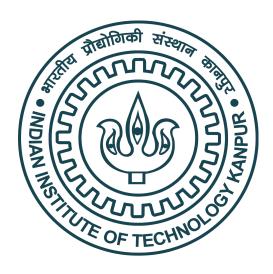# CS422: COMPUTER ARCHITECTURE

Assignment 2

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October 11, 2023

1 Details

- Predicated calls have not been used to calculate the accuracy of branch prediction.

- All the fractions have been given in form of percentages

2 PART A:

2.1 400.perlbench diffmail.pl

Predictor	Total Predictions	Total Misprediction	Forward Misprediction	Backward Misprediction
FNBT	129964018	41.3073	37.5658	56.2294
Bimodal	129964018	9.53447	9.95687	7.8498
SAg	129964018	3.67493	3.75906	3.33939
GAg	129964018	11.7968	12.4947	9.01312
gshare	129964018	10.1689	10.2961	9.6618
Hybrid-1	129964018	3.11033	3.19698	2.76476
Hybrid-2 Majority	129964018	5.00856	5.08194	4.71588
Hybrid-2 Tournament	129964018	2.80353	2.91212	2.37044

2.2 401.bzip2 input.source

Predictor	Total Predictions	Total Misprediction	Forward Misprediction	Backward Misprediction
FNBT	129923158	46.892	30.9892	61.9445
Bimodal	129923158	9.99839	10.7903	9.24878
SAg	129923158	10.1409	11.4242	8.92617
GAg	129923158	12.5105	14.7518	10.389
gshare	129923158	11.3094	12.1152	10.5467
Hybrid-1	129923158	9.58242	10.8428	8.38937
Hybrid-2 Majority	129923158	9.30162	10.2011	8.45028
Hybrid-2 Tournament	129923158	9.12115	10.0766	8.2168

2.3 403.gcc cp-decl.i

Predictor	Total Predictions	Total Misprediction	Forward Misprediction	Backward Misprediction
FNBT	145801085	36.5864	31.8051	54.1066
Bimodal	145801085	12.9406	14.7196	6.42163
SAg	145801085	5.09694	5.36764	4.105
GAg	145801085	15.403	16.1544	12.6498
gshare	145801085	9.73989	9.13862	11.9431
Hybrid-1	145801085	4.19611	4.51192	3.03888
Hybrid-2 Majority	145801085	5.39438	5.35734	5.53009
Hybrid-2 Tournament	145801085	2.93886	2.9198	3.00872

2.4 429.mcf

Predictor	Total Predictions	Total Misprediction	Forward Misprediction	Backward Misprediction
FNBT	178243369	31.9498	35.7095	28.1898
Bimodal	178243369	18.0208	16.2899	19.7518
SAg	178243369	13.051	15.0996	11.0023
GAg	178243369	9.28636	9.22823	9.34448
gshare	178243369	10.2199	10.3489	10.091
Hybrid-1	178243369	8.77588	8.95071	8.60103
Hybrid-2 Majority	178243369	8.68199	8.7616	8.60237
Hybrid-2 Tournament	178243369	8.40371	8.54623	8.26119

2.5 450.soplex ref.mps

Predictor	Total Predictions	Total Misprediction	Forward Misprediction	Backward Misprediction
FNBT	103135145	17.142	20.0388	15.7204
Bimodal	103135145	4.86166	0.996342	6.75865
SAg	103135145	4.07083	0.748235	5.70147
GAg	103135145	3.88751	0.973775	5.31749
gshare	103135145	4.06226	1.43109	5.35356
Hybrid-1	103135145	3.64375	0.739388	5.06913
Hybrid-2 Majority	103135145	3.85344	0.915582	5.29526
Hybrid-2 Tournament	103135145	3.64263	0.738543	5.06788

2.6 456.hmmer nph3.hmm

Predictor	Total Predictions	Total Misprediction	Forward Misprediction	Backward Misprediction
FNBT	144361300	63.914	76.6308	0.669725
Bimodal	144361300	8.55509	10.2042	0.353681
SAg	144361300	9.12531	10.8636	0.480271
GAg	144361300	11.7681	13.6184	2.56612
gshare	144361300	10.2738	11.7955	2.70598
Hybrid-1	144361300	8.64248	10.2254	0.770024
Hybrid-2 Majority	144361300	8.68851	10.3097	0.625654
Hybrid-2 Tournament	144361300	8.35166	9.94719	0.416591

2.7 471.omnetpp

Predictor	Total Predictions	Total Misprediction	Forward Misprediction	Backward Misprediction
FNBT	117334365	34.1219	33.7249	36.1839
Bimodal	117334365	10.3999	9.72794	13.8895
SAg	117334365	5.00306	4.36216	8.33152
GAg	117334365	12.2329	11.8268	14.3421
gshare	117334365	10.8436	10.3793	13.2551
Hybrid-1	117334365	4.11902	3.58406	6.89733
Hybrid-2 Majority	117334365	5.48424	4.76378	9.22591
Hybrid-2 Tournament	117334365	3.89982	3.38285	6.58463

2.8 483.xalancbmk

Predictor	Total Predictions	Total Misprediction	Forward Misprediction	Backward Misprediction
FNBT	198103720	6.16329	6.81628	4.05936
Bimodal	198103720	2.77581	3.10669	1.70969
SAg	198103720	1.4942	1.66091	0.957054
GAg	198103720	3.51876	3.81146	2.57566
gshare	198103720	3.11536	3.33586	2.40493
Hybrid-1	198103720	1.14434	1.24189	0.830046
Hybrid-2 Majority	198103720	1.70082	1.82572	1.29838
Hybrid-2 Tournament	198103720	1.04953	1.15022	0.725113

3 PART B:

3.1 400.perlbench diffmail.pl

BTB Type	BTB Predictions	BTB Misprediction Fraction	BTB Miss Rate
BTB A	28101377	35.3716	0.0113873
BTB B	28101377	10.42	1.80605

3.2 401.bzip2 input.source

BTB Type	BTB Predictions	BTB Misprediction Fraction	BTB Miss Rate
BTB A	791935	48.2935	0.00745011
BTB B	791935	47.5233	0.0270224

3.3 403.gcc cp-decl.i

BTB Type	BTB Predictions	BTB Misprediction Fraction	BTB Miss Rate
BTB A	34746386	70.6185	0.000109364
BTB B	34746386	31.7407	0.0500858

3.4 429.mcf

BTB Type	BTB Predictions	BTB Misprediction Fraction	BTB Miss Rate
BTB A	12555923	0.613495	7.16793e-05
BTB B	12555923	0.409934	0.000844223

3.5 450.soplex ref.mps

BTB Type	BTB Predictions	BTB Misprediction Fraction	BTB Miss Rate
BTB A	6333664	0.024725	0.00187885
BTB B	6333664	0.032572	0.00833641

3.6 456.hmmer nph3.hmm

BTB Type	BTB Predictions	BTB Misprediction Fraction	BTB Miss Rate
BTB A	201471	6.35824	0.0317664
BTB B	201471	2.58598	0.365809

3.7 471.omnetpp

BTB Type	BTB Predictions	BTB Misprediction Fraction	BTB Miss Rate
BTB A	30294875	29.3618	0.0188283
BTB B	30294875	11.6379	0.878611

3.8 483.xalancbmk

BTB Type	BTB Predictions	BTB Misprediction Fraction	BTB Miss Rate
BTB A	29705219	24.7677	2.11875
BTB B	29705219	25.2124	13.9443