Final Report – Julia vs Python Performance

Project Path:
J:\SCHAEDLER\Senac Gabriel 2025\Desempenho Julia Vs Python

Objective:
Compare the performance between Julia and Python in computational tasks involving matrix multiplication, prime number generation, and Monte Carlo simulation for estimating π.

Tests Summary:
Matrix Multiplication:
- Julia: 1.02 s, 231.57 MB
- Python: 2.10 s, 314.22 MB

Prime Number Generation:
- Julia: 0.0038 s, 0.74 MB
- Python: 0.05 s, 9.45 MB

Monte Carlo Simulation:
- Julia: 0.0083 s, 0.03 MB
- Python: 0.15 s, 11.03 MB

Analysis:
Julia consistently outperformed Python across all three tests, particularly in memory efficiency and execution spe
Julia's JIT compilation and native mathematical capabilities make it highly efficient for numerical tasks.

AI Insights:
- Prompt 1: Julia is faster in matrix operations due to native BLAS/LAPACK usage.
- Prompt 2: Julia is ideal when performance and memory are critical.
- Prompt 3: Monte Carlo simulation benefits from Julia's compiled loop performance.

Conclusion:
Julia proves to be more efficient and scalable for high-performance and memory-sensitive tasks.
Python remains versatile and accessible, but is less optimal for intense numerical computations.

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