University of Central Florida

Department of Computer Science

CDA 5106: Spring 2022

Machine Problem 2: Branch Prediction
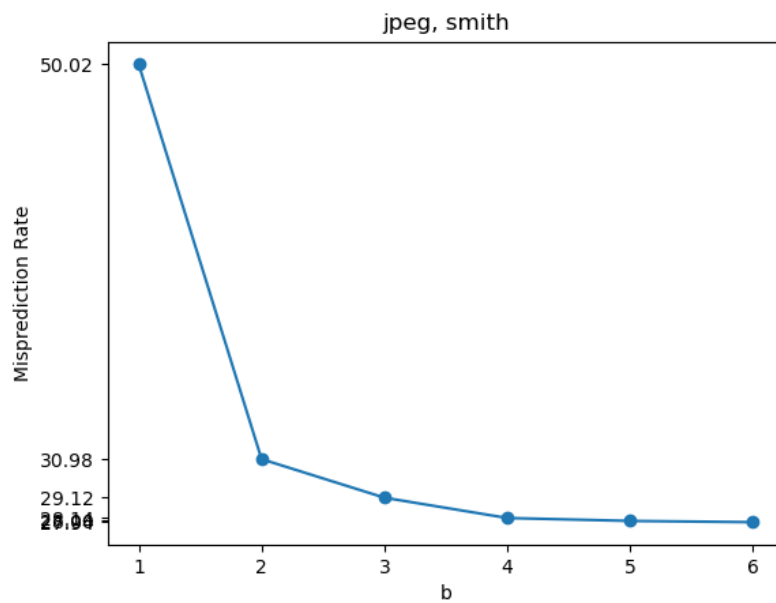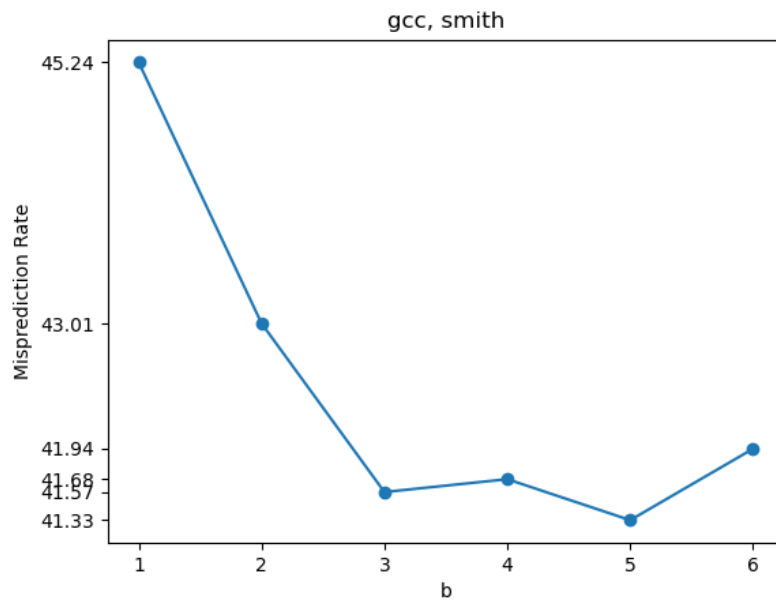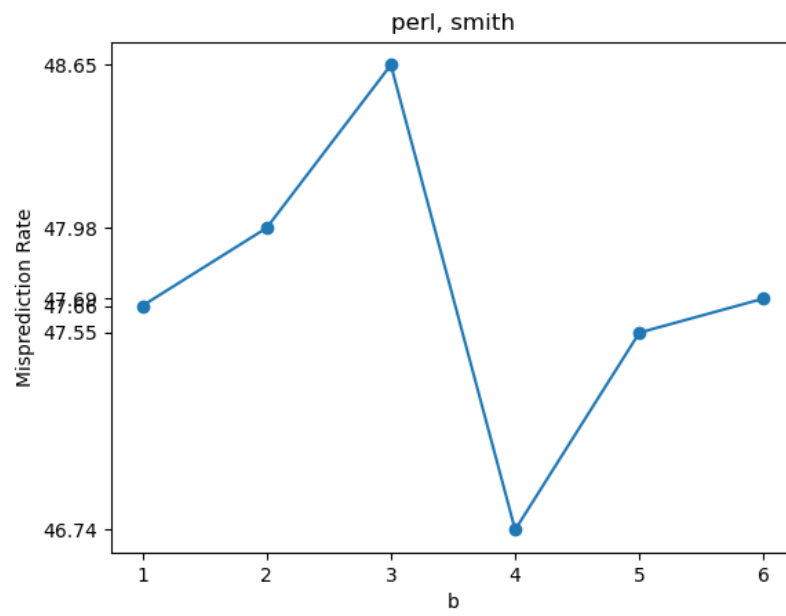
by

Ashish Jain

Graph 1: SMITH N-BIT COUNTER PREDICTOR

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Smith Table:
        0       1       2       3       4       5
0  45.24   43.01   41.57   41.68   41.33   41.94
1  50.02   30.98   29.12   28.14   28.00   27.94
2  47.66   47.98   48.65   46.74   47.55   47.69
```
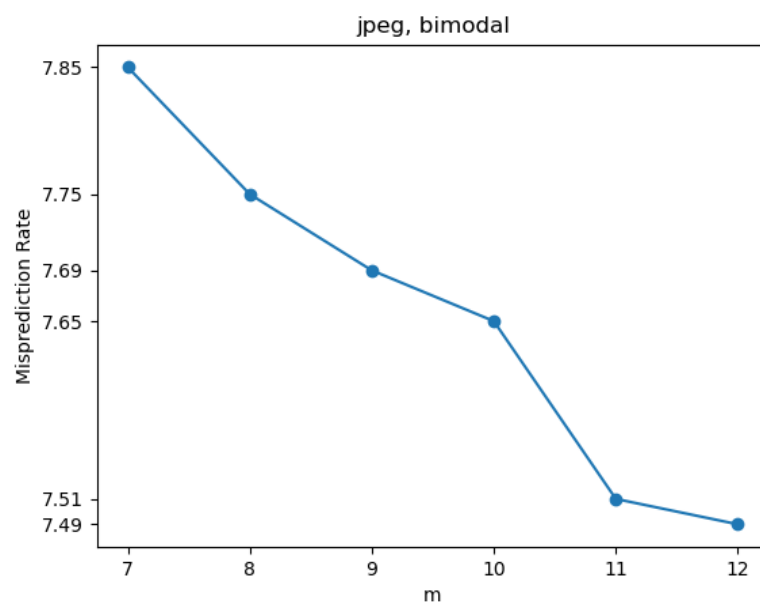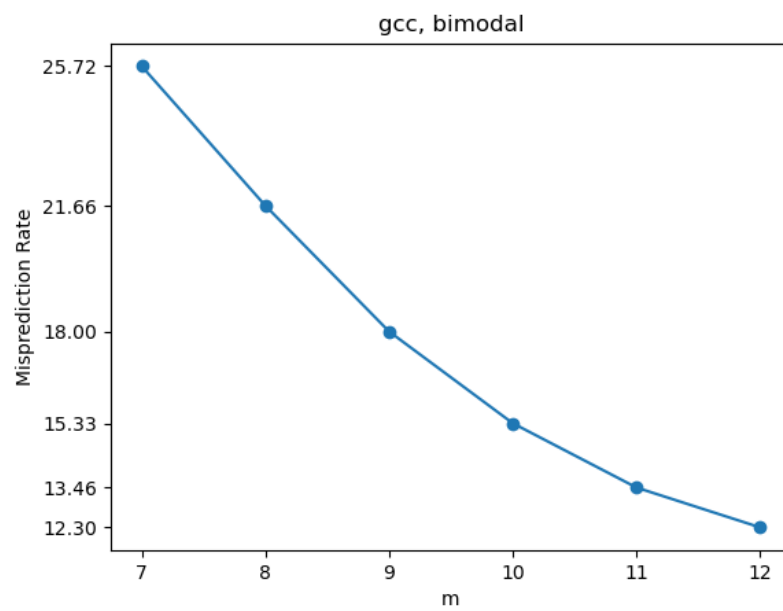
gcc, smith

jpeg, smith

perl, smith

Graph 2: BIMODAL PREDICTOR

Bimodal Table:

	0	1	2	3	4	5
0	25.72	21.66	18.00	15.33	13.46	12.30
1	7.85	7.75	7.69	7.65	7.51	7.49
2	20.60	16.17	13.79	11.62	10.59	8.94

gcc, bimodal

jpeg, bimodal

perl, bimodal
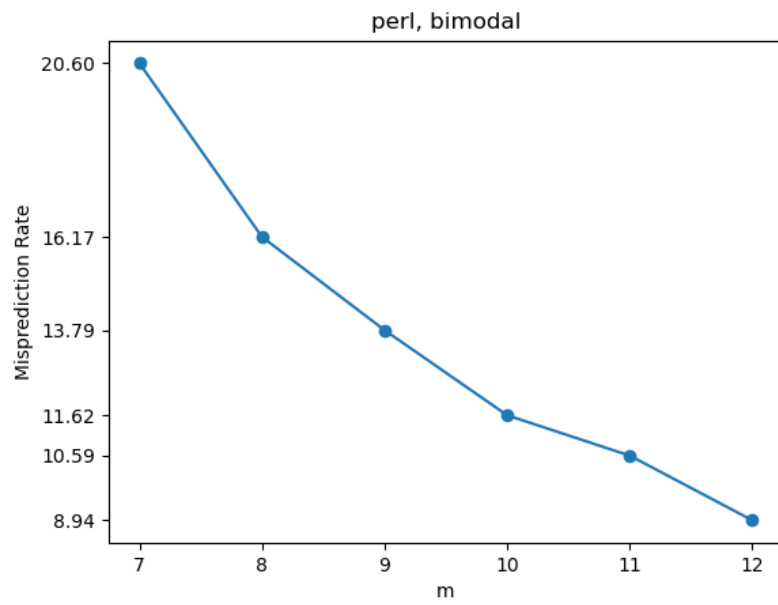
Graph 3: GSHARE PREDICTOR

Gshare Tables

gcc, gshare

	0	1	2	3	4	5
0	27.81	28.95	31.10	NaN	NaN	NaN
1	23.56	24.96	27.53	29.53	NaN	NaN
2	19.94	20.84	23.47	25.49	NaN	NaN
3	16.95	18.00	19.88	21.22	22.52	NaN
4	14.46	15.05	17.06	17.75	18.84	NaN
5	12.53	13.40	14.47	15.16	15.69	16.28

jpeg, gshare

	0	1	2	3	4	5
0	8.41	8.65	9.49	NaN	NaN	NaN
1	8.04	8.20	8.82	9.07	NaN	NaN
2	7.94	8.04	8.46	8.32	NaN	NaN
3	7.87	7.97	8.37	8.05	7.98	NaN
4	7.45	7.62	7.90	7.50	7.47	NaN
5	7.43	7.60	7.84	7.28	7.30	7.35

perl, gshare

	0	1	2	3	4	5
0	21.28	24.78	28.72	NaN	NaN	NaN
1	17.47	19.00	22.63	23.39	NaN	NaN
2	14.58	16.11	18.19	17.69	NaN	NaN
3	11.52	13.19	13.78	12.64	13.66	NaN
4	9.91	11.03	12.03	9.29	8.91	NaN
5	8.83	9.42	10.00	6.97	6.42	6.88

gcc, gshare

jpeg, gshare

perl, gshare

Validation Runs:

perl, smith
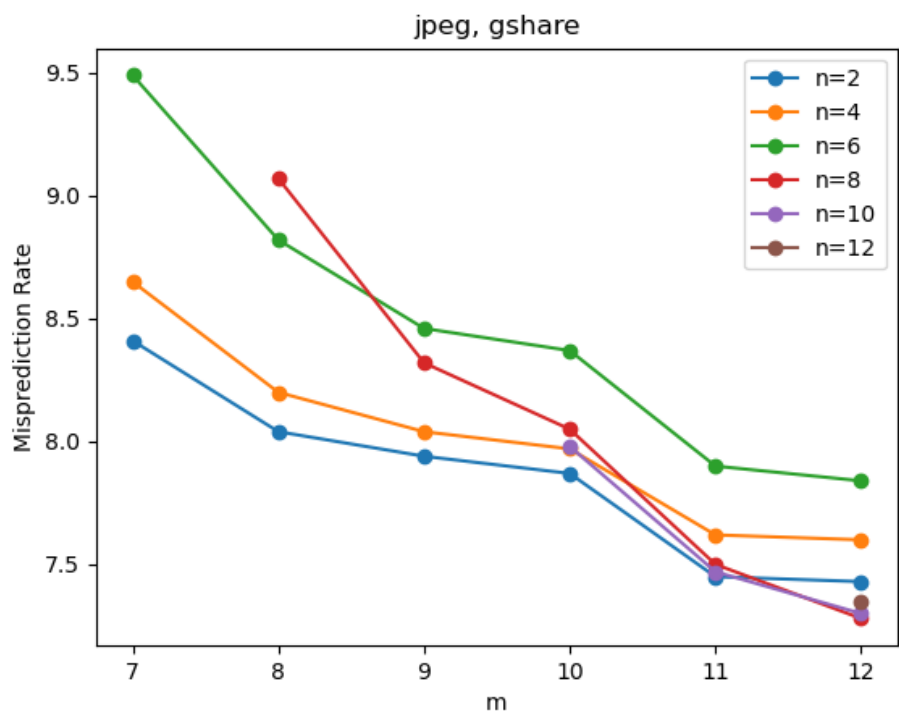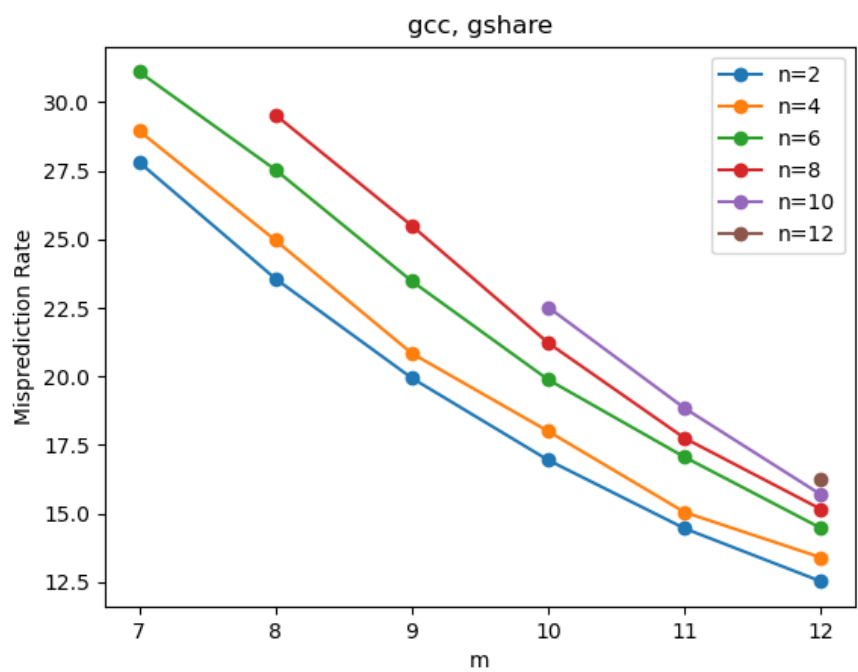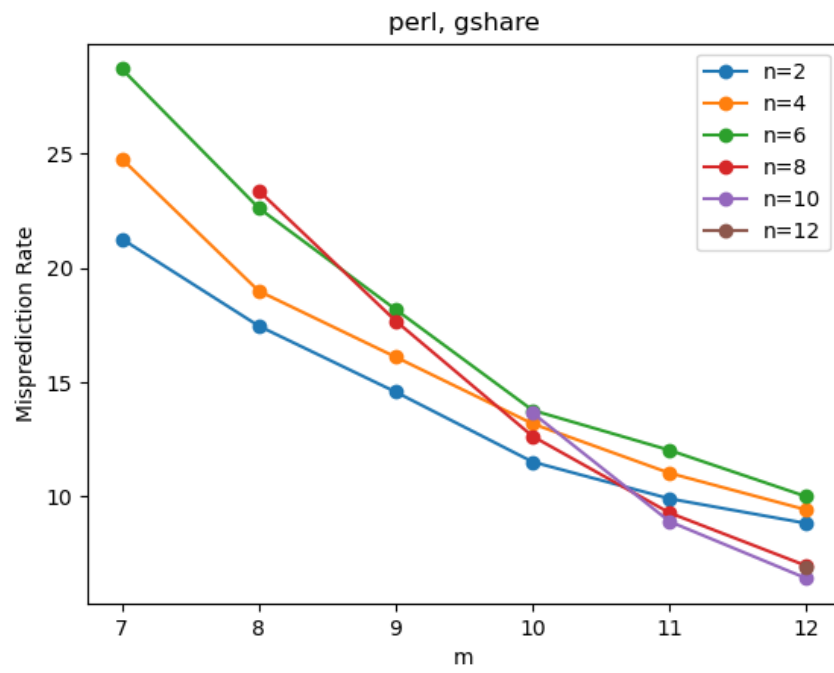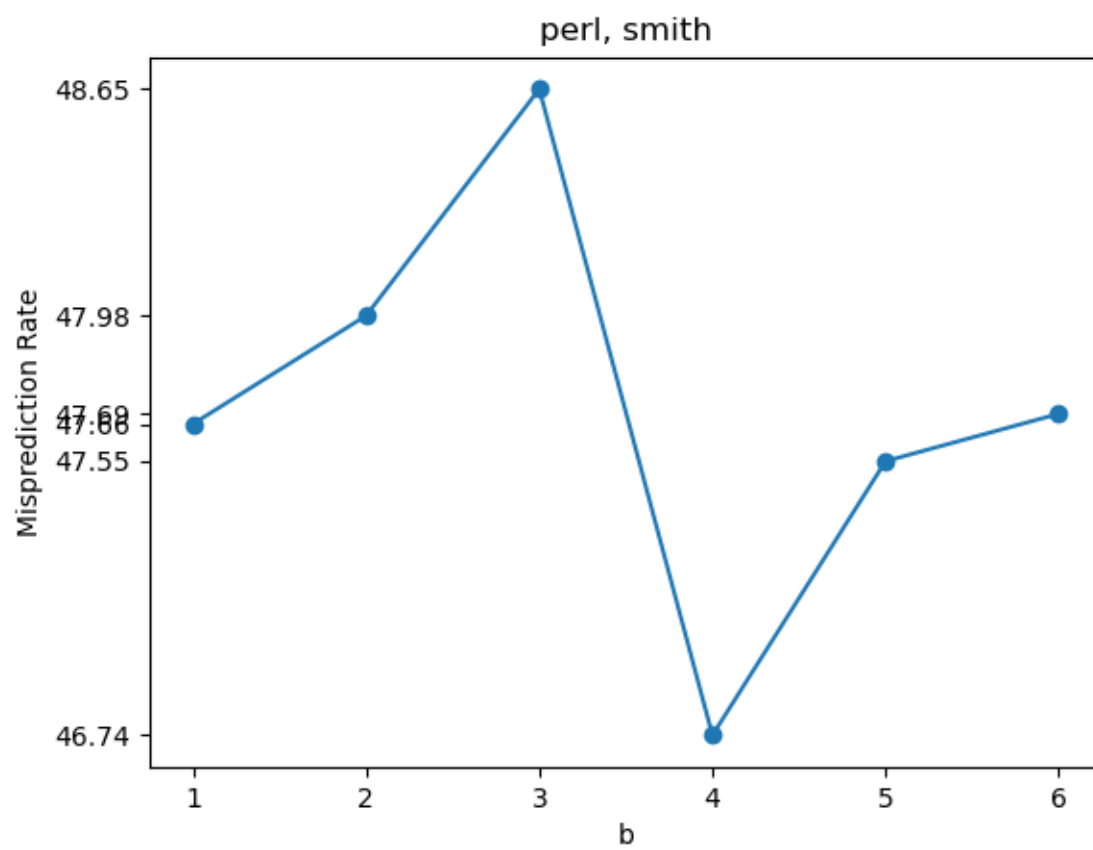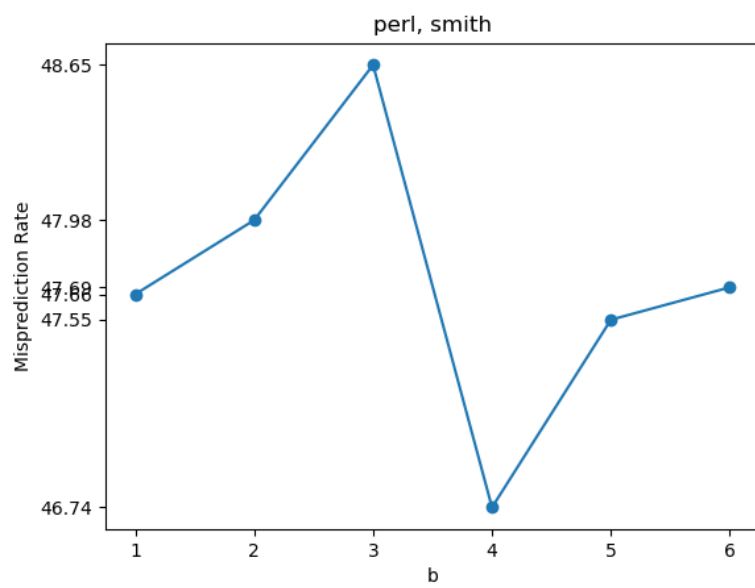
To run the code:

1) Unzip the folder

2) Navigate branch_predictor.py file

3) Run python3 branch_predictor.py

4) Enter inputs