Summary Part 1
DBMSs on a Modern Processor: Where Does Time Go?

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What are the problems solved by this paper?
It is seen that modern processors are able to speed-up scientific workloads much more than database workloads. This paper concentrates on finding out the memory behavior of the database applications and to find out how the processor time is spent while executing these applications. It provides a simple analytical model to account for the contribution of various stalls to the total execution time of a database application.

What are the approaches attempted by this paper?
Instead of just using one database system, the authors use four different systems on a particular platform, so that any characteristics that are common to all database systems can be noticed. They use a memory resident database since they want to focus on the memory behavior of database applications and exclude the I/O effects. They use simple queries on the database instead of using full benchmarks, so that the results are easier to analyze. They also find that the behavior of these ‘micro-benchmarks’ is similar to that of the full-blown benchmarks.

What are the main conclusions of this paper?
They find that more than half of the execution time of database applications is spent in various types of stalls. However, the most time is spent in stalls due to L2 data cache misses and L1 instruction cache misses. Branch mispredictions also cause significant amount of stall time. Thus, database designers should pay attention to data layout at the L2 level and instruction layout at the L1 level.