

# Branch Control Unit

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#	Instruction Type	Instruction	PCSrcE
1	B-Type	JAL	jumpE == JAL ? 2'b01
2	B-Type	JALR	jumpE == JALR ? 2'b10
3	B-Type	BEQ	zero ? 2'b01
4	B-Type	BNE	~zero ? 2'b01
5	B-Type	BLT	neg ? 2'b01
6	B-Type	BGE	zero   ~neg ? 2'b01
7	default	---	2'b00

# Hazard Control Unit

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#	Condition	Rs1D	Rs2D	RdE	RdM	RdW	Rs1E	Rs2E	PCSrcE	resultSrc0	regWriteM	regWriteW	luiM	forwardAE	forwardBE	stallF	stallD	flushD	flushE
1	Rs1E == 0	XXX	XXX	XXX	XXX	XXX	XXXXX	XXXXX	XX	X	X	X	X	00	XX	0	0	0	0
2	Rs1E == RdM && regWriteM	XXX	XXX	XXX	RdM	XXX	RdM	XXXXX	XX	X	1	X	0	10 or 11	XX	0	0	0	0
3	Rs1E == RdW && regWriteW	XXX	XXX	XXX	XXX	RdW	RdW	XXXXX	XX	X	X	1	0	01	XX	0	0	0	0
4	Rs2E == 0	XXX	XXX	XXX	XXX	XXX	XXXXX	XXXXX	XX	X	X	X	X	XX	00	0	0	0	0
5	Rs2E == RdM && regWriteM	XXX	XXX	XXX	RdM	XXX	XXXXX	RdM	XX	X	1	X	0	XX	10 or 11	0	0	0	0
6	Rs2E == RdW && regWriteW	XXX	XXX	XXX	XXX	RdW	XXXXX	RdW	XX	X	X	1	0	XX	01	0	0	0	0
7	lwStall == 1	Rs1D	Rs2D	RdE	XXX	XXX	XXXXX	XXXXX	XX	1	XXX	XXX	XXX	XX	XX	1	1	0	1
8	PCSrcE != 2'b00	XXX	XXX	XXX	XXX	XXX	XXXXX	XXXXX	XX	XXX	XXX	XXX	XXX	XX	XX	0	0	1	1
9	default	XXX	XXX	XXX	XXX	XXX	XXXXX	XXXXX	00	XXX	XXX	XXX	XXX	00	00	0	0	0	0

# Main Control Unit

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#	Instruction_type	Instruction	PCSrc	ResultSrc	MemWrite	ALUControl	ALUSrc	ImmSrc	RegWrite
1	R-Type	ADD	00	00	0	010	0	XX	1
2	R-Type	SUB	00	00	0	110	0	XX	1
3	R-Type	SLTU	00	00	0	100	0	XX	1
4	R-Type	SLT	00	00	0	111	0	XX	1
5	R-Type	OR	00	00	0	001	0	XX	1
6	R-Type	AND	00	00	0	000	0	XX	1
7	I-Type	LW	00	01	0	010	1	000	1
8	I-Type	ADDI	00	00	0	010	1	000	1
9	I-Type	SLTUI	00	00	0	100	1	000	1
10	I-Type	SLTI	00	00	0	111	1	000	1
11	I-Type	XORI	00	00	0	011	1	000	1
12	I-Type	ORI	00	00	0	001	1	000	1
13	S-Type	SW	00	XX	1	010	1	001	0
14	J-Type	JALR	10	10	0	010	1	000	1
15	J-Type	JAL	01	10	0	010	X	011	1
16	B-Type	BEQ	zero ? 1 : 2'b00	00	0	011	0	010	0
17	B-Type	BNE	zero ? 0 : 2'b01	00	0	011	0	010	0
18	B-Type	BLT	sign + ? 1 : 2'b00	00	0	111	0	001	0
19	B-Type	BGE	sign + or zero ? 1 : 2'b00	00	0	111	0	000	0
20	U-Type	LUI	00	11	0	XXX	X	100	1