31	27	26	25	24		20	19	15	14	12	11	7	6	0	
	funct7				rs2		rs	1	fun	ct3		$\operatorname{rd}$	opo	code	R-type
	in	nm[	11:0	)]			rsi	1	fun	ct3		rd	opo	code	I-type
	imm[11:5	5]			rs2		rsi	1	fun	ct3	imı	n[4:0]	opo	code	S-type
i	mm[12 10]	):5]			rs2		rsi	1	fun	ct3	imm	[4:1 11]	opo	code	B-type
imm[31:12]									rd	opo	code	U-type			
imm[20 10:1 11 19]						9:12]					rd	opo	code	J-type	

<b>BV32I</b>	Raco	Inetru	ction	Sot
D V AZI	Dase	THSLEI	ica icari	Del.

		imana [21,19]	Base Instr			0110111	TTTT
		$\frac{\text{imm}[31:12]}{\text{imm}[31:12]}$			rd rd	0110111 0010111	LUI AUIPC
	imm	$\frac{11111[31:12]}{1[20 10:1 11 1]}$	0.19]		rd	1101111	JAL
i	$\frac{11111}{\text{mm}[11:0]}$	and the second of the second	rs1	000	rd	1101111	JALR
imm[12 10	L.	rs2	rs1	000	imm[4:1 11]	1100111	BEQ
$\frac{\text{imm}[12]10}{\text{imm}[12]10}$		rs2	rs1	001	$\frac{\text{imm}[4:1 11]}{\text{imm}[4:1 11]}$	1100011	BNE
$\frac{\text{imm}[12]10}{\text{imm}[12]10}$		rs2	rs1	100	$\frac{\text{imm}[4:1 11]}{\text{imm}[4:1 11]}$	1100011	BLT
imm[12 10]		rs2	rs1	101	imm[4:1 11]	1100011	BGE
imm[12 10]		rs2	rs1	110	imm[4:1 11]	1100011	BLTU
$\overline{\mathrm{imm}[12 10]}$		rs2	rs1	111	imm[4:1 11]	1100011	BGEU
in	mm[11:0		rs1	000	$\overline{\mathrm{rd}}$	0000011	$_{ m LB}$
iı	$\overline{\mathrm{mm}[11:0]}$		rs1	001	$\operatorname{rd}$	0000011	LH
iı	mm[11:0]	]	rs1	010	$\operatorname{rd}$	0000011	LW
iı	mm[11:0]	]	rs1	100	$\operatorname{rd}$	0000011	LBU
iı	mm[11:0]	]	rs1	101	$\operatorname{rd}$	0000011	$\overline{\mathrm{LHU}}$
imm[11:	-	rs2	rs1	000	imm[4:0]	0100011	SB
imm[11:	3	rs2	rs1	001	imm[4:0]	0100011	$\mathbf{SH}$
imm[11:		rs2	rs1	010	imm[4:0]	0100011	SW
	mm[11:0]		rs1	000	$\operatorname{rd}$	0010011	ADDI
	mm[11:0]		rs1	010	$\operatorname{rd}$	0010011	SLTI
	mm[11:0]		rs1	011	rd	0010011	SLTIU
	mm[11:0]		rs1	100	$\operatorname{rd}$	0010011	XORI
	mm[11:0]		rs1	110	$\operatorname{rd}$	0010011	ORI
	mm[11:0]		rs1	111	$\operatorname{rd}$	0010011	ANDI
000000		shamt	rs1	001 101	rd rd	0010011 0010011	SLLI SRLI
		shamt	rs1	1		0010011	SRAI
010000							
010000		shamt	rs1	101	rd rd		_
0000000	0	rs2	rs1	000	rd	0110011	ADD
0000000	0	rs2 rs2	rs1 rs1	000	rd rd	0110011 0110011	ADD SUB
0000000 0100000 0000000	0 0 0	rs2 rs2 rs2	rs1 rs1 rs1	000 000 001	rd rd rd	0110011 0110011 0110011	ADD SUB SLL
0000000 0100000 0000000 0000000	0 0 0 0 0 0 0	rs2 rs2 rs2 rs2	rs1 rs1 rs1 rs1	000 000 001 010	rd rd rd rd	0110011 0110011 0110011 0110011	ADD SUB SLL SLT
0000000 0100000 0000000 0000000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	rs2 rs2 rs2 rs2 rs2	rs1 rs1 rs1 rs1	000 000 001 010 011	rd rd rd rd rd	0110011 0110011 0110011 0110011 0110011	ADD SUB SLL SLT SLTU
0000000 0100000 0000000 0000000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	rs2 rs2 rs2 rs2	rs1 rs1 rs1 rs1	000 000 001 010	rd rd rd rd	0110011 0110011 0110011 0110011	ADD SUB SLL SLT
0000000 0100000 0000000 0000000 0000000	0 0 0 0 0 0 0	rs2 rs2 rs2 rs2 rs2 rs2	rs1 rs1 rs1 rs1 rs1	000 000 001 010 011 100	rd rd rd rd rd rd rd rd	0110011 0110011 0110011 0110011 0110011 0110011	ADD SUB SLL SLT SLTU XOR
0000000 0100000 0000000 0000000 0000000 000000	0 0 0 0 0 0 0 0 0 0	rs2 rs2 rs2 rs2 rs2 rs2 rs2 rs2	rs1 rs1 rs1 rs1 rs1 rs1	000 000 001 010 011 100 101	rd rd rd rd rd rd rd rd rd	0110011 0110011 0110011 0110011 0110011 0110011 0110011	ADD SUB SLL SLT SLTU XOR SRL
0000000 0100000 0000000 0000000 0000000 000000	0 0 0 0 0 0 0 0 0 0 0	rs2 rs2 rs2 rs2 rs2 rs2 rs2 rs2 rs2	rs1 rs1 rs1 rs1 rs1 rs1 rs1 rs1	000 000 001 010 011 100 101 101	rd	0110011 0110011 0110011 0110011 0110011 0110011 0110011 0110011	ADD SUB SLL SLT SLTU XOR SRL SRA
0000000 0100000 0000000 0000000 0000000 0100000 000000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	rs2	rs1	000 000 001 010 011 100 101 101 110	rd r	0110011 0110011 0110011 0110011 0110011 0110011 0110011 0110011 0110011 0110011	ADD SUB SLL SLT SLTU XOR SRL SRA OR AND FENCE
0000000 0100000 0000000 0000000 0000000 000000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	rs2	rs1	000 000 001 010 011 100 101 101	rd r	0110011 0110011 0110011 0110011 0110011 0110011 0110011 0110011 0110011 001011 0001111	ADD SUB SLL SLT SLTU XOR SRL SRA OR AND FENCE FENCE.I
0000000 0100000 0000000 0000000 0000000 0100000 0000000 0000000 000000 000000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	rs2	rs1	000 001 010 011 100 101 101 110 111 000 001	rd r	0110011 0110011 0110011 0110011 0110011 0110011 0110011 0110011 0110011 0001111 1110011	ADD SUB SLL SLT SLTU XOR SRL SRA OR AND FENCE FENCE.I ECALL
0000000 0100000 0000000 0000000 0000000 0100000 0000000 0000000 000000 000000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	rs2	rs1	000 001 011 011 100 101 101 110 111 000 001 000	rd ono ono ono ono ono ono ono ono ono on	0110011 0110011 0110011 0110011 0110011 0110011 0110011 0110011 0110011 0001111 1110011 1110011	ADD SUB SLL SLT SLTU XOR SRL SRA OR AND FENCE FENCE.I ECALL EBREAK
0000000 0100000 0000000 0000000 0000000 0100000 0000000 0000000 000000 000000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	rs2	rs1	000 001 011 011 100 101 101 110 111 000 001 000 000 001	rd r	0110011 0110011 0110011 0110011 0110011 0110011 0110011 0110011 0110011 0001111 1110011 1110011 1110011	ADD SUB SLL SLT SLTU XOR SRL SRA OR AND FENCE FENCE.I ECALL EBREAK CSRRW
0000000 0100000 0000000 0000000 0000000 0100000 0000000 0000000 000000 000000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	rs2	rs1	000 000 001 010 011 100 101 110 111 000 001 000 000 001	rd r	0110011 0110011 0110011 0110011 0110011 0110011 0110011 0110011 0110011 0001111 1110011 1110011 1110011 1110011	ADD SUB SLL SLT SLTU XOR SRL SRA OR AND FENCE FENCE.I ECALL EBREAK CSRRW CSRRS
0000000 0100000 0000000 0000000 0000000 0100000 0000000 0000000 000000 000000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	rs2	rs1	000 000 001 010 011 100 101 110 111 000 001 000 001 010 011	rd r	0110011 0110011 0110011 0110011 0110011 0110011 0110011 0110011 0110011 001011 1110011 1110011 1110011 1110011 1110011	ADD SUB SLL SLT SLTU XOR SRL SRA OR AND FENCE FENCE.I ECALL EBREAK CSRRW CSRRS CSRRC
0000000 0100000 0000000 0000000 0000000 0100000 0000000 0000000 000000 000000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	rs2	rs1	000 000 001 010 011 100 101 110 110 111 000 001 000 001 010 011 101	rd r	0110011 0110011 0110011 0110011 0110011 0110011 0110011 0110011 0110011 0110011 1110011 1110011 1110011 1110011 1110011 1110011	ADD SUB SLL SLT SLTU XOR SRL SRA OR AND FENCE FENCE.I ECALL EBREAK CSRRW CSRRS CSRRC CSRRWI
0000000 0100000 0000000 0000000 0000000 0100000 0000000 0000000 000000 000000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	rs2	rs1	000 000 001 010 011 100 101 110 111 000 001 000 001 010 011	rd r	0110011 0110011 0110011 0110011 0110011 0110011 0110011 0110011 0110011 001011 1110011 1110011 1110011 1110011 1110011	ADD SUB SLL SLT SLTU XOR SRL SRA OR AND FENCE FENCE.I ECALL EBREAK CSRRW CSRRS CSRRC

31	27	26	25	24	20	19	15	14	12	11	7	6	0	
	funct	7			rs2	rs	s1	fun	ct3	rd		op	code	R-type
		imm	[11:0]			rs	s1	fun	ct3	rd		op	code	I-type
j	mm[11]	L:5]			rs2	rs	s1	func	ct3	imm[4	1:0]	op	code	S-type

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

		`		,	<b>,</b>	
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	$^{\mathrm{rd}}$	0110011	MUL
0000001	rs2	rs1	001	rd	0110011	MULH
0000001	rs2	rs1	010	rd	0110011	MULHSU
0000001	rs2	rs1	011	$^{\mathrm{rd}}$	0110011	MULHU
0000001	rs2	rs1	100	$^{\mathrm{rd}}$	0110011	DIV
0000001	rs2	rs1	101	$^{\mathrm{rd}}$	0110011	DIVU
0000001	rs2	rs1	110	$^{\mathrm{rd}}$	0110011	REM
0000001	rs2	rs1	111	$^{\mathrm{rd}}$	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	$^{\mathrm{rd}}$	0111011	DIVUW
0000001	rs2	rs1	110	rd	0111011	REMW
0000001	rs2	rs1	111	$^{\mathrm{rd}}$	0111011	REMUW

## RV32A Standard Extension

00010		1	00000	1	010	1	0101111	TDW
00010	aq	rl	00000	rs1	010	$^{\mathrm{rd}}$	0101111	LR.W
00011	aq	rl	rs2	rs1	010	$^{\mathrm{rd}}$	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	$\operatorname{rd}$	0101111	AMOMAXU.W