Name (Pin Yin): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Assin. No.: \_\_\_\_\_\_

**CQUPT EE310 2017 Fall Quiz 5a**

**(20min, 30pts)**

1. (2pts) What is the main function of an ALU in a microprocessor? Is our ALU a combinational unit or sequential unit?

Arithmetic and logic operations.

combinational

1. (1pts) What is the function of “opcode” in an ALU?

Tell the ALU what operation to process.

1. (6pts) Change the following decimal numbers into 8-bit signed binary numbers in 2’s complement form, calculate the result and check if there is a carry or overflow for each of them.

-62+34 -70-60

11000010 10111010

+ 00100010 + 11000100

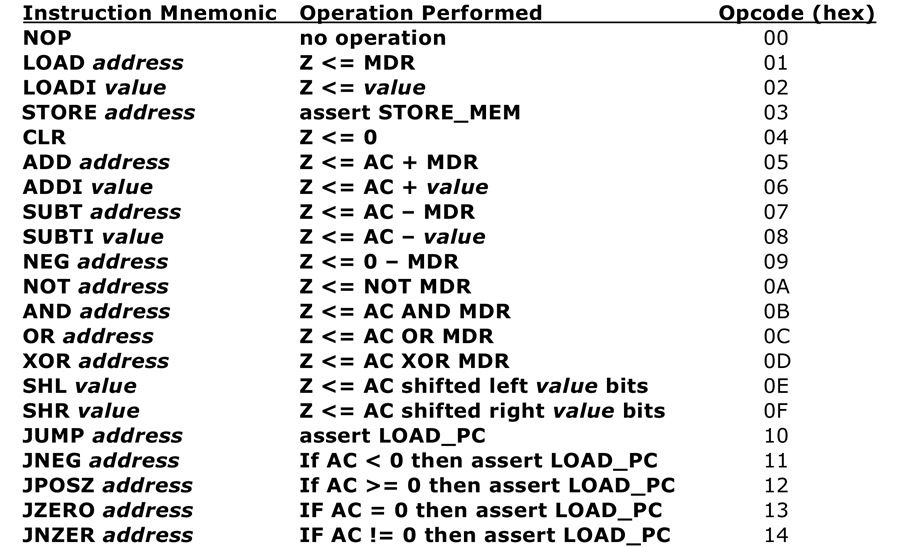
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11100100 101111110

No carry nor overflow overflow

1. (21pts) Read the instruction set table for our 8-bit ALU below and find the resulting output Z (If Z output is not required for certain operation, put it to don’t care state as “XX”)

|  |  |  |  |
| --- | --- | --- | --- |
|  | **MDR: 9E** | **AC: 06** | **address/value: 3A** |
| **Opcode** | **Z (in hex)** | **STORE\_MEM** | **LOAD\_PC** |
| 01 | 9E | 0 | 0 |
| 04 | 00 | 0 | 0 |
| 06 | 40 | 0 | 0 |
| 08 | CC | 0 | 0 |
| 0A | 61 | 0 | 0 |
| 0B | 06 | 0 | 0 |
| 11 | XX | 0 | 0 |

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