Branch Prediction

Program counter

1st iteration
Branch Taken (predicted not taken)
History -> 1

for (i=0; i<10; i++) {
    ...
    ...
    add $i, $i, #1
    beq $i, #10, loop
}

2nd iteration
Branch Taken (predicted taken)
History -> 1

Branch History Table

- has limited size
- 2 bits by N (e.g. 4K)
- uses low bits of branch address to choose entry

- what happens when table too small?
- what about even/odd branch?
Assume a loop that repeatedly executes three iterations (thus, the branch is TTNTTNTTN…)

First iteration
Branch Taken
Predicted not taken
BHT -> 10
Pattern Hist Table -> 101101

Second iteration
Branch Taken
Predicted not taken
BHT -> 10
Pattern Hist Table -> 110110

Third iteration
Branch not taken
Predicted not taken
BHT -> 00
Pattern Hist Table -> 011011

Assume a loop that repeatedly executes three iterations (thus, the branch is TTNTTNTTN…)

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