**Project 2: Branch Predictor Report**

**Section A: Fix M at 4, and vary N from 1-4.**

|  |  |  |
| --- | --- | --- |
| Mispredict. Rate | | |
| n | mcf | goBMK |
| 1 | 0.25 | 0.0077 |
| 2 | 0.27 | 0.0087 |
| 3 | 0.29 | 0.0086 |
| 4 | 0.32 | 0.0082 |

**Section B: Fix N at 4, vary M from 4-7.**

|  |  |  |
| --- | --- | --- |
| Mispredict. Rate | | |
| M | mcf | goBMK |
| 4 | 0.3172 | 0.0082 |
| 5 | 0.2656 | 0.0067 |
| 6 | 0.1981 | 0.006 |
| 7 | 0.1240 | 0.0058 |

**Section C: Fix N=0, vary M=4-7.**

|  |  |  |
| --- | --- | --- |
| Mispredict. Rate | | |
| M | mcf | goBMK |
| 4 | 0.2376 | 0.0069 |
| 5 | 0.2083 | 0.0066 |
| 6 | 0.1507 | 0.0067 |
| 7 | 0.1063 | 0.006 |

**Part C Analysis:** The general curve shape between sections B and C is very similar. However, it is clear that fixing N at 0 results in a lower misprediction rate versus fixing N at 4. In both sections, the MCF tracefile has a higher misprediction rate in comparison to the goBMK tracefile. This makes sense since the majority of the latter tracefile is composed of consecutive instructions with the same address, and ‘taken outcomes’. This would result in a gshare index that will continuously predict ‘taken’ which also happens to be the outcome. Whereas, in the MCF tracefile, there are a lot of different addresses and far more ‘not taken’ outcomes. Additionally it makes sense in this case that the bimodal has a lower amount of mispredictions. For simple applications, (since it is mapping each index to the address directly) it can learn faster and become more accurate. Since the tracefiles were fairly simple, the bimodal branch predictor performed better. One of the disadvantages of the bimodal predictor is that it has a harder time picking up on patterns. But, for straight forward execution, it typically will outperform the gshare. Although, this of course dependent on the data/dependency. In a more professional setting, a hybrid branch predictor is the best choice since it takes advantage of the best parts of each type of predictor.