Aidan Barbieux

Thumbsim Report

1. I would always take the branch, less certain for forward branches.
2. 32 bytes. This had the highest hit rate for -O2 optimization at 85%. For O0 it is not the highest, but close to it, the highest hit rate for O0 was 8 bytes at 94% (90% for 32 bytes). And it makes sense to prioritize optimized programs (utilizing cache locality), as those who don't do that probably care less about hit rates.
3. Executing 5 times fewer instructions is already a huge benefit. With fewer reads and writes (even proportionally to the number of instructions for the most part) this speeds everything up. Interestingly there isn't much of a difference between backward branches (probably keeping loops), whereas forward branches were cut down somewhat (probably eliminating conditions?).

	O0	**O2**
Total number of dynamic instructions:	1326980	261935
Number of Memory Reads:	354001	44342
Number of Memory Writes:	73058	27710
Number of Register Reads:	2967987	613428
Number of Register Writes:	2512287	439949
Forward Taken:	9410	8001
Forward Not taken:	8461	5210
Backward Taken:	41250	39109
Backward Not taken:	1741	1801

-O0

256 byte cache (blocksize 4 bytes): 377632 hits, 30243 misses (hit rate: 92.5852%)
256 byte cache (blocksize 8 bytes): 383482 hits, 24393 misses (hit rate: 94.0195%)
256 byte cache (blocksize 16 bytes): 382199 hits, 25676 misses (hit rate: 93.7049%)
256 byte cache (blocksize 32 bytes): 371018 hits, 36857 misses (hit rate: 90.9637%)
256 byte cache (blocksize 64 bytes): 347467 hits, 60408 misses (hit rate: 85.1896%)
256 byte cache (blocksize 128 bytes): 296780 hits, 111095 misses (hit rate: 72.7625%)
256 byte cache (blocksize 256 bytes): 242527 hits, 165348 misses (hit rate: 59.4611%)

-O2

256 byte cache (blocksize 4 bytes): 49918 hits, 22052 misses (hit rate: 69.3595%)
256 byte cache (blocksize 8 bytes): 57560 hits, 14410 misses (hit rate: 79.9778%)
256 byte cache (blocksize 16 bytes): 60231 hits, 11739 misses (hit rate: 83.689%)
256 byte cache (blocksize 32 bytes): 61685 hits, 10285 misses (hit rate: 85.7093%)
256 byte cache (blocksize 64 bytes): 60971 hits, 10999 misses (hit rate: 84.7172%)
256 byte cache (blocksize 128 bytes): 45232 hits, 26738 misses (hit rate: 62.8484%)
256 byte cache (blocksize 256 bytes): 9715 hits, 62255 misses (hit rate: 13.4987%)