Nick Marton CSCI-2500 Computer Organization

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Daniel Campos December 6th, 2012

Josh Zone

Group Project: Instruction Pipeline and Cache(IPLC) Simulator

Responsibilities

Nick Marton([marton@rpi.edu](mailto:marton@rpi.edu)):Pipeline Coding and overarching concepts.

Nick Lafarriere(lafarn@rpi.edu):Theoretical Development and math, Cache Coding

Daniel Campos(campod2@rpi.edu):Tester of code, Writing Report, Debugging Code, theoretical development and math, Cache Coding

Josh Zone(zonej@rpi.edu): Theoretical Development and math, Debugging, Pipeline Coding

Overall we worked together the whole time and any time we would work using our collective minds to solve the problems.

The file is located in Nick Lafaerriere’s kratos account under final.

Evaluation

Branch Taken

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Block Size | Associativity | Index Bits | Cache Size | Cache Access | Cache Miss | Cache Hit | Cache Miss Rate | Total cycles | Total Instructions | Total Branch Instructions | Total correct predictions | CPI |
| 1 | 1 | 7 | 7168 | 35863 | 1390 | 34473 | 0.038759 | 53120 | 34752 | 7044 | 1279 | 1.528545 |
| 2 | 1 | 6 | 5632 | 35863 | 1301 | 34562 | 0.036277 | 52307 | 34752 | 7044 | 1290 | 1.505151 |
| 4 | 1 | 6 | 9664 | 35863 | 770 | 35093 | 0.021471 | 47646 | 34752 | 7044 | 1291 | 1.371029 |
| 1 | 2 | 6 | 7296 | 35863 | 502 | 35361 | 0.013998 | 45324 | 34752 | 7044 | 1280 | 1.304213 |
| 2 | 2 | 5 | 5696 | 35863 | 357 | 35506 | 0.009955 | 44021 | 34752 | 7044 | 1290 | 1.266718 |
| 4 | 2 | 5 | 9728 | 35863 | 144 | 35719 | 0.004015 | 42131 | 34752 | 7044 | 1291 | 1.212333 |
| 1 | 4 | 5 | 7424 | 35863 | 363 | 35500 | 0.010122 | 44117 | 34752 | 7044 | 1284 | 1.269481 |
| 2 | 4 | 4 | 5760 | 35863 | 200 | 35663 | 0.005577 | 42664 | 34752 | 7044 | 1290 | 1.22767 |
| 4 | 4 | 4 | 9792 | 35863 | 78 | 35785 | 0.002175 | 41576 | 34752 | 7044 | 1291 | 1.196363 |

Branch Not-Taken

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Block Size | Associativity | Index Bits | Cache Size | Cache Access | Cache Miss | Cache Hit | Cache Miss Rate | Total cycles | Total Instructions | Total Branch Instructions | Total correct predictions | CPI |
| 1 | 1 | 7 | 7168 | 35863 | 1390 | 34473 | 0.038759 | 48669 | 34752 | 7044 | 5730 | 1.400466 |
| 2 | 1 | 6 | 5632 | 35863 | 1301 | 34562 | 0.036277 | 47871 | 34752 | 7044 | 7044 | 1.377503 |
| 4 | 1 | 6 | 9664 | 35863 | 770 | 35093 | 0.021471 | 43208 | 34752 | 7044 | 5729 | 1.243324 |
| 1 | 2 | 6 | 7296 | 35863 | 502 | 35361 | 0.013998 | 40865 | 34752 | 7044 | 5739 | 1.175904 |
| 2 | 2 | 5 | 5696 | 35863 | 357 | 35506 | 0.009955 | 39575 | 34752 | 7044 | 5736 | 1.138783 |
| 4 | 2 | 5 | 9728 | 35863 | 144 | 35719 | 0.004015 | 37673 | 34752 | 7044 | 5749 | 1.084053 |
| 1 | 4 | 5 | 7424 | 35863 | 363 | 35500 | 0.010122 | 39657 | 34752 | 7044 | 5744 | 1.141143 |
| 2 | 4 | 4 | 5760 | 35863 | 200 | 35663 | 0.005577 | 38208 | 34752 | 7044 | 5746 | 1.099448 |
| 4 | 4 | 4 | 9792 | 35863 | 78 | 35785 | 0.002175 | 37118 | 34752 | 7044 | 5749 | 1.068082 |

The fastest case is the Block size of 128 bits(4 word) a 4 way associativity and with 4 Index it had the lowest cycle count at 37118 and the lowest CPI with 1.068082