r/ThingsYouDidntKnow • 2 mo. ago
TheStocksGuy

Traveling Sat Problem (TSP, SAT)

To analyze the performance difference between the Lightning and Water modules regarding query execution time, I started by outlining the basic structure of the problem and then considered how it scales with varying input sizes.

Assumptions

1. Each object contains three values: `name`, `x`, and `y`.
2. I decided to compare the execution time for an initial set of 50 objects and then scale that up to 50,000 variations.
3. The execution times for each module are as follows:
    - Lightning: 0.40 ms per query
    - Water: 1.20 ms per query

Step 1: Calculate Execution Time for 50 Objects

For the initial 50 objects, I calculated the total execution time for both modules:

- **Lightning Total Time for 50 Objects:** Total Time = Number of Objects × Execution Time per Object Total Time = 50 × 0.40 ms = **20 ms**
- **Water Total Time for 50 Objects:** Total Time = 50 × 1.20 ms = **60 ms**

Step 2: Scale Up to 50,000 Variations

Next, I examined how these times would scale for 50,000 objects. Since the processing time increases linearly with the number of objects, I used the same approach:

- **Lightning Total Time for 50,000 Objects:** Total Time = 50,000 × 0.40 ms = **20,000 ms** = **20 seconds**
- **Water Total Time for 50,000 Objects:** Total Time = 50,000 × 1.20 ms = **60,000 ms** = **60 seconds**

Summary of Results

- For **50 Objects**:
    - Lightning Module: **20 ms**
    - Water Module: **60 ms**
- For **50,000 Objects**:
    - Lightning Module: **20 seconds**
    - Water Module: **60 seconds**

Conclusion

Lightning module when dealing with larger datasets, making it the better choice for performance-sensitive applications.

If you have any questions or need further calculations, feel free to reach out!

Link to Lightning TSP: https://github.com/BadNintendo/tsp/blob/main/lightning-tsp.js

Link to Water TSP: https://github.com/BadNintendo/tsp/blob/main/water-tsp.js

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TheStocksGuy OP • 2mo ago • Edited 2mo ago

I've created a new version that removes SAT and improves performance even further. This version has two examples: one is a more precise, but longer approach, while the other shows the optimized results with faster speeds.

With the refined algorithm, processing 50,000 objects is projected to take about **1.38 minutes** (or **82.9 seconds**), a significant improvement compared to the previous estimate of **24.11 minutes**.

Optimized Calculation:
12.8 ms for 50 objects scales up to only **12.8 seconds** for 50,000 objects.

The optimized approach clearly makes a huge difference in processing time!

https://github.com/BadNintendo/tsp/blob/main/visual/tsp-professional.html

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