University of Central Florida

Department of Computer Science

CDA 5106: Fall 2020

Machine Problem 2: Branch Prediction

by

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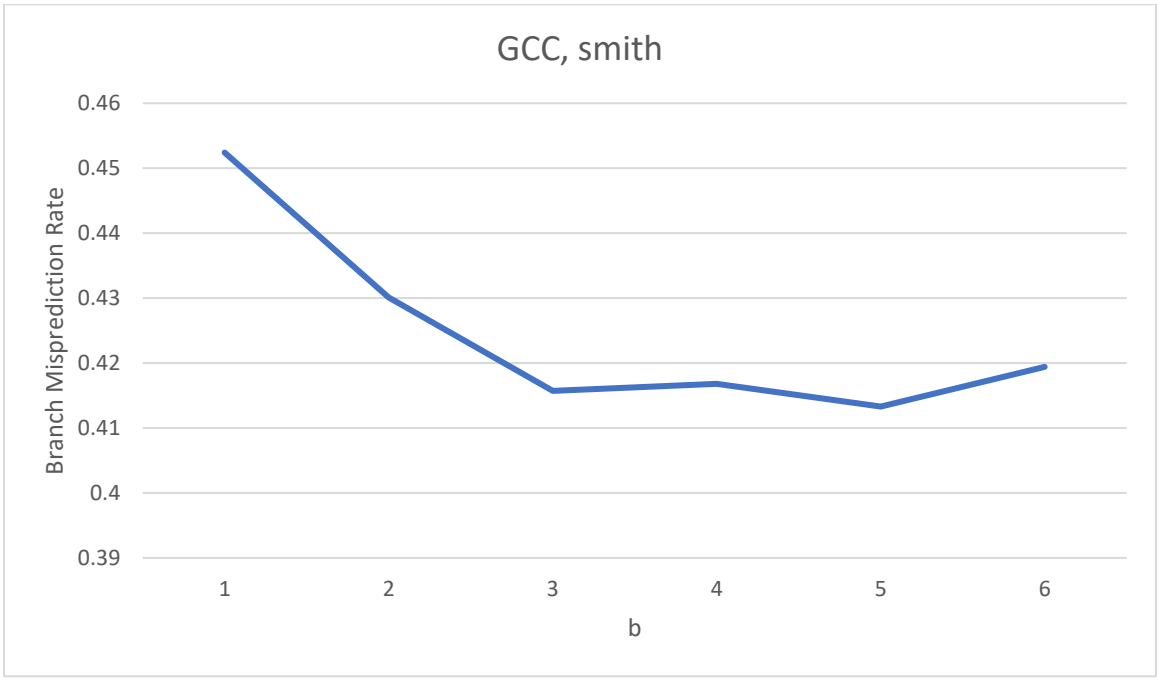
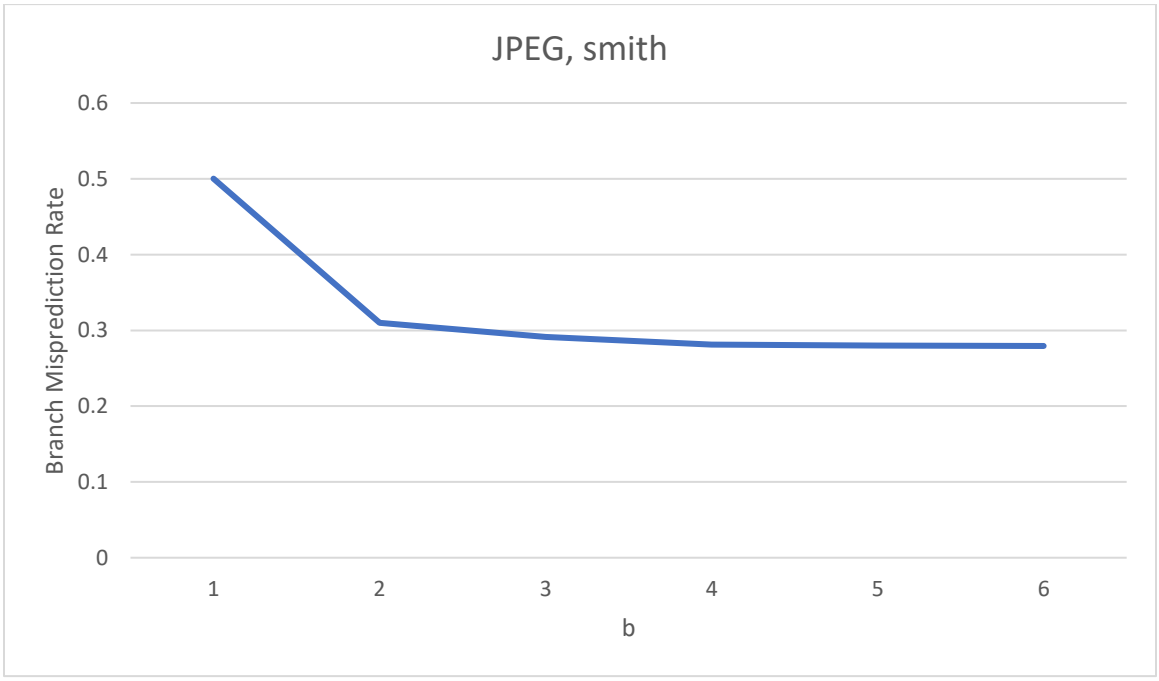
Honor Pledge: "I have neither given nor received unauthorized aid on this test or assignment."

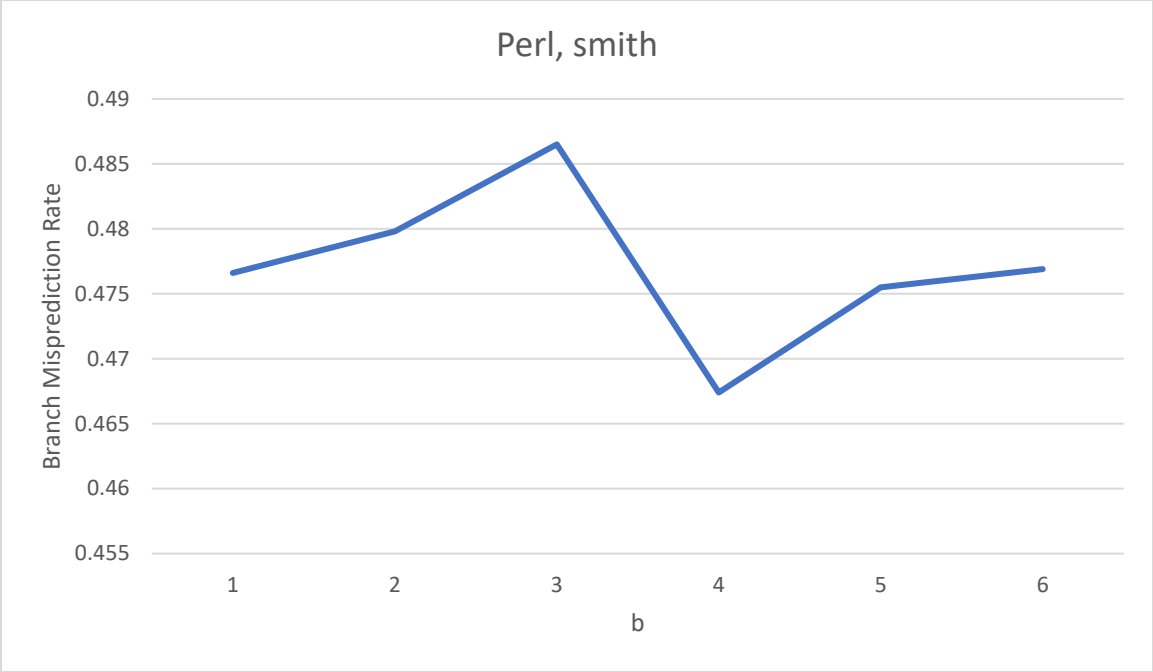
Student's electronic signature: ___Parker Scott_____
(sign by typing your name)

Machine Problem 2: Branch Prediction

Part 1: Smith N-Bit Counter Predictor

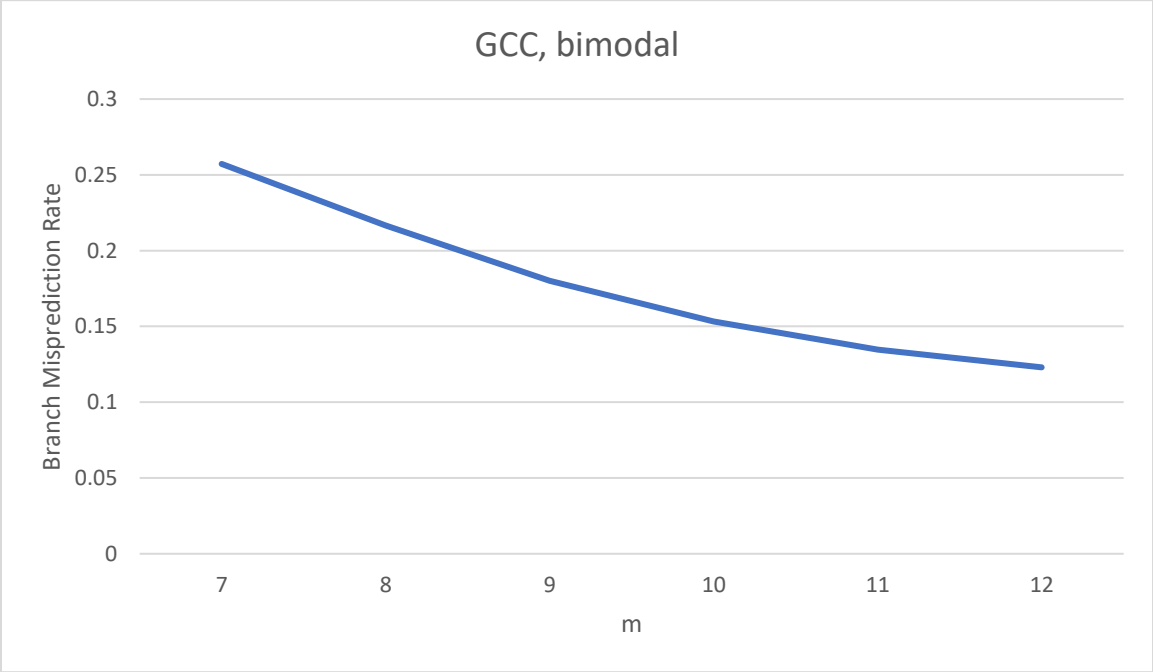


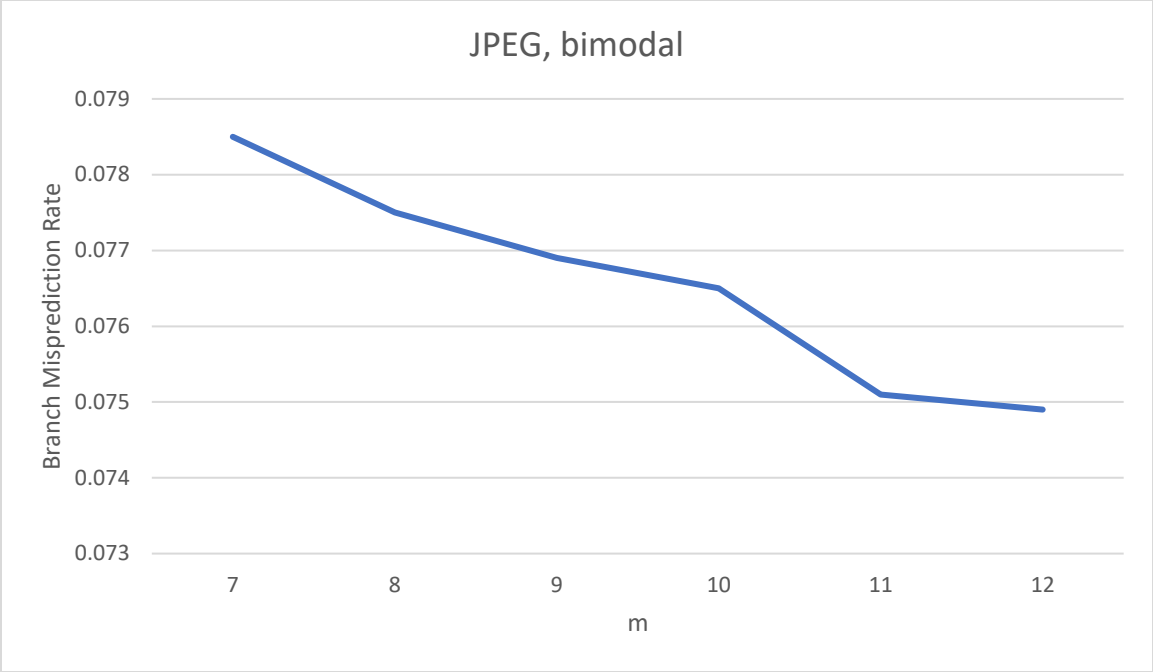


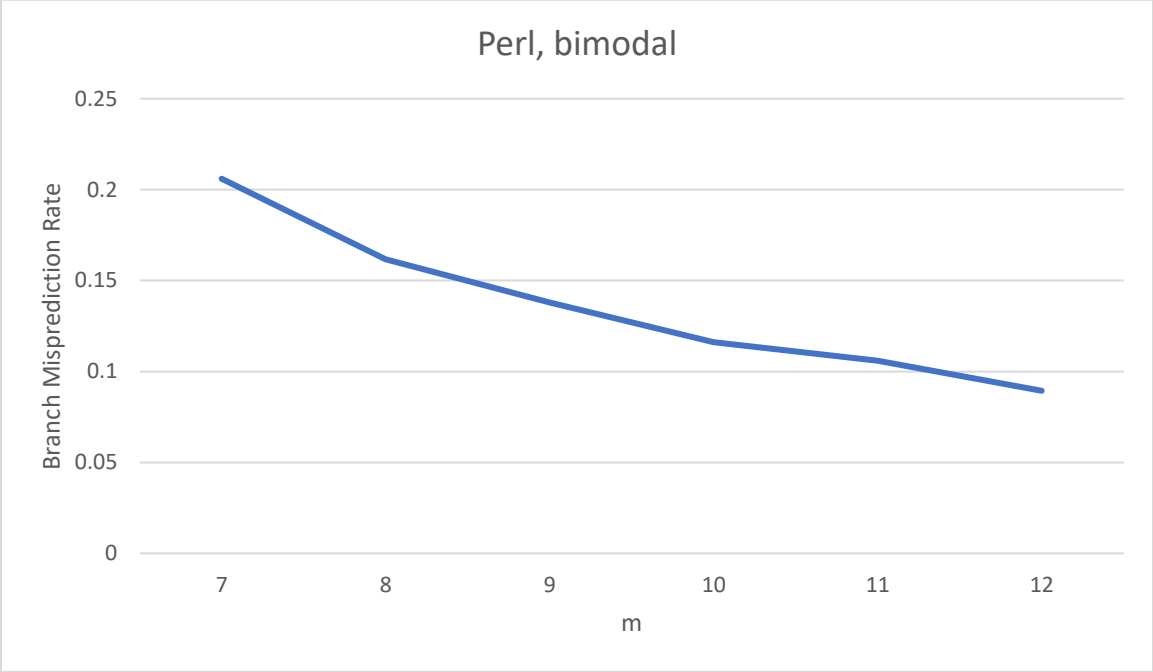


The Smith branch predictor seems to gradually lower in misprediction rate as b increases from 1 to 6 for GCC and JPEG. The Perl graph appears to hover between a 2 percent bound .4655 to .4855.

Part 2: Bimodal Predictor

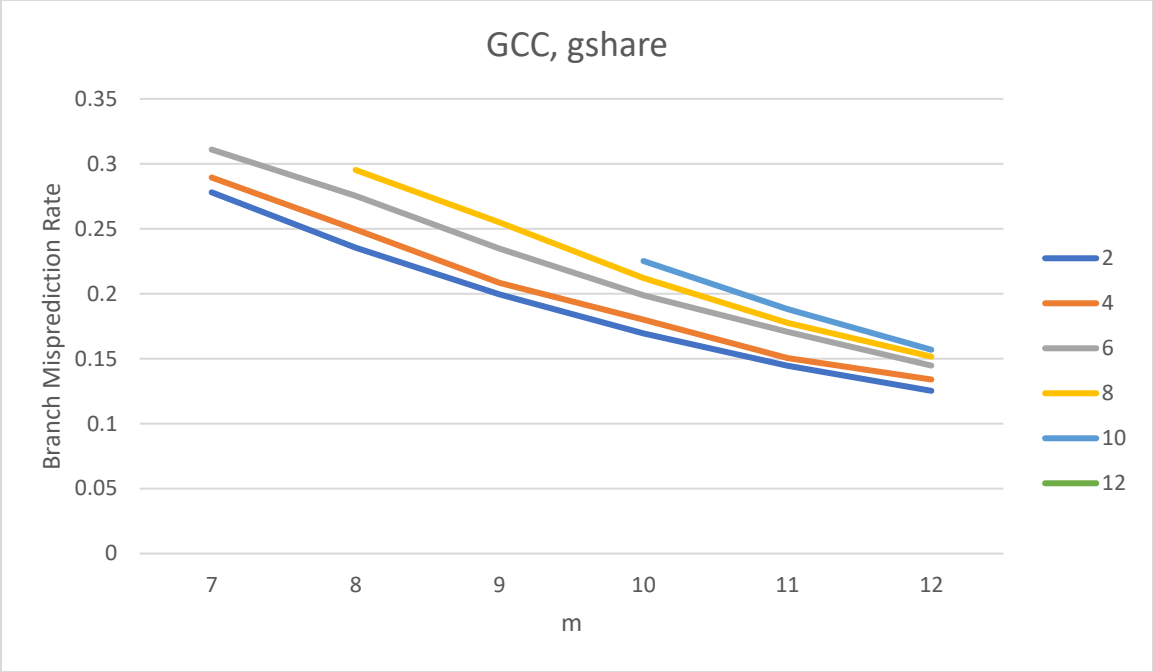


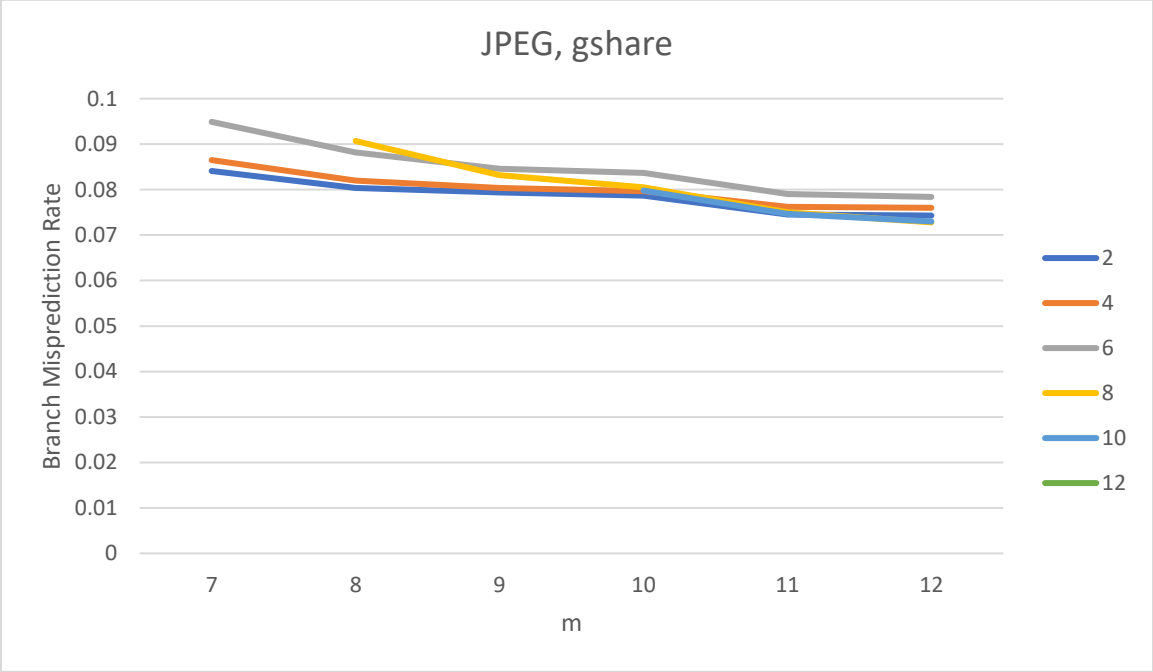


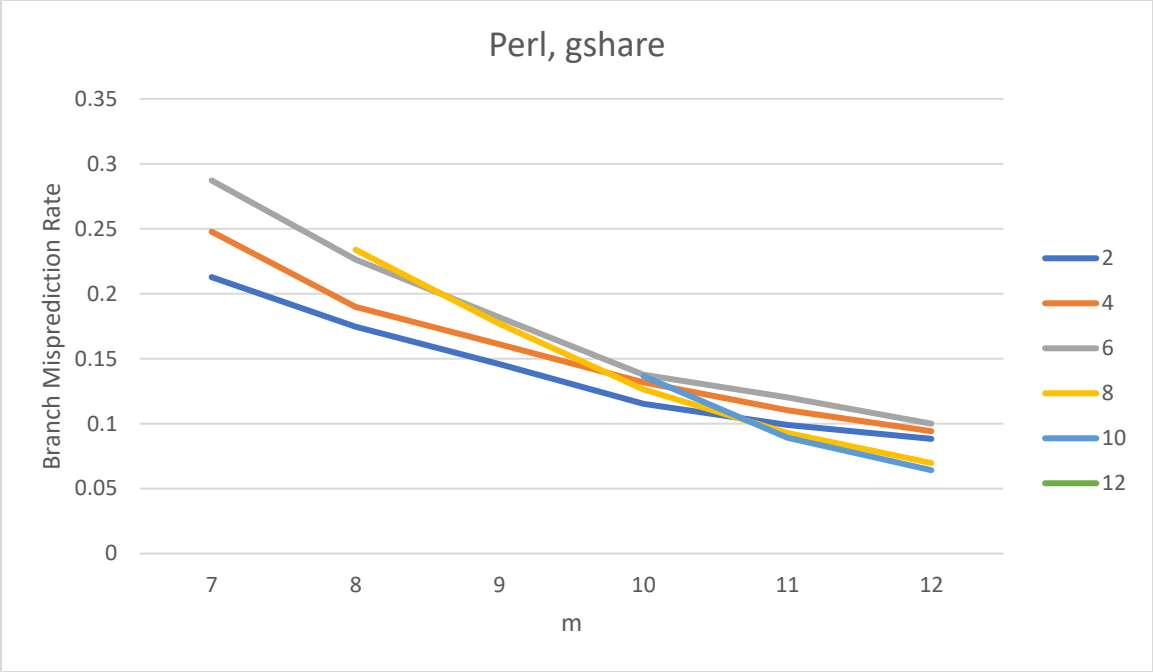


For Bimodal branch predictor and all 3 traces, branch misprediction rate decreases as m increases from 7 to 12.

Part 3: GShare Predictor


GCC, gshare
Branch Misprediction Rate
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
7
8
9
10
11
12
m
2
4
6
8
10
12


JPEG, gshare
Branch Misprediction Rate
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
7
8
9
10
11
12
m
2
4
6
8
10
12



For all traces and all even values of n from 2 to 12, the GShare branch predictor's branch misprediction rate decreases as m increases from 7 to 12.