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10/15/2024
ECEC 412
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Project 1

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531.deepsjeng_r_branches

localPredictorSize	localCounterBits	Results
2048	1	Number of correct predictions: 168274768 Number of incorrect predictions: 36445198 Predictor Correctness: 82.197533%
2048	2	Number of correct predictions: 175794247 Number of incorrect predictions: 28925719 Predictor Correctness: 85.870590%
4096	2	Number of correct predictions: 177385518 Number of incorrect predictions: 27334448 Predictor Correctness: 86.647888%
8192	2	Number of correct predictions: 178085223 Number of incorrect predictions: 26634743 Predictor Correctness: 86.989662%
16384	2	Number of correct predictions: 178223608 Number of incorrect predictions: 26496358 Predictor Correctness: 87.057266%
32768	2	Number of correct predictions: 178223992 Number of incorrect predictions: 26495974 Predictor Correctness: 87.057457%
65536	2	Number of correct predictions: 178224001 Number of incorrect predictions: 26495965 Predictor Correctness: 87.057457%

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541.leela_r_branches

localPredictorSize	localCounterBits	Results
2048	1	Number of correct predictions: 168602556 Number of incorrect predictions: 47530217 Predictor Correctness: 78.008789%
2048	2	Number of correct predictions: 178713549 Number of incorrect predictions: 37419224 Predictor Correctness: 82.686928%
4096	2	Number of correct predictions: 178989861 Number of incorrect predictions: 37142912 Predictor Correctness: 82.814774%
8192	2	Number of correct predictions: 179391515 Number of incorrect predictions: 36741258 Predictor Correctness: 83.000610%
16384	2	Number of correct predictions: 179415029 Number of incorrect predictions: 36717744 Predictor Correctness: 83.011482%
32768	2	Number of correct predictions: 179417105 Number of incorrect predictions: 36715668 Predictor Correctness: 83.012451%
65536	2	Number of correct predictions: 179417270 Number of incorrect predictions: 36715503 Predictor Correctness: 83.012520%

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548.exchange2_r_branches

localPredictorSize	localCounterBits	Results
2048	1	Number of correct predictions: 255602221 Number of incorrect predictions: 98248979 Predictor Correctness: 72.234383%
2048	2	Number of correct predictions: 292073706 Number of incorrect predictions: 61777494 Predictor Correctness: 82.541389%
4096	2	Number of correct predictions: 292146797 Number of incorrect predictions: 61704403 Predictor Correctness: 82.562042%
8192	2	Number of correct predictions: 292178159 Number of incorrect predictions: 61673041 Predictor Correctness: 82.570908%
16384	2	Number of correct predictions: 292195854 Number of incorrect predictions: 61655346 Predictor Correctness: 82.575905%
32768	2	Number of correct predictions: 292198756 Number of incorrect predictions: 61652444 Predictor Correctness: 82.576729%
65536	2	Number of correct predictions: 292200308 Number of incorrect predictions: 61650892 Predictor Correctness: 82.577171%

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Benchmark	LPS	CPI	%Wrong	%Right
531.deepsjeng_r_branches	2048	1.07120986	17.80246%	82.19754%
531.deepsjeng_r_branches	2048	1.05651763	14.12941%	85.87059%
531.deepsjeng_r_branches	4096	1.05340847	13.35212%	86.64788%
531.deepsjeng_r_branches	8192	1.05204132	13.01033%	86.98967%
531.deepsjeng_r_branches	16384	1.05177093	12.94273%	87.05727%
531.deepsjeng_r_branches	32768	1.05177018	12.94255%	87.05745%
531.deepsjeng_r_branches	65536	1.05177016	12.94254%	87.05746%
541.leela_r_branches	2048	1.08796485	21.99121%	78.00879%
541.leela_r_branches	2048	1.06925229	17.31307%	82.68693%
541.leela_r_branches	4096	1.06874092	17.18523%	82.81477%
541.leela_r_branches	8192	1.06799757	16.99939%	83.00061%
541.leela_r_branches	16384	1.06795405	16.98851%	83.01149%
541.leela_r_branches	32768	1.06795021	16.98755%	83.01245%
541.leela_r_branches	65536	1.06794990	16.98748%	83.01252%
548.exchange2_r_branches	2048	1.11106248	27.76562%	72.23438%
548.exchange2_r_branches	2048	1.06983443	17.45861%	82.54139%
548.exchange2_r_branches	4096	1.06975181	17.43795%	82.56205%
548.exchange2_r_branches	8192	1.06971636	17.42909%	82.57091%
548.exchange2_r_branches	16384	1.06969635	17.42409%	82.57591%
548.exchange2_r_branches	32768	1.06969307	17.42327%	82.57673%
548.exchange2_r_branches	65536	1.06969132	17.42283%	82.57717%

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Based on the data provided, we assessed the performance of various combinations of local predictor sizes and correct/incorrect predictions across three benchmarks: 531.deepsjeng_r_branches, 541.leela_r_branches, and 548.exchange2_r_branches.

For the 531.deepsjeng_r_branches benchmark, the most favorable results were obtained with a local predictor size of 65536, resulting in a CPI of 1.05177016 and the highest percentage of correct predictions among all options.

In the case of the 541.leela_r_branches benchmark, the best-performing combination utilized a local predictor size of 65536, resulting in a CPI of 1.06794990 and the highest percentage of correct predictions among all options.

Similarly, for the 548.exchange2_r_branches benchmark, a CPI of 1.06969132 was achieved with a local predictor size of 65536, along with the highest percentage of correct predictions among all options.

In summary, a local predictor size of 65536 with 2 local predictor bits consistently yielded the lowest CPI across all three benchmarks and performed the best in all tested scenarios.