NC State University

Department of Electrical and Computer Engineering

ECE 463/563: Fall 2021 (Rotenberg)

Project #2: Branch Prediction

by

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NCSU Honor Pledge: "I have neither given nor received unauthorized aid on this project."

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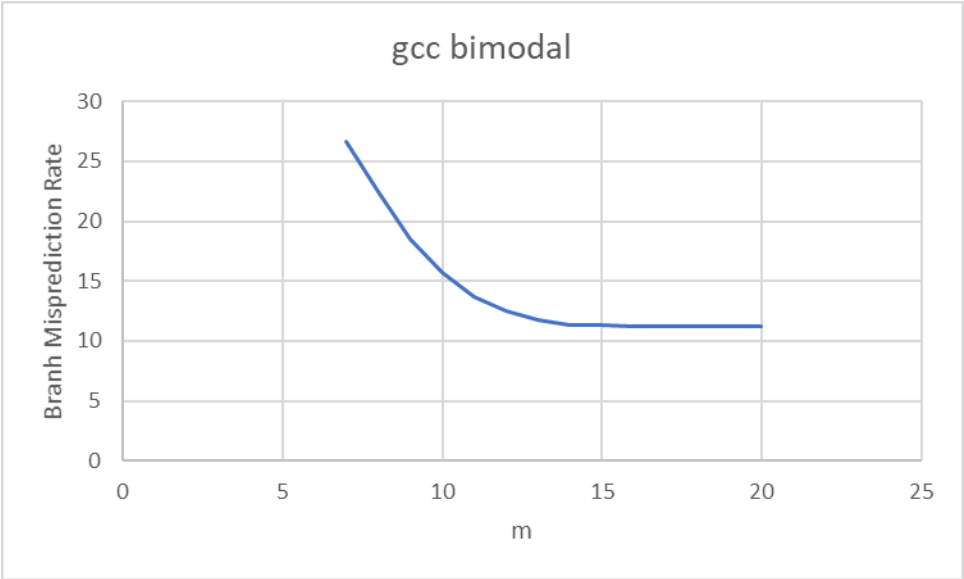
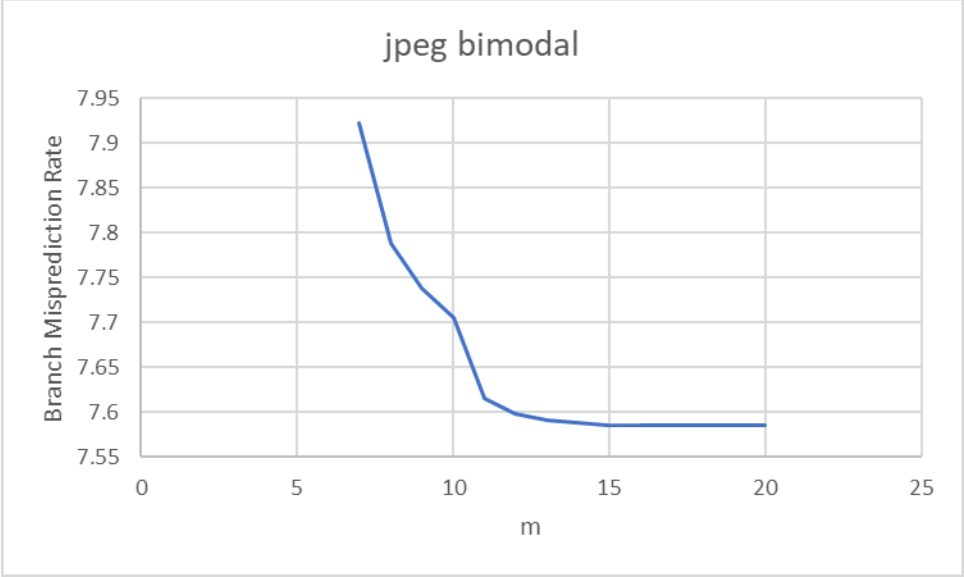
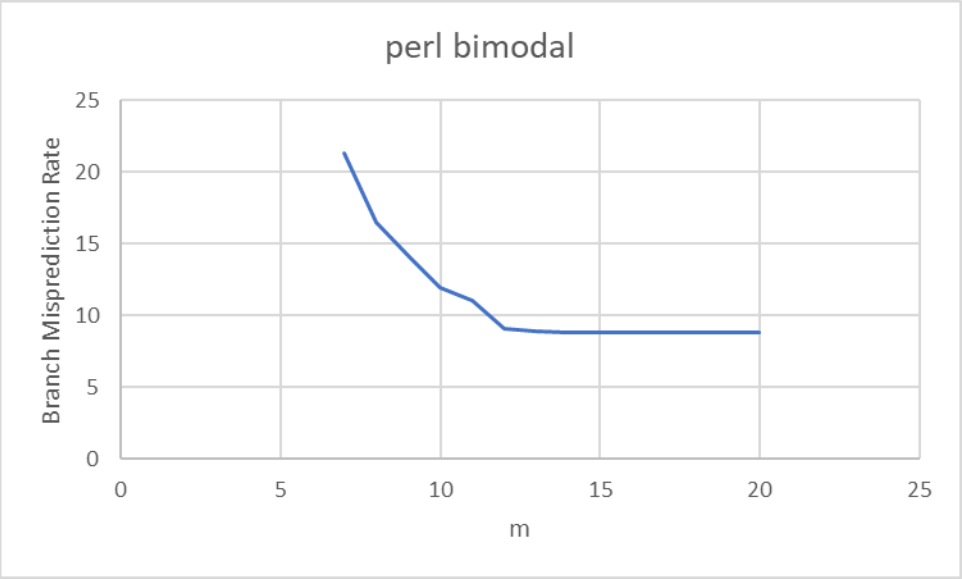
(sign by typing your name)

Course number: 463
(463 or 563 ?)

Bimodal Branch Predictor Trends



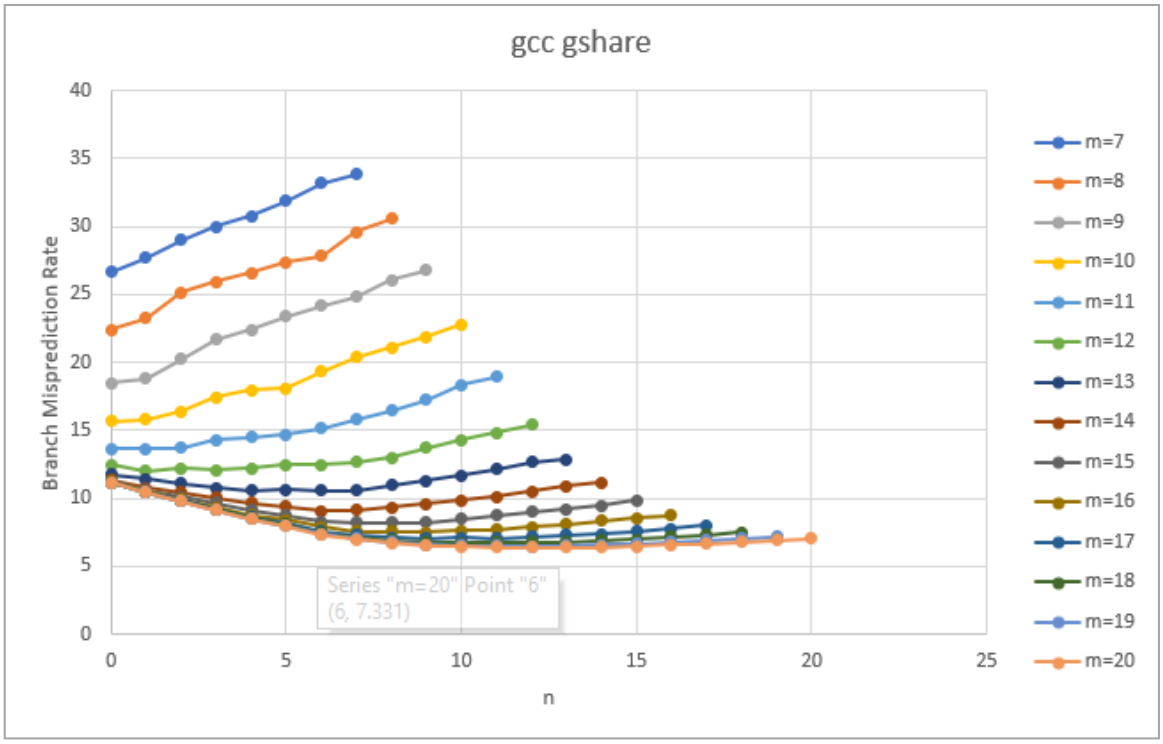


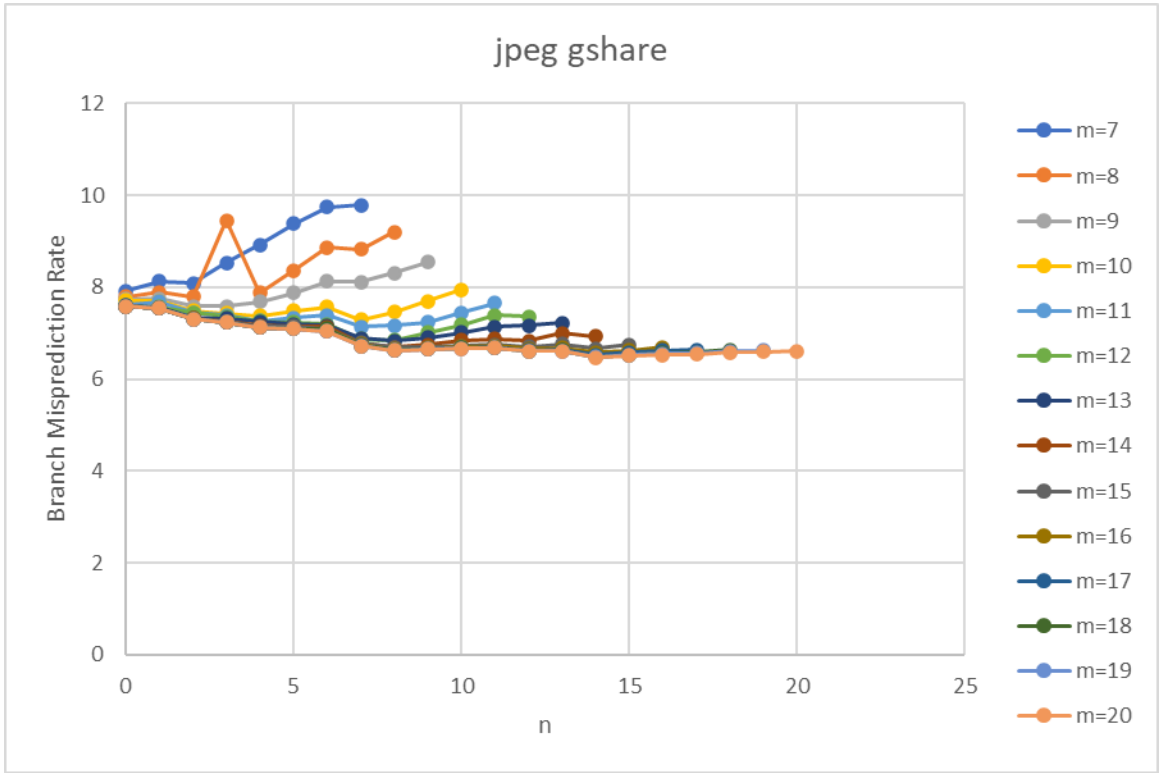


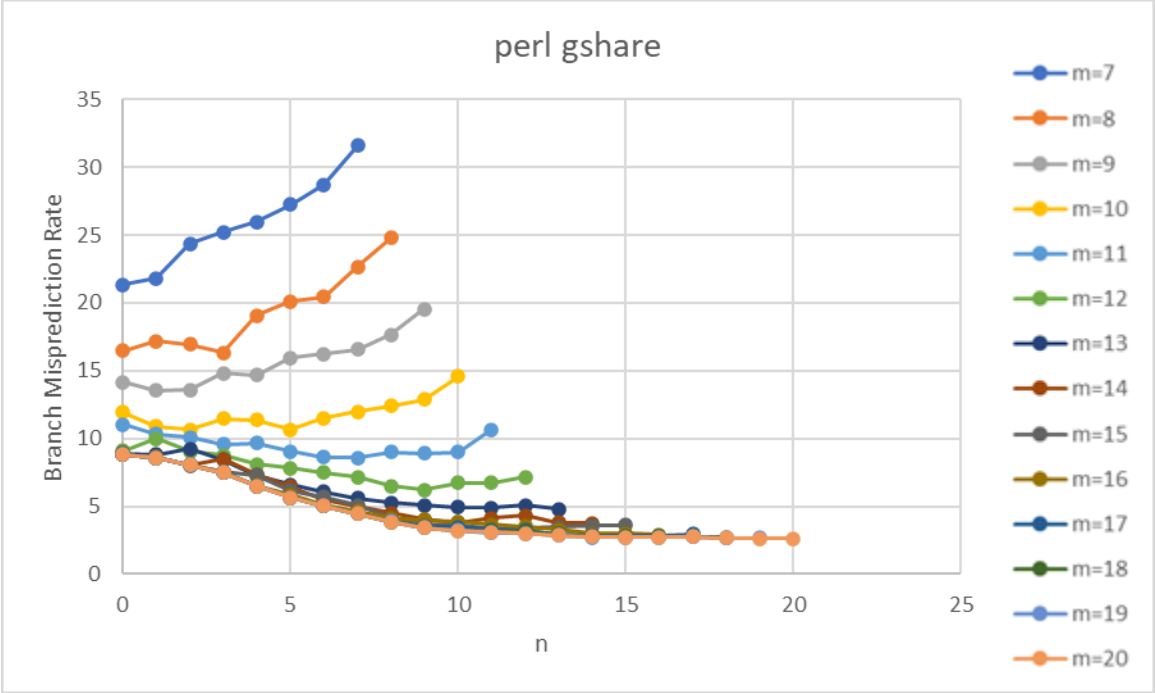
Results:
From the above results, we can conclude that that the Branch Misprediction Rate decreases with increase in Branch Predictor Size for the Bimodal Predictor, as size of Prediction table is 2^m. We can also observe that the Misprediction rate for a specific predictor size is the lowest for jpeg benchmark and greatest for the gcc benchmark.

Both the gcc and jpeg bimodal benchmark graphs, stabilize at a constant misprediction rate, independent of the value of m, for a value of m approximately greater than or equal to 16. The perl benchmark graph on the other hand stabilizes at a constant misprediction rate for a value of m greater than or equal to 14. This shows that beyond a specific branch predictor size, which on average is approximately m=15, there is hardly any net effect on the performance of the branch predictor.

Gshare Branch Predictor Trends







Results:
From the above results, we can conclude that that the Branch Misprediction Rate decreases with increase in Branch Predictor Size for the Gshare Predictor, as size of Prediction table is 2^m. Further we can observe that the misprediction rate is significantly lower for n=20 for the perl benchmark and greatest for jpeg.

For values of m>=10 and m<=20, the jpeg curves begin to converge and almost completely overlap each other for all values of n, for m>=15. Similar conclusions can be made for m>=16 for perl curves and m>=18 for the gcc curves. This shows that beyond a specific branch predictor size, which on average is approximately m=16, there is hardly any net effect on the performance of the branch predictor