Tutorial 10

Supplementary Material

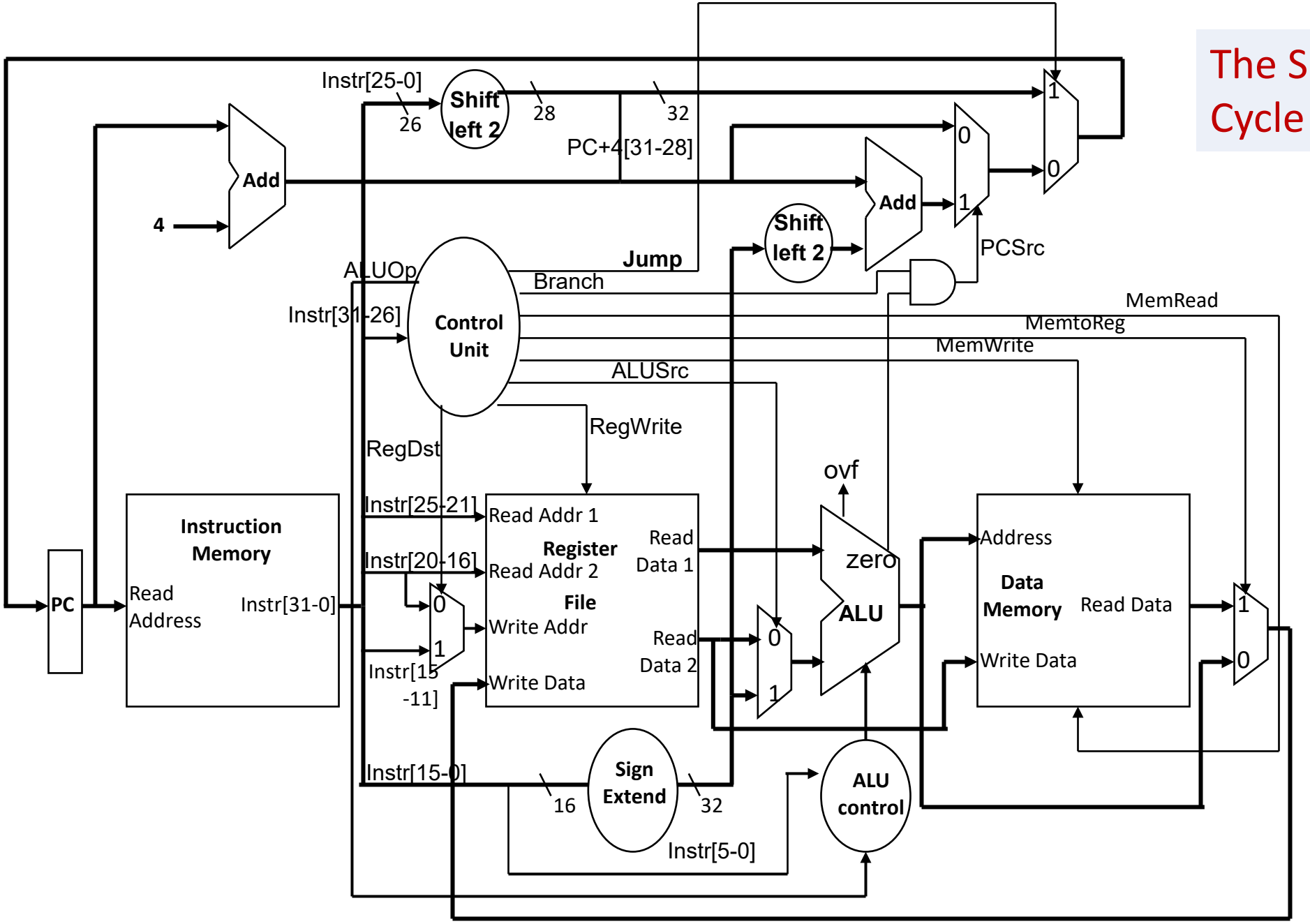
Take a look before the tutorial, and this will help with doing the tutorial questions themselves.

Try to fill in the pipeline tables :)

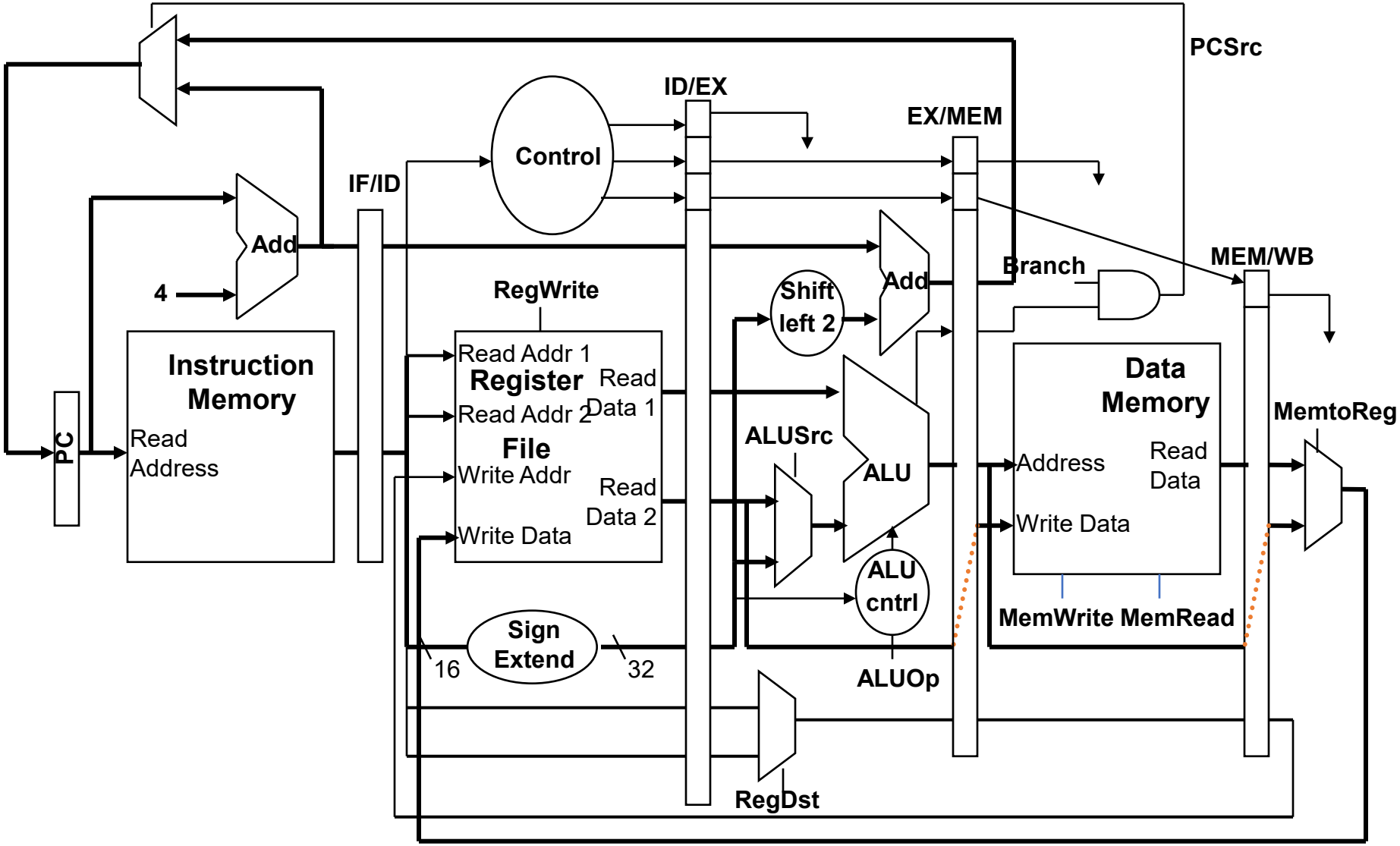
All the best! –Theodore

Material from Prof. Anandha's & Prof. Aaron's slides

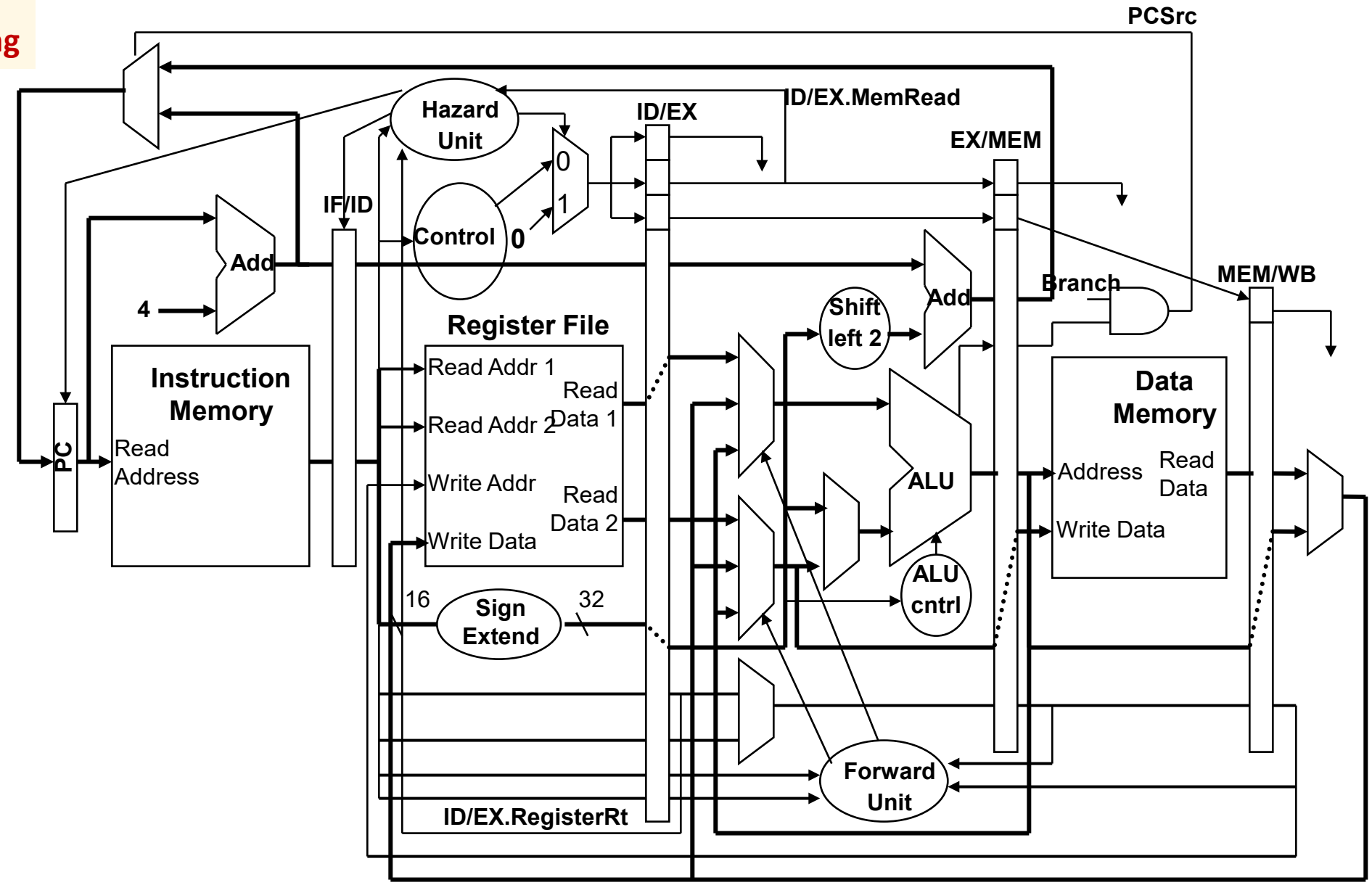
The Single Cycle Datapath



Pipelined Datapath



Datapath With Forwarding



Pipeline Control: Grouping

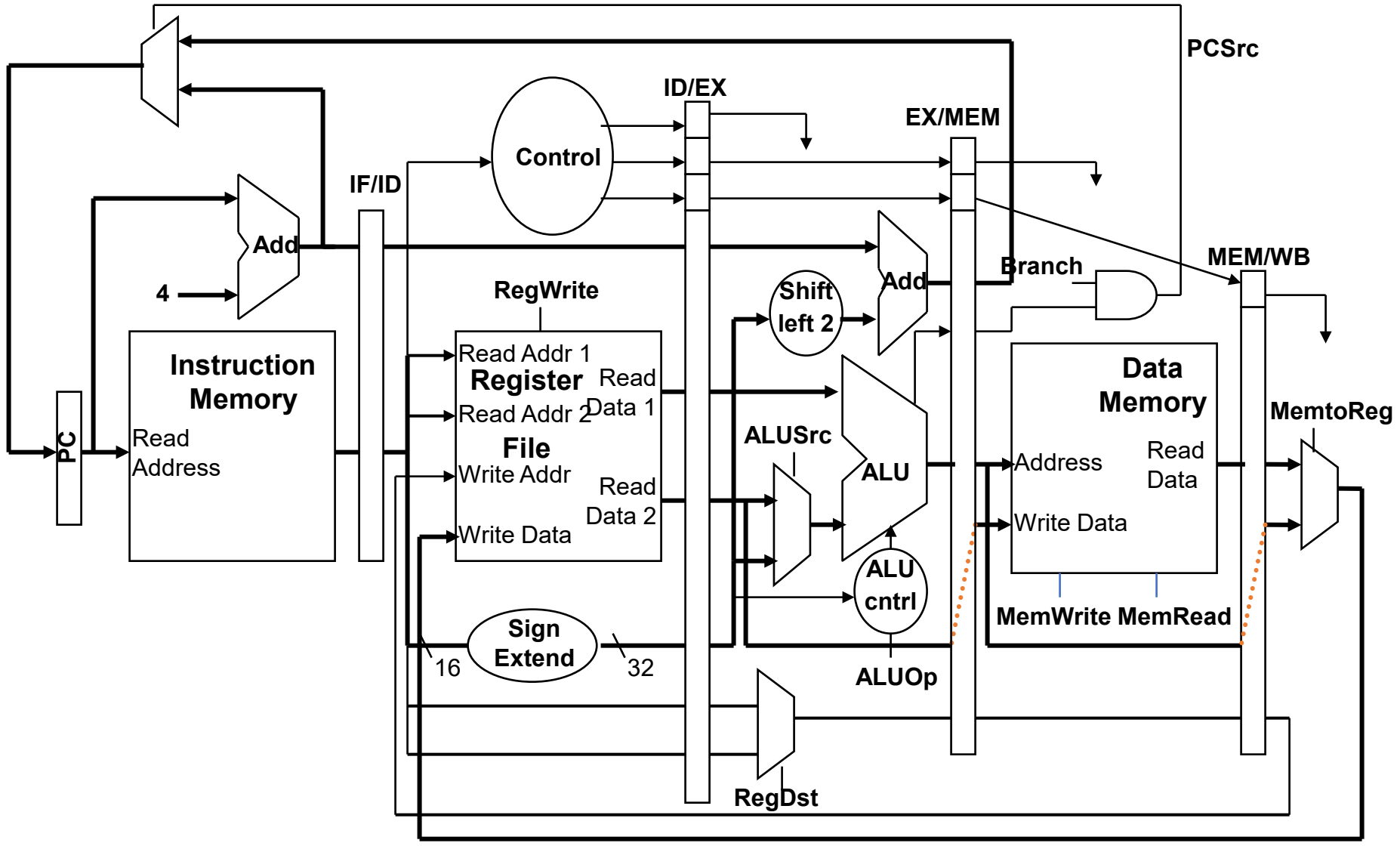
- Group control signals according to pipeline stage

	RegDst	ALUSrc	MemTo Reg	Reg Write	Mem Read	Mem Write	Branch	ALUop	
								op1	op0
R-type	1	0	0	1	0	0	0	1	0
lw	0	1	1	1	1	0	0	0	0
sw	X	1	X	0	0	1	0	0	0
beq	X	0	X	0	0	0	1	0	1

	EX Stage				MEM Stage			WB Stage	
	RegDst	ALUSrc	ALUop		Mem Read	Mem Write	Branch	MemTo Reg	Reg Write
			op1	op0					
R-type	1	0	1	0	0	0	0	0	1
lw	0	1	0	0	1	0	0	1	1
sw	X	1	0	0	0	1	0	X	0
beq	X	0	0	1	0	0	1	X	0

Q1

	sub $1, $2, $3	lw $6, 4 ($7)	beq $4, $5, L2
Cycle 1			
Cycle 2			
Cycle 3			
Cycle 4			
Cycle 5			
Cycle 6			
Cycle 7			



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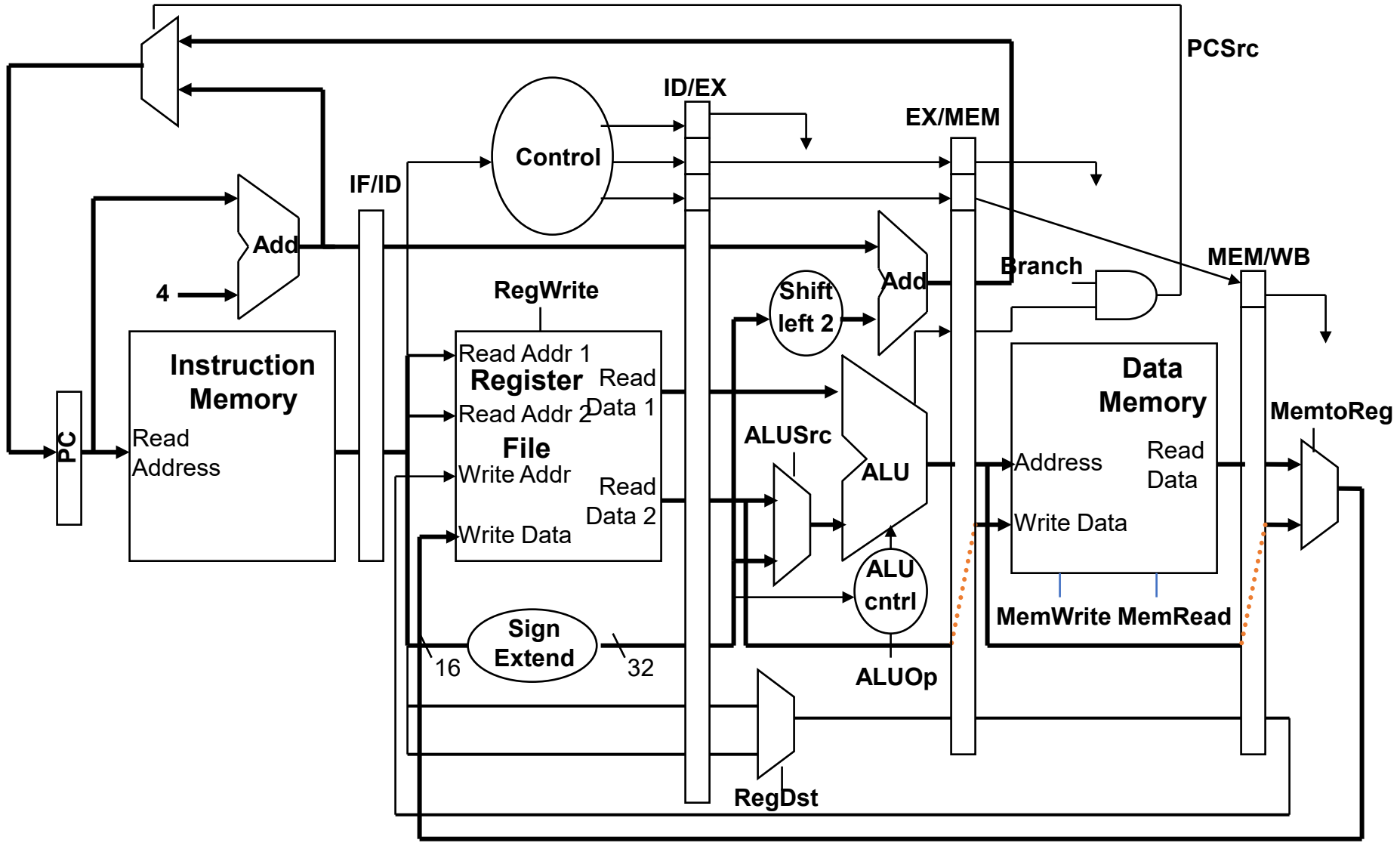

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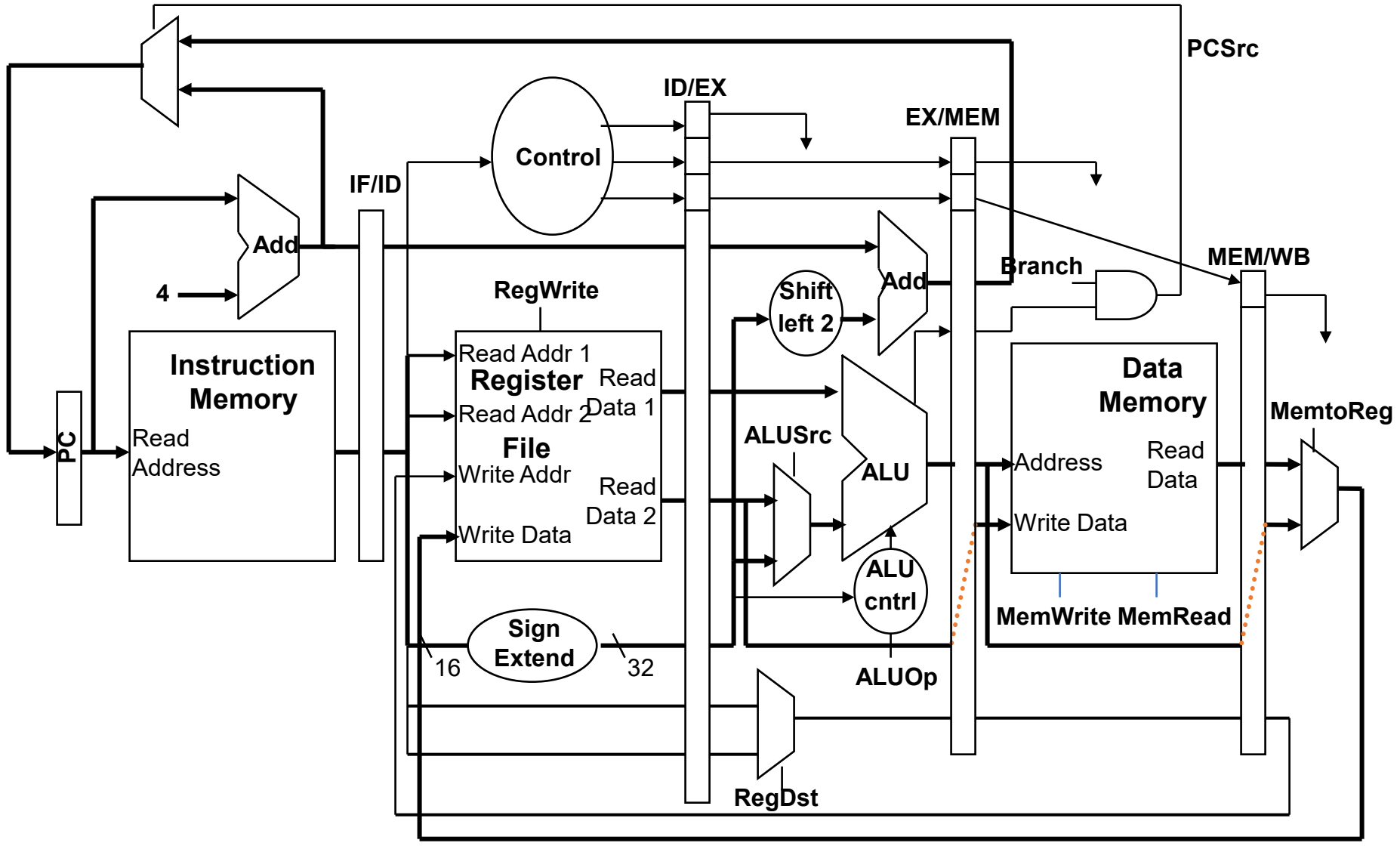

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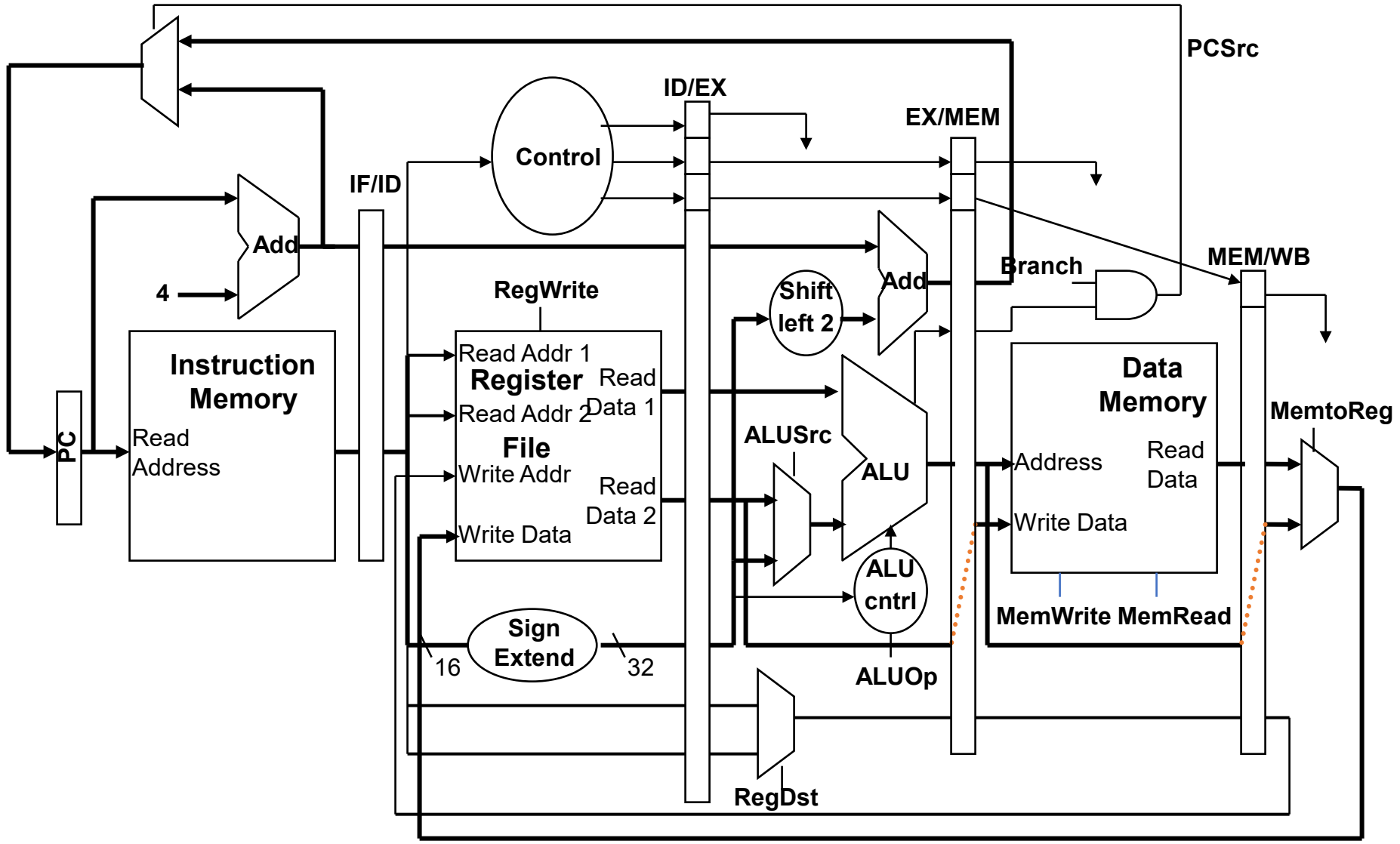

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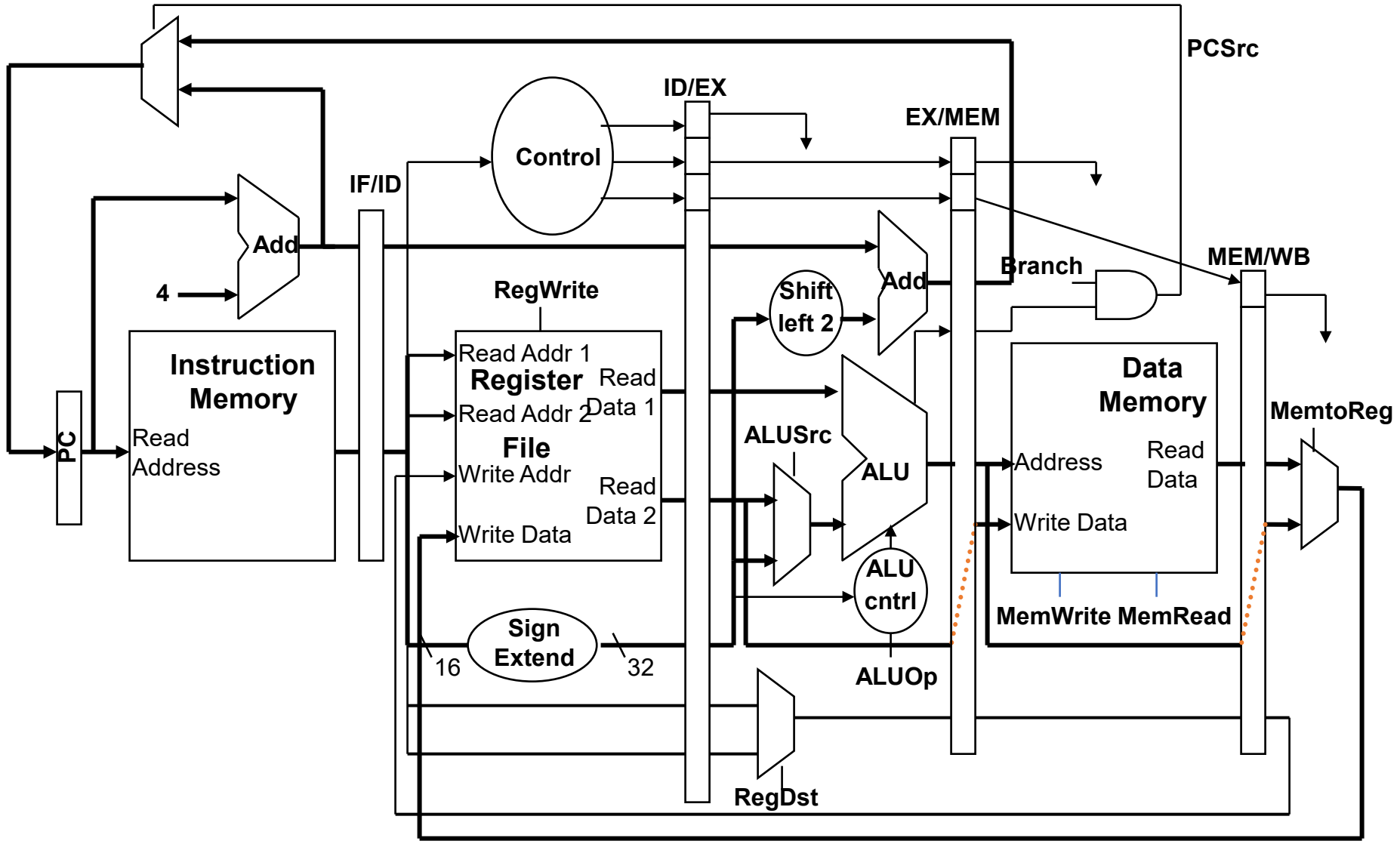

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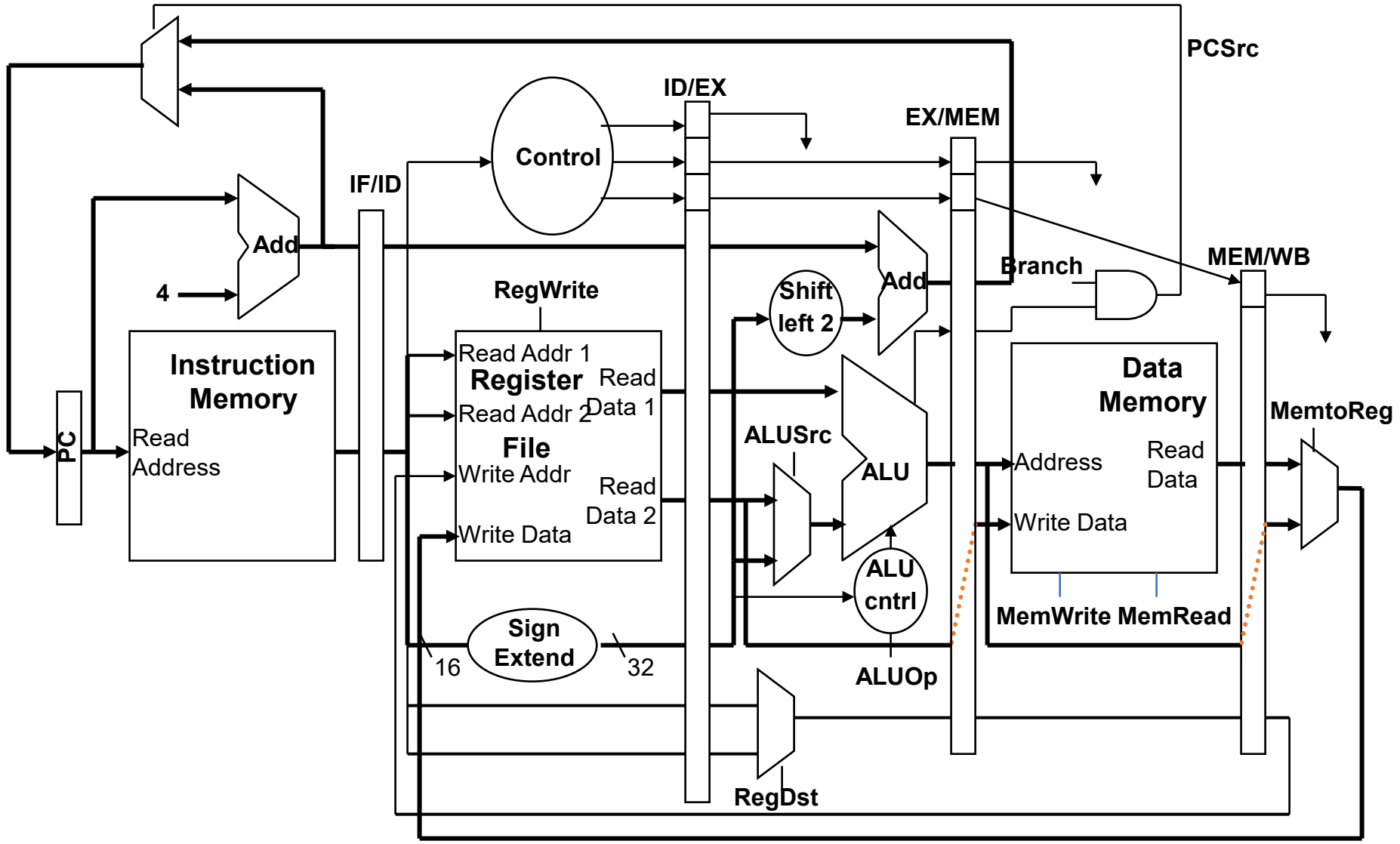

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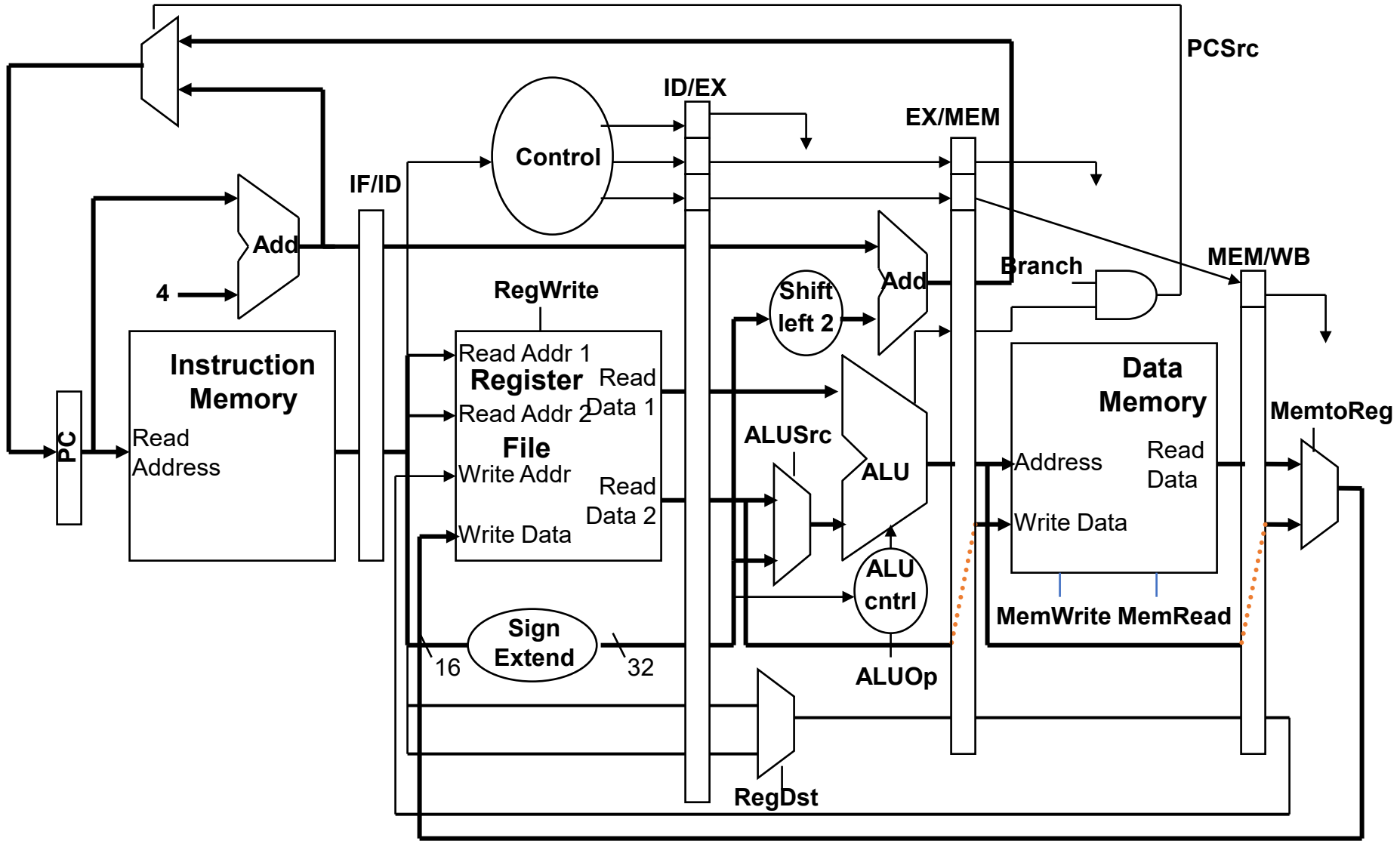

Q2

	add $1, $2, $3	add $1, $1, $3	add $1, $1, $1
Cycle 1			
Cycle 2			
Cycle 3			
Cycle 4			
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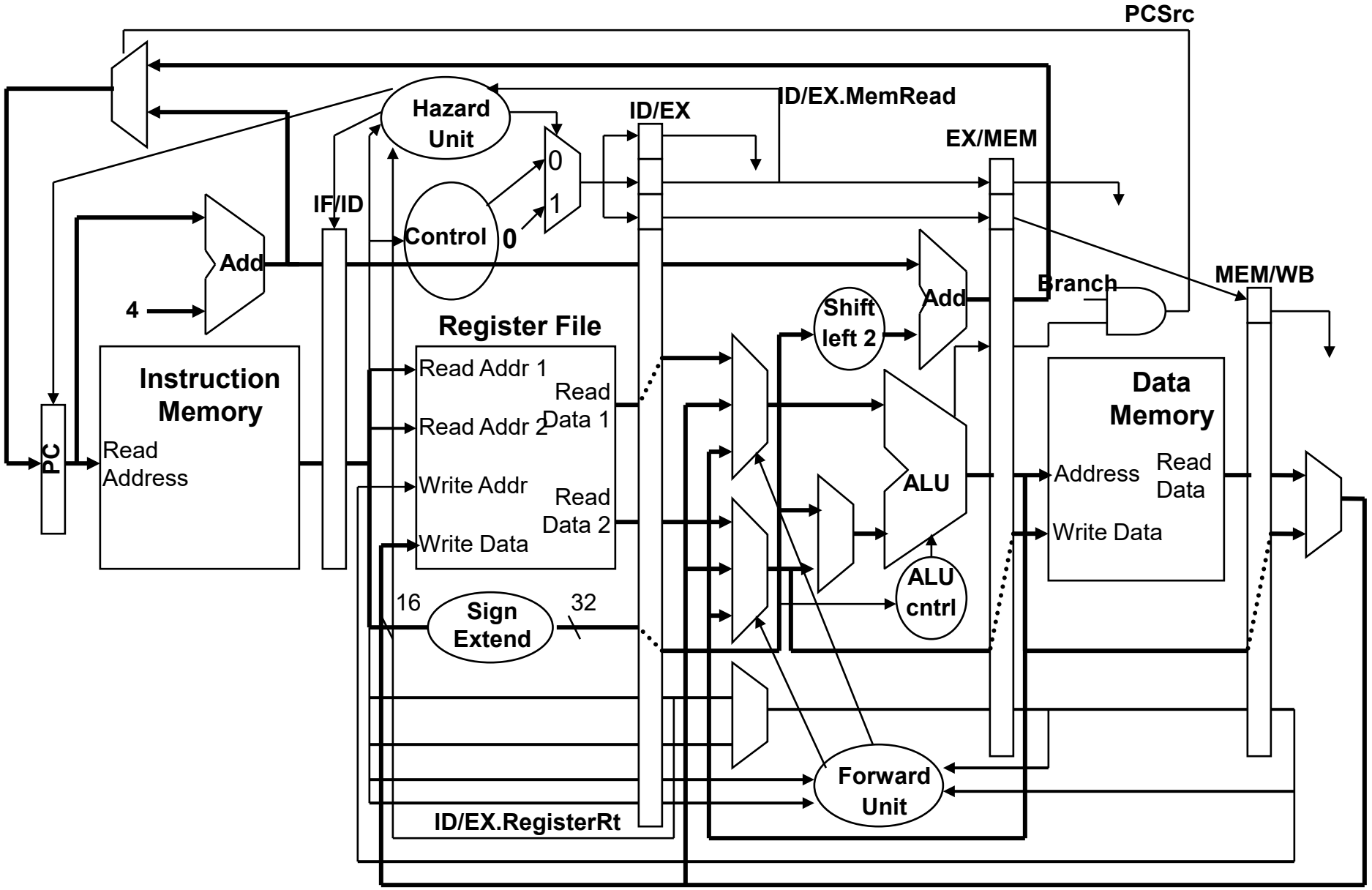

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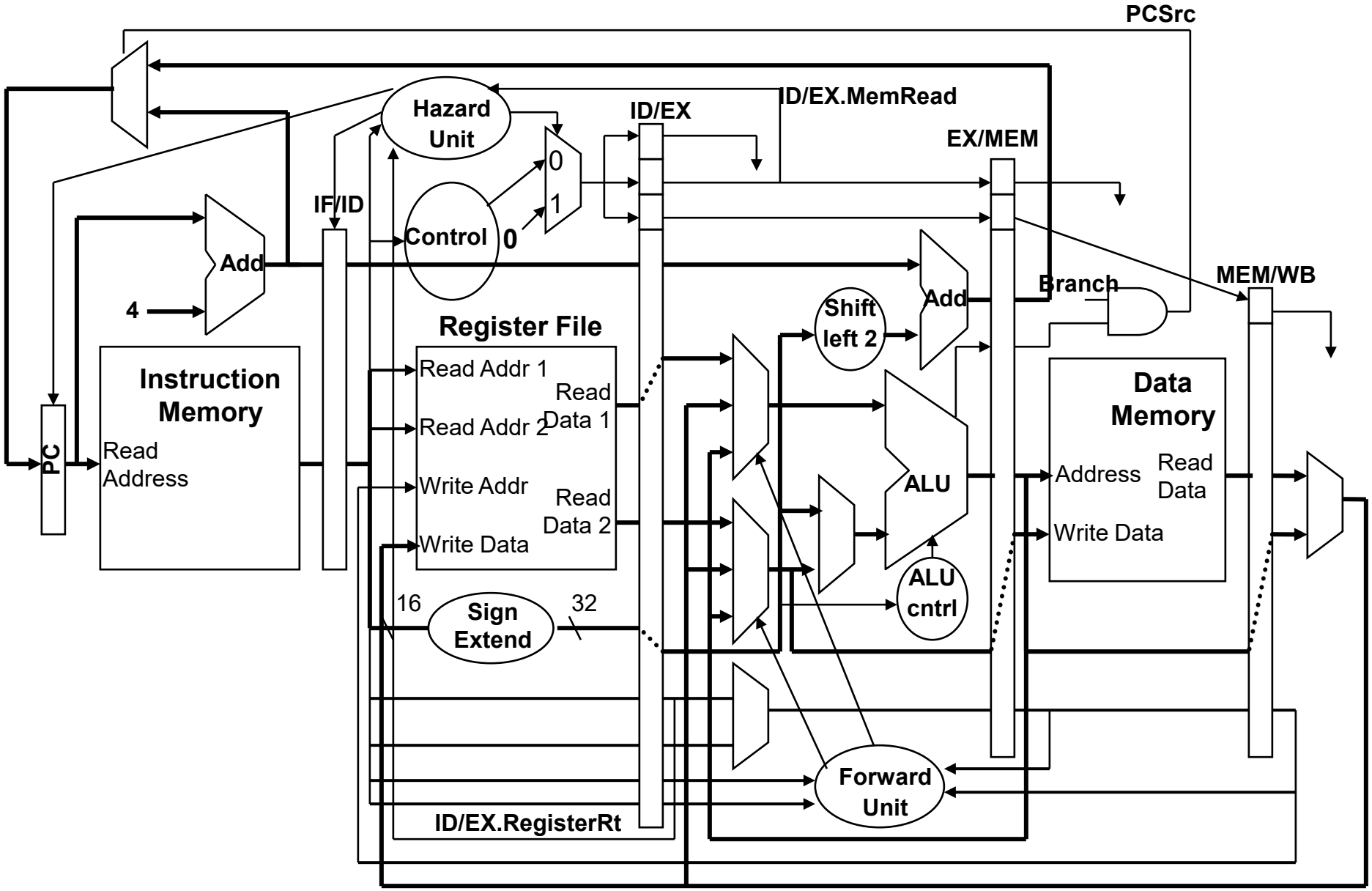

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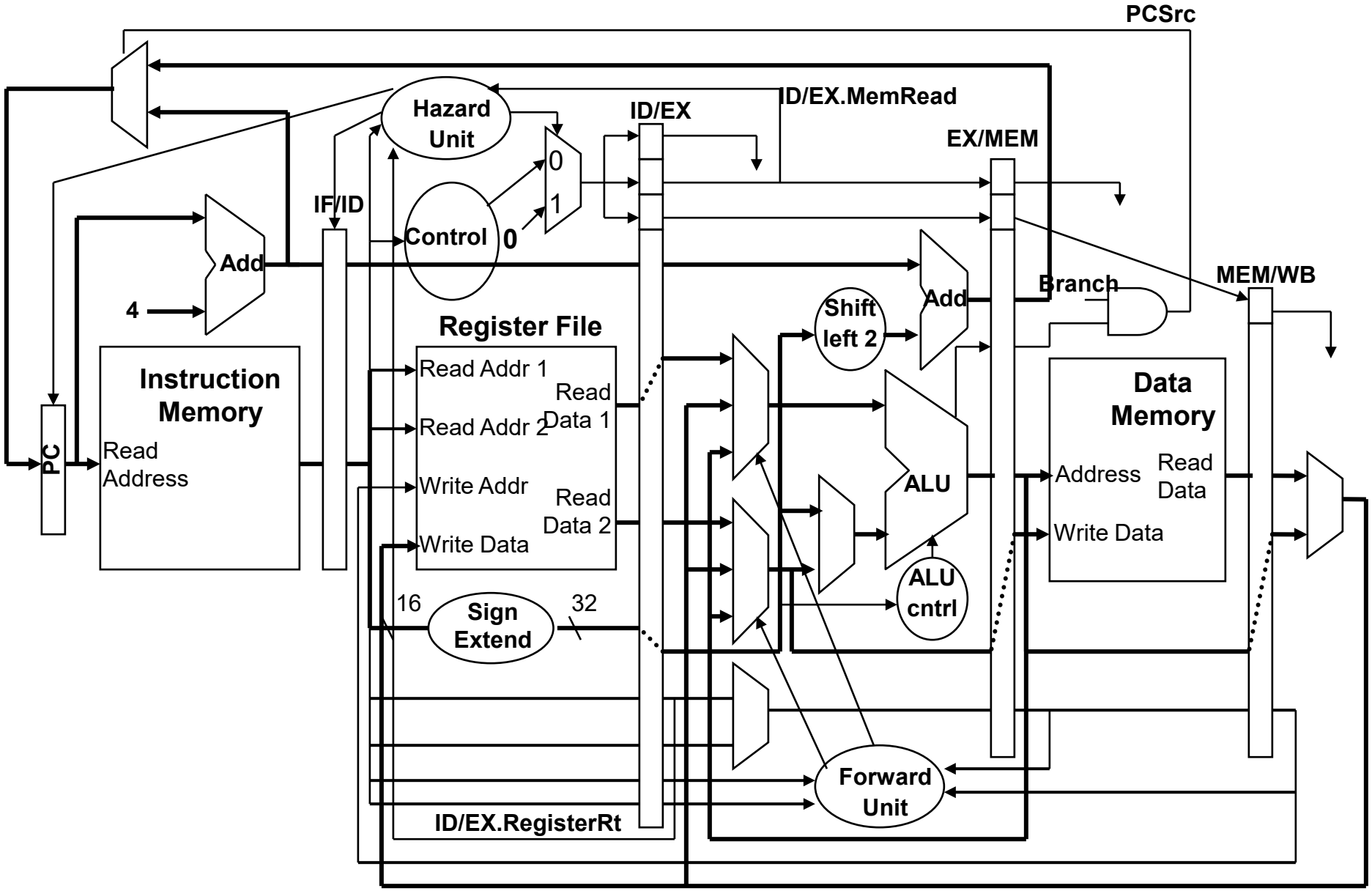

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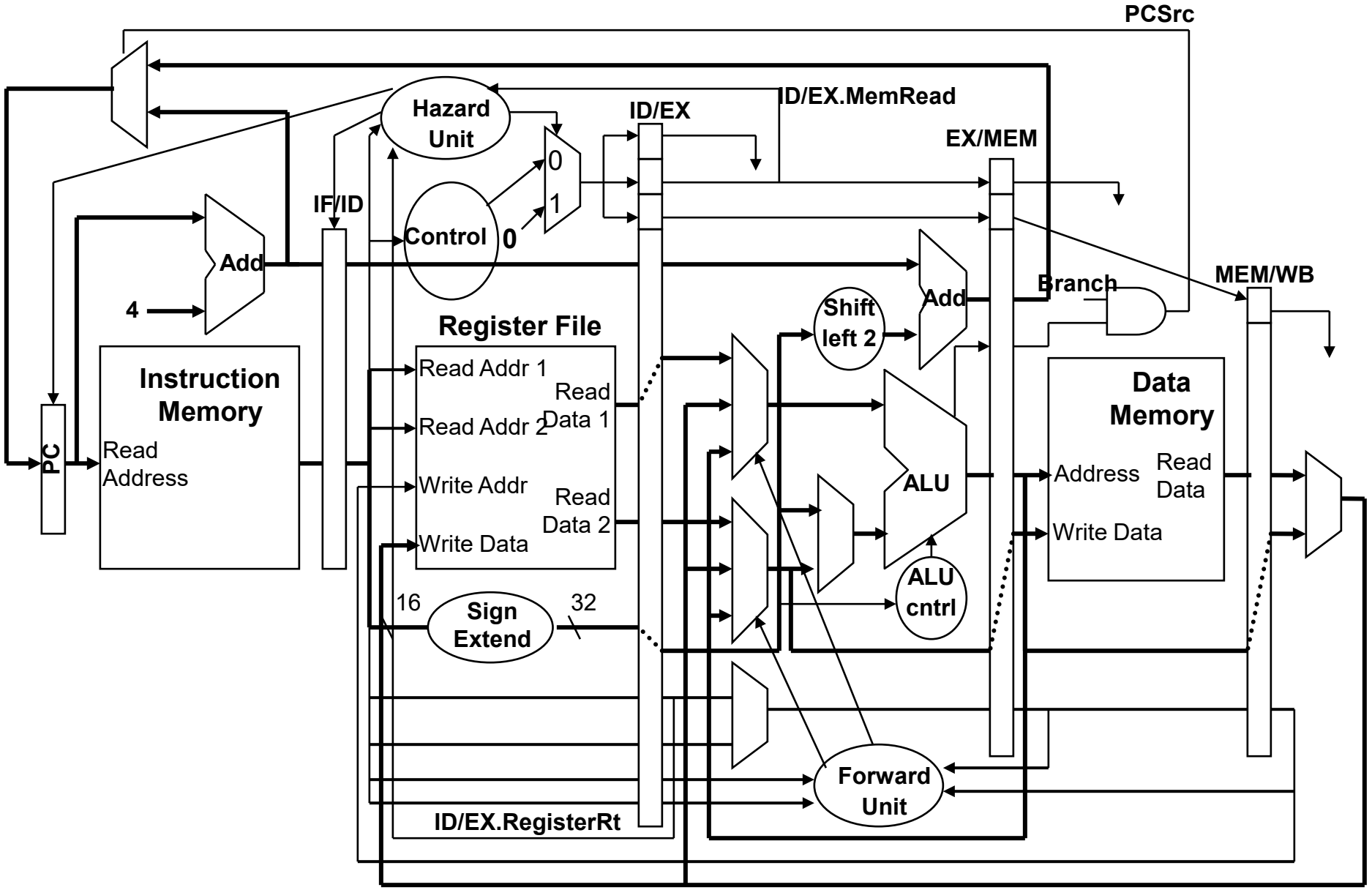

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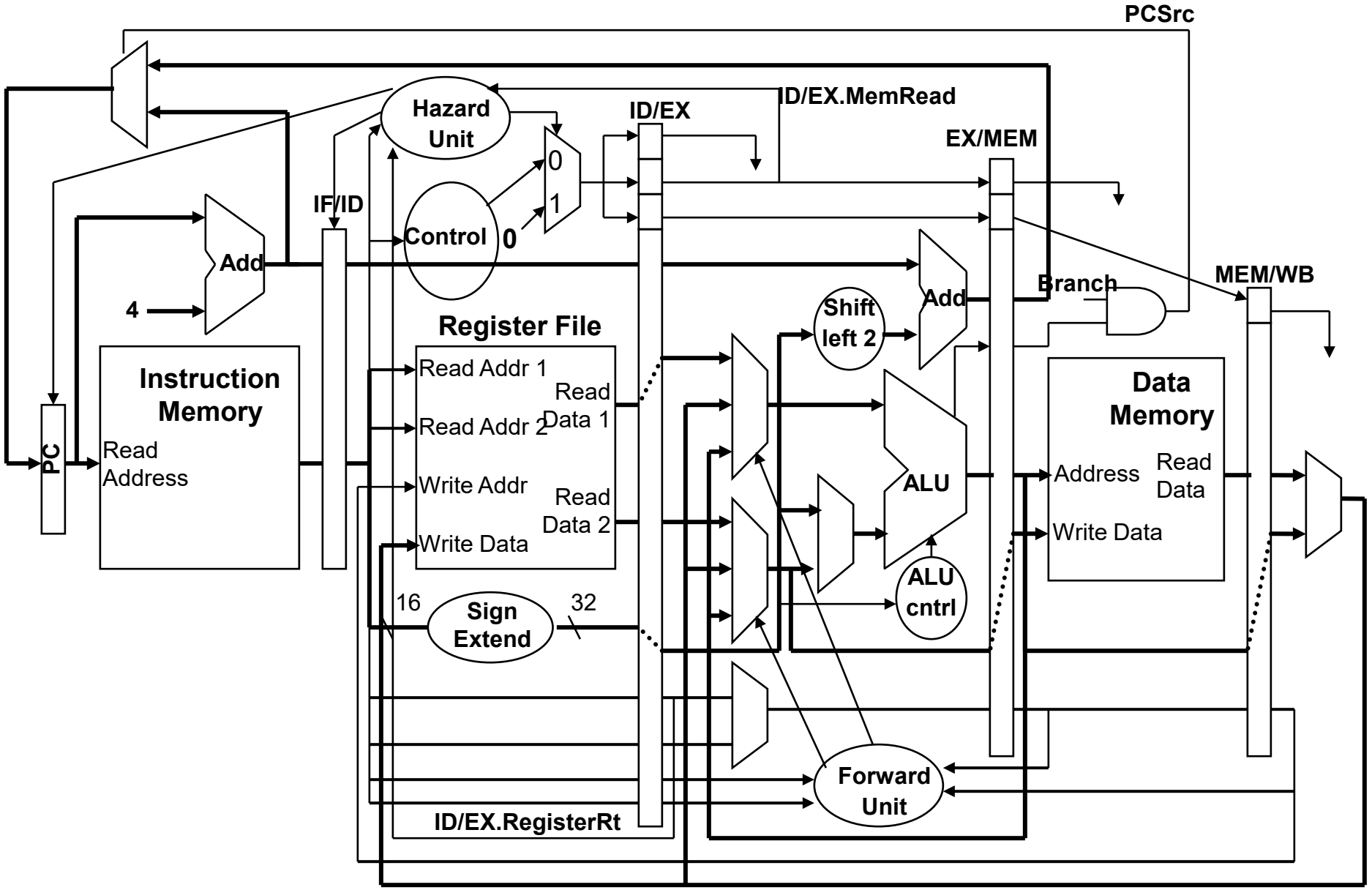

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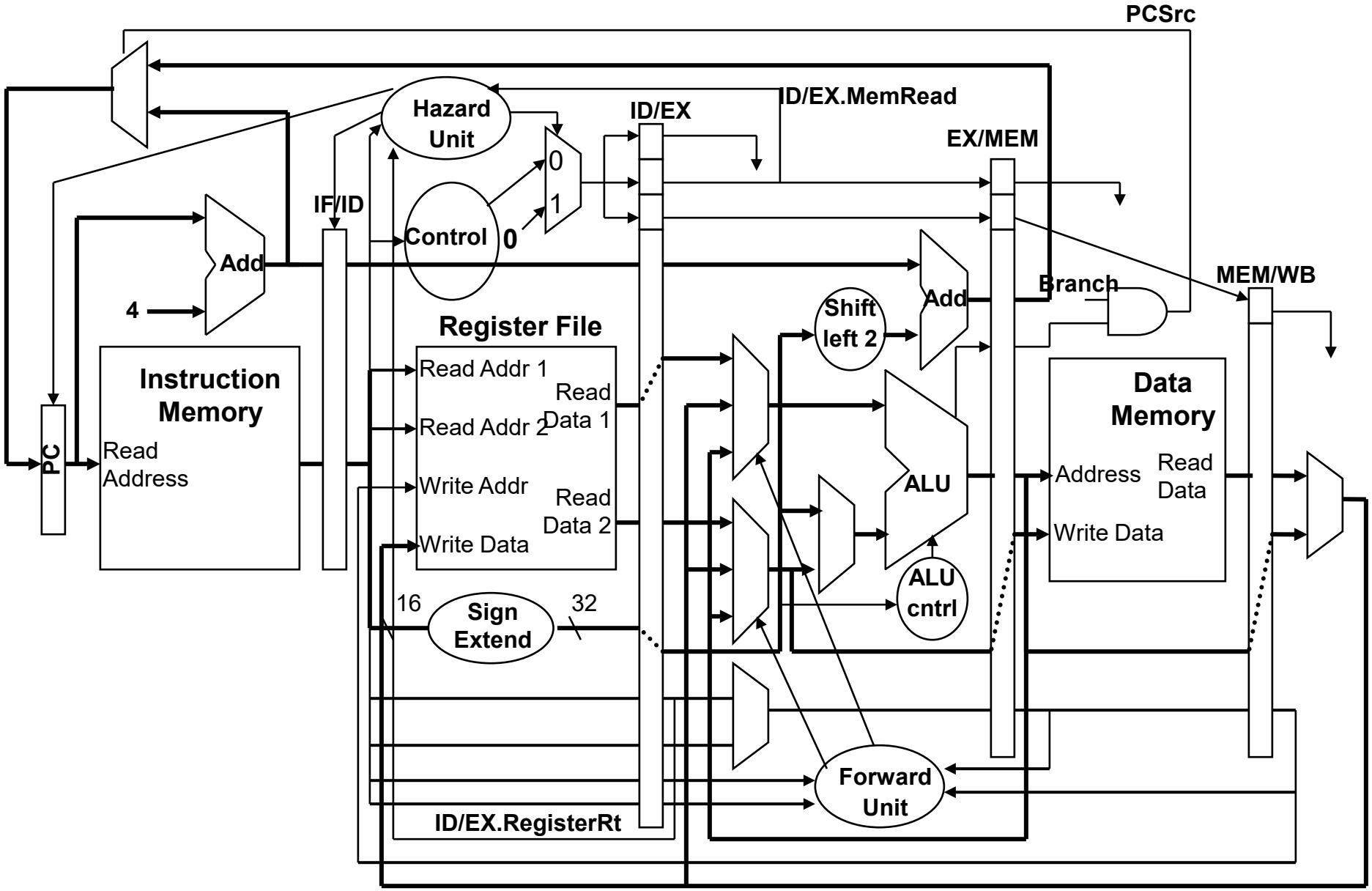

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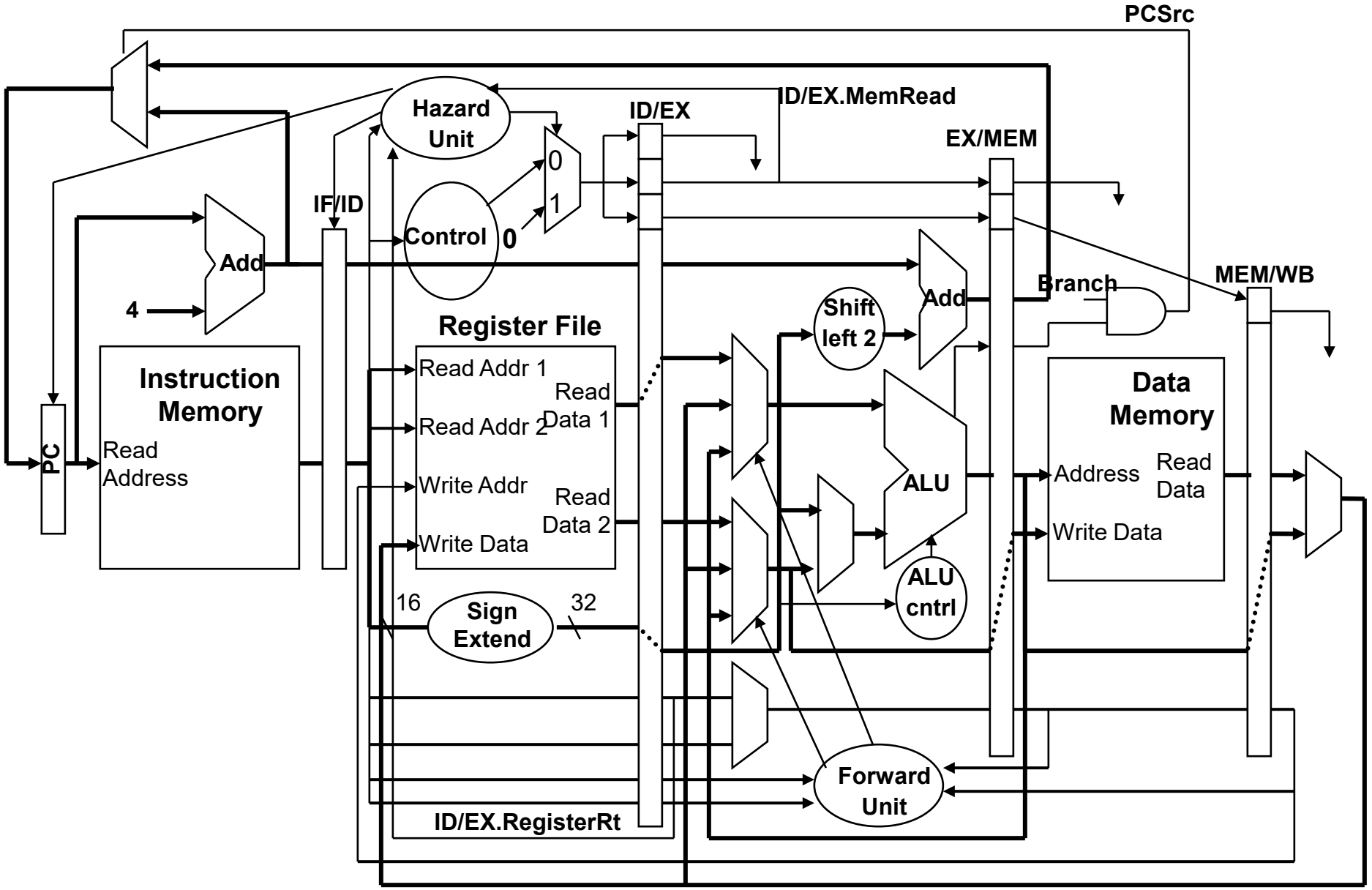

Q3

	add $1, $2, $3	lw $1, 0 ($1)	add $1, $1, $1	add $3, $2, $1
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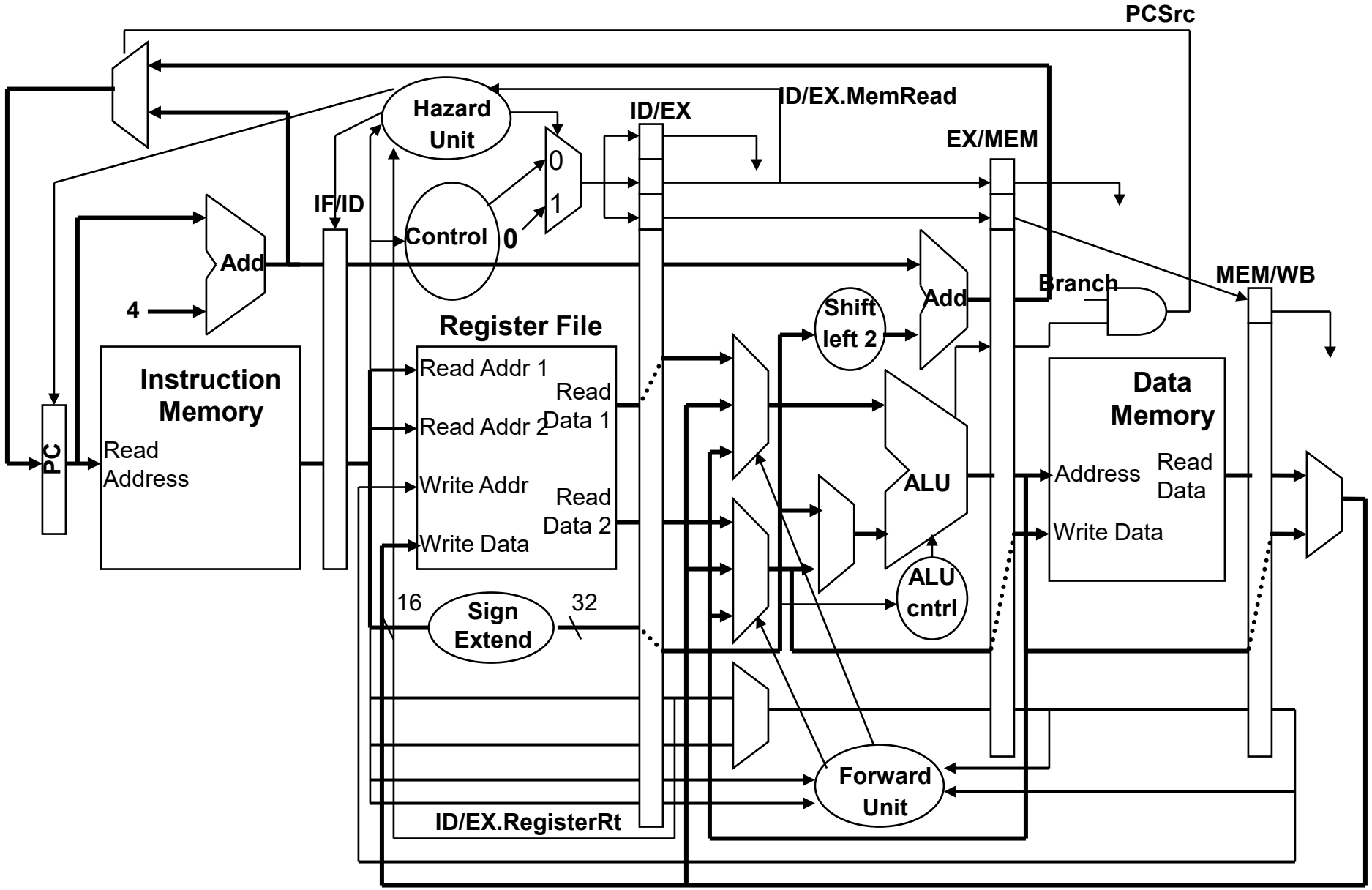

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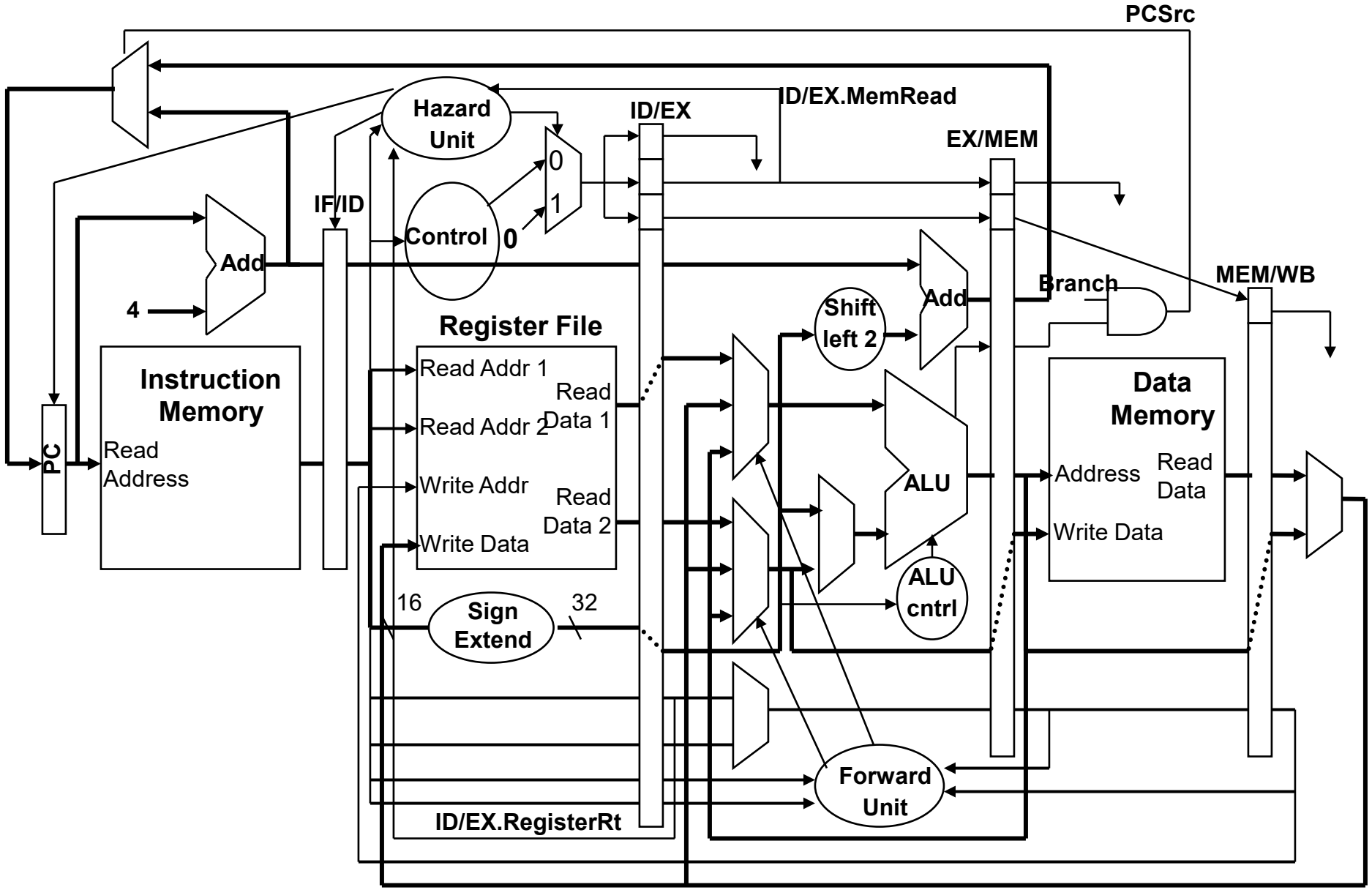

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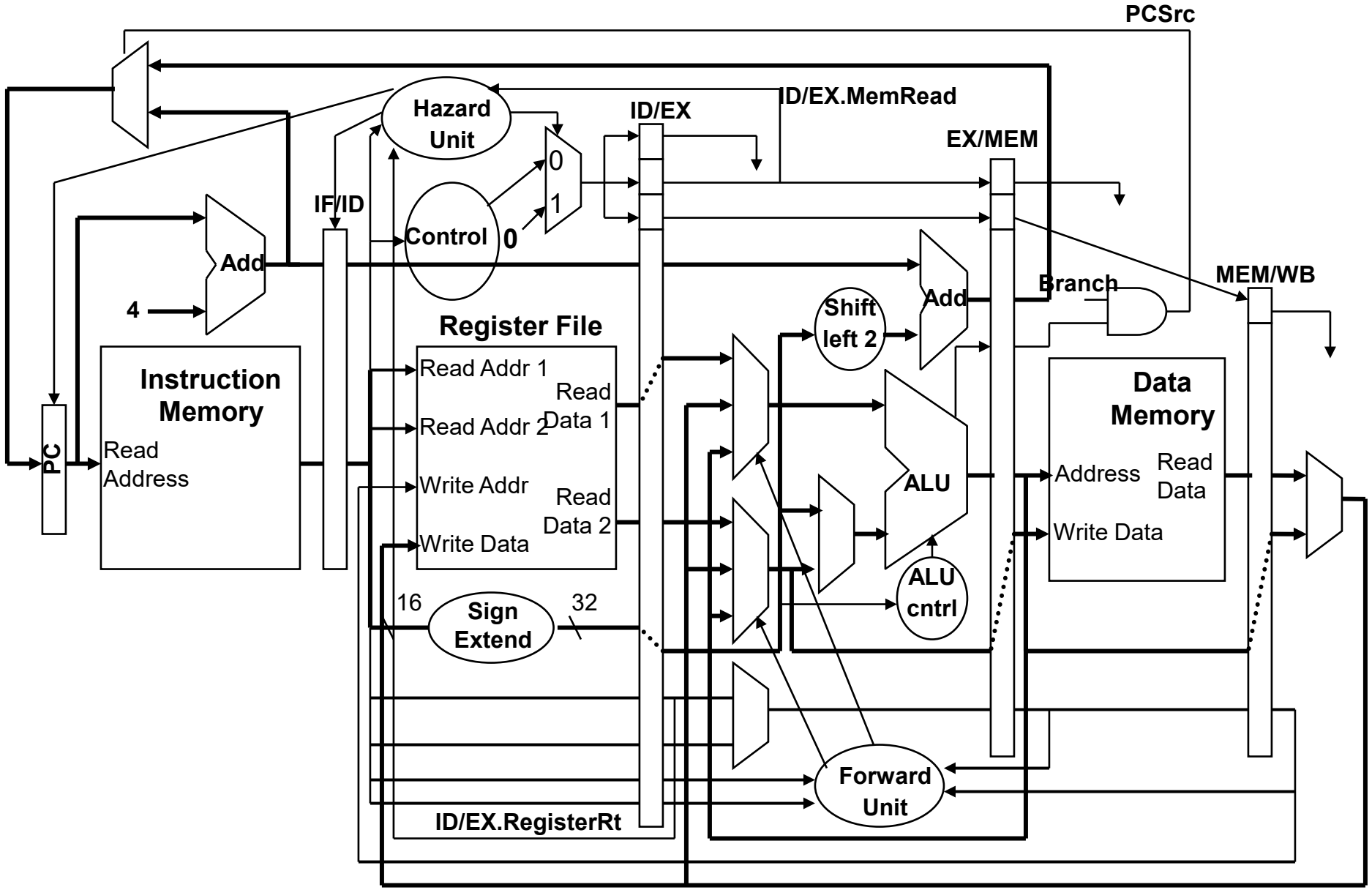

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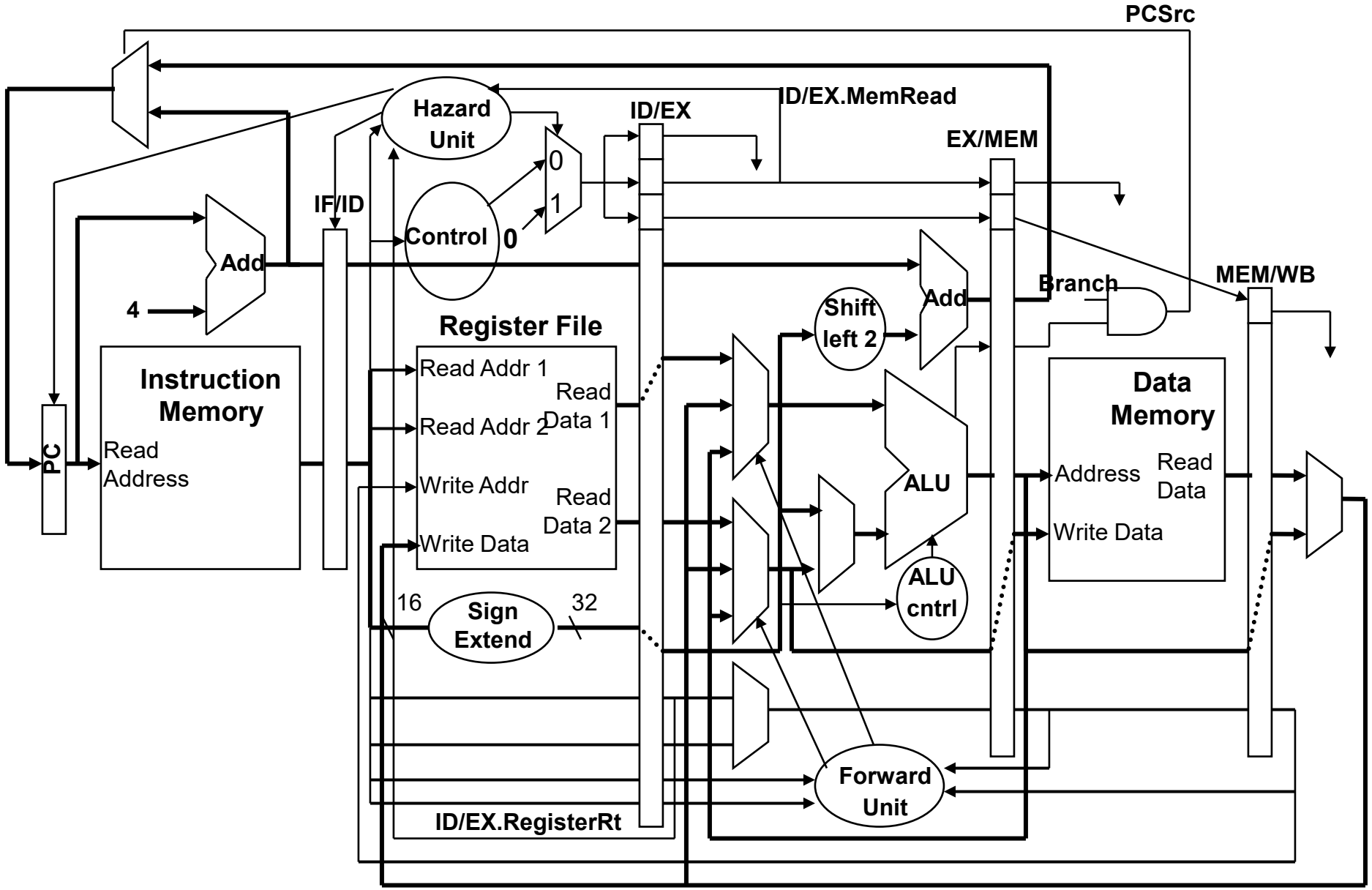

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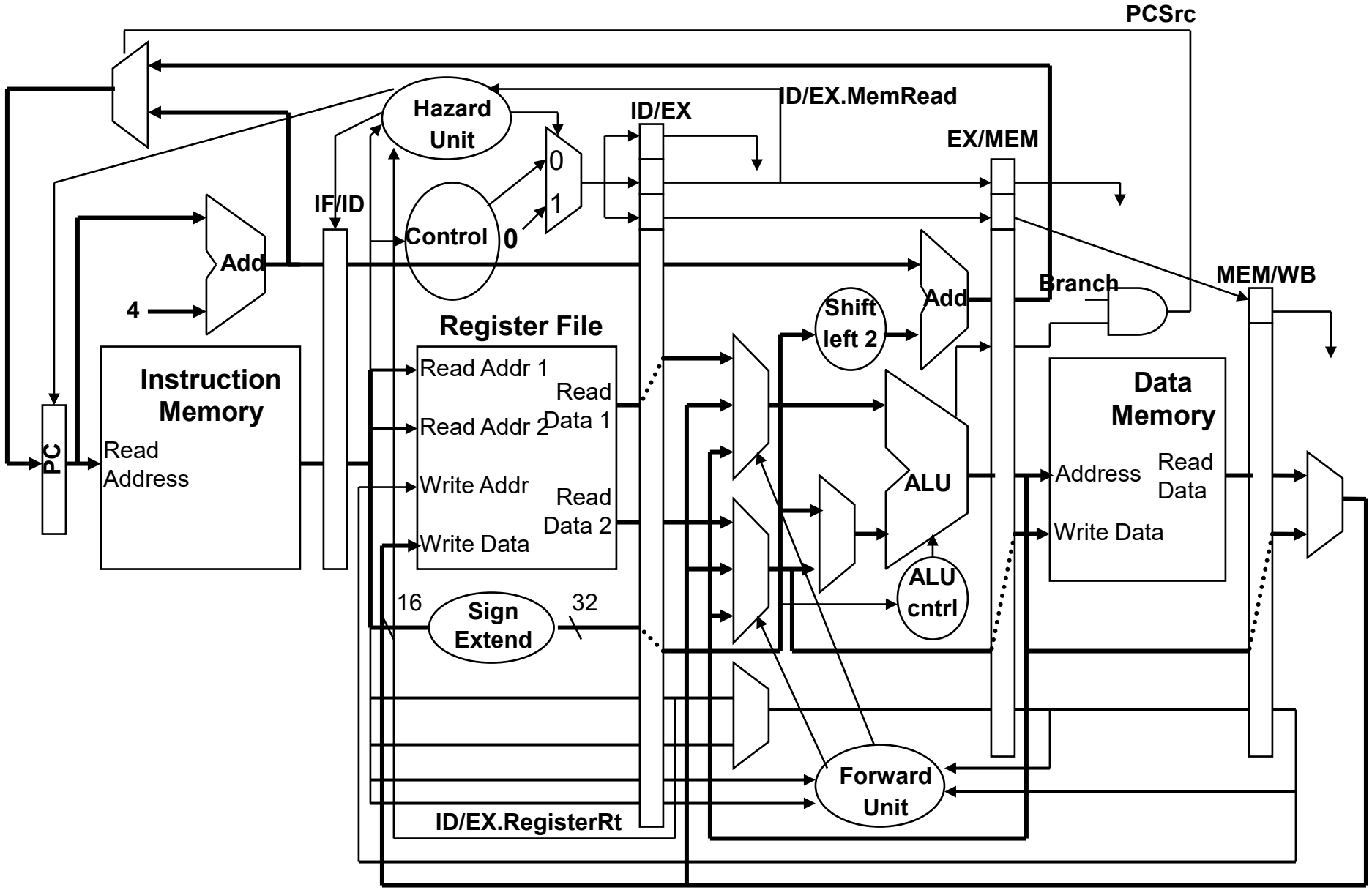

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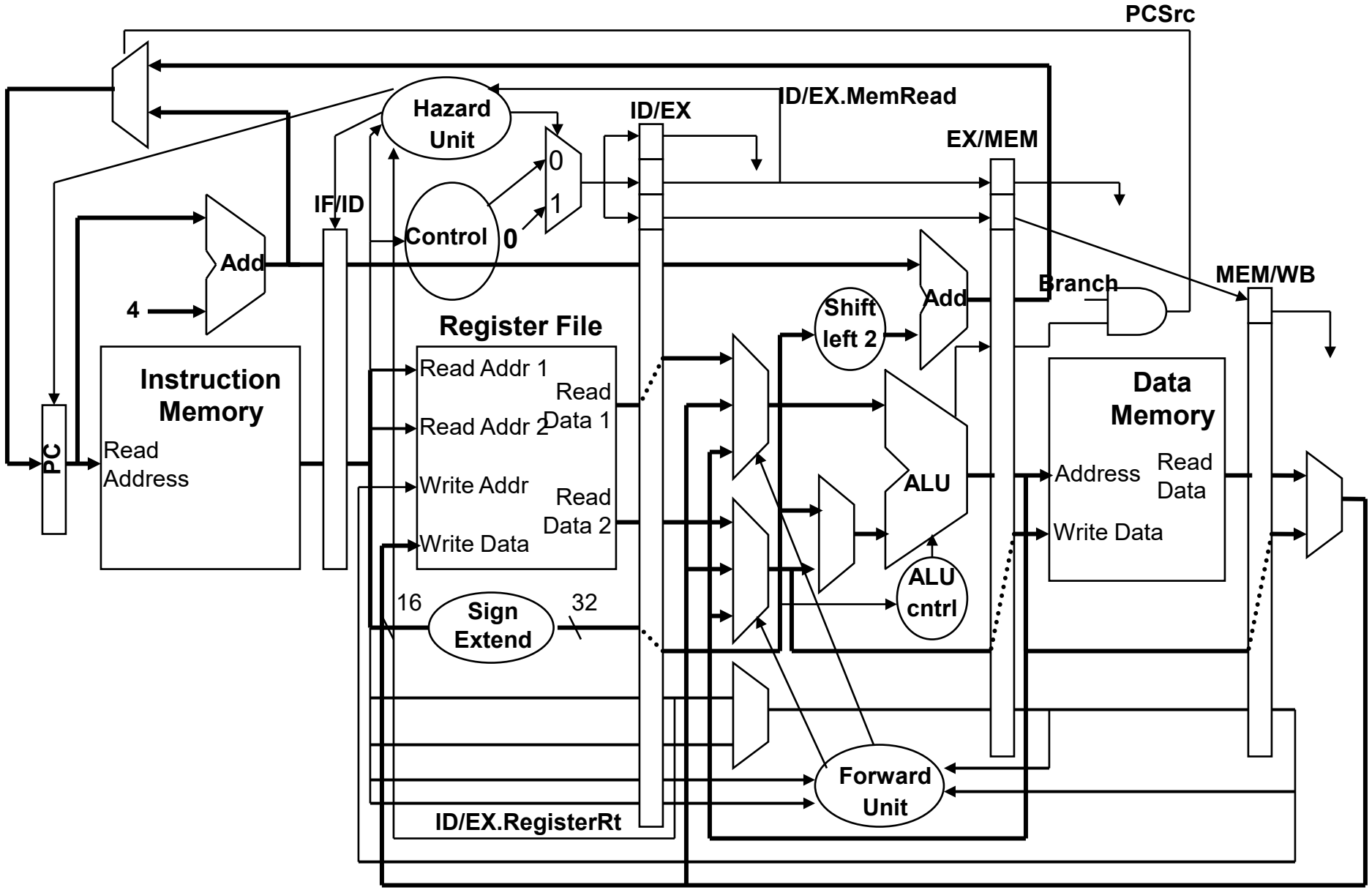

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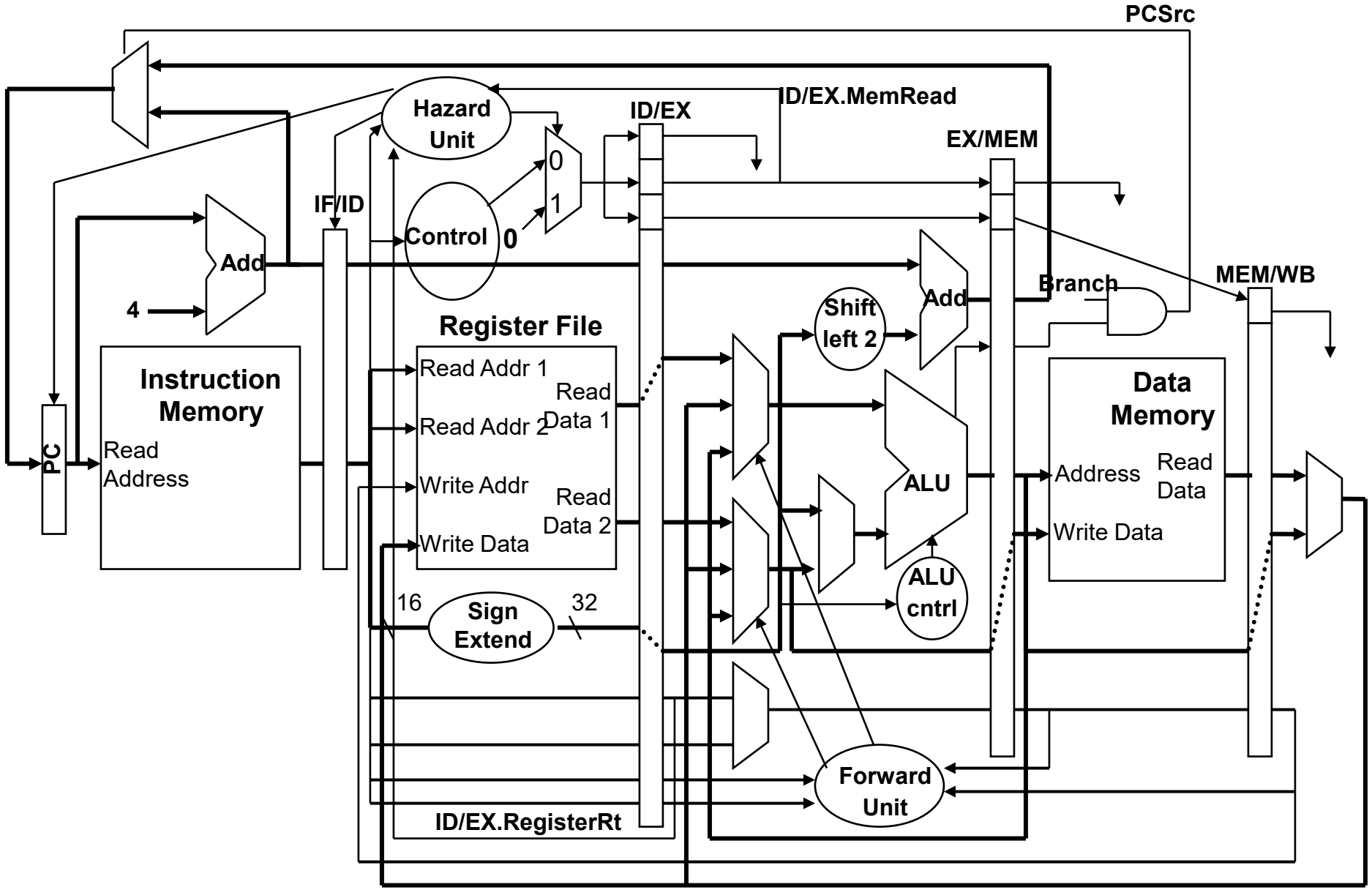

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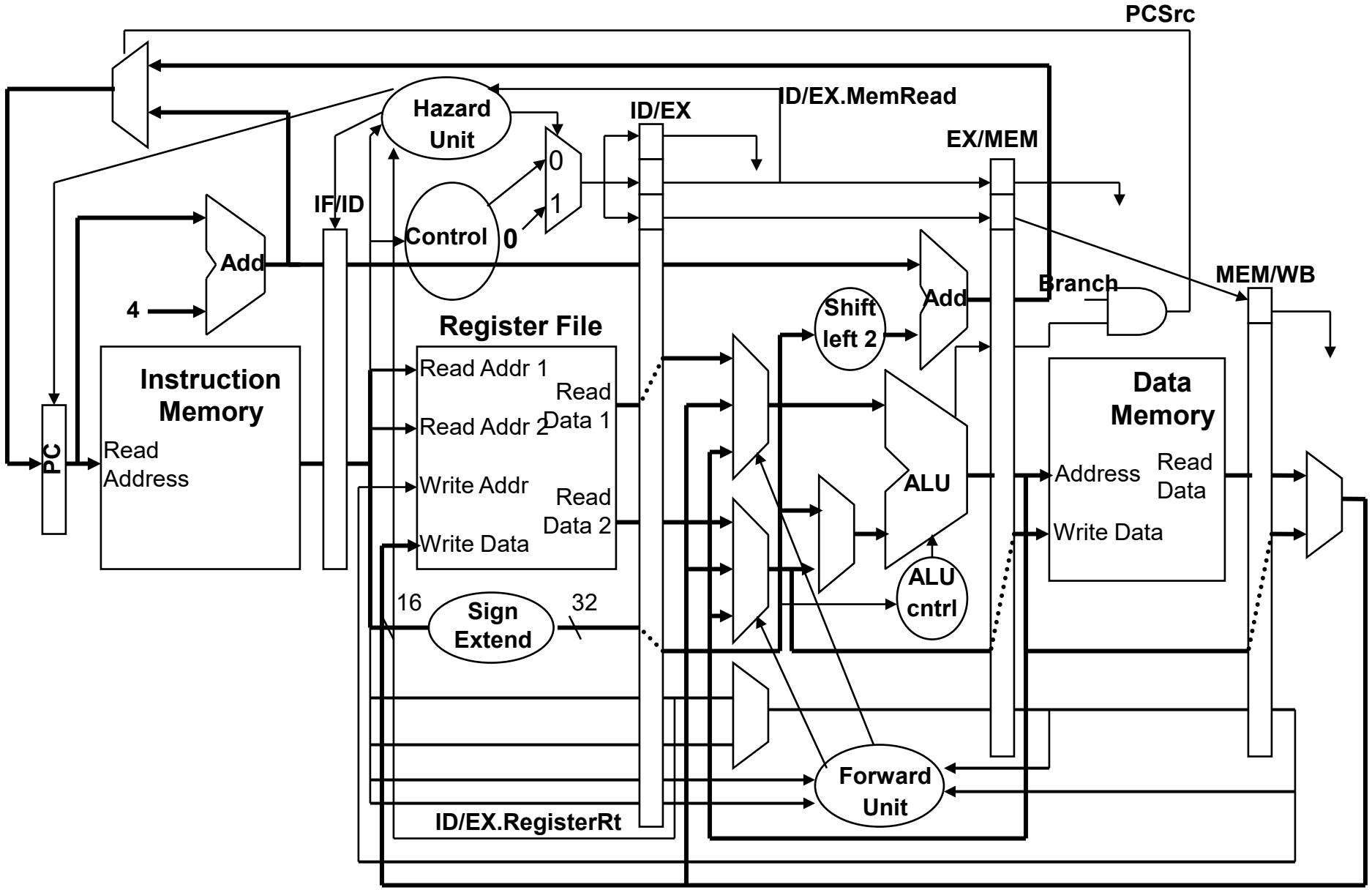

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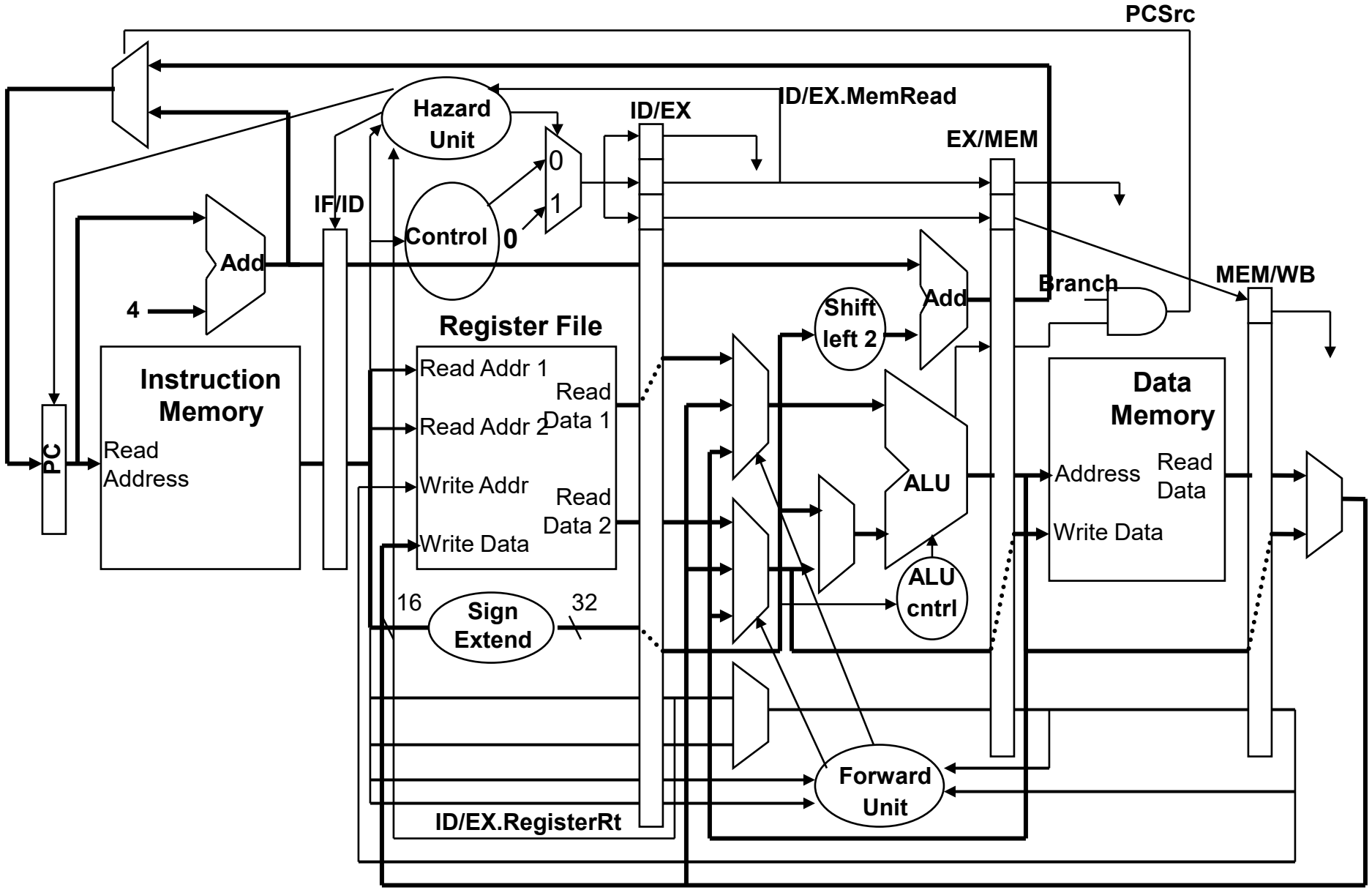
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