Text

Description automatically generated

SEMESTER 1, 2021/2022

CSCI 3301 CAAL Section 03

COMPUTER ARCHITECTURE AND ASSEMBLY LANGUAGE

**Lab 1**

**PREPARED BY:**

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**Part B**

Conversions of MIPS instructions and their machine codes:

1. addi $s1, $s2, 0xff11

*Step 1: identify the type of instruction format*

I-Type

*Step 2: identify each part of the instruction segment*

OP =addi

Rs=$s2=18

Rt= $s1 =17

Immediate =0xff11

*Step 3: convert all the values to binary*

addi = 001000

$s2 = 10010

$s1 = 10001

0xff11 = 1111 1111 0001 0001

*Step 4: put each value on its place in the segment*

OP Rs Rt Immediate

|  |  |  |  |
| --- | --- | --- | --- |
| 001000 | 10010 | 10001 | 1111 1111 0001 0001 |

*Step 5: convert the whole address in binary to hex to get the final address in hex*

0x2251FF11

1. lb $s2,4($s1)

*Step 1: identify the type of instruction format*

I-type

*Step 2: identify each part of the instruction segment*

OP/FN = lb

Rt= $s2 =18

Rs = $s1=17

Immediate = 4

*Step 3: convert all the values to binary*

lb = 100000

$s2 =10010

$s1 =10001

4 = 0000 0000 0000 0100

*Step 4: put each value on its place in the segment*

Op Rs Rt Immediate

|  |  |  |  |
| --- | --- | --- | --- |
| 100000 | 10001 | 10010 | 0000 0000 0000 0100 |

*Step 5: convert the whole address in binary to hex to get the final address in hex*

0x82320004

1. 0x012a602a

*Step 1: convert each number to binary*

0 = 0000

1 = 0001

2 = 0010

A = 1010

6 = 0110

0 = 0000

2 = 0010

A = 1010

*Step 2: combine all the converted numbers in to get the whole address in binary*

0000 0001 0010 1010 0110 0000 0010 1010

1. 0x36730098

*Step 1: convert each number to binary*

3 = 0011

6 = 0110

7 = 0111

3 = 0011

0 = 0000

0 = 0000

9 = 1001

8 = 1000

*Step 2: combine all the converted numbers in to get the whole address in binary*

0011 0110 0111 0011 0000 0000 1001 1000