

ECE2810 Digital Systems Design Laboratory

Laboratory Report #4

Name:

Student ID:

Date:

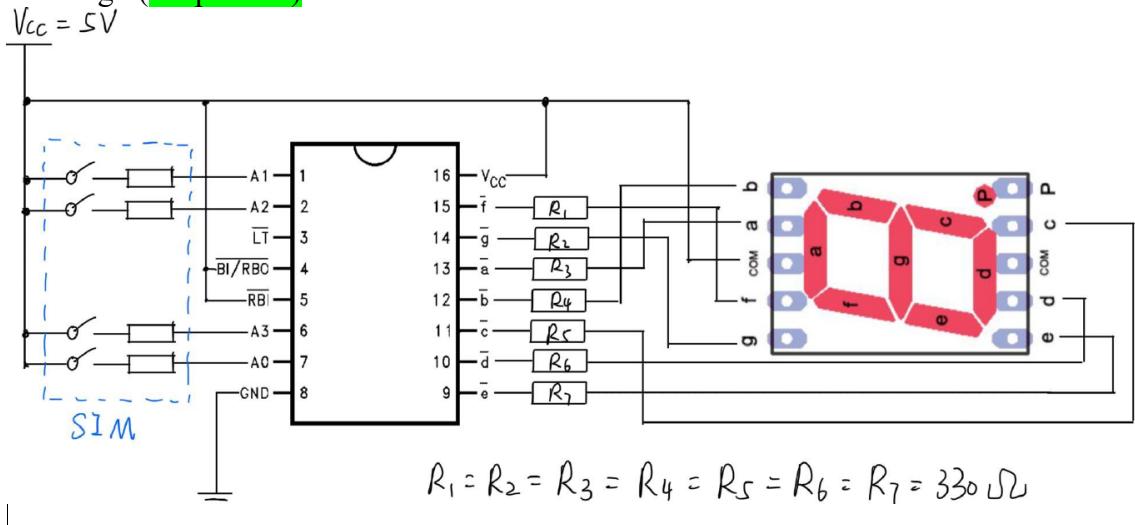
2025-10-31

The Chinese University of Hong Kong, Shenzhen

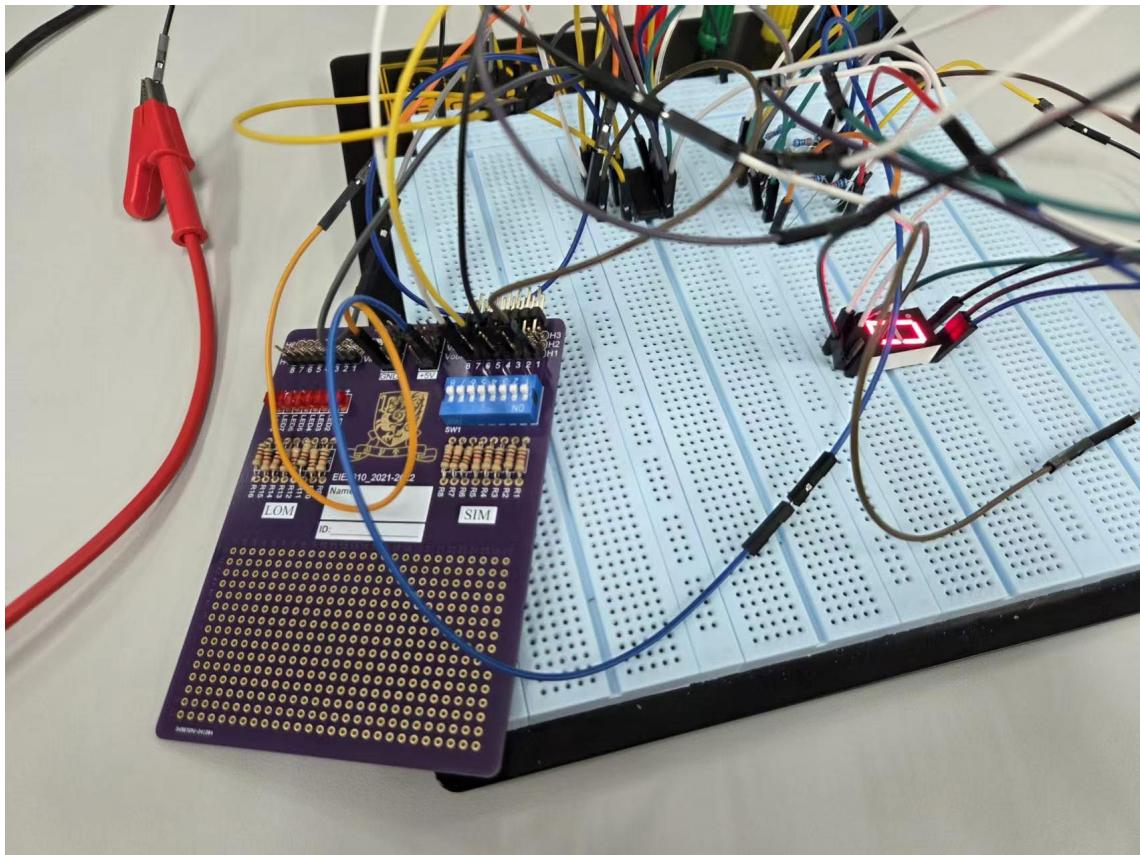
- Experiment A: Use a 7-Segment Display with a BCD-to-7-Segment Decoder (74LS47)
- Experiment B: 2-Bit x 2-Bit Multiplier (Again)
- Experiment C: Combine Multiplier with 7-Segment Display

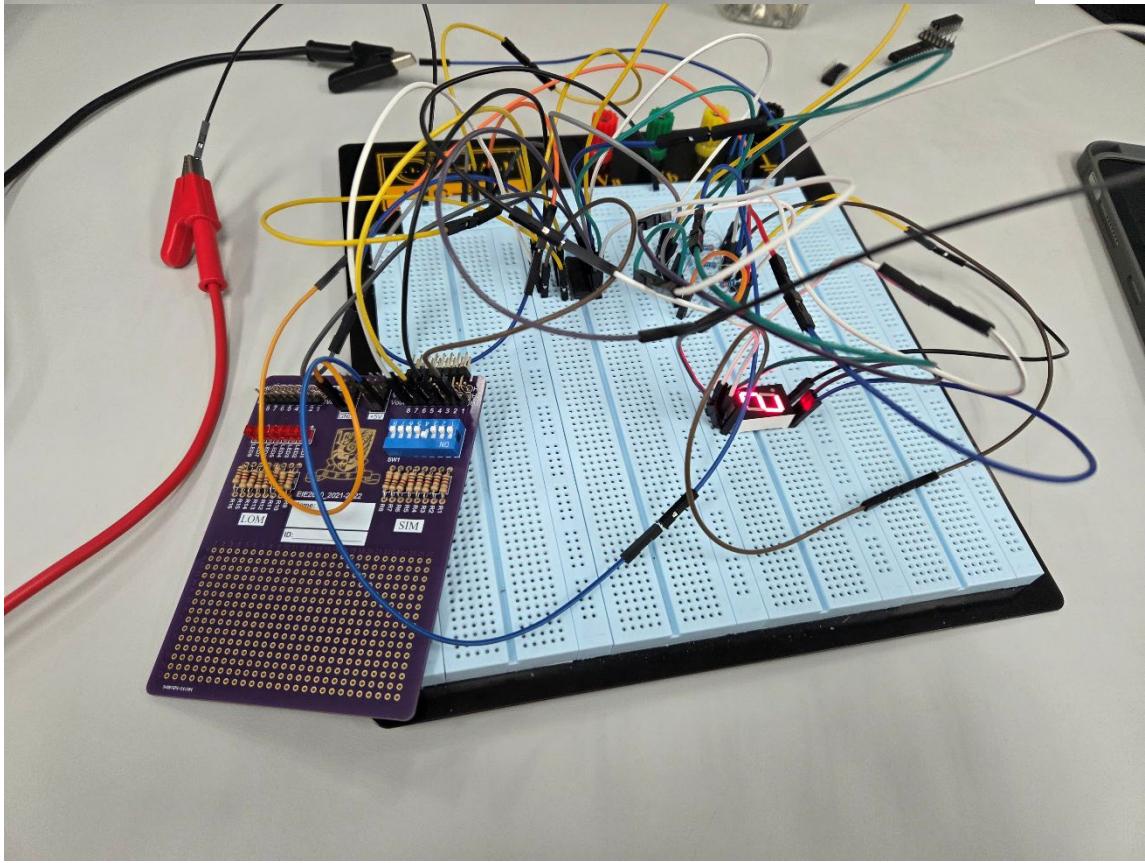
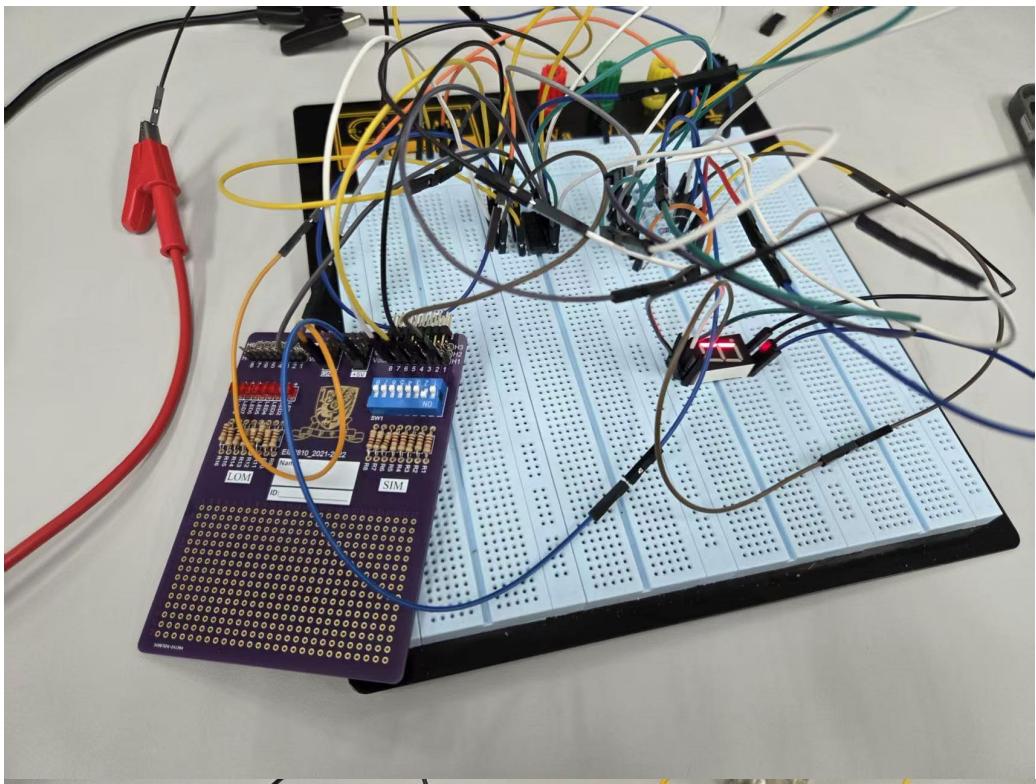
1. Experiment A

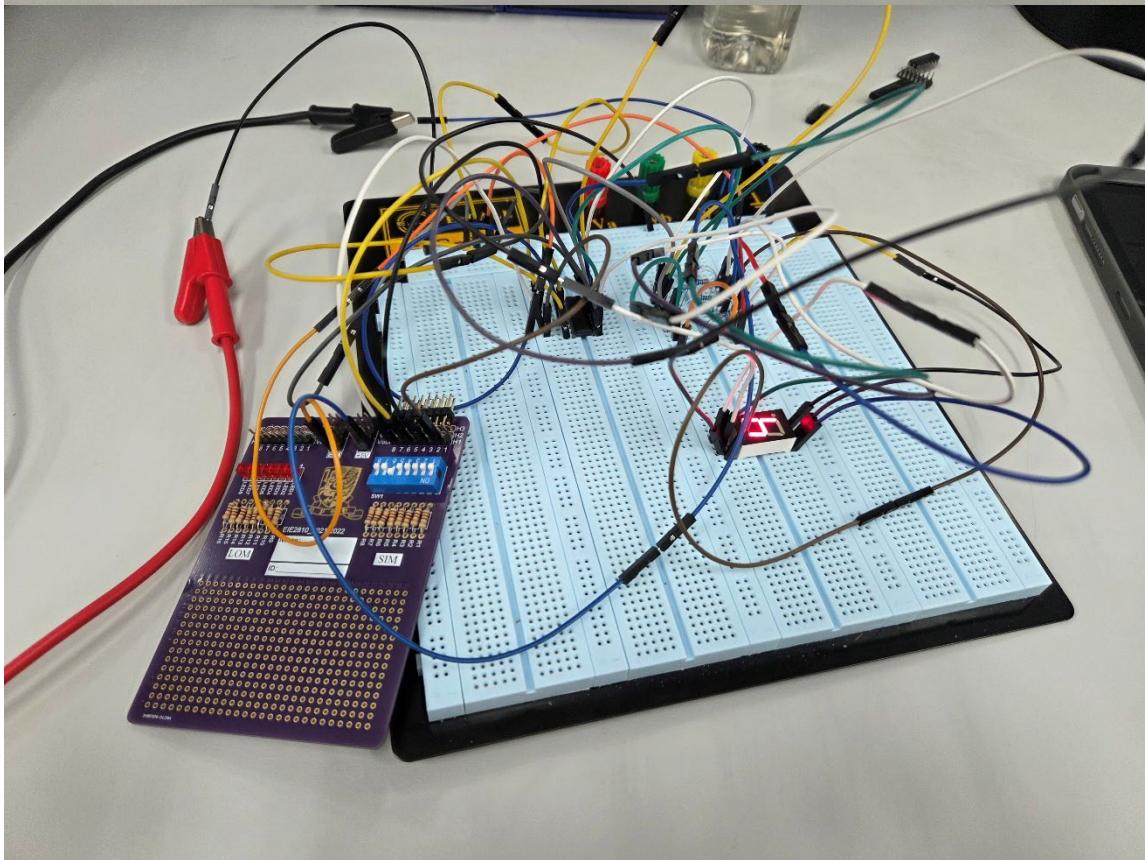
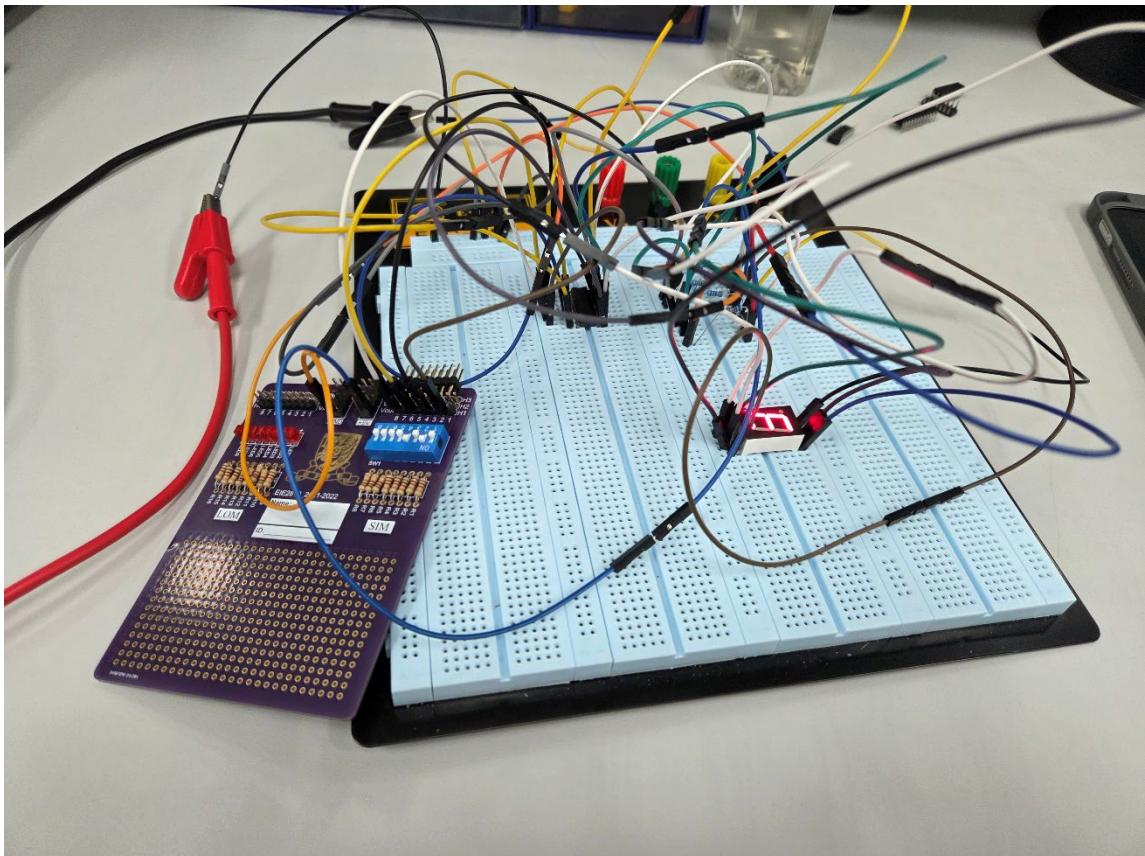
1.1 Design (Chip Level) Hardware

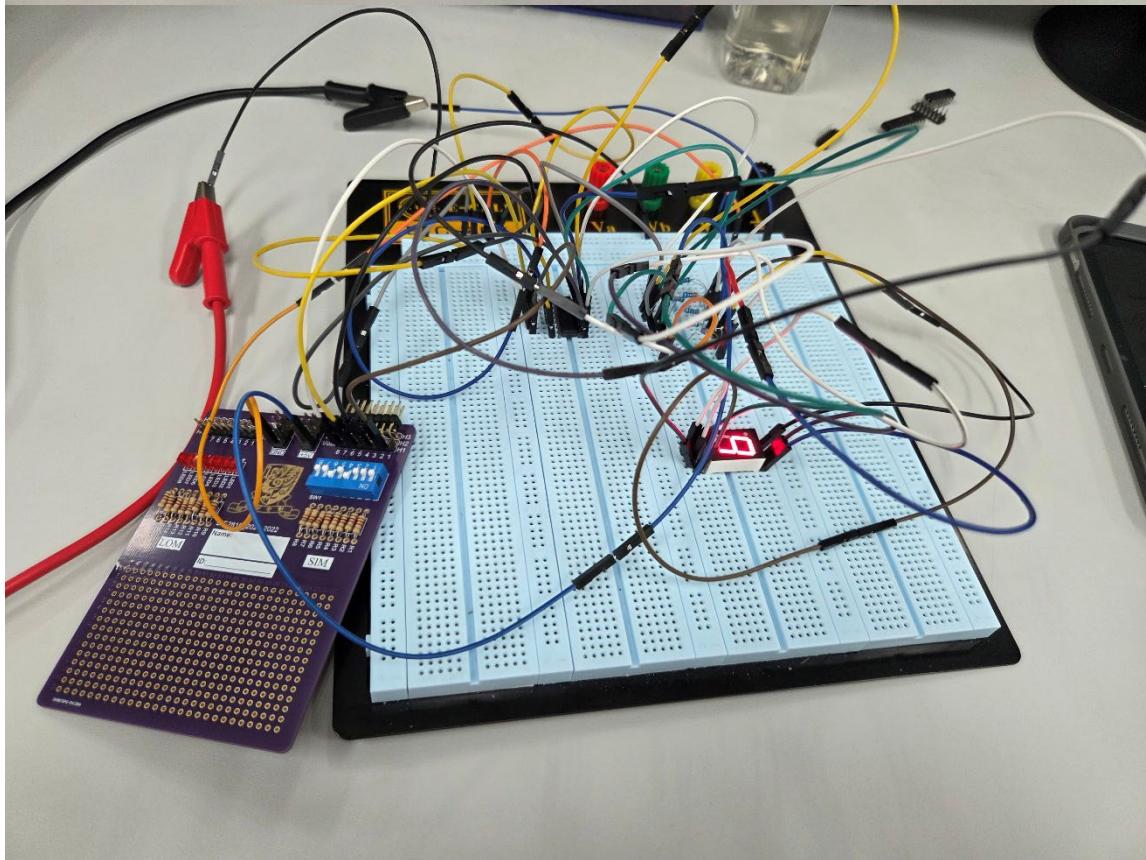
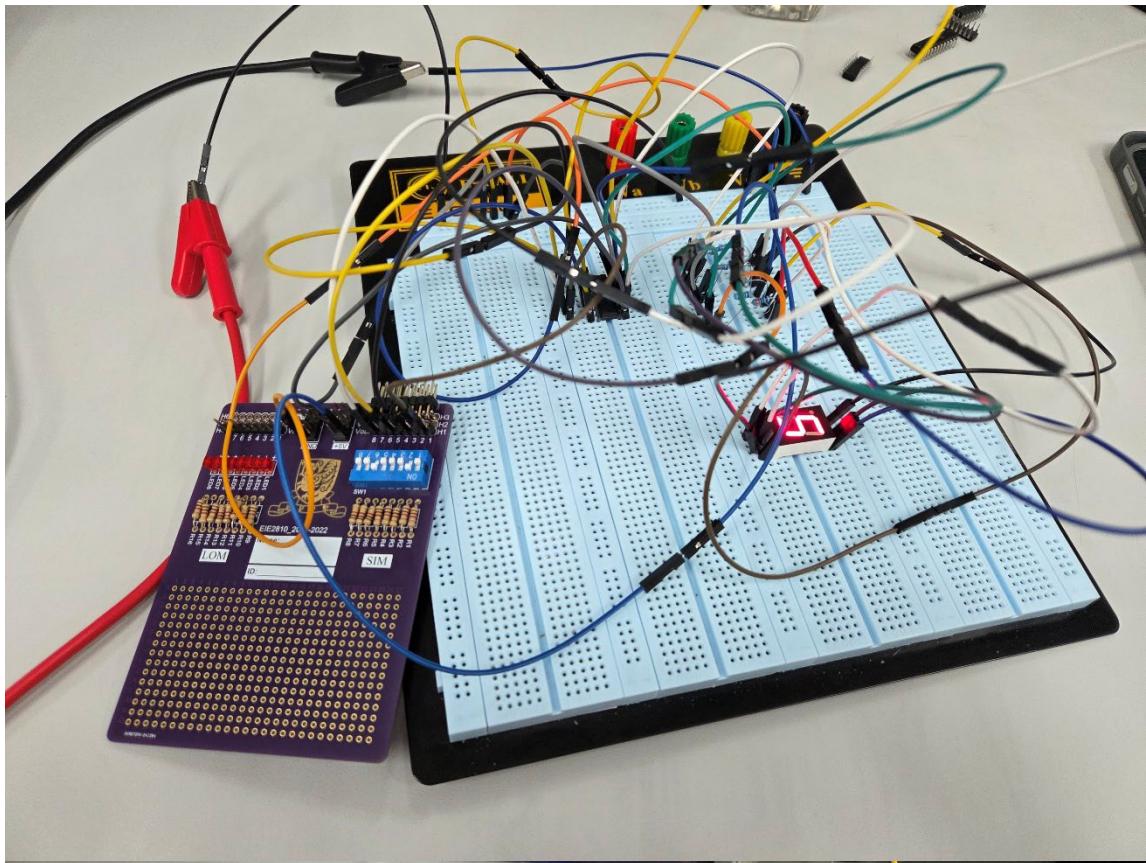


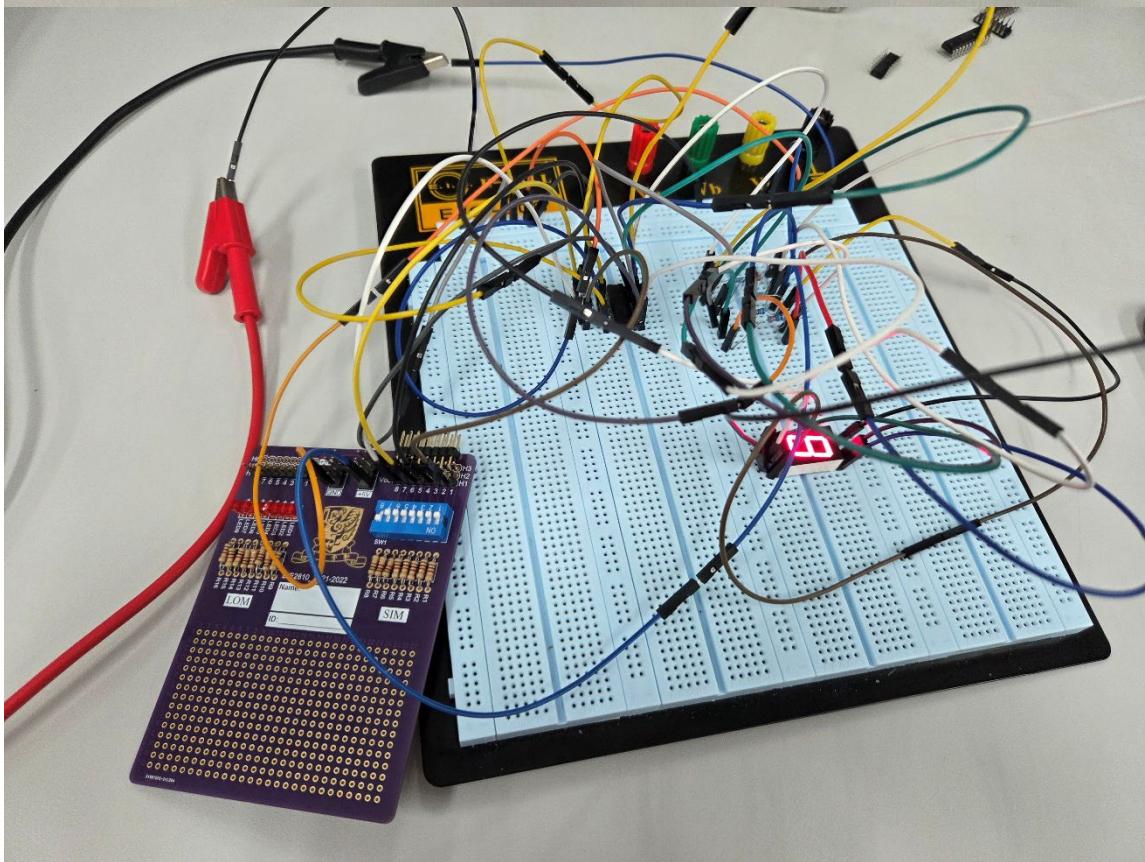
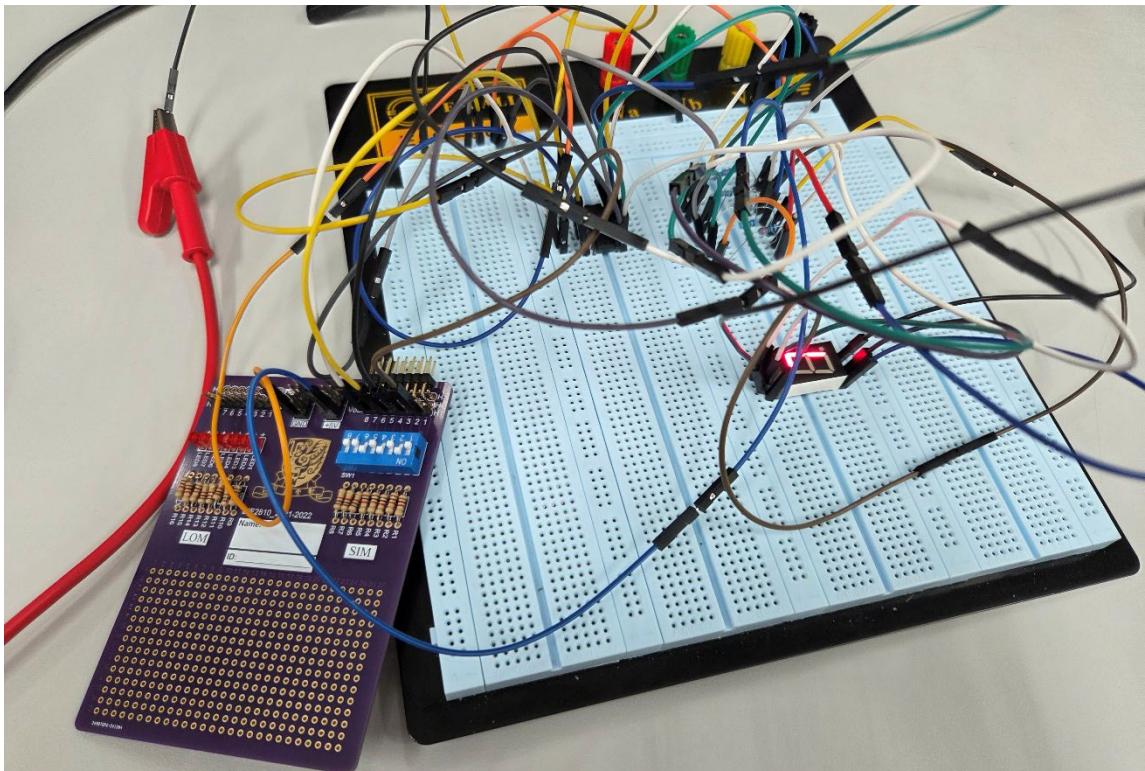
1.2 Result

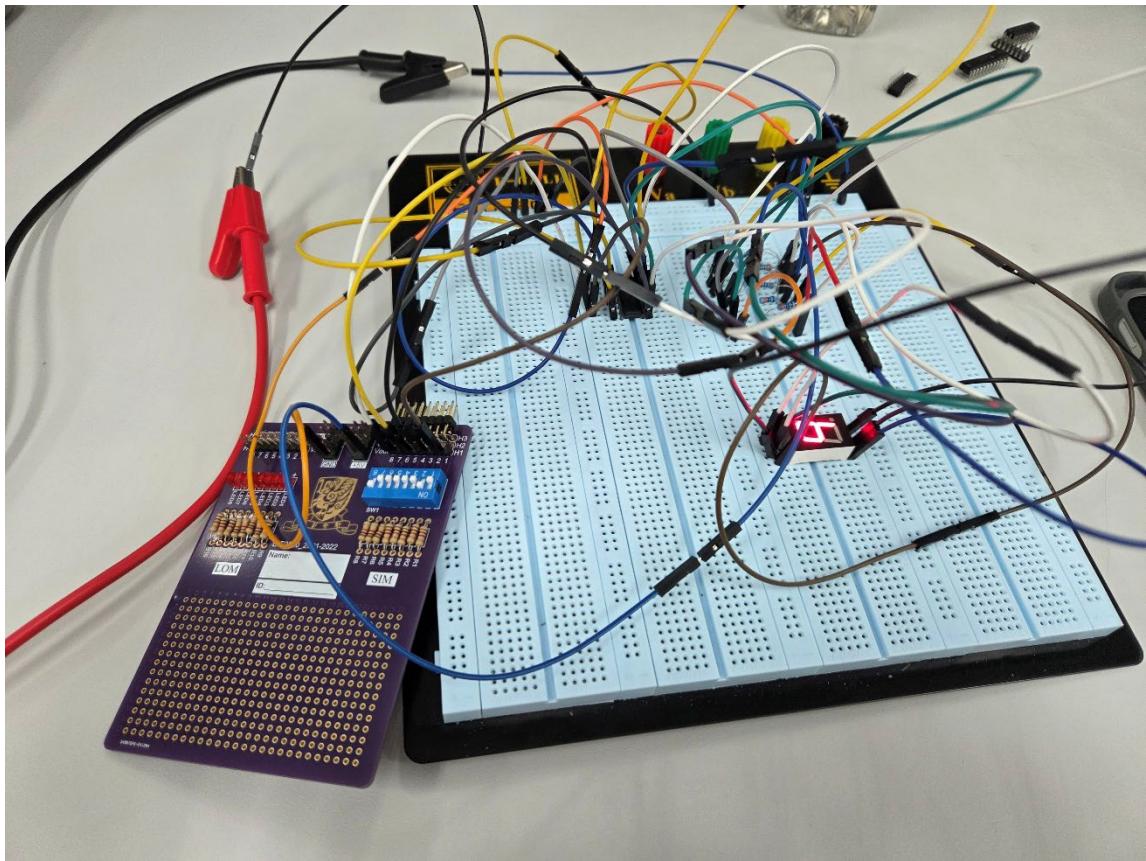












2. Experiment B

2.1 Design

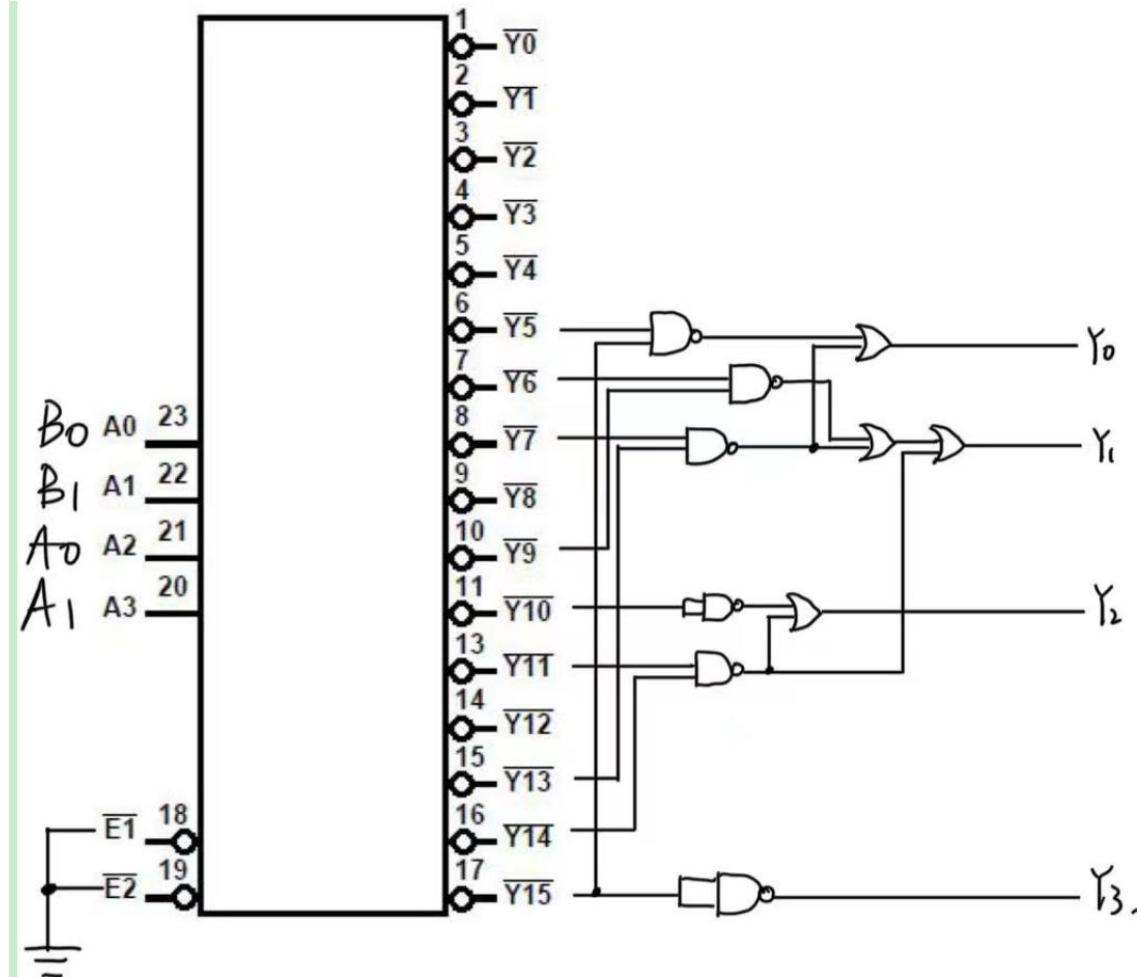
$$Y_0 = \overline{Y_5 \cdot Y_7 \cdot Y_{13} \cdot Y_{15}} = \overline{\overline{Y_7 \cdot Y_{13}}} + \overline{\overline{Y_5 \cdot Y_{15}}}$$

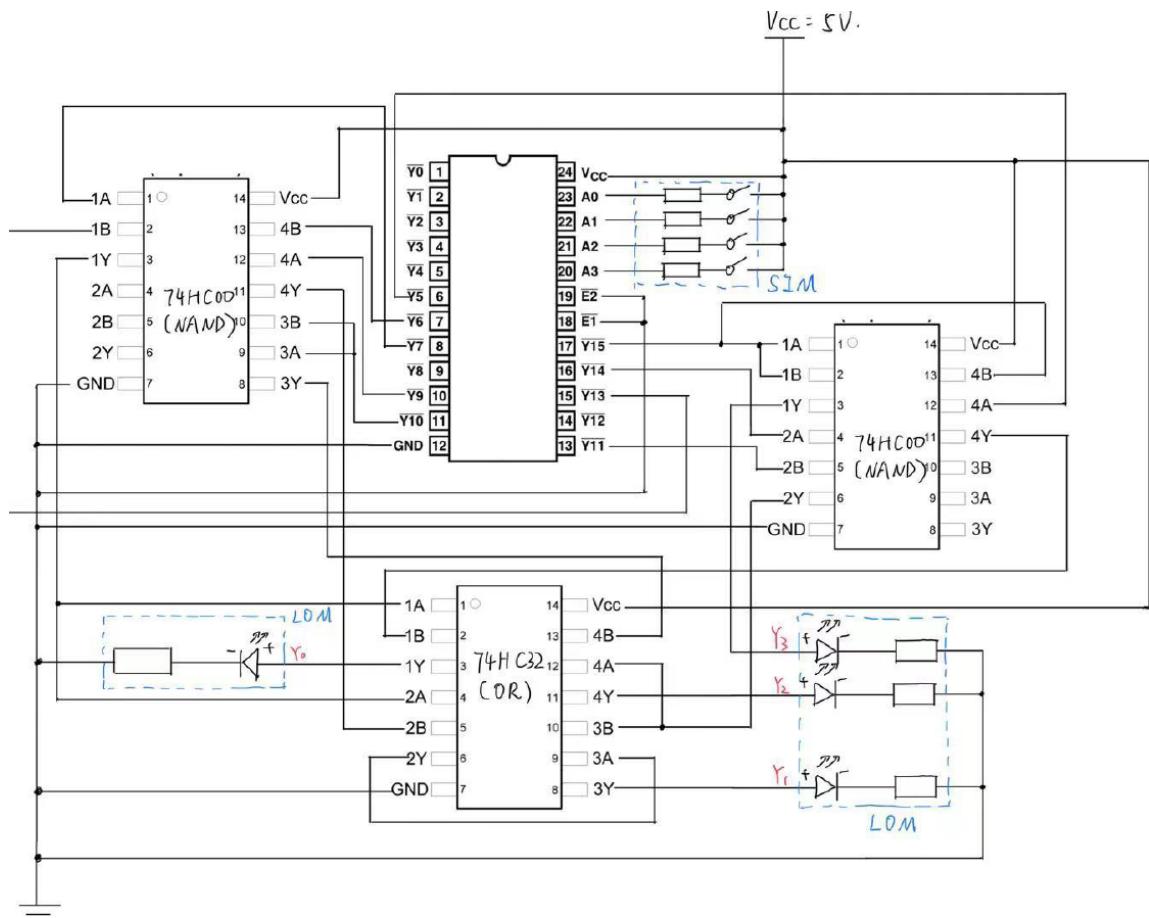
$$Y_1 = \overline{Y_6 \cdot Y_7 \cdot Y_9 \cdot Y_{11} \cdot Y_{13} \cdot Y_{14}} = \overline{\overline{Y_7 \cdot Y_{13}}} + \overline{\overline{Y_{11} \cdot Y_{14}}} + \overline{\overline{Y_6 \cdot Y_9}}$$

$$Y_2 = \overline{Y_{10} \cdot Y_{11} \cdot Y_{14}} = \overline{\overline{Y_{10}}} + \overline{\overline{Y_{11} \cdot Y_{14}}}$$

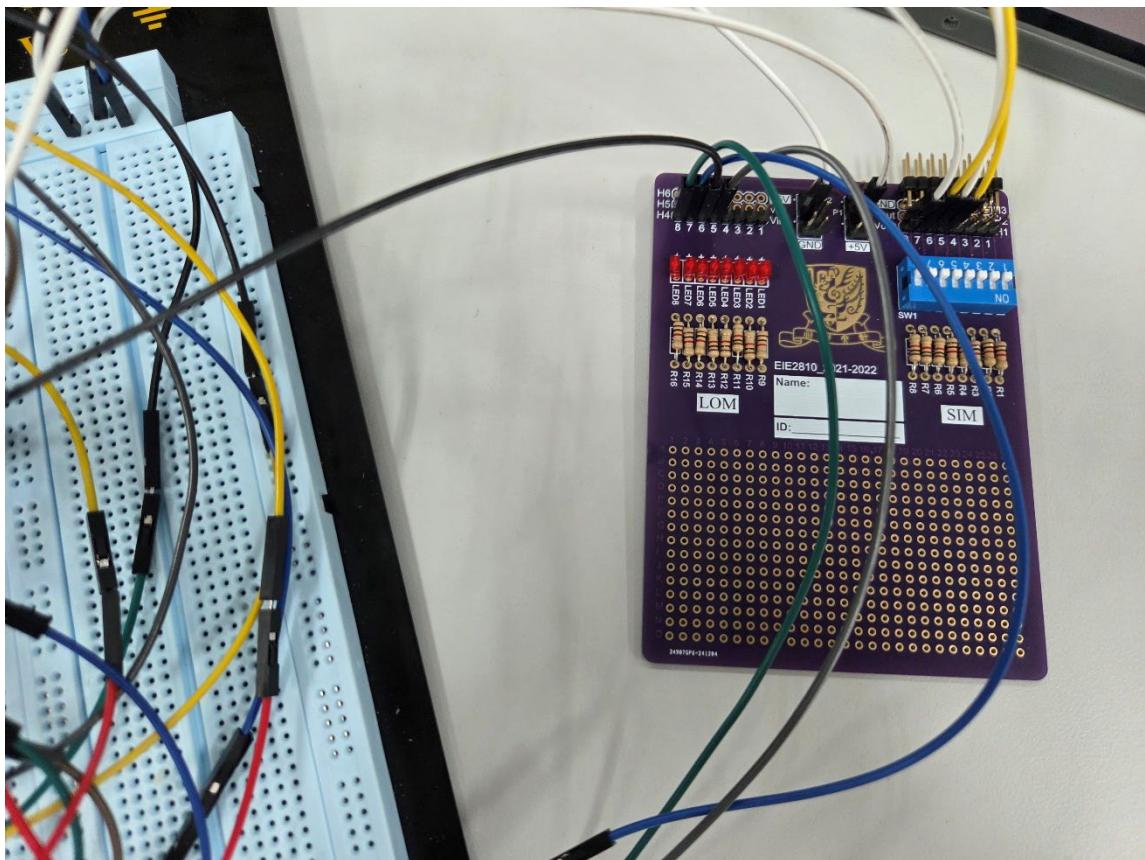
$$Y_3 = \overline{\overline{Y_{15}}}$$

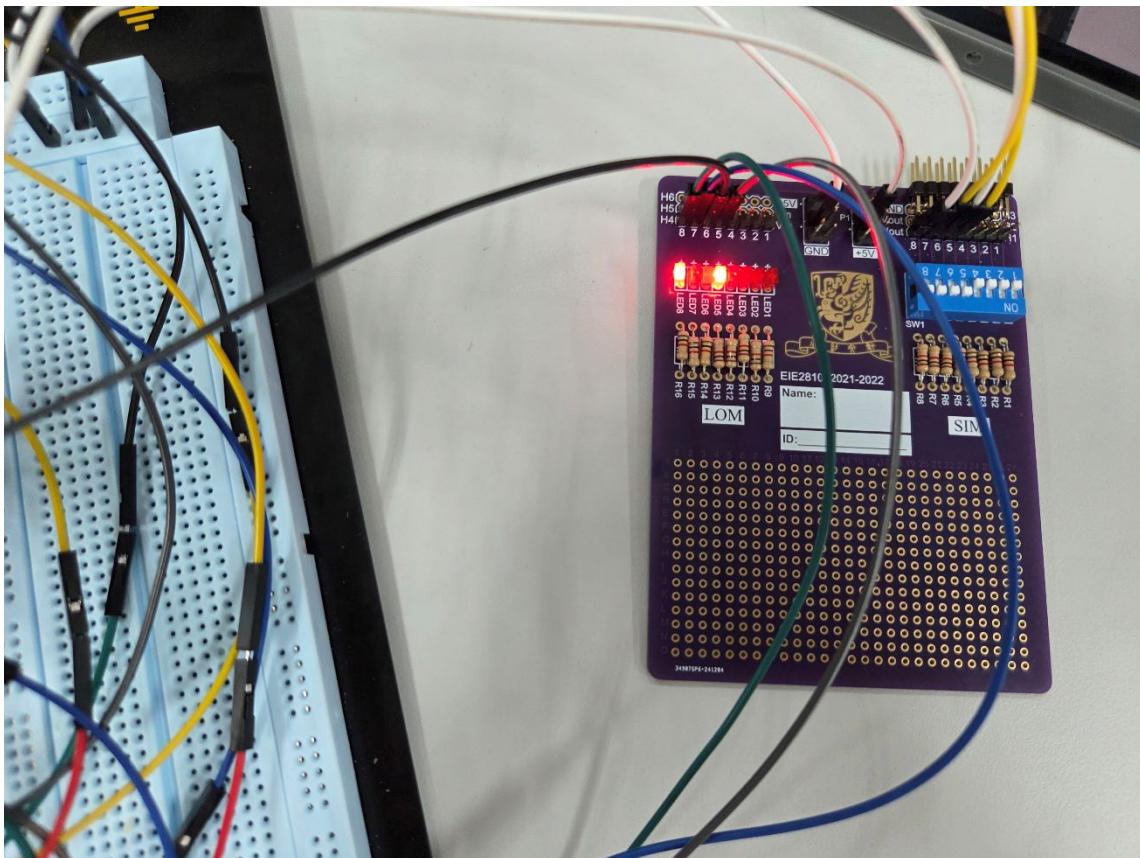
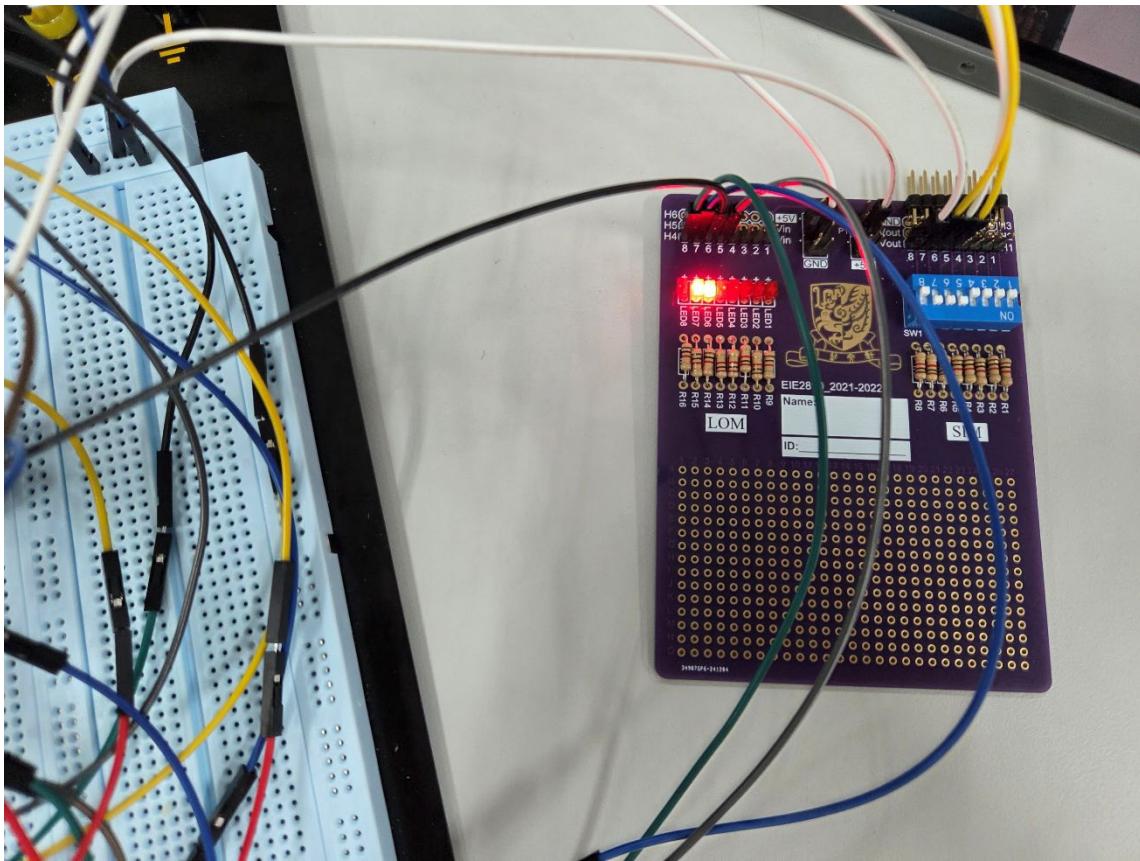
				Outputs															
A 0	A 1	B 0	B 1	O 0	O 1	O 2	O 3	O 4	O 5	O 6	O 7	O 8	O 9	O 10	O 11	O 12	O 13	O 14	O 15
0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0	0	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0	0	1	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1
0	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1
0	1	0	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1
0	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1
0	1	1	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1
0	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1
1	0	0	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1
1	0	0	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1
1	0	1	0	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1
1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1
1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1
1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1
1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
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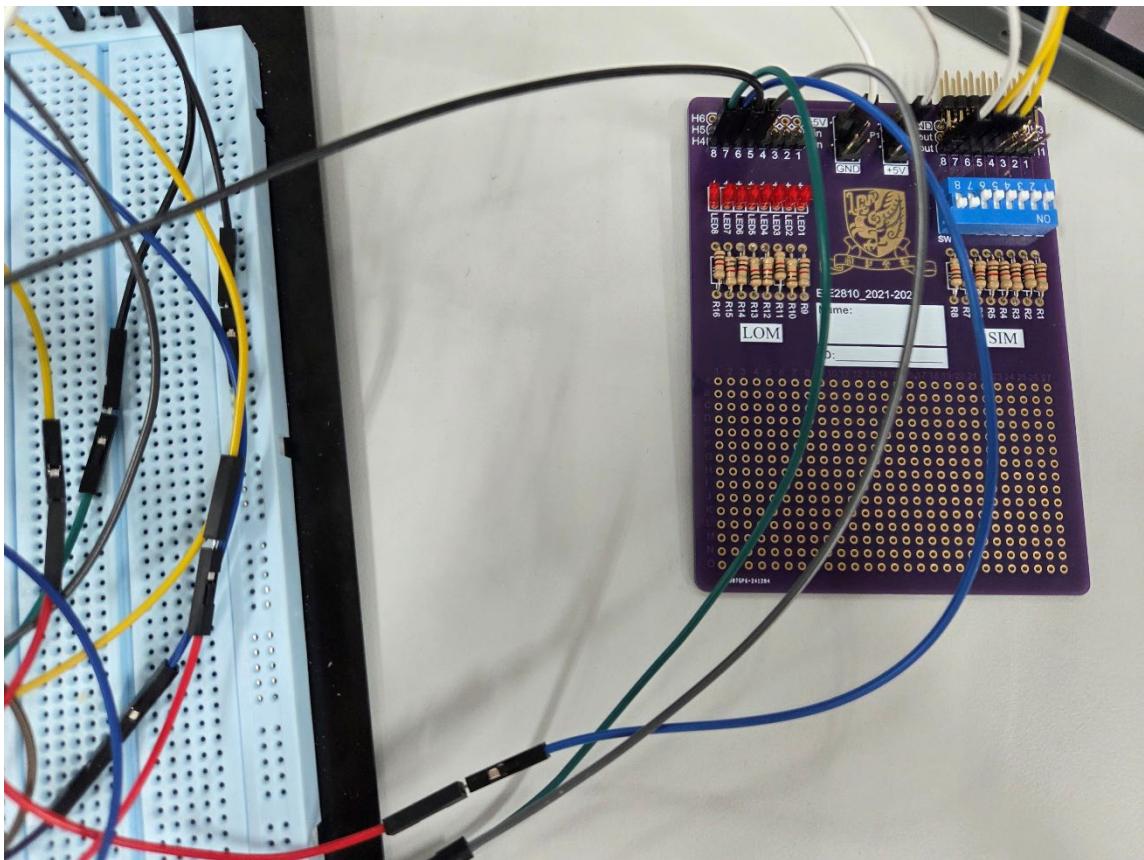
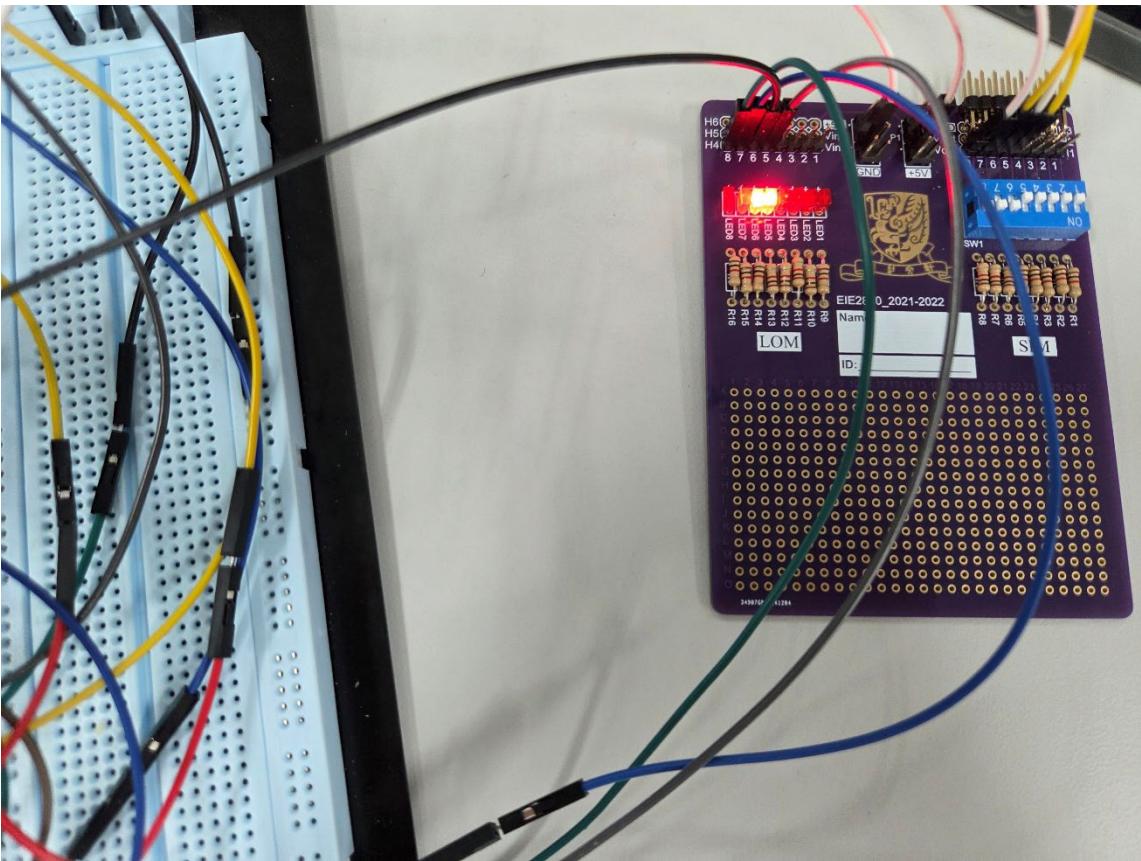


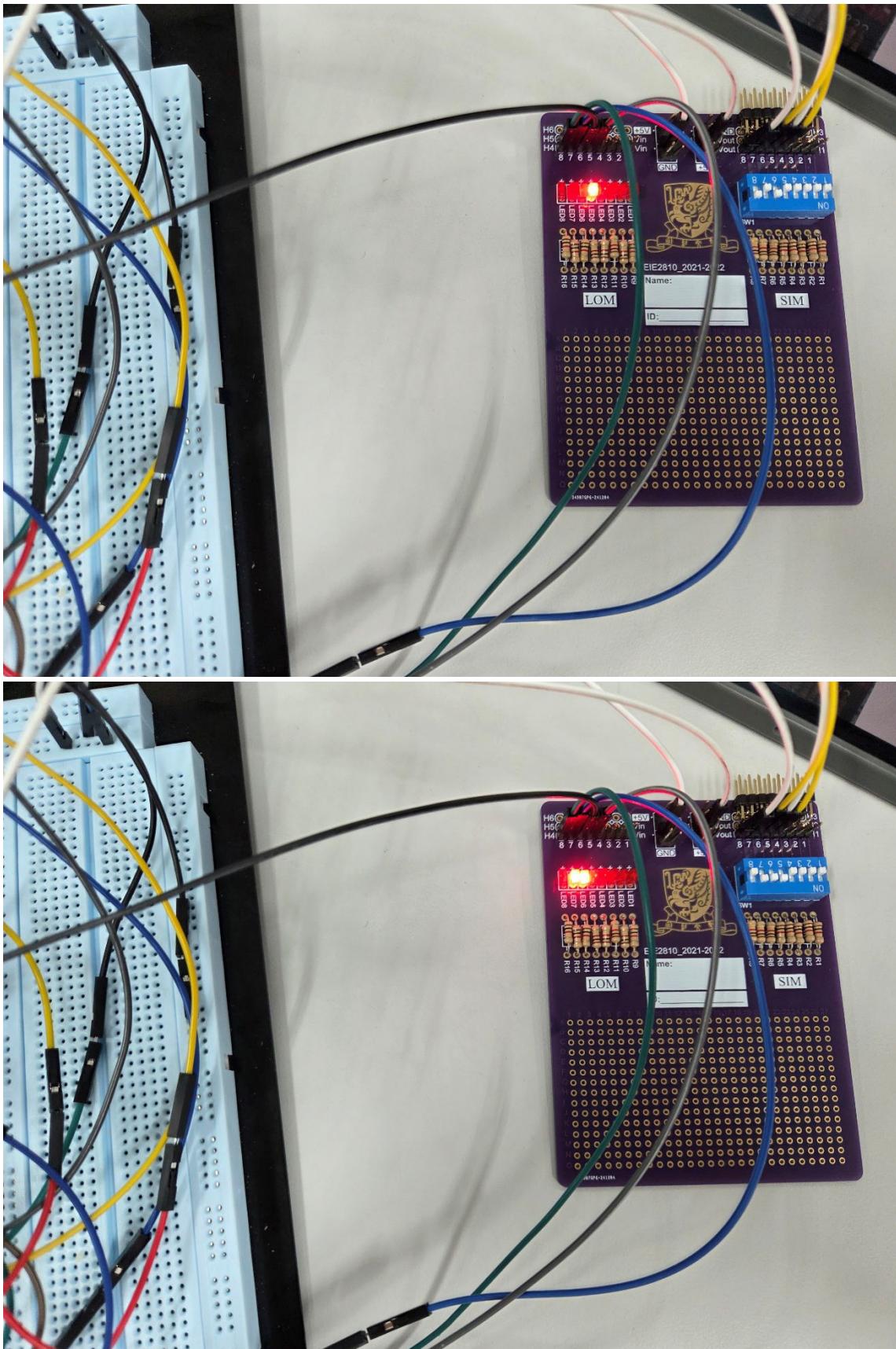


2.11Result









3 Experiment C

3.2 Result

