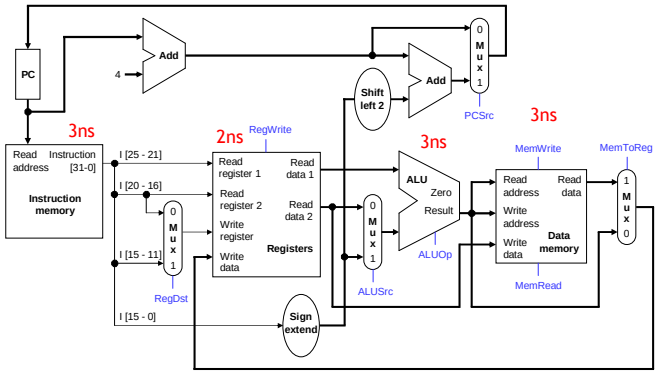
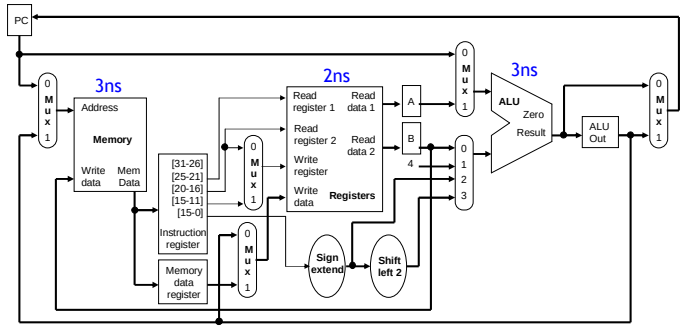
The single-cycle datapath; What is the cycle time?



The multi-cycle implementation; What is the cycle time?



Student Activity

How long (in ns) does each instruction take?

	Single Cycle	Multi-cycle
loads		
stores		
branches		
arithmetic		
Cycle Time		

Which ones are faster in Multi-cycle?

Student Activity

How long does it take to execute a sequence of four lw instructions?

	Instruction Fetch	Register Read	ALU Operation	Data Access	Register Write
Load Word (lw)	200 ps	100 ps	200 ps	200 ps	100 ps

lw $1, 100 ($0)

lw $1, 104 ($0)

lw $1, 108 ($0)

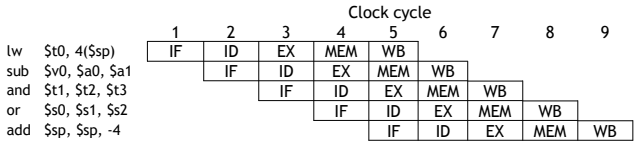
lw $1, 112($0)

Single Cycle = (Time in ps)

Pipelined = (Time in ps)

Student Activity

Reading Pipeline Diagrams



1. What cycle is the “add” instruction being fetched in?

2. What is the last cycle where the “or” instruction is active?

3. What happens in cycle 4?

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