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Report of the Assignment Two

Branch Prediction Modeling and Simulation

a) The overall hit rate in the BTB on a cold start (the fraction of times a branch was looked up in the BTB and found present) is 53.1612% - 53.7982% (avg. 53.4797).

b) The overall branch misprediction rate on a cold start (the fraction of times a branch was incorrectly predicted, regardless of whether that prediction belonged to the branch being predicted) is 5.2213% - 5.4856% (avg. 5.35345).

c) The most common branch is 0x4012c681 (637 times). The overall number of correct predictions is 634.

d) The effect of a cold start versus a warm start: reducing the misses.
branch_history.txt: 1- Misprediction rate (cold: 5.2213%, warm: 4.0957%)

2- Hit rate (cold: 53.1612%, warm: 54.8982%)

the_buffer_64.txt: 1- Misprediction rate (cold: 5.4856%, warm: 3.8521%)

2- Hit rate (cold: 53.7892%, warm: 55.1215%)

e) Conclusion: With the upgrade of the buffer size on a cold start, the hit rate increase and the misprediction decrease because when the buffer grow up, it result to a space where more branches can be stored.
Size 4: Misprediction rate: 5.5844%, Hit rate: 52.2711.
Size 8: Misprediction rate: 5.5639%, Hit rate: 52.7425.
Size 16: Misprediction rate: 5.4461%, Hit rate: 52.8054.
Size 32: Misprediction rate: 5.3152%, Hit rate: 52.9367.
Size 64: Misprediction rate: 5.2213%, Hit rate: 53.1612%.