INEL 6009: Homework 7
Branch Prediction Performance

Task:

Consider a pipelined execution unit of five stages and a memory latency of 4 cycles. A program executes a total 75 instructions in this system without any hazard except control hazards. Among the 75 instructions executed there are three branch instructions that account for 22 of all the instructions executed. The outcome of the executions of the branches is as follows:

Branch1 taken
Branch1 taken
Branch1 taken
Branch1 taken
Branch1 taken
Branch1 not taken
Branch2 taken
Branch1 taken
Branch1 taken
Branch1 taken
Branch1 not taken
Branch2 not taken
Branch3 taken
Branch1 taken
Branch1 taken
Branch1 taken
Branch1 taken
Branch1 taken
Branch1 taken
Branch1 taken
Branch1 taken
Branch1 not taken
Branch2 taken

Part 1: Determine the CPI for the code if a one-bit history predictor is used for each of the three branches (show your calculations).

Part 2: Determine the CPI for the code if a two-bit saturated counter predictor is used for each of the three branches (show your calculations).

Submission:

Upload a pdf document with your answers on or before 3/28/2016.

Rubrics:

Part 1:
10 points will be awarded if the CPI is calculated correctly. Otherwise, partial points may be awarded based on the correctness of the calculation.

Part 2:
10 points will be awarded if the CPI is calculated correctly. Otherwise, partial points may be awarded based on the correctness of the calculation.