Computer Architecture 2022 – Project 3

Performance analysis under TDP consideration

Deadline: 2022/12/09 23:59

I.   Introduction

In previous projects, different cores and different cache (levels, cache size, data access time, tags access time…) affect the processor performance or power. You might observe that using more cores or levels of cache may decrease the processing latency or power. However, these metrics are not monotonically decreasing due to delay faults.

In this project, you have to analyze the performance between different numbers of cores, numbers of cache and size, etc.

II.   Reference Source

You can find support for this project in the following reference:

1. C. Chou, Y. Ho, H. Li and A. A. Wu, "Sniper-TEVR: Core-variation simulation platform with register-level fault injection for robust computing in CMP system," *2016 International Symposium on VLSI Design, Automation and Test (VLSI-DAT)*, Hsinchu, 2016, pp. 1-4, 2016.
2. Sniper IISW Tutorial:
    http://snipersim.org/documents/2013-09-22%20Sniper%20IISWC%20Tutorial.pdf
3. The Sniper User Manual: http://snipersim.org/documents/sniper-manual.pdf

III.   Change the benchmark

Please use the **Cholesky** benchmark during the project.

IV. Project Problem

Problem requirement in your report. **Please written in word file**

a. Please analyze the performance (power, energy, latency…) under different conditions (number of cores, cache levels, cache size, access time…).
   Paste the result images and configuration images in the file. Analyze the relationship between the conditions and performance clearly.

b. Submit the corresponding resulting file if you can't screenshot in one figure. (i.e. sim.out)

c. (**bonus**) Find the **optimal performance** under the specific condition.
   Paste the result images and configuration images in the file.

- **~/Downloads/sniper-6.0/config/gainestown.cfg**

```
[perf_model/core]
frequency = 2.66

[perf_model/l?_cache]
perfect = false
cache_size = ?
associativity = 16
address_hash = mask
replacement_policy = lru
data_access_time = ?
tags_access_time = ?
perf_model_type = parallel
writethrough = 0
shared_cores = 4
```

V. Contact Information

If you encountered any unsolvable problem, please email me. Pack your files as a compressed file, name the compressed file as "CAProject3_ID_Name" like (CAProject3_M012345678 吳小勳) and upload
it when you finished the report.

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