NORTH SOUTH UNIVERSITY
Department of Electrical & Computer Engineering

Semester: Summer 2022
Course Initial: CSE332L
Course Title: Computer Organization and Architecture
Faculty: Dr. Mainul Hossain

Project on:

Design a 10-bit Custom RISC-V Microprocessor

Section: 10
Group: 05

Group Members:

Name	Student ID
1. Md. Jakaria Hossain Jihad	2011773042
2. Rashedul Islam Tono	2022154642
3. Wahidun Akter	2022188642

Part 1.1: ISA Design (Document)

We have designed a 10-bit custom RISC-V Microprocessor

1. How many types of instruction (R-Type, I-Type, J-Type, etc.)?
Ans: We have taken two types of instructions. They are - R type and I type.

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

R type ISA format:

We have taken 4-bit for Opcode and 2-bits for rd, rs and rt type as we need to make 10-bit RISC type of CPU.

OP Code	rd	rs	rt
4-bit	2-bit	2-bit	2-bit

I -type format:

We have taken 4-bit for Opcode and 2-bits for rd, and 4-bit for immediate part.

OP code	rd	Immediate
4-bit	2-bit	4-bit

3. How many operands? (3 operands, 2 operands)
Ans: We have used 3 operands.

4. How many operations?
Ans: We have used 7 operations.

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

Ans: We have used 7 operations. These operations are belonged to arithmetic and logical part. We have also categorized opcodes and their respective binary values. An instruction table is given below:

Instructions Table:

Category	Operation	Format	Example	Meaning	Opcode
Arithmetic	Addition	R-Type	add $r1,$r2,$r3	$r1 = $r2+$r3	0000
	Addition immediate	I-Type	addi $r1, 3	$r1= $r1+3	0001
	Subtraction	R-Type	sub $r1,$r2, $r3	$r1= $r2-$r3	0010
	Subtraction immediate	I-Type	subi $r1, 3	$r1= $r1-3	0011
Logical	AND	R-Type	and $r1,$r2,$r3	$r1=$r2.$r3	0100
	OR	R-Type	or$r1, $r2, $r3	$r1=$r2||$r3	0101
	XOR	R-Type	Xor $r1,$r2,$r3	$r1= $r2 $\oplus$ $r3	0110