

Student Name	Lin Rui
Maynooth ID	21124264

Student Name	林锐
FZU ID	832103316

CS220 Computer Architecture

Practical 2 Report

a. Design a circuit that takes as input two 2-bit numbers $N1$ and $N2$ to be compared and generates three outputs:– one output for $N1=N2$, one for $N1 < N2$ and one for $N1 > N2$.

b. The truth tables and k-maps for each of the function

A	B	C	D	F_{eq}	F_{lt}	F_{gt}
0	0	0	0	1	0	0
0	0	0	1	0	1	0
0	0	1	0	0	1	0
0	0	1	1	0	1	0
0	1	0	0	0	0	1
0	1	0	1	1	0	0
0	1	1	0	0	1	0
0	1	1	1	0	1	0
1	0	0	0	0	0	1
1	0	0	1	0	0	1
1	0	1	0	1	0	0
1	0	1	1	0	1	0
1	1	0	0	0	0	1
1	1	0	1	0	0	1
1	1	1	0	0	0	1
1	1	1	1	1	0	0

AB \ CD	00	01	11	10
00	1	0	0	0
01	0	1	0	0
11	0	0	1	0
10	0	0	0	1

F_{eq}

AB \ CD	00	01	11	10
00	0	0	0	0
01	1	0	0	0
11	1	1	0	1
10	1	1	0	0

F_{lt}

AB \ CD	00	01	11	10
00	0	1	1	1
01	0	0	1	1
11	0	0	0	0
10	0	0	1	0

F_{gt}

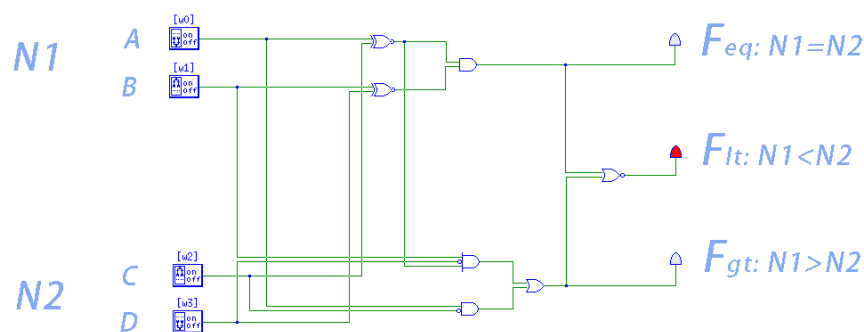
The circuit input/output equations

$$F_{eq} = \bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}B\bar{C}D + A\bar{B}C\bar{D} + ABCD = (\bar{A}\bar{C} + AC)(\bar{B}\bar{D} + BD)$$

$$F_{lt} = \bar{A}\bar{B}D + \bar{B}CD + \bar{A}C$$

$$F_{gt} = A\bar{C} + B\bar{C}\bar{D} + AB\bar{D}$$

c. Logic Schematic



d. Verification of Experiment and Observations

The circuit worked in accordance with the truth table for all input combinations.