

Parallel Programming Exercise 4 – 12

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(If you and your team member contribute equally, you can use (co-first author), after each name.)

1 Problem and Proposed Approach

利用給定的公式，近似出 pi 的值。

我的做法是將 summation 的那一項拆給不同的 processor 去算，最後 reduce 再由 p0 算出結果。

(Brief your problem, and give your idea or concept of how you design your program.)

2 Theoretical Analysis Model

(Try to give the time complexity of the algorithm, and analyze your program with iso-efficiency metrics)

$$Time\ complexity = O\left(\frac{n}{p} + \lambda \log p\right)$$

$$n \geq Cp \log p$$

$$scalability\ function = \frac{M(Cp \log p)}{p} = C \log p$$

3 Performance Benchmark

(Give your idea or concept of how you design your program.)

我把 n 設為 10^9 ，才比較能看出差異

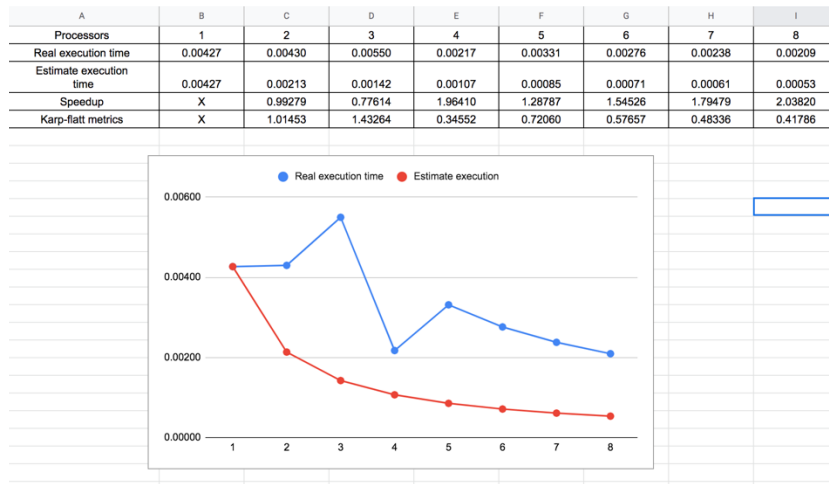


Figure 1. The performance of diagram

4 Conclusion and Discussion

1. Speedup 未必隨 p 而上升，可見 communication 所佔的比重不小
2. 減少計算的步驟
3. 由 k 值和 speedup 可知，communication 佔了不少比例
4. Overhead 佔不少比例；有良好的 scalability

(Discuss the following issues of your program

1. What is the speedup respect to the number of processors used?
2. How can you improve your program further more
3. How does the communication and cache affect the performance of your program?
4. How does the Karp-Flatt metrics and Iso-efficiency metrics reveal?

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Appendix(optional):

(If something else you want to append in this file, like picture of life game)