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