Summary
Compiler optimization of memory-resident value communication between speculative threads
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1  To be completed before class

What are the problems solved by this paper? (50 words)
Frequent mis-speculation is one of the major overheads of TLS. The compiler can easily identify some of the frequent dependences and synchronize them to avoid squashing. But the compiler can identify dependences occurring in between scalar variables. The memory dependences are very hard to identify in hardware because of aliasing. If there are many stores through pointers, we cannot identify which particular store is storing into a particular location. Due to this limitations, current compiler techniques cannot avoid squashes due to memory dependences. This paper addresses this issue by handling memory dependences also.

What are the approaches attempted by this paper? (50 words)
Previous work done on scalar variables has given very good performance. The same technique can be applied to pointer variables. But because of pointers, we cannot identify the dependence with certainty. So the paper uses profiling to identify the load store pairs which cause frequent dependences (5% is found to be a good threshold). Then the compiler inserts the wait and signal instructions for the dependences which are frequent. The paper also proposes some hardware modifications which ensures correct execution if wrong value is passed. By synchronizing memory dependences, frequent squashes are reduced.

What are the main conclusions of this paper? (50 words)
The results show that the due to the reduction in squashes after applying the proposed techniques, some of the applications show an average speedup of 17% (region speedup). The results are then compared with the hardware techniques. It is found that the hardware and compiler based synchronization can each benefit a different set of benchmarks. Also it is shown that the two techniques synchronize different instructions. This shows that the two techniques can be complimentary to each other.

2  To be completed after class

Did this paper address an important issue? Explain. (100 words)

Are the proposed approaches valid? Describe its strength and weakness. (100 words)
Do the results support the conclusions? Explain. (100 words)

Describe the potential future works? (100 words)