

## ECEC 412 Project 1 Report

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### Two-bit and Tournament Results:

The following tables show a summary of the highest performing configurations for the two-bit predictor and the accuracy of the predictor across three different workloads.

<b>localPredictorSize</b>	<b>localCounterBits</b>
65536	2

<b>Workload</b>	<b>Predictor Correctness (%)</b>
531.deepsjeng_r_branches	87.057457
541.leela_r_branches.cpu_trace	83.01252
548.exchange2_r_branches.cpu_trace	82.577171

The following tables show a summary of the highest performing configurations for the tournament predictor and the accuracy of the predictor across three different workloads.

<b>localHistoryTableSize</b>	<b>globalPredictorSize</b>	<b>choicePredictorSize</b>
16384	32768	32768

<b>Workload</b>	<b>Predictor Correctness (%)</b>
531.deepsjeng_r_branches	93.046516
541.leela_r_branches.cpu_trace	86.012314
548.exchange2_r_branches.cpu_trace	95.948799

### gShare Results:

The following tables show a summary of the highest performing configurations for the gShare predictor and the accuracy of the predictor across three different workloads.

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<b>globalPredictorSize</b>
4194304

<b>Workload</b>	<b>Predictor Correctness (%)</b>
531.deepsjeng_r_branches	94.781227
541.leela_r_branches.cpu_trace	89.089455
548.exchange2_r_branches.cpu_trace	96.788048

For small globalPredictorSize's (between 1KB and 131KB), gShare was outperformed by the Tournament predictor. After 131 KB, gShare steadily increased with respect to the globalPredictorSize. After 16 MB, gShare exhibited either an asymptote, or highly diminished benefits to predictor correctness.

### Summary

For section 5, we evaluated the prediction accuracies for the two-bit and tournament predictors with different configurations to see which values gave the best performance. We found that as the value of the variables (localPredictorSize, localHistoryTableSize etc.) increased, the performance of each predictor also increased, though the accuracies vary across different workloads.

For section 6, we implemented the gShare predictor as described by the supplement. We created an index based on the XOR output between the global history pointer and the branch address. Then, we varied the size of the global history table to see at what point did gShare outperform the two-bit and tournament predictors. We concluded that that point was around 4 MB.