

Pipelining

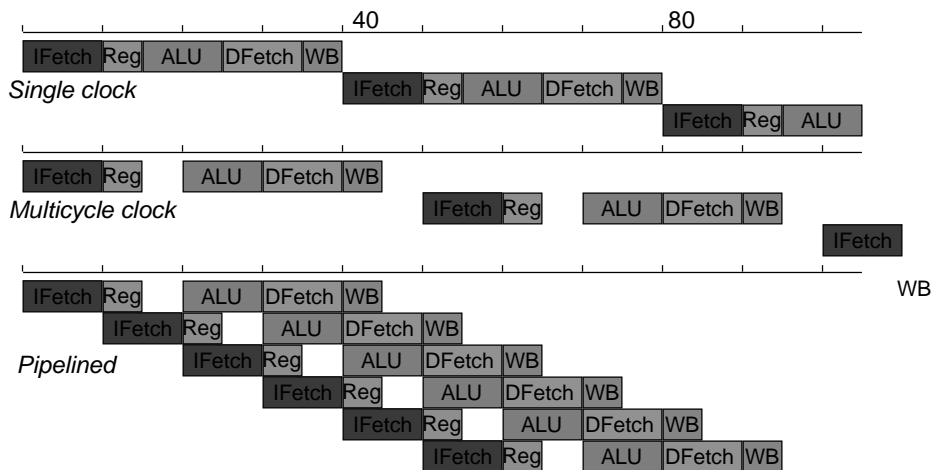
Pipelining is a standard technique for exploiting parallelism in tasks that are ordered. Two considerations are: Balancing the step size and avoiding hazards

Benefits of Pipelining

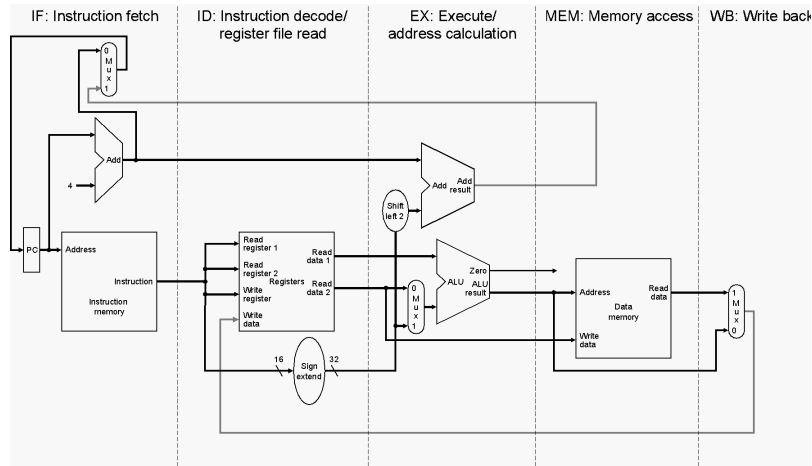
Assume:
Memory(10ns), ALU(10ns), Register(5ns),
All other operations are 0ns.

Charges for instructions are ...

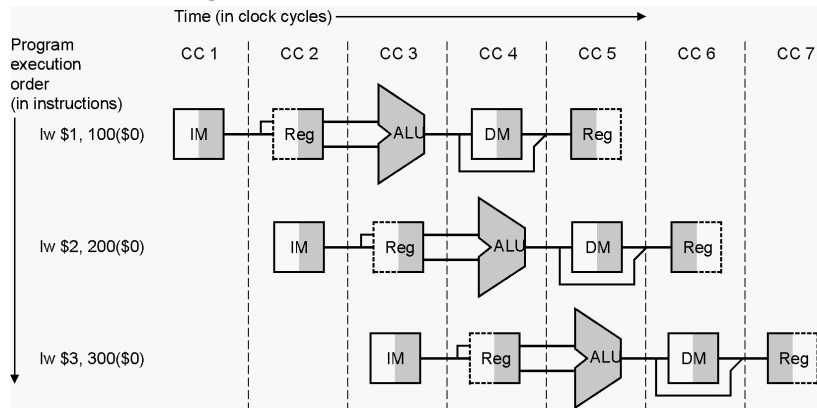
- R-format: 30ns
- Load inst: 40ns
- Store inst: 35ns
- Branch: 25ns
- Jump: 10ns



Decomposing the Fetch/Execute Cycle



Abstracting the Pipeline



Keeping State In The Pipeline

