

Al-Isra University

Faculty of IT

Department of Computer Science



جامعة الإسرائ

كلية تكنولوجيا المعلومات

قسم هندسة البرمجيات

<b><u>Department:</u></b> SE	<b><u>Assignment:</u></b> <b>#4</b>	<b><u>Submission Deadline:</u></b>
<b><u>Semester:</u></b>	<b><u>Year:</u></b> 2023/2024	<b><u>Instructor</u></b> Dr. Dimah Fraihat
<b><u>Course No.:</u></b>	<b><u>Course Name:</u></b> Computer Design and Organisation	<b><u>Section:</u></b> <u>1</u>
<b><u>Student No.:</u></b> <b>AD0039</b>	<b><u>Student Name:</u></b> فراس سمير سليم	<b><u>Submission date:</u></b> 12/06/2024

Question No.	Mark	
	Max	Score
1	2	
2. a	1	
2. b	1	
2. c	1	
Total Mark	5	

**Note: 1- Copy and paste are prohibited**

**Q1) Translate the following C statement into MIPS assembly code.**

*Assume that x, y, z, q are stored in registers \$s1-\$s4 respectively.*

*You may use the other registers to hold intermediate results*

**$x = x + y + z - q;$**

**Solution:**

**# Load the values of x, y, z, and q into temporary registers**

**lw \$t0, 0(\$s1)    # \$t0 = x**

**lw \$t1, 0(\$s2)    # \$t1 = y**

**lw \$t2, 0(\$s3)    # \$t2 = z**

**lw \$t3, 0(\$s4)    # \$t3 = q**

**# Perform the arithmetic operations**

**add \$t4, \$t0, \$t1    # \$t4 = x + y**

**add \$t5, \$t4, \$t2    # \$t5 = x + y + z**

**sub \$t6, \$t5, \$t3    # \$t6 = x + y + z - q**

**# Store the result back into register \$s1 (x)**

**sw \$t6, 0(\$s1)    # x = \$t6**

**Q2) Use the register and memory values in the tables below for the next questions. Assume a 32-bit machine. Assume each of the following questions starts from the table values; that is, DO NOT use value changes from one question as propagating into future parts of the question.**

Register	Value
\$1	12
\$2	16
\$3	20
\$4	24

Memory Address	Value
12	16
16	20
20	24
24	28

- a. Give the values of registers \$1, \$2, and \$3 after this instruction is executed: add \$3, \$2, \$1

$\$1 = 12$  (remains unchanged)

$\$2 = 16$  (remains unchanged)

$\$3 = \$2 + \$1 = 16 + 12 = 28$

- b. Give the values of registers \$1 and \$3 after this instruction is executed: lw \$3, 12(\$1).

$\$1 = 12$  (remains unchanged)

$\$3 = \text{Memory}[12 + \$1] = \text{Memory}[12 + 12] = \text{Memory}[24] = 28$

- c. Give the values of registers \$2 and \$3 after this instruction is executed: addi \$2, \$3, 16

$\$2 = \$3 + 16 = 28 + 16 = 44$

$\$3 = 28$  (remains unchanged)