B, and C) with maximum sustainable capacities of A: 1000 units, B: 1500 units, and C: 2000 units. The maximum operating capacity of the power generation equipment is 3000 units. To maintain the pressure in the geothermal field, some of the used hot water or steam needs to be reinjected underground, with a reinjection ratio requirement of 40%. The unit extraction costs for each geothermal well are A: 5 units, B: 4 units, and C: 3 units, and the environmental protection cost is 2 units. Assuming the electricity market demand for a time period t is 2800 units, and each unit of electricity generation brings 1 unit of revenue.*

     How should the extraction quantities of the three geothermal wells be scheduled to meet the electricity market demand while maximizing revenue and minimizing costs? Design a scheduling plan and calculate the maximum total revenue."

Paste the screen shots here to show the model output. What do you notice? Does all LLMs give the correct answer? Explain the behavior observed.

2. **(30 points)** We have the following question to address:

"*A city is developing a promotion strategy for green travel to increase public participation. Currently, there are four different modes of green travel available in the city: bicycles, electric cars, public transportation, and walking. The promotion costs, expected participation rates, and environmental scores for each travel mode are shown in the table below:*

Travel Mode	Promotion Cost (in 10,000 yuan)	Expected Participation Rate	Environmental Score
Bicycle	5	0.3	4
Electric Car	15	0.5	3
Public Transportation	10	0.4	5
Walking	3	0.2	5

The city's goal is to maximize the expected participation rate and environmental score within a limited budget (total promotion cost should not exceed 300,000 yuan). At the same time, to ensure diversity in the strategy, at least two travel modes need to be selected.

Please help the city select the travel modes and develop a promotion strategy for green travel that maximizes the expected participation rate and environmental score while meeting the budget and diversity requirements.
."

Your task: Use ORLM-LLaMA-3-8B to help you build a mathematical model and corresponding Python code using coptpy to solve this question. In your submission, you should:

- **Provide the screenshot** of the prompt you used and the complete output from the LLM.

- **Transcribe the mathematical model** (decision variables, objective function, constraints) as generated by the LLM

- **Report the output** (optimal strategy) after running the Python code provided by the LLM

- **Reflect on correctness:** Do you think the LLM provided a correct model and code? If yes, explain how you verified it. If not, identify the error(s) and explain how you corrected them to find the right solution.