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| **Logic Circuit Design Homework #04** | | | |
| Due date | May 22nd, 2024 | Instructor | Yoo, Younghwan |
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1. Design the following comparators for two 32-bit unsigned numbers, A and B. Sketch the schematics.

1. A is not equal to B

A[0]

B[0]

XNOR

A[1]

B[1]

XNOR

A[31]

B[31]

XNOR

· · ·

NAND

· · ·

A≠B

1. A is greater than B

A[31]

B[31]

AND

A>B

AND

· · ·

AND

A[0]

B[0]

AND

· · ·

XNOR

A[30]

B[30]

AND

XNOR

AND

OR

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2. Build an unsigned comparison unit that compares two unsigned numbers *A* and *B*. The unit’s input is the Flags signal (*N, Z, C, V*) from the ALU of Figure 5.16, with the ALU performing subtraction: *A − B*. The unit’s outputs are HS, LS, HI, and LO, which indicate that *A* is higher than or the same as (HS), lower than or the same as (LS), higher (HI), or lower (LO) than *B*.

1. Write minimal equations for HS, LS, HI, and LO in terms of *N, Z, C,* and *V*.
2. Sketch circuits for HS, LS, HI, and LO.

C

Z

HS

LO

OR

LS

HI

3. Implement the following functions using a PLA below. Use dot notation.

