HW - Quantitative Risk Analysis

Start Assignment

- Due Dec 5 by 11:59pm
- Points 15
- Submitting a file upload

HW - Quantitative Risk Analysis

In this assignment, you'll use Python to perform quantitative risk analysis for a hypothetical scenario. Your project has encountered a technical challenge, and your team provides two possible solutions (option A and option B). Your task is to analyze the impact of these options on project schedule and cost.

Cost Impact:

- Option A: 60% chance of $6,000 additional cost; 40% chance of $9,000 additional cost.

- Option B: 20% chance of $4,000 additional cost; 25% chance of $6,000; 40% chance of $8,000; 15% chance of $12,000.

Schedule Impact:

- Option A: 40% chance of 1-week delay; 60% chance of 2-week delay.

- Option B: 20% chance no delay; 25% chance of 1-week delay; 40% chance of 2-week delay; 15% chance of 3-week delay.

Tasks:

1. (4 pts) Use Python to calculate the expected schedule delays and additional costs for both options.

2. (2 pts) Based purely on delay, determine which option you would select and explain your choice clearly.

3. (2 pts) Based purely on additional cost, determine which option you would select and justify your decision.

4. (2 pts) Suppose your company receives a bonus of $5,000 from the customer if the project finishes without delay. Determine which option you would recommend and why.

Monte Carlo Simulation: 5. (5 pts) Using Python, perform a Monte Carlo simulation (at least 100 iterations) to estimate the expected schedule delay for Option A. Generate and include a chart in your

submission illustrating how the estimated delay converges as more iterations are performed.

Submission Details:

- Submit a zip file containing:

    - Your Python code (.py file).

    - A document (.pdf or .docx) containing clearly explained answers and your justifications for each question.

    - A generated chart showing your Monte Carlo simulation convergence.

HW Quantitative Risk Analysis Rubric (1)

Criteria	Ratings			Pts
Question 1A Determine the expected schedule delays and additional costs for both options using Python calculations.	**4 pts** **Both Options** Correctly calculated expected schedule delays and additional costs for both options clearly using Python.	**2 pts** **One Option** Correct calculations for only schedule or only cost, or minor inaccuracies in calculations.	**0 pts** **No Marks** No attempt or major errors in calculations.	4 pts
Question 1B Based purely on delay, clearly state the preferred option and justify your choice.	**2 pts** **Correct Option and Justification** Correct option chosen with clear and accurate justification.	**1 pts** **No Justification** Correct option chosen, but justification is weak or unclear.	**0 pts** **No Marks** No attempt or incorrect option chosen without justification.	2 pts
Question 1C Based purely on additional costs, clearly state the preferred option and justify your choice.	**2 pts** **Correct Option and Justification** Correct option chosen with clear and accurate justification.	**1 pts** **No Justification** Correct option chosen, but justification is weak or unclear.	**0 pts** **Incorrect Option** No attempt or incorrect option chosen without justification.	2 pts
Question 1D If a bonus of $5,000 is offered for on-time project delivery, clearly determine and justify the most beneficial option considering schedule and bonus impact.	**2 pts** **Both Options** Correct option chosen with clear reasoning including the bonus consideration.	**1 pts** **One Option** Correct option selected, but explanation is partially unclear or incomplete.	**0 pts** **Missing or Incorrect MV** No attempt or incorrect option selected without logical reasoning.	2 pts
Question 2 Use Python to run a Monte Carlo simulation to estimate the expected schedule delay for Option A. Clearly show results graphically and numerically with at least 100 iterations.	**5 pts** **Simulation and Correct Estimation** Correct Python Monte Carlo simulation provided with at least 100 iterations, results clearly graphed, and results properly	**3 pts** **Simulation with iterations** Simulation completed, but fewer than required iterations, or graphical representation	**0 pts** **No Marks** No attempt or significant errors in simulation or lack of graphical data.	5 pts

Criteria	Ratings		Pts
	converge to a stable estimate.	unclear or incomplete.	
			Total Points: 15