

31	27	26	25	24	20	19	15	14	12	11	7	6	0	
funct7				rs2		rs1		funct3		rd		opcode		R-type
imm[11:0]						rs1		funct3		rd		opcode		I-type
imm[11:5]				rs2		rs1		funct3		imm[4:0]		opcode		S-type
imm[12 10:5]				rs2		rs1		funct3		imm[4:1 11]		opcode		B-type
imm[31:12]										rd		opcode		U-type
imm[20 10:1 11 19:12]										rd		opcode		J-type

## RV32I Base Instruction Set

imm[31:12]					rd	0110111	LUI
imm[31:12]					rd	0010111	AUIPC
imm[20 10:1 11 19:12]					rd	1101111	JAL
imm[11:0]			rs1	000	rd	1100111	JALR
imm[12 10:5]		rs2	rs1	000	imm[4:1 11]	1100011	BEQ
imm[12 10:5]		rs2	rs1	001	imm[4:1 11]	1100011	BNE
imm[12 10:5]		rs2	rs1	100	imm[4:1 11]	1100011	BLT
imm[12 10:5]		rs2	rs1	101	imm[4:1 11]	1100011	BGE
imm[12 10:5]		rs2	rs1	110	imm[4:1 11]	1100011	BLTU
imm[12 10:5]		rs2	rs1	111	imm[4:1 11]	1100011	BGEU
imm[11:0]			rs1	000	rd	0000011	LB
imm[11:0]			rs1	001	rd	0000011	LH
imm[11:0]			rs1	010	rd	0000011	LW
imm[11:0]			rs1	100	rd	0000011	LBU
imm[11:0]			rs1	101	rd	0000011	LHU
imm[11:5]		rs2	rs1	000	imm[4:0]	0100011	SB
imm[11:5]		rs2	rs1	001	imm[4:0]	0100011	SH
imm[11:5]		rs2	rs1	010	imm[4:0]	0100011	SW
imm[11:0]			rs1	000	rd	0010011	ADDI
imm[11:0]			rs1	010	rd	0010011	SLTI
imm[11:0]			rs1	011	rd	0010011	SLTIU
imm[11:0]			rs1	100	rd	0010011	XORI
imm[11:0]			rs1	110	rd	0010011	ORI
imm[11:0]			rs1	111	rd	0010011	ANDI
0000000		shamt	rs1	001	rd	0010011	SLLI
0000000		shamt	rs1	101	rd	0010011	SRLI
0100000		shamt	rs1	101	rd	0010011	SRAI
0000000		rs2	rs1	000	rd	0110011	ADD
0100000		rs2	rs1	000	rd	0110011	SUB
0000000		rs2	rs1	001	rd	0110011	SLL
0000000		rs2	rs1	010	rd	0110011	SLT
0000000		rs2	rs1	011	rd	0110011	SLTU
0000000		rs2	rs1	100	rd	0110011	XOR
0000000		rs2	rs1	101	rd	0110011	SRL
0100000		rs2	rs1	101	rd	0110011	SRA
0000000		rs2	rs1	110	rd	0110011	OR
0000000		rs2	rs1	111	rd	0110011	AND
0000	pred	succ	00000	000	00000	0001111	FENCE
0000	0000	0000	00000	001	00000	0001111	FENCE.I
0000000000000			00000	000	00000	1110011	ECALL
0000000000001			00000	000	00000	1110011	EBREAK
csr			rs1	001	rd	1110011	CSRWR
csr			rs1	010	rd	1110011	CSRWS
csr			rs1	011	rd	1110011	CSRRC
csr			zimm	101	rd	1110011	CSRRWI
csr			zimm	110	rd	1110011	CSRRSI
csr			zimm	111	rd	1110011	CSRRCI

31	27	26	25	24	20	19	15	14	12	11	7	6	0	
funct7				rs2		rs1		funct3		rd		opcode		R-type
imm[11:0]						rs1		funct3		rd		opcode		I-type
imm[11:5]				rs2		rs1		funct3		imm[4:0]		opcode		S-type

**RV64I Base Instruction Set (in addition to RV32I)**

imm[11:0]		rs1	110	rd	0000011	LWU	
imm[11:0]		rs1	011	rd	0000011	LD	
imm[11:5]		rs2	rs1	011	imm[4:0]	0100011	SD
000000	shamt	rs1	001	rd	0010011		SLLI
000000	shamt	rs1	101	rd	0010011		SRLI
010000	shamt	rs1	101	rd	0010011		SRAI
imm[11:0]		rs1	000	rd	0011011		ADDIW
0000000	shamt	rs1	001	rd	0011011		SLLIW
0000000	shamt	rs1	101	rd	0011011		SRLIW
0100000	shamt	rs1	101	rd	0011011		SRAIW
0000000	rs2	rs1	000	rd	0111011		ADDW
0100000	rs2	rs1	000	rd	0111011		SUBW
0000000	rs2	rs1	001	rd	0111011		SLLW
0000000	rs2	rs1	101	rd	0111011		SRLW
0100000	rs2	rs1	101	rd	0111011		SRAW

**RV32M Standard Extension**

0000001				rs2		rs1		000		rd		0110011		MUL
0000001				rs2		rs1		001		rd		0110011		MULH
0000001				rs2		rs1		010		rd		0110011		MULHSU
0000001				rs2		rs1		011		rd		0110011		MULHU
0000001				rs2		rs1		100		rd		0110011		DIV
0000001				rs2		rs1		101		rd		0110011		DIVU
0000001				rs2		rs1		110		rd		0110011		REM
0000001				rs2		rs1		111		rd		0110011		REMU

**RV64M Standard Extension (in addition to RV32M)**

0000001				rs2		rs1		000		rd		0111011		MULW
0000001				rs2		rs1		100		rd		0111011		DIVW
0000001				rs2		rs1		101		rd		0111011		DIVUW
0000001				rs2		rs1		110		rd		0111011		REMW
0000001				rs2		rs1		111		rd		0111011		REMUW

**RV32A Standard Extension**

00010	aq	rl	00000	rs1		010		rd		0101111		LR.W	
00011	aq	rl	rs2	rs1		010		rd		0101111		SC.W	
00001	aq	rl	rs2	rs1		010		rd		0101111		AMOSWAP.W	
00000	aq	rl	rs2	rs1		010		rd		0101111		AMOADD.W	
00100	aq	rl	rs2	rs1		010		rd		0101111		AMOXOR.W	
01100	aq	rl	rs2	rs1		010		rd		0101111		AMOAND.W	
01000	aq	rl	rs2	rs1		010		rd		0101111		AMOOR.W	
10000	aq	rl	rs2	rs1		010		rd		0101111		AMOMIN.W	
10100	aq	rl	rs2	rs1		010		rd		0101111		AMOMAX.W	
11000	aq	rl	rs2	rs1		010		rd		0101111		AMOMINU.W	
11100	aq	rl	rs2	rs1		010		rd		0101111		AMOMAXU.W	