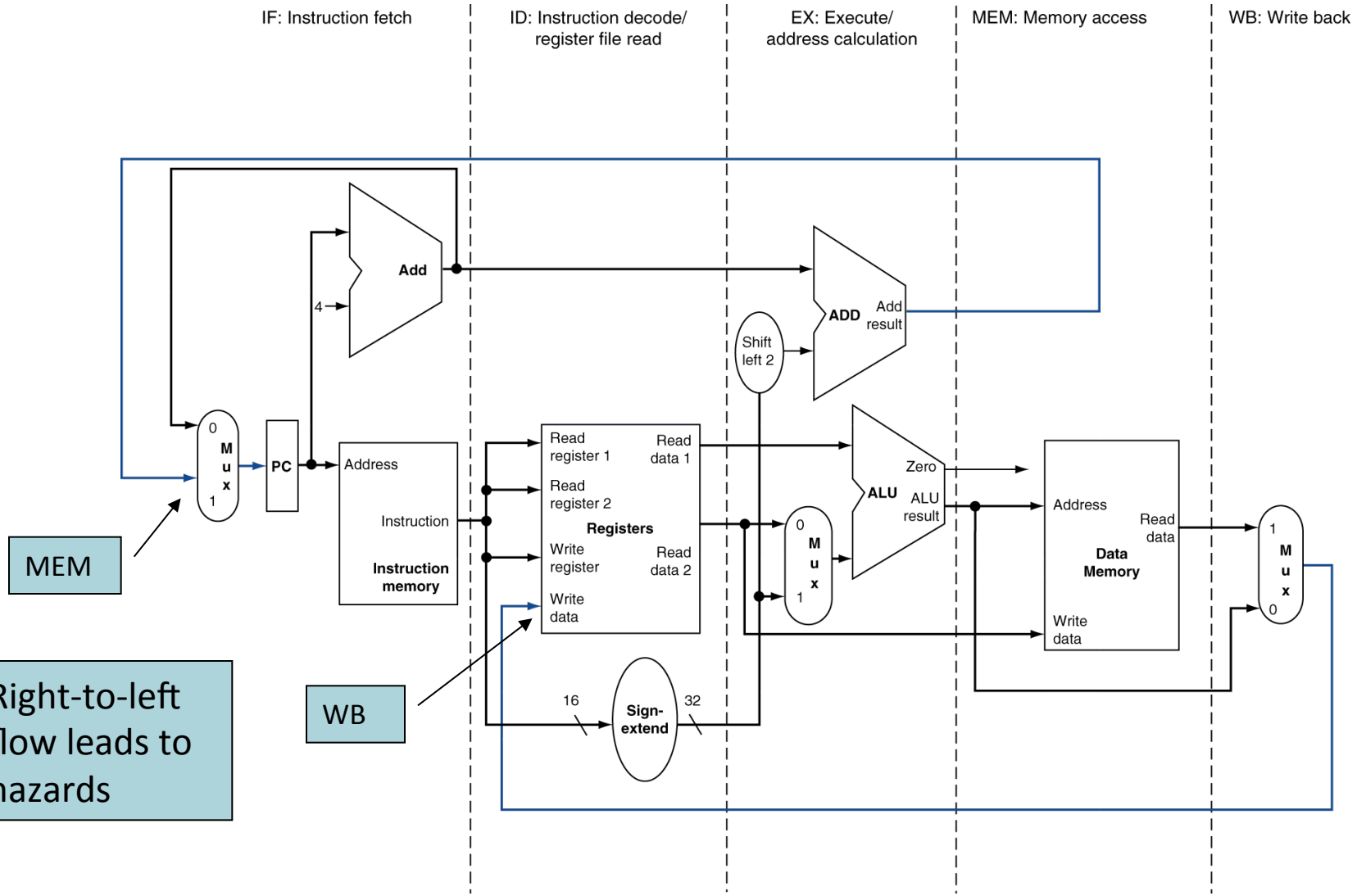
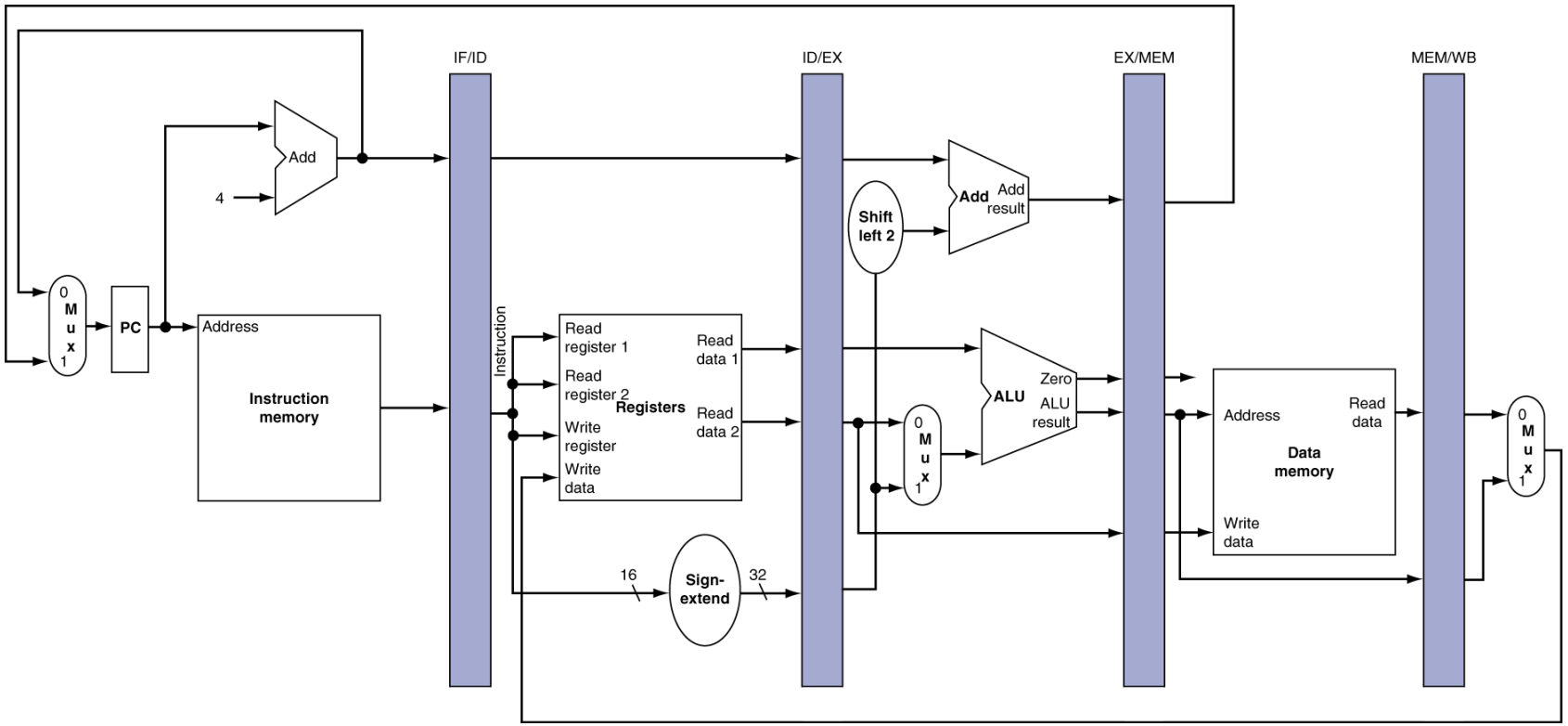
MIPS Pipelined Datapath



Right-to-left flow leads to hazards

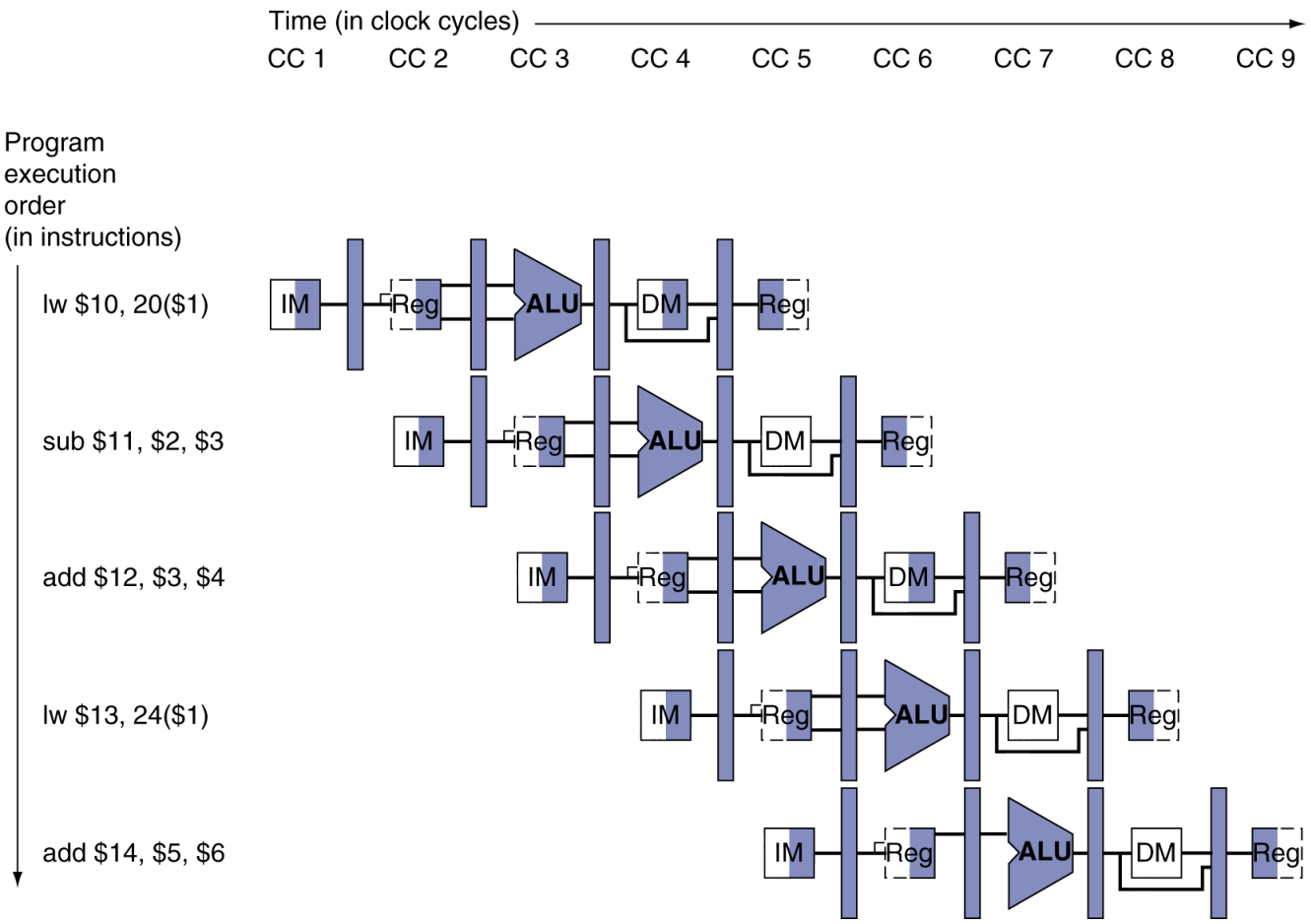
Pipeline Registers

- Need registers between stages
  - To hold information produced in previous cycle



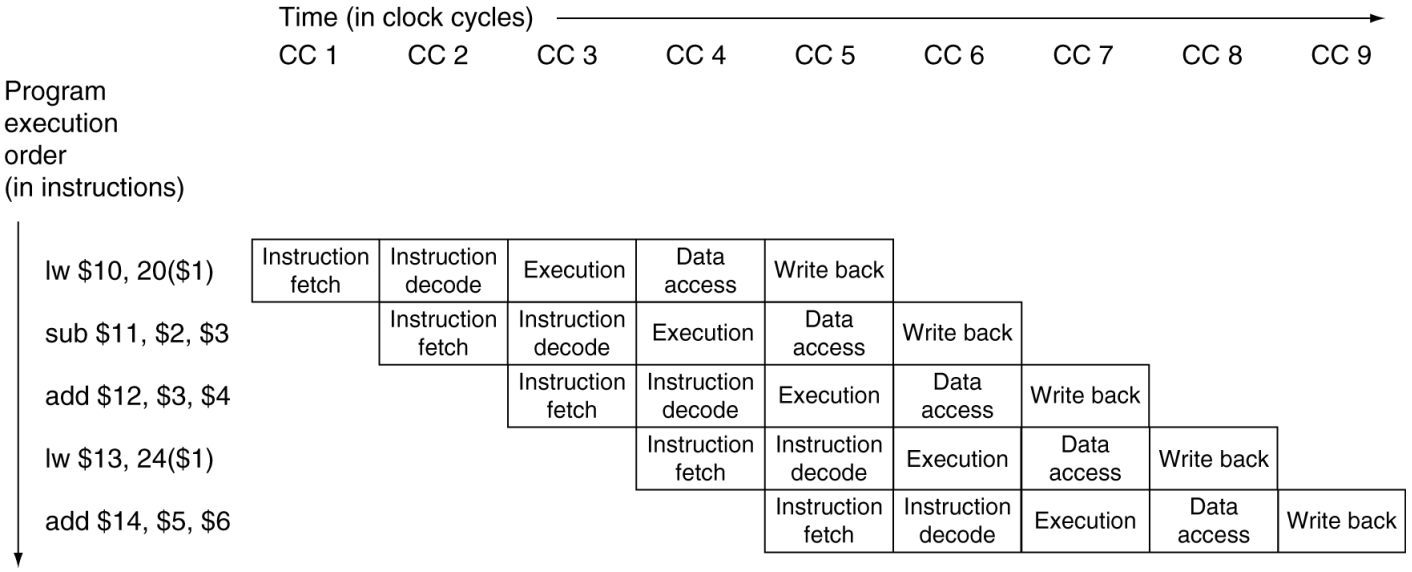
Pipeline Diagram

- Form showing resource usage



Pipeline Diagram

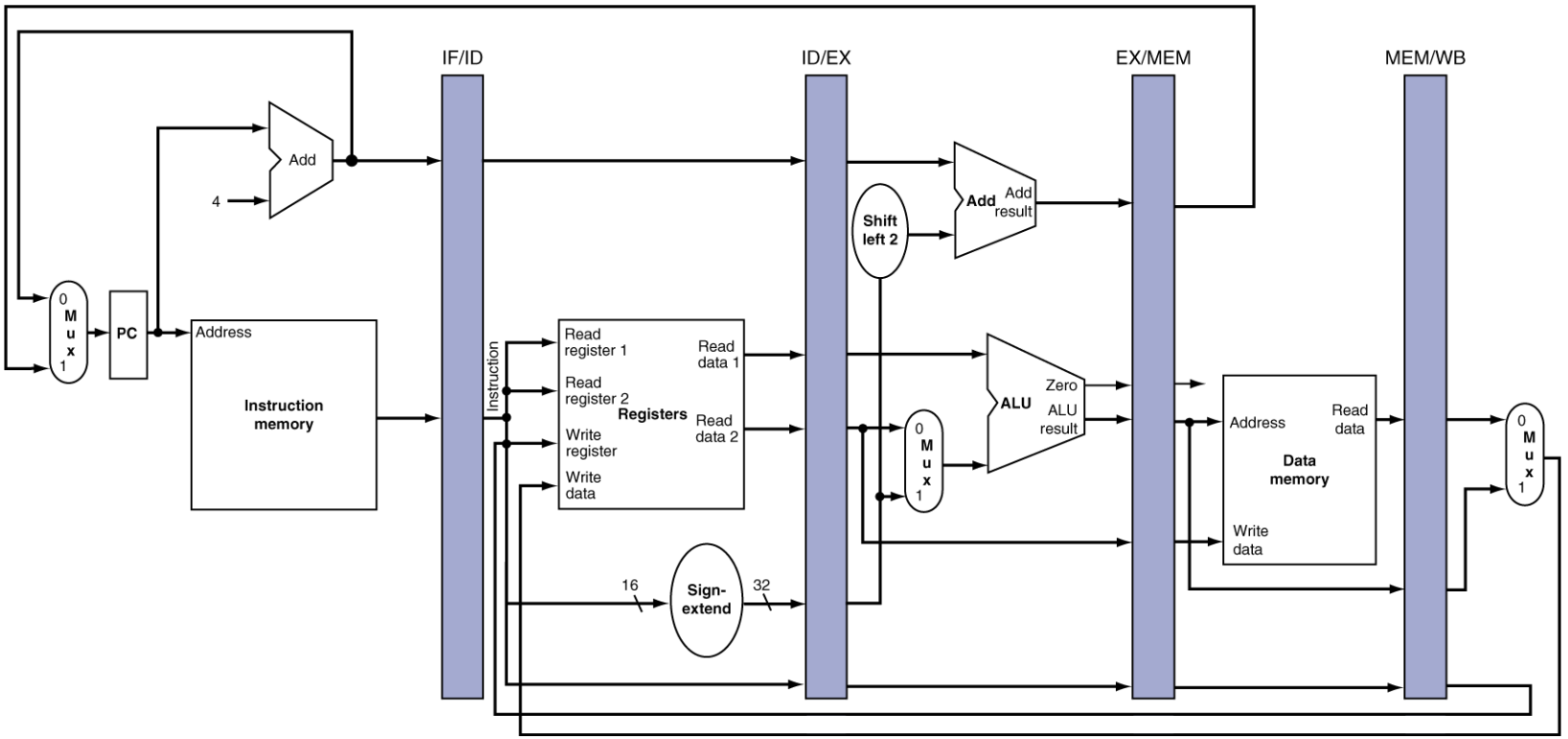
- Traditional form



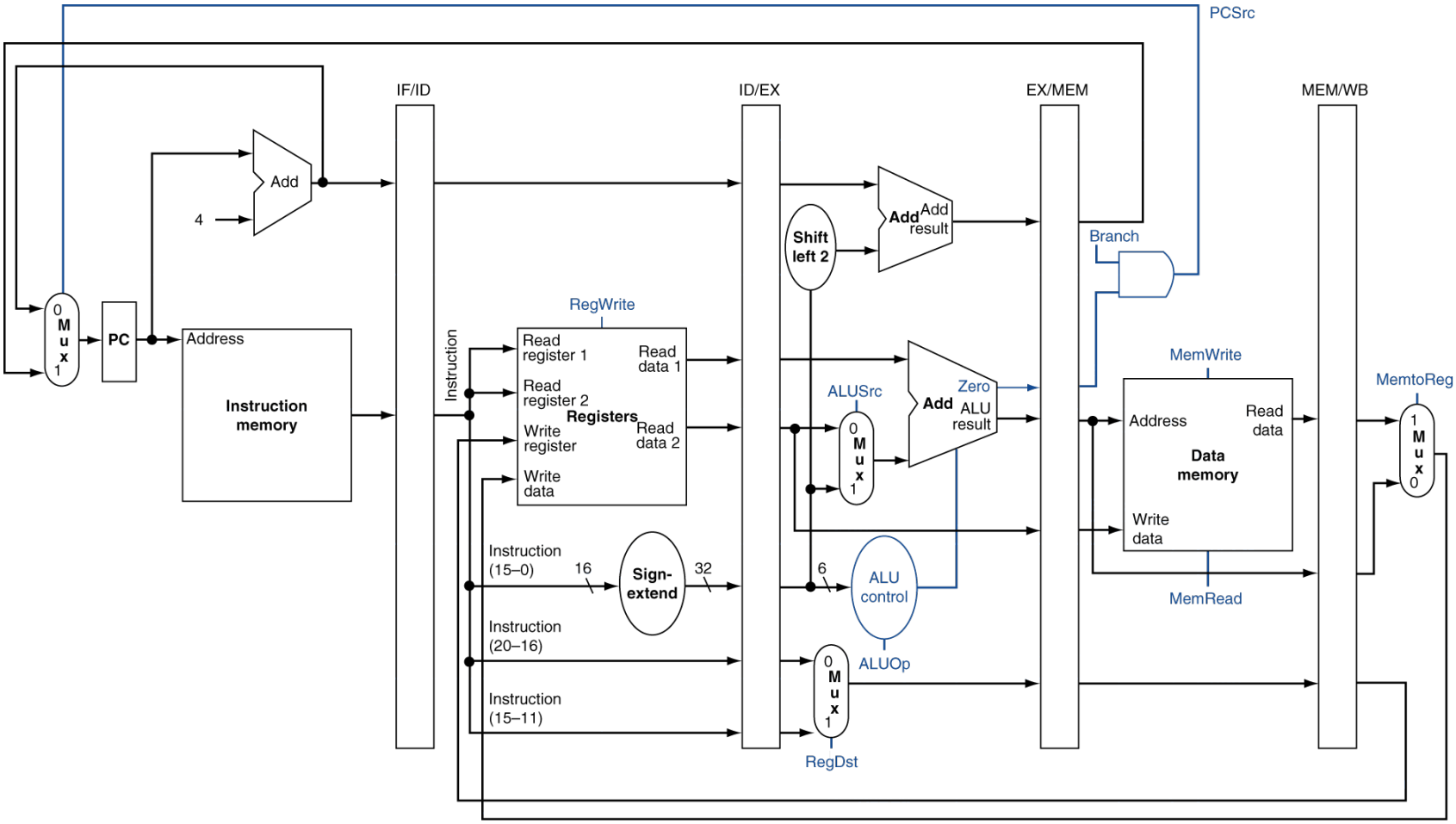
Pipeline Diagram

- State of pipeline in a given cycle

add $14, $5, $6	lw $13, 24 ($1)	add $12, $3, $4	sub $11, $2, $3	lw $10, 20($1)
Instruction fetch	Instruction decode	Execution	Memory	Write-back

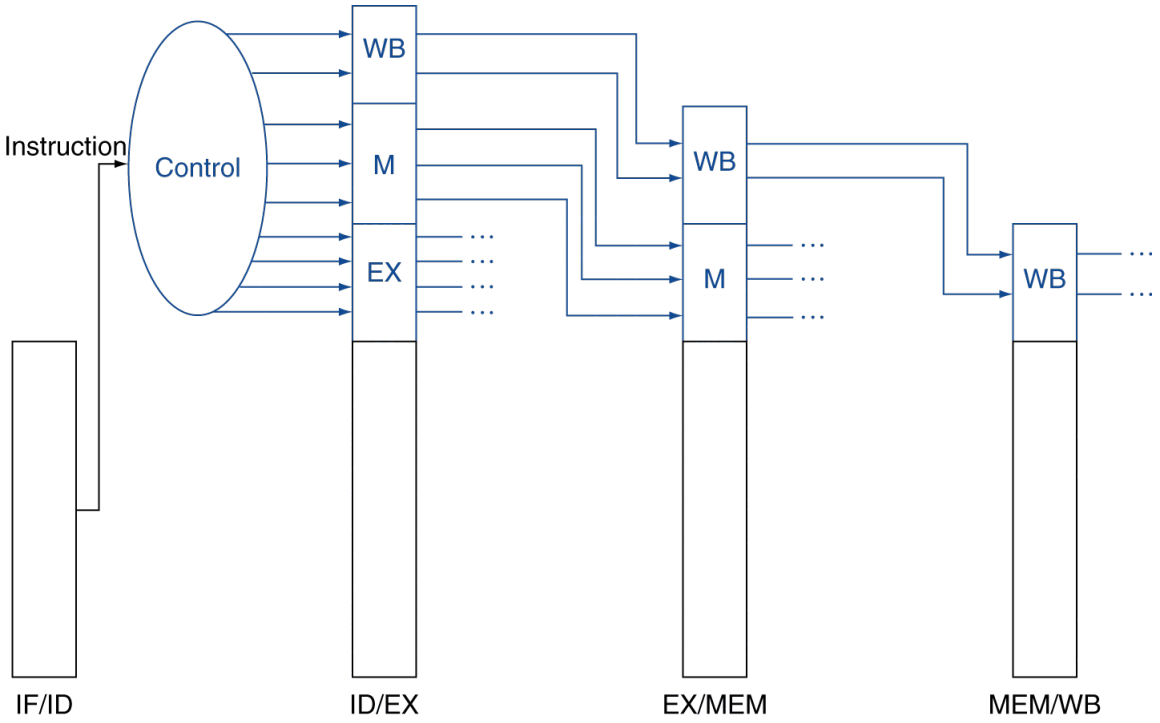


Pipelined Control



Pipelined Control

- Control signals derived from instruction
  - As in single-cycle implementation



Pipelined Control