

ISA Design Document

Group no. 4

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Part 1: ISA Design (Document)

1. How many types of instruction (R-Type, I-Type, J-Type, etc.)?

Ans: There are 3 types of instruction. R-Type, I-Type and J-Type.

2. Describe each of the formats (fields and field length)

Ans: For R-Type:

OP_CODE(3 bits)	RS(3 bits)	RT(3 bits)	RD(3 bits)
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For I-Type:

OP_CODE(3 bits)	RS(3 bits)	RD(3 bits)	IMM(3 bits)
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For J-Type:

OP_CODE(3 bits)	Target address(9 bits)
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3. How many operands? (3 operands, 2 operands)

Ans: 3 operands.

4. How many operations?

Ans: 7 operations.

5. Types of operations? (Arithmetic, logical, branch type?? How many from each category? List the opcodes and respective binary values)

Ans: There are 4 arithmetic(add, addi, sub, subi) operations, 2 data transfer type(load, store) operation and 1 branch type(jump) operation.

Op_code	Reg_dst	B_inv	Cin	ALU_op	ALU_src	Write_enb	Sw_enb	Lw_enb	RAM_to_Reg	Jump
000	0	0	0	10	0	1	0	0	0	0
001	0	1	1	10	0	1	0	0	0	0
010	1	0	0	10	1	0	1	0	0	0
011	1	0	0	10	1	1	0	1	1	0
100	1	0	0	10	1	1	0	0	0	0
101	1	1	1	10	1	1	0	0	0	0
110	0	0	0	00	0	0	0	0	0	1