

# RV32I Base Instruction Set

## Instruction Formats

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]				rs2		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]				rs2		rs1		funct3		rd		opcode		U-type
imm[20 10:1 11 19:12]				rs2		rs1		funct3		rd		opcode		J-type

## Instructions

31	27	26	25	24	20	19	15	14	12	11	7	6	0		
				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			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
fm	pred			succ		rs1		000		rd				0001111	FENCE
0000000				00000		00000		000		00000				1110011	ECALL
0000000				00001		00000		000		00000				1110011	EBREAK
0000000				shamt		rs1		001		rd				0010011	SLLI
0000000				shamt		rs1		101		rd				0010011	SRLI
0100000				shamt		rs1		101		rd				0010011	SRAI
1000001				10011		rs1		000		rd				0001111	FENCE.TSO
0000000				10000		00000		000		00000				0001111	PAUSE