|  |  |  |
| --- | --- | --- |
| Basic 5 Stage Pipeline | | |
| Trace Name | Predict Not Taken Cycles | 1-bit Prediction Cycles |
| Sample.tr | 1204 | 1205 |
| [sample\_large1.tr](http://people.cs.pitt.edu/~melhem/courses/1541p/files/long_traces/sample_large1.tr) | 120298645 | 120239588 |
| [sample\_large2.tr](http://people.cs.pitt.edu/~melhem/courses/1541p/files/long_traces/sample_large2.tr) | 134034842 | 134686661 |
| [sample\_large3.tr](http://people.cs.pitt.edu/~melhem/courses/1541p/files/long_traces/sample_large3.tr) | 119213203 | 118931462 |
| [sample1.tr](http://people.cs.pitt.edu/~melhem/courses/1541p/files/short_traces/sample1.tr) | 1402710 | 1402866 |
| [sample2.tr](http://people.cs.pitt.edu/~melhem/courses/1541p/files/short_traces/sample2.tr) | 1269951 | 1267128 |
| [sample3.tr](http://people.cs.pitt.edu/~melhem/courses/1541p/files/short_traces/sample3.tr) | 1426996 | 1435028 |
| [sample4.tr](http://people.cs.pitt.edu/~melhem/courses/1541p/files/short_traces/sample4.tr) | 4099657 | 4104982 |

Having a branch-predictor for the basic, five-stage pipeline sometimes helped to lower cycle count. On 2/3 of the larger files, the branch-predictor saved a substantial number of cycles; on smaller files, though, the branch-predictor wasn’t accurate enough to lower the cycle count relative to the cycle count from always predicting that a branch isn’t taken.

|  |  |  |
| --- | --- | --- |
| Superscalar Pipeline | | |
| Trace Name | Predict Not Taken | 1-bit Prediction |
| Sample.tr | 640 | 510 |
| [sample\_large1.tr](http://people.cs.pitt.edu/~melhem/courses/1541p/files/long_traces/sample_large1.tr) | 57305786 | 47732818 |
| [sample\_large2.tr](http://people.cs.pitt.edu/~melhem/courses/1541p/files/long_traces/sample_large2.tr) | 73763380 | 48372522 |
| [sample\_large3.tr](http://people.cs.pitt.edu/~melhem/courses/1541p/files/long_traces/sample_large3.tr) | 59883416 | 48386344 |
| [sample1.tr](http://people.cs.pitt.edu/~melhem/courses/1541p/files/short_traces/sample1.tr) | 629932 | 500542 |
| [sample2.tr](http://people.cs.pitt.edu/~melhem/courses/1541p/files/short_traces/sample2.tr) | 661948 | 526212 |
| [sample3.tr](http://people.cs.pitt.edu/~melhem/courses/1541p/files/short_traces/sample3.tr) | 791940 | 520216 |
| [sample4.tr](http://people.cs.pitt.edu/~melhem/courses/1541p/files/short_traces/sample4.tr) | 2083820 | 1546980 |

Having two pipelines very clearly decreased the number of cycles, relative to the basic 5 stage pipeline. Moreover, it seems like branch prediction was clearly helpful for the 5 stage pipeline, and helped reduce the number of cycles pretty drastically, relative to predicting that a branch would not be taken every time.