

United International University (UIU)

Dept of CSE

CSE 313 : Computer Architecture

(Summer 2020) Section B

CT-2, Set-A (For odd IDs)

Full Marks: 20

Time: 25 min (+10 min for submission)

Answer all the questions. Your answer script must contain your name and ID.

1. Suppose an array arr1 has 10 elements. The location of the base address of arr1 is saved in register \$s1. Write a MIPS program to copy the contents of **the odd elements of arr1** (1st, 3rd, 5th etc) into another array named arr2. Write the corresponding C code first (4 marks) and then convert the C code line-by-line into MIPS code (6 marks). The location of the base address of arr2 is saved in \$s2. Assume that the instructions start from memory location 100. Note that you must use an intermediate register to copy between two memory locations of RAM. 10

Solution:

//C Code:	#MIPS Code
int i = 8;	addi \$t0, \$zero, 32 #offset 8 x 4 bytes
int j = 4;	addi \$t1, \$zero, 16 #offset 4 x 4 bytes
while (i != 0)	WHILE: beq \$t0, \$zero, EXIT
{	add \$t2, \$s0, \$t0 #get the address of arr1[i]
int temp = arr1[i];	lw \$t3, 0(\$t2) #load the value to temp
arr2[j] = temp;	add \$t4, \$s1, \$t1 # get the address of arr2[j]
i = i - 2;	sw \$t3, 0(\$t4)
j = j - 1	addi \$t0, \$t0, -8 #prev 2 times = 8 bytes
}	addi \$t1, \$t1, -4 #prev 1 times = 4 bytes
	j WHILE
	EXIT:

2. Write the corresponding Machine code (No need to write binary) for your MIPS code written for question 1. 10

				Address/Const		
Location	Opcode	rs	rt	rd	shmt	funct
100	8	0	8	32		
104	8	0	9	16		
108	4	8	0	7		
112	0	16	8	10	0	32
116	35	10	11	0		
120	0	17	9	11	0	32
124	43	11	10	0		
128	8	8	8	-8		
132	8	9	9	-4		
136	2	27				

- 7 because to reach EXIT label, we'll need to skip 7 instructions in our MIPS code.
- 27 because we need to jump to WHILE label whose address is 108, and we divide it by 4 to get the jump address, $108/4 = 27$