University of Central Florida

Department of Computer Science

CDA 5106: Fall 2022

Machine Problem 2: Branch Prediction

by

<< RISHWANTH VANKAYALA >>

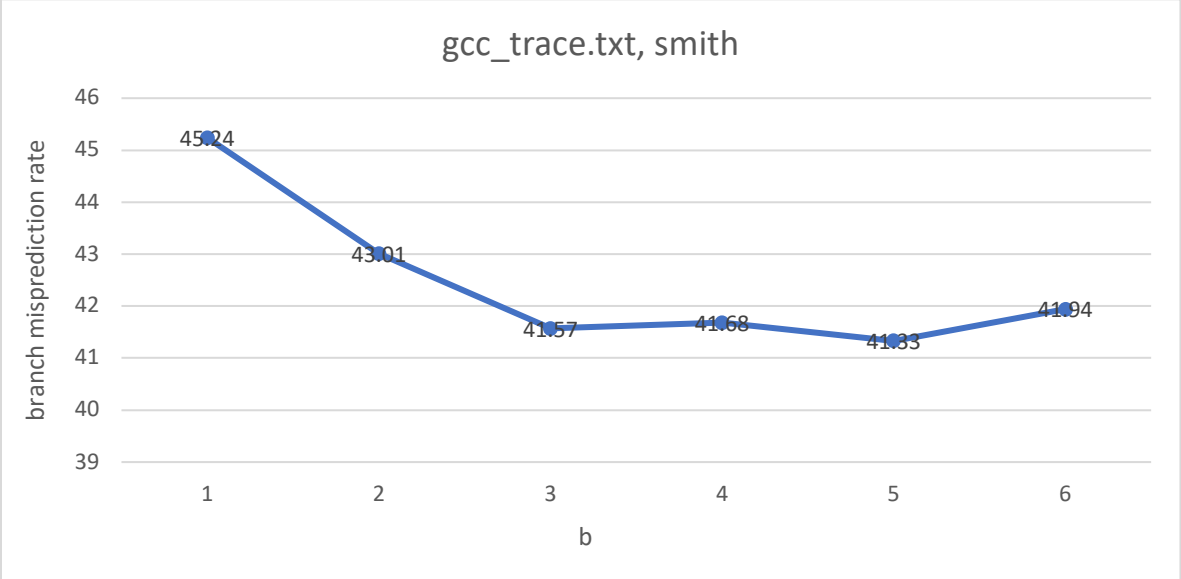
Honor Pledge: "I have neither given nor received unauthorized aid on this test or assignment."

Student's electronic signature: ____Rishwanth Vankayala_____
(sign by typing your name)

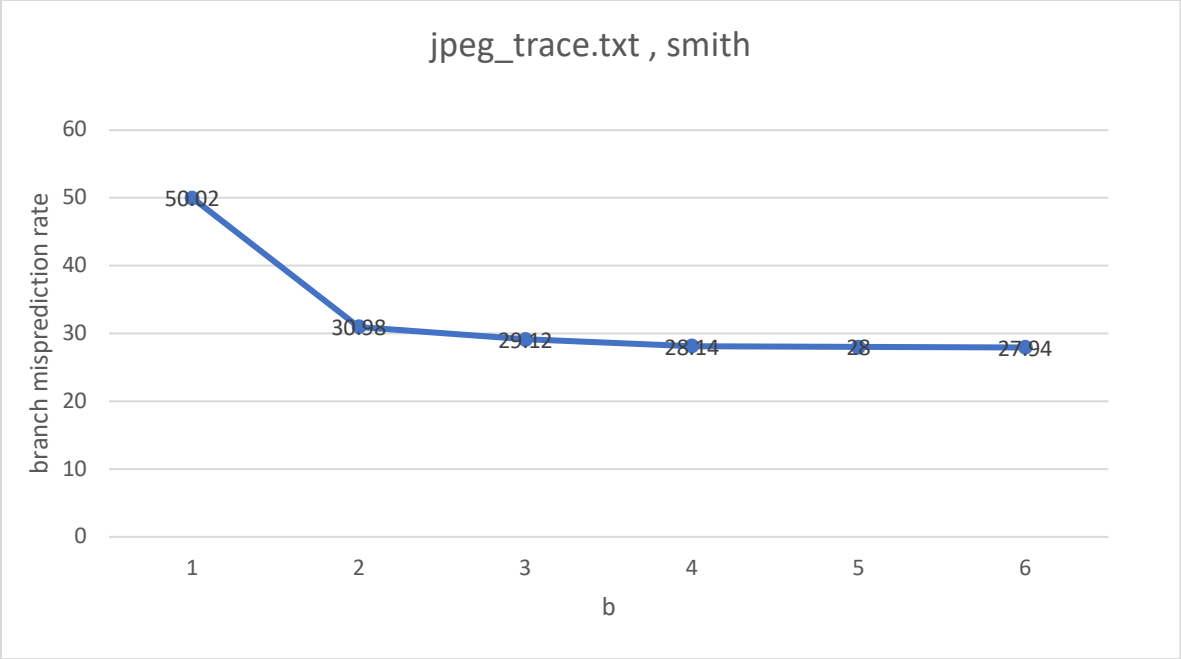
Sample cover page for MP2.

PART 1: SMITH N-BIT COUNTER PREDICTOR

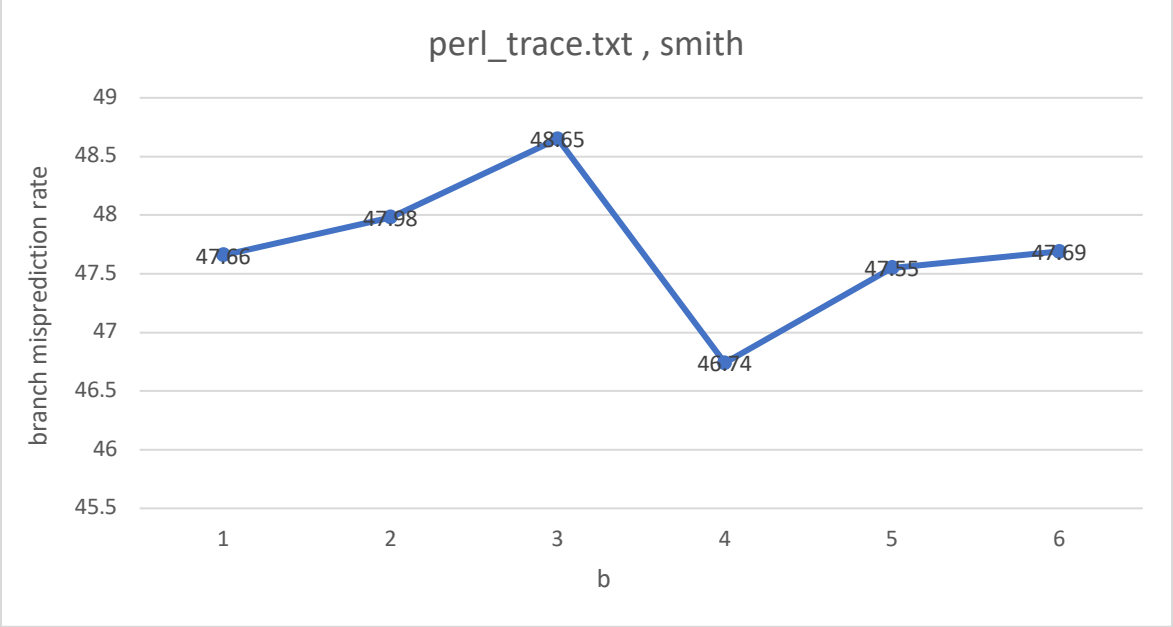
- The below shown graph is taken for the trace file "gcc_trace.txt" with **x-axis** as **b** values ranging from 1 to 6 and **y-axis** shows the **branch misprediction rate** for each b value.
- Greater the b value lesser the branch misprediction rate, as we see from the below graph for the value of b=1, branch misprediction rate was very higher when compared to the branch misprediction rate for the value of b=2 and b=3 and so on.



- The below shown graph is taken for the trace file "jpeg_trace.txt" with **x-axis** as **b** values ranging from 1 to 6 and **y-axis** shows the **branch misprediction rate** for each b value.
- Greater the b value lesser the branch misprediction rate, as we see from the below graph for the value of b=1, branch misprediction rate (50.02%) was very higher when compared to the branch misprediction rate for the value of b=2(30.98%) and b=3(29.12%) and so on.
- Branch misprediction rate came to saturation and maintained a range of 28% when value of b is from 4 to 6.



- The below shown graph is taken for the trace file "perl_trace.txt" with **x-axis** as **b** values ranging from 1 to 6 and **y-axis** shows the **branch misprediction rate** for each b value.
- Branch misprediction rate was higher(48.65%) when value of b =3 and the misprediction rate was lowest(46.74%) when value of b =4
- The graph started with a value of 47.66% and ended with almost the value of 47.69%



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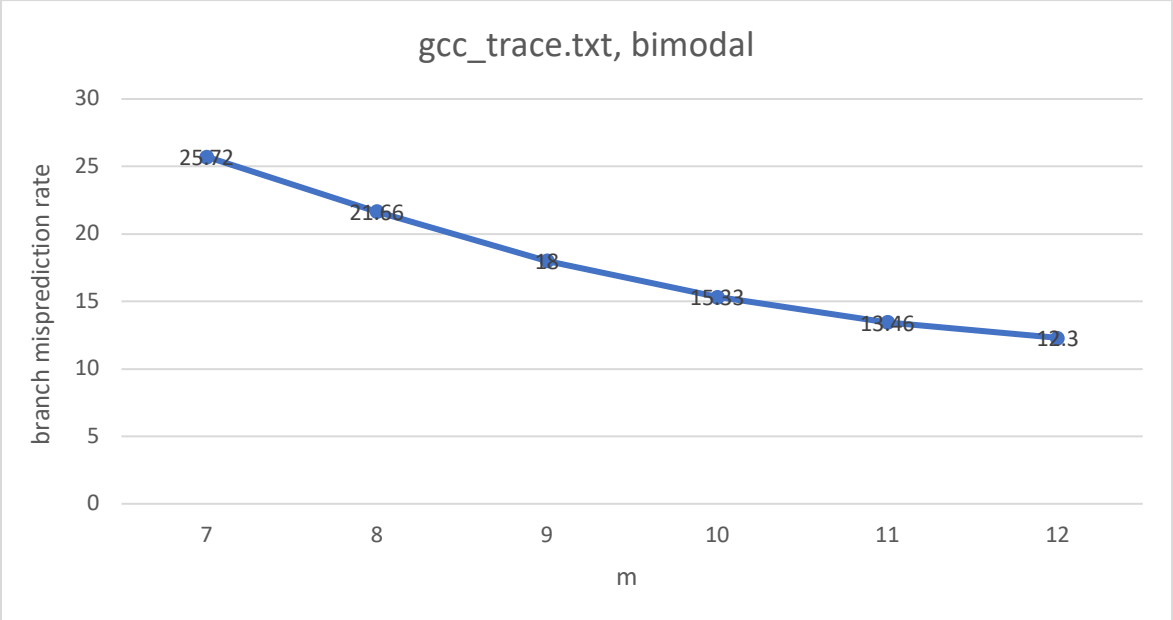
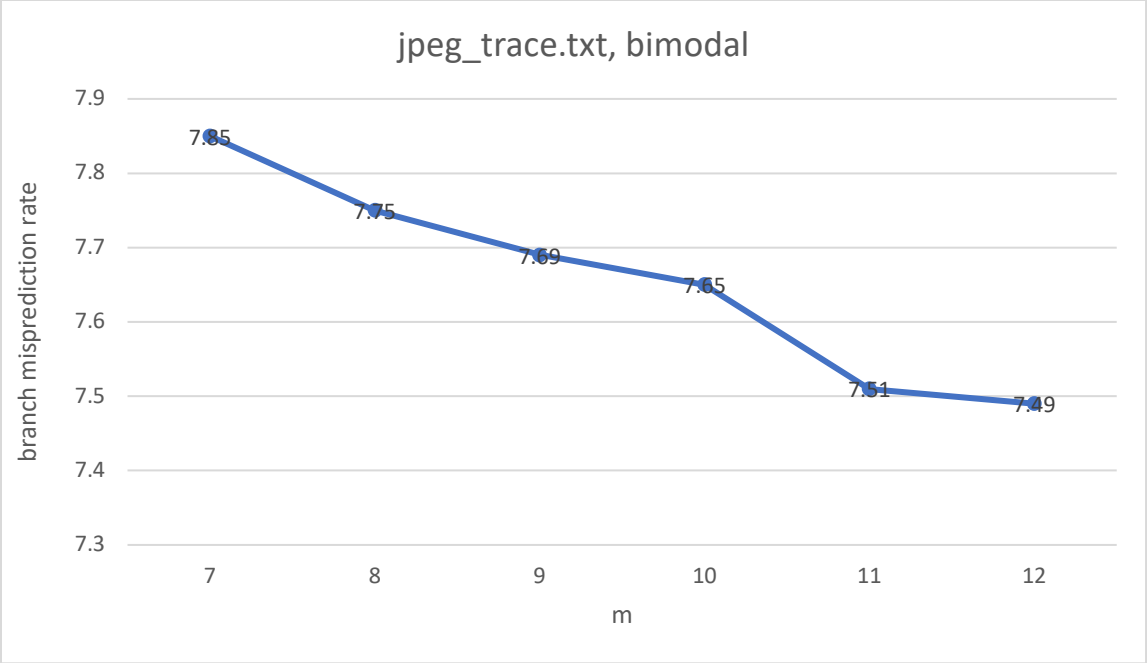
PART 2: BIMODAL PREDICTOR

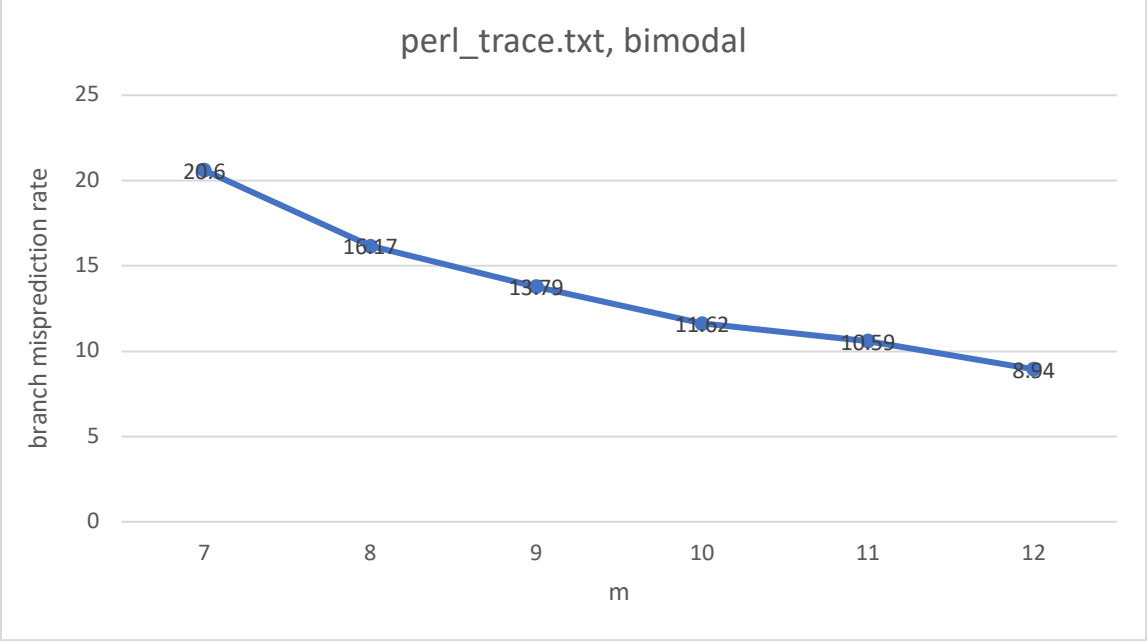
- The below shown graph is taken for the trace file "gcc_trace.txt" with **x-axis** as **m** values ranging from 7 to 12 and **y-axis** shows the **branch misprediction rate** for each m value.
- Greater the m value lesser the branch misprediction rate, as we see from the below graph for the value of m=7, branch misprediction rate was very higher when compared to the branch misprediction rate for the value of m=8 and m=9 and so on and the misprediction rate kept decreasing with increase in m values.



- The below shown graph is taken for the trace file "jpeg_trace.txt" with **x-axis** as **m** values ranging from 7 to 12 and **y-axis** shows the **branch misprediction rate** for each m value.
- Greater the m value lesser the branch misprediction rate, as we see from the below graph for the value of m=7, branch misprediction rate was very higher when compared to the branch misprediction rate for the value of m=8 and m=9 and so on and the misprediction rate kept decreasing with increase in m values.



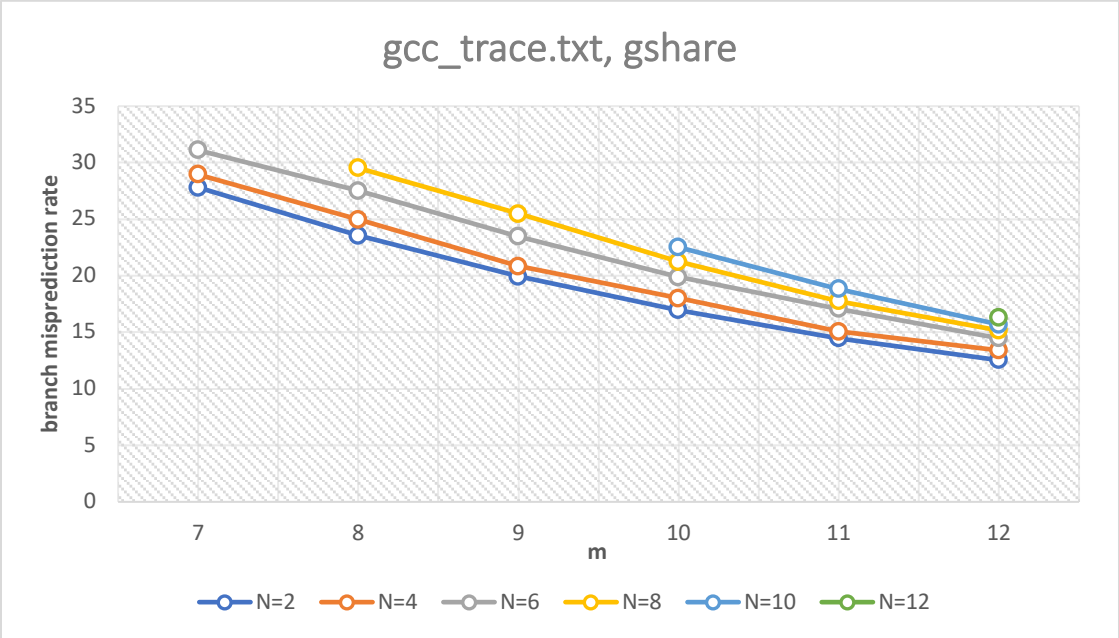
- The below shown graph is taken for the trace file "perl_trace.txt" with **x-axis** as **m** values ranging from 7 to 12 and **y-axis** shows the **branch misprediction rate** for each m value.
- Greater the m value lesser the branch misprediction rate, as we see from the below graph for the value of m=7, branch misprediction rate was very higher when compared to the branch misprediction rate for the value of m=8 and m=9 and so on and the misprediction rate kept decreasing with increase in m values.



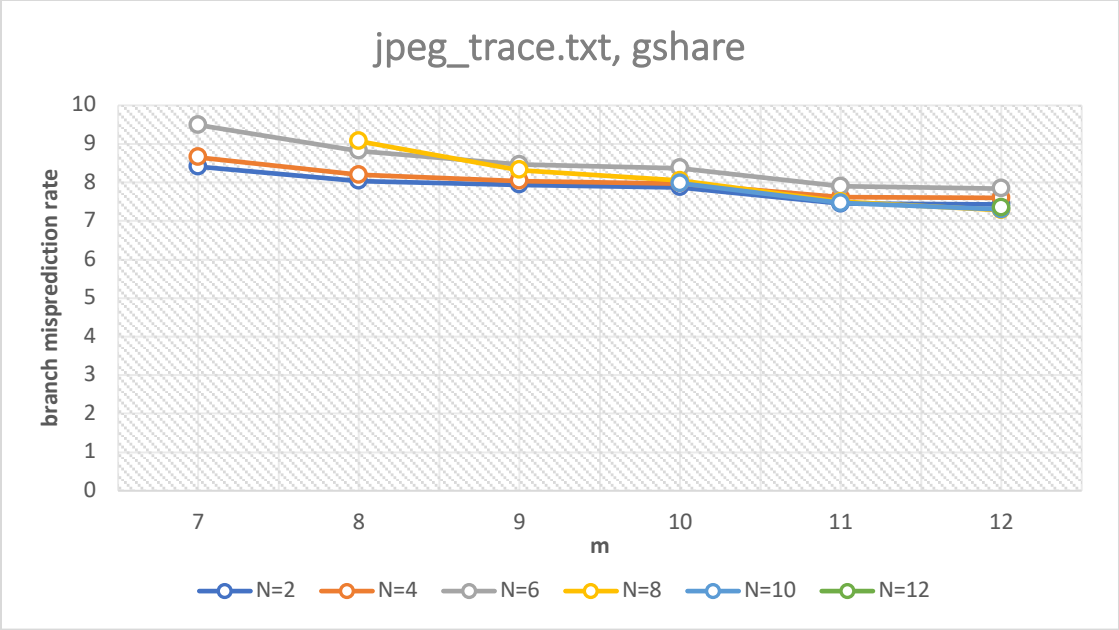
Sample cover page for MP2.

PART 3: GSHARE PREDICTOR

- The below shown graph is taken for the trace file "gcc_trace.txt" with **x-axis** as **m** values ranging from 7 to 12 and **y-axis** shows the **branch misprediction rate** for each **n** value where n values are taken based on the current m value (7 <= **m**<=12 & 2<=**n**<=m).
- Greater the m value lesser the branch misprediction rate for each value of n, as we see from the below graph for the value of m=7, branch misprediction rate was very higher when compared to the branch misprediction rate for the value of m=8 and m=9 for each value of n and so on and the misprediction rate kept decreasing with increase in m values.
- Greater the n value, greater the branch misprediction rate for each value of m.



- The below shown graph is taken for the trace file "jpeg_trace.txt" with **x-axis** as **m** values ranging from 7 to 12 and **y-axis** shows the **branch misprediction rate** for each **n** value where n values are taken based on the current m value (7 <= **m**<=12 & 2<=**n**<=m).
- Greater the m value lesser the branch misprediction rate for each value of n.



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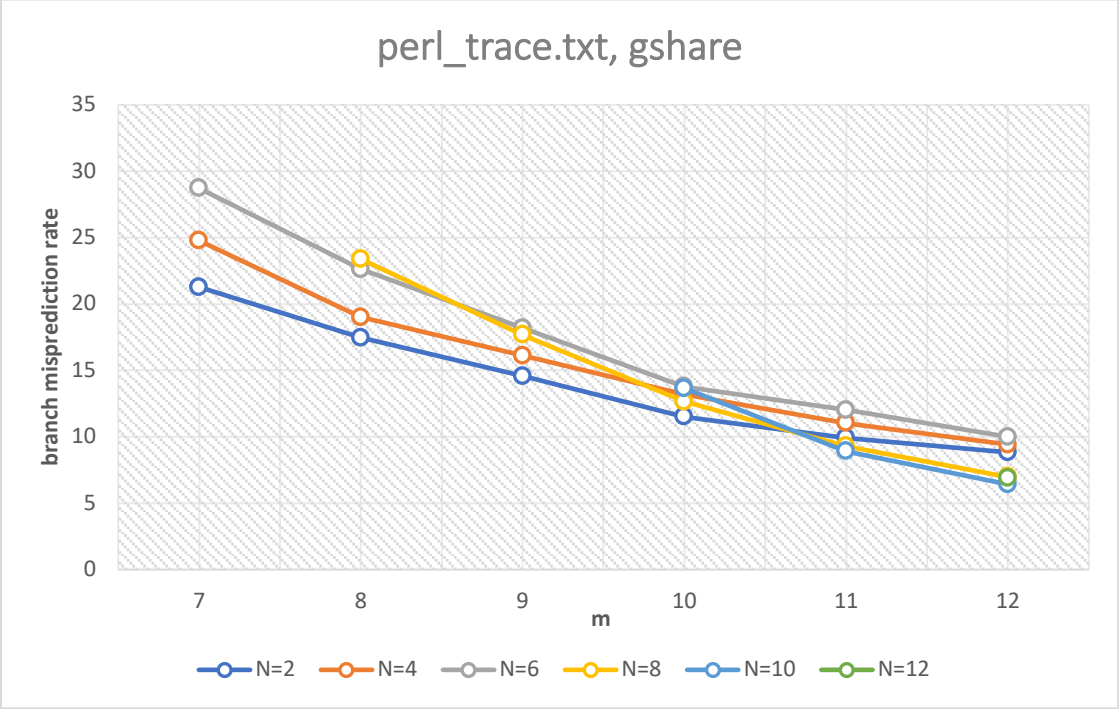
- Greater the m value lesser the branch misprediction rate for each value of n.



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