Assignment 5

Xipu Li

Note that some steps are screenshotted for better display of math equations

Question 1:

1.1 Which route should we pick? Show your work.

- **Route 1:**
  - Expected Time $= 2km \times (0.2 \times \frac{1}{3} + 0.3 \times \frac{1}{5} + 0.5 \times \frac{1}{2})$
- **Route 2:**
  - Expected Time $= 1.8km \times (0.4 \times \frac{1}{3} + 0.2 \times \frac{1}{5} + 0.4 \times \frac{1}{2})$
- **Route 3:**
  - Expected Time $= 3.1km \times (0.5 \times \frac{1}{3} + 0.4 \times \frac{1}{5} + 0.1 \times \frac{1}{2})$

- Route 1: Approximately 0.753 hours
- Route 2: Approximately 0.672 hours
- Route 3: Approximately 0.920 hours

So, it seems that **Route 2** is the best.

1.2 Now, which route should we pick? Show your work.

- **Route 1:**
  - Adjust for crater: $0.753hours + 0.3 \times 0.75hours$ (30% chance of 45 min delay)
- **Route 2:**
  - Adjust for bridge: $0.672hours + 0.6 \times 1hour$ (60% chance of 1 hour delay)
- **Route 3:**
  - Remains the same as no new info affects it.

After adjustments:

- Route 1: Approximately 0.978 hours
- Route 2: Approximately 1.272 hours
- Route 3: Remains the same at approximately 0.920 hours

So, it seems that **Route 3** is the best after adjustments.

1.3 Now suppose that we can use a satellite to find out whether the terrain in route 3 is smooth. Is this helpful? What is the value of this information?

The best case scenario for Route 3 would take about 3.1/5 = 0.62 hours, which is less than the expected time for the other two routes. The satellite info for route 3 is 0.919 - 0.62 = 0.3 hours. This number is significant enough to be helpful and worth the wait for obtaining this data from the satellite.

1.4 Now put this problem into ChatGPT. Is it able to solve it correctly? If not, where does it make mistakes?

Using the free version of the ChatGPT, I couldn't solve this problem as it's known that ChatGPT doesn't do well with math and logical reasoning.

I got a hallucinated result (0 hours vs 0.3 hours) from GPT. So math is where it made the mistake.