

Pipelined Control

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1 Administrivia

Announcements

Second exam on Wednesday, April 21.

Assignment

Read 6.4 and 6.5.

From Last Time

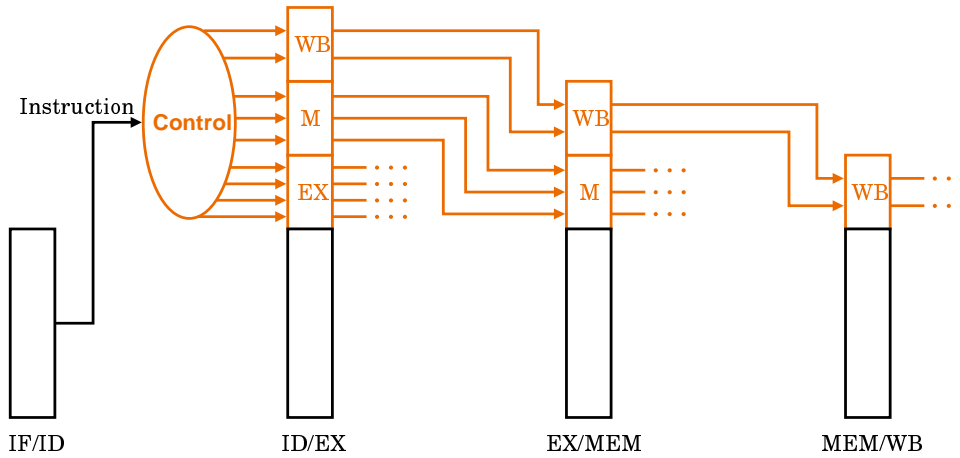
Pipelined datapath.

Outline

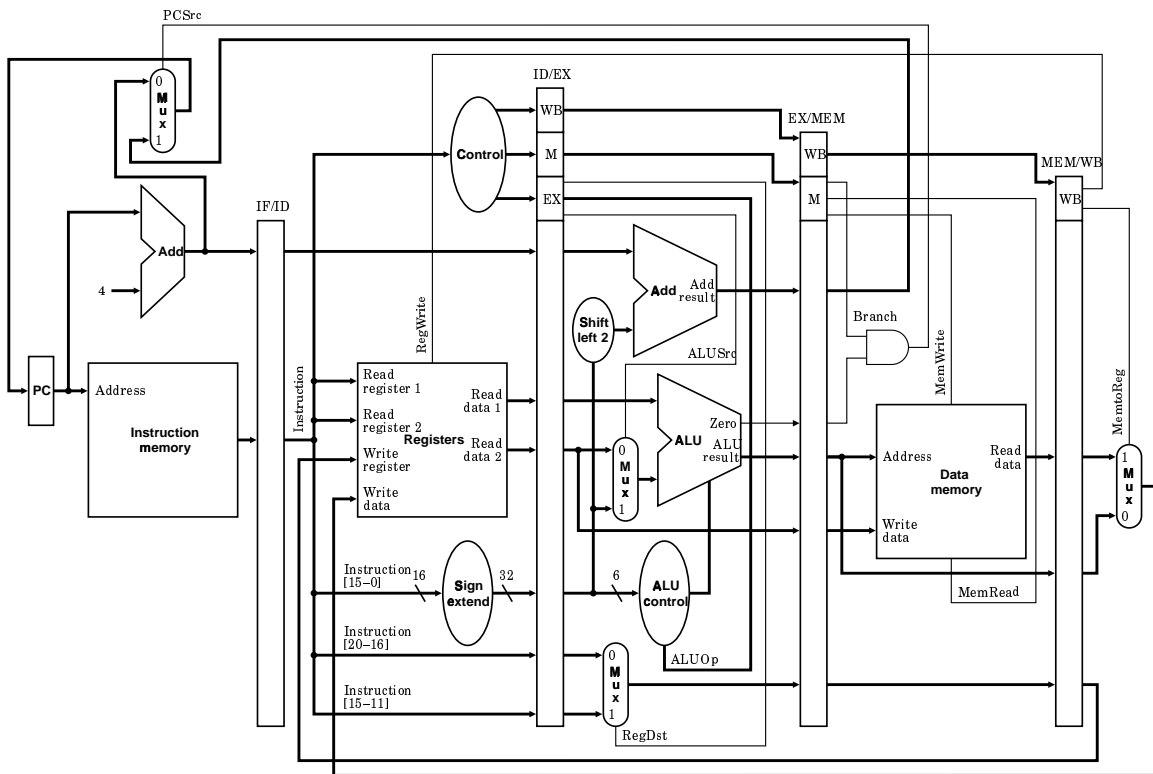
1. Pipeline control.
2. A real-world example of the pipeline in use.

Coming Up

Data hazards: forwarding and stalling.



The final, simple, pipelined processor:



3 A Real-World Example

This will demonstrate shortcomings of the simple pipelined processor. Can we find them all?

Consider the following MIPS code segment, assuming the following:

1. The code segment begins at address 1000.
2. Initially, $\$7 = 4$, $\$8 = 2000$, $\$10 = 12$, and $\$11 = 20$.
3. Also initially, memory location 2000 has the word value 16 and memory location 2004 has the word value 6.

```
Top:    lw $10, 0($8)
        lw $11, 4($8)
        slt $9, $11, $10
        beq $9, $0, Label
        sw $10, 4($8)
        sw $11, 0($8)
Label:  add $8, $8, $7
```

1. What does this code do?
2. Can it be optimized? Does what follows the `add` affect the optimization?
3. What happens if we run it through the pipeline? Do we get the correct results? Why or why not?