

CS152
Computer Architecture and Engineering
Lecture 22

Advanced Caching

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lecture slides: <http://inst.eecs.berkeley.edu/~cs152/>

Recap: Cache Performance

Execution_Time =

$$\text{Instruction_Count} \times \text{Cycle_Time} \times (\text{ideal CPI} + \text{Memory_Stalls/Inst} + \text{Other_Stalls/Inst})$$

Memory_Stalls/Inst =

$$\begin{aligned} & \text{Instruction Miss Rate} \times \text{Instruction Miss Penalty} + \\ & \text{Loads/Inst} \times \text{Load Miss Rate} \times \text{Load Miss Penalty} + \\ & \text{Stores/Inst} \times \text{Store Miss Rate} \times \text{Store Miss Penalty} \end{aligned}$$

Average Memory Access time (AMAT) =

$$\begin{aligned} & \text{Hit Time}_{L1} + (\text{Miss Rate}_{L1} \times \text{Miss Penalty}_{L1}) = \\ & (\text{Hit Rate}_{L1} \times \text{Hit Time}_{L1}) + (\text{Miss Rate}_{L1} \times \text{Miss Time}_{L1}) \end{aligned}$$