Roadmap for Outel CP3

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The third checkpoint will be due on April 28th, two weeks after our Checkpoint 2. For checkpoint 3, we are asked to implement the most of our proposed advanced features of our CPU. Specifically, based on the features we propose, we are planning to finish the third checkpoint based on the following timeline:

By the end of this week (April 18th), we shall finish the implementation of the L2 cache. Starting with the simplest L2 cache structure, we are going to increase its associativity gradually to boost the CPU performance. We are planning to test our L2 cache design simply using the checkpoint2 test case: as long as it passes the checkpoint2 test case the L2 cache is well implemented.

By the end of this week (April 18th), we should finish the implementation and testing of the basic hardware prefetcher. Checkpoint two should be sufficient for testing the function of prefetch, but we should be able to see some improvement in performance. At the same time, we are planning to finish the local branch history table, the simplest dynamic branch prediction scheme.

By the mid of next week (April 21th), we shall finish the eviction write buffer (EWB). To test the EWB, we shall focus on both the final regfile values after running the test case and the waveform to ensure that the EWB works as expected. We shall also design some corner cases to test the robustness of the EWB. At the same time, after ensure the robustness of the branch history table, we will try to implement a tournament branch predictor based on it.

By the checkpoint 3 due date, we shall make our CPU support the RISC-V M Extension. We are planning to implement the multiplier using add-shift algorithm, Wallace tree, and Dadda Multiplier and choose the one with best performance.