# COMPUTER ARCHITECTURE

REPORT

BRANCH PREDICTION

Firstly we started working and implementing Global History based branch prediction where there is a single register(Global History Register) for all the branches stored in program counter. However we got approx. 95% accuracy in that implementation. Suddenly we realized that it was not enough to record history of previously taken branches at a global level. So intuitively we thought for recording the history of a particular branch. We constructed a local history table (LHT) which records the histories of taken or not taken history of a particular branch indexed by taking some N least significant bits of program counter. Moreover we constructed Local Pattern Table (LPT) which is indexed by pattern of history bits stored in LHT. An abstract figure is shown below for better illustration. After implementing this we got accuracy of 96.4% for 2400 predictor, 97.13% for 6400 predictor, 97.2% for 9999 predictor.

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LOCAL HISTORY TABLE   LOCAL PATTERN TABLE
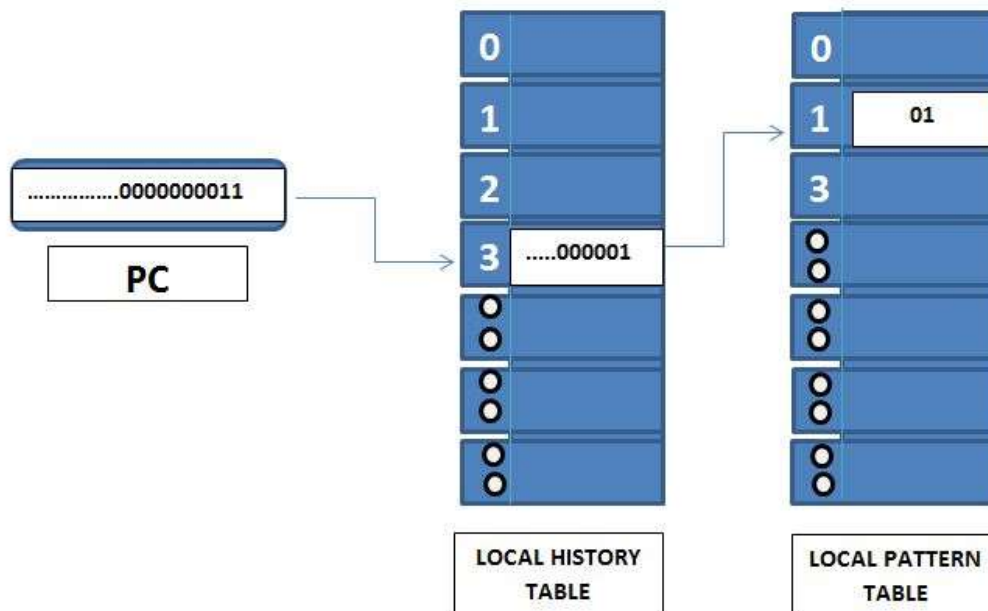
TEJAS

In case of Tejas installation we changed configuration file as follows. When we changed predictor as PAP, accuracy became 84.82% ,for TAGE accuracy 88.91%, for GShare accuracy 86.19%. Moreover we changed bits for indexing from program counter as 8 bits,10 bits,14bits and got accuracy of 88.91%, 89.01%, 88.91% respectively and observed 10 bits selection gives better result than others. In addition to this we used 2 bits ,3 bits, 4 bits where 2 saturation bit gave max accuracy because it gives one more chance before predicting something

WEKA TOOL

	Trace1		Trace2		Trace3		Trace4		Trace5	
	a=0	b=1	a=0	b=1	a=0	b=1	a=0	b=1	a=0	b=1
Confusion matrix	1664048	136725	1302517	123431	169354	18235	799987	3314	57955	449779
	40489	372410	23000	343886	2095	1357112	37844	54696	38602	1357712
Prediction Accuracy (%)	91.9946		91.8324		98.6857		95.4057		79.836	