**Smartest – Final Demo**

**Jenny**

We implemented branch prediction on top of a pipelined CPU, called Smartest.

The algorithm we used for making predictions on branches is a Two-Way Adaptive Predictor, which allows for complete prediction of any 4-bit branch sequence, such as, taken, not taken, not taken, taken).

**{ Grant talks details about two-way adaptive predictor }**

Our CPU design was very simple: strip out a lot of the pipeline and MIPS advanced features and concentrate heavily on branch-prediction. Our pipeline does not support forwarding. We support 16 instructions, and 256 bytes of instruction memory and 256 bytes of data memory.

We can make predictions on up to 16 branch statements simultaneously, with new entries replacing old entries using a First-In-First-Out strategy.

We have a simple program for demonstrating the branch predictor predicting an all true sequence, which takes all branches. It takes the predictor several branches to "learn" the sequence and apply the appropriate weights before the predictor can accurately predict the target.

However, we don't demonstrate arbitrary sequences due to time constraints.

**{ Grant demonstrates the program }**