

Results/Observations

The following are the results and observations of the simulation for the Last Level cache(LLC) for 10 million instructions :

ALGORITHM	BRANCH PREDICTOR	TOTAL ACCESSES	HITS	MISSES	HIT RATIO (approx.)
LRU	BIMODAL	90727	67519	23208	74.42%
SHIP	BIMODAL	90767	67652	23115	74.53%
SRRIP	BIMODAL	90727	67361	23366	74.25%
DRRIP	BIMODAL	90665	66872	23793	73.76%

Hence, from the simulation we find that SHIP replacement policy gives the maximum hit ratio of 74.53% out of these four replacement policies for the LLC using bimodal branch predictor. The branch predictor has an accuracy of 90.4199%.

ALGORITHM	BRANCH PREDICTOR	TOTAL ACCESSES	HITS	MISSES	HIT RATIO (approx.)
LRU	GSHARE	90769	67559	23210	74.43%
SHIP	GSHARE	90825	67713	23112	74.55%
SRRIP	GSHARE	90769	67404	23365	74.26%
DRRIP	GSHARE	91116	67240	23876	73.80%

Hence, from the simulation we find that SHIP replacement policy gives the maximum hit ratio of 74.55% out of these four replacement policies for the LLC using global history counter or gshare branch predictor. The branch predictor has an accuracy of 88.7345%.

DRAM STATISTICS

These are the results for simulation using bimodal branch predictor.

ALGORITHM	ROW BUFFER HITS	ROW BUFFER MISS	HIT RATIO (approx.)
LRU	10744	12438	46.35%
SHIP	11088	12001	48.02%
SRRIP	10804	12423	46.51%
DRRIP	10883	12672	46.20%

These are the results for simulation using global history counter or ‘gshare’ branch predictor.

ALGORITHM	ROW BUFFER HITS	ROW BUFFER MISS	HIT RATIO (approx.)
LRU	10775	12404	46.49%
SHIP	10747	12324	46.58%
SRRIP	10825	12402	46.61%
DRRIP	10763	12873	45.54%

Thus, from the above simulation results we can clearly see that the **Signature-based Hit Predictor or SHIP** replacement algorithm is better than the other four algorithms especially better than the LRU algorithm. SHIP policy gives the best hit ratio.

Although we see a slight deviation when we use gshare branch predictor, the SRRIP policy gives a slight better hit ratio than SHIP (0.03%) in the DRAM.

For the Last Level Cache, we can safely say that the SHIP replacement policy is better among the four algorithms.