Ping-Chun, Shih 1/3 Homework 1

1:

一張含有 文字, 行, 繪圖, 圖表 的圖片

自動產生的描述

一張含有 文字, 繪圖, 行, 螢幕擷取畫面 的圖片

自動產生的描述

CC1 Trace:

Reads: 130655

Writes: 104513

Spice Trace:

Reads: 150699

Writes: 66538

In both traces, there are more reads than writes. This is a common pattern in many applications where reading data from memory often outweighs the number of write operations.

Comment based on the histograms:

the spice trace exhibits characteristics of a more memory intensive workload, with less localized access patterns and larger working sets. The cc1 trace appears more cache-friendly. The broader distribution and hotspots in the spice trace point to potential optimization targets for improving locality of reference if possible. The narrow cc1 distribution suggests its working set already fits well in caches.

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2:

|  |  |  |
| --- | --- | --- |
|  | My computer | Ubuntu |
| CPU | 2th Gen Intel(R) Core(TM) i7-12700H 2.30 GHz | 2th Gen Intel(R) Core(TM) i7-12700H 2.30 GHz |
| Memory | 16GB | 3.8GB |
| operating system | Windows | Ubuntu 22.04.3 LTS |
| hardware information | ASUSTek COMPUTER INC. | Virtual Box |

First algorithm:

Integer Matrix average time taken:

My computer: (3.218s + 2.931s + 3.391s + 3.2s + 3.189s)/5 = 3.1858s

Ubuntu 22.04: (3.705s + 3.378s + 3.106s + 3.503s + 2.988s)/5 = 3.336s

Double Matrix average time taken:

My computer: (5.929s + 5.501s + 5.527s + 5.268s + 5.26s)/5 = 5.497s

Ubuntn 22.04: (8.035s + 8.132s + 6.878s + 7.769s + 7.445s)/5 = 7.6518s

Performance ratio (Integer Matrix): 3.336/3.1858 = 1.05

Performance ratio (Integer Matrix): 7.6518/5.497 = 1.34

Clack ratio: 2.30/2.30 = 1

Second algorithm:

Integer Matrix average time taken:

My computer: (1.096s + 1.124s + 1.084s + 1.061s + 1.087s)/5 = 1.0904s

Ubuntu 22.04: (0.93s + 0.944s + 0.914s + 1.093s + 0.903s)/5 = 0.9568s

Double Matrix average time taken:

My computer: (1.683s + 1.642s + 1.638s + 1.594s + 1.643s)/5 = 1.64s

Ubuntn 22.04: (1.707s + 1.711s + 1.719s + 1.723s + 1.65s)/5 = 1.702s

Performance ratio (Integer Matrix): 1.0904/0.9568 = 1.14

Performance ratio (Integer Matrix): 1.702/1.64 = 1.04

Clack ratio: 2.30/2.30 = 1

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Compare the performance of the two systems:

For comparison of two system, I think my computer’s performance is better than Ubuntu because Ubuntu is running at virtual box at my computer, so the performance of virtual box is less than my computer.

Is the performance ratio the same as the clock rate ratio of the two systems? Explain.

No, because even if two processors have the same clock rate, their architectures may differ, leading to variations in how efficiently they execute instructions. A processor

with a more advanced architecture or better instruction pipeline may achieve higher performance despite a similar clock rate.

Based on the retail price of the two systems, which one is more cost effective?

My computer is around $1000, and Ubuntu is free. However, Ubuntu’s performance is depending on my computer, so I think my computer is better.

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