

Classwork 05 CPE221 Computer Organization  
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Student's Name: \_\_\_\_\_

① Consider an ARM Assembly

(20 points  
total)

.global \_start

\_start:

```
1      LDR R0, =array
2      LDR R1, [R0, #4]
3      MOV R2, #99
4      STR R2, [R0, #8]

5      MOV R7, #1
6      MOV R0, #0
7  done: B done
```

.data

```
8      array: .word 11, 22, 33, 44, 55
```

Assume the 32-bit instruction set architecture,  
and 4 byte word size.

Further assume that the first instruction  
is stored in address 0x00000000.

And, the starting address of array is 0x20.

## Questions

1. Explain what each line of the code is doing. (10 points)

Solution

Line 1: It stores the starting address of array variable in the register R0.

Line 2: It stores the value of the second element of array into R1.

Line 3: Move value 99 to R2

Line 4: Store the value 99 from register R2 to the third element of array

Line 5: Move value 1 to R7 register

Line 6: Move value 0 to R0 register.

Line 7: Infinite loop to keep the program running.

Line 8: Declaring an array data with some values.

2. What is the value in register R0, R1 and R7 after the execution of instruction in line 3. (4 points)

R0: 0x00 00 00 20

R1: 0x00 00 00 16 (or 22 in decimal)

R7: 0x00 00 00 00 (Garbage, old value or undefined is also correct)

3. What is the value stored in the memory address 0x00 00 00 28 after the execution of the program. (3 points)

0x00 00 00 63

4. What is the opcode for the instruction 2 as you see in the copulator. (3 points)

Instruction 2 is LDR R1, [R0, #4]

As shown in the copulator, its opcode is E5901004