

Performance via Pipelining

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Introduction

Pipelining is the process of accumulating instruction from the processor through a pipeline. It allows storing and executing instructions in an orderly process. It is also known as pipeline processing. Pipelining is a technique where multiple instructions are overlapped during execution.

Issues in pipelining

In data hazard, read and write operations of shared variables by different instructions in a pipeline may lead to different kind of data dependencies such as, Read after write hazard. Write after reading hazard. Write after write hazard.

Advantages of Pipelining

Increase in the number of pipeline stages increases the number of instructions executed simultaneously. Faster ALU can be designed when pipelining is used. Pipelined CPU's works at higher clock frequencies than the RAM. Pipelining increases the overall performance of the CPU.

Increase performance by Pipelining

Super pipelining improves the performance by decomposing the long latency stages (such as memory access stages) of a pipeline into several shorter stages, thereby possibly increasing the number of instructions running in parallel at each cycle.

Pipelining and CPI

Pipelining increases average throughput for the same clock speed, which is exactly the same thing as decreasing average CPI. Or it lets you increase the clock speed if your CPU's clock was so slow that it could do everything for a whole instruction in one clock cycle

Uses of Pipelining

Pipelining is an implementation technique whereby multiple instructions are overlapped in execution; it takes the advantage of parallelism that exists among the actions needed to execute an instruction. Today, pipelining is the key implementation technique used to make fast CPUs

Any Questions?

