Faculty of Engineering & Technology
Department of Electrical & Computer Engineering
First Semester (2024/2025)

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Digital Systems (ENCS2340) Section: 2	Instructor: Mohammed Khalil SMW: 11 – 11:50
Quiz No.: (**2**) Covered Material: (Chapter **4**)	Date: December 11th, 2024 Pages/**Questions**: 2/**2**

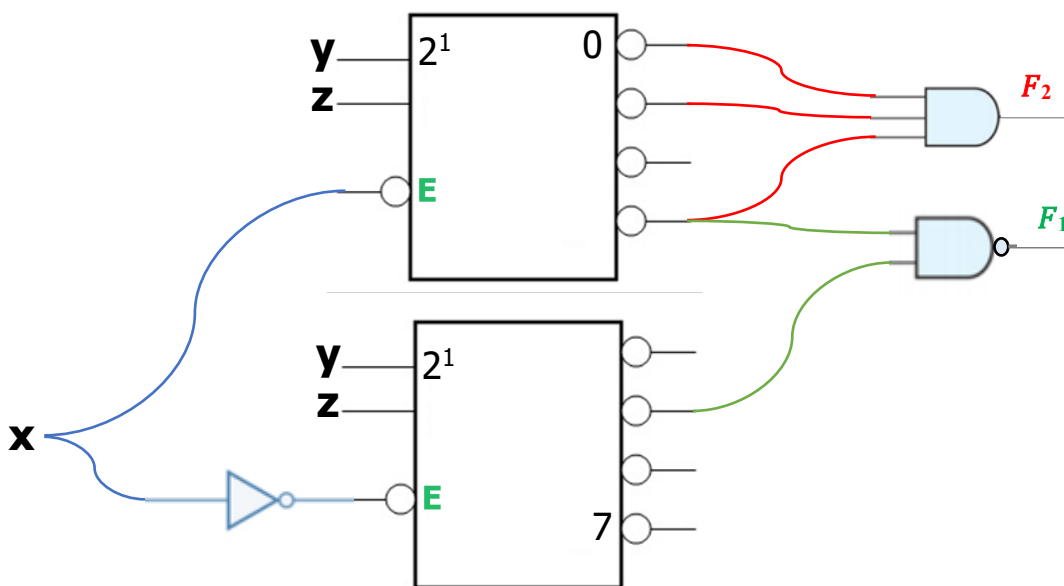| Student **Name**	Student **ID**	Grade (out of **15**)
ANSWER Key		

[Decoder] **Q1:** **Implement the following Boolean functions (Together):**　　　　　　　**{8 Mark}**
(With **minimum** number of **inputs** in the **external gates**)

$$F_1(x, y, z) = \sum m(3, 5) \qquad F_2(x, y, z) = \sum m(2, 4, 5, 6, 7)$$

*[Easy]*　　**A:** Using: **3x8 decoder** constructed with AND gates (Active **High**)　　　　{4 Mark}
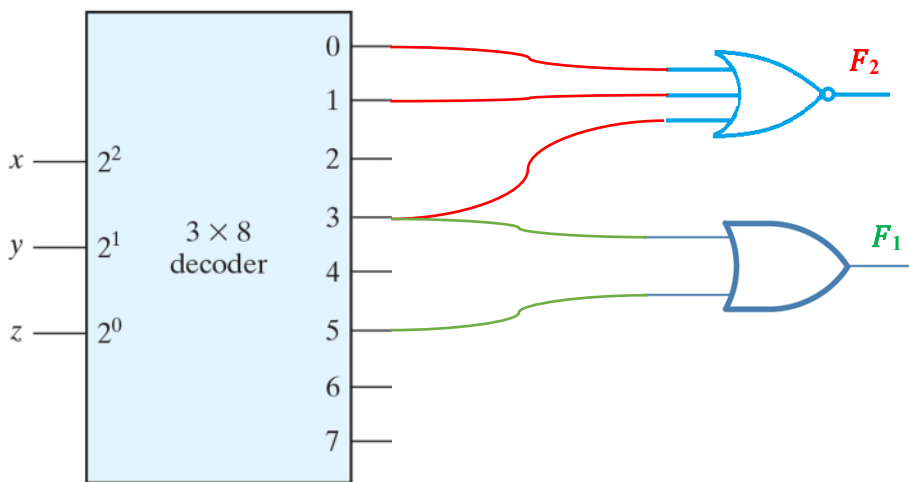
[Medium]　　**B:** Using: **2x4 decoders** constructed with NAND gates (Active **Low** with **Enable**)　　{4 Mark}

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[MUX]   **Q2: Implement the following Boolean function:**   **{7 Mark}**

$$G\,(A, B, C) = \sum (0, 1, 3, 4)$$

[Easy]   **A: Using: 4-to-1** <u>Multiplexer</u>   **{4 Mark}**
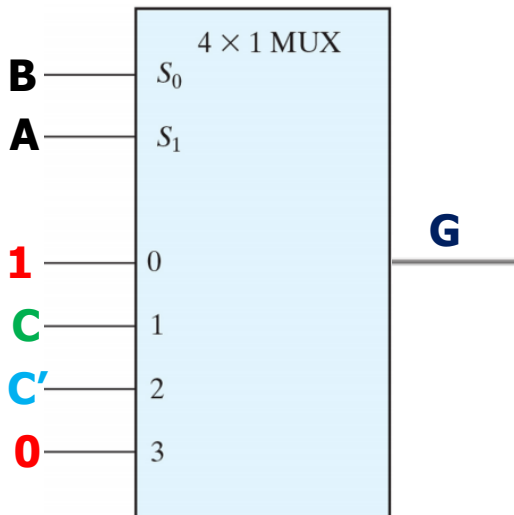
A	B	C	G
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	0

4 × 1 MUX

B — S_0
A — S_1

1 — 0
C — 1
C' — 2
0 — 3

G

[Tricky]   **B: Using: 1-to-4** <u>De-Multiplexer</u> with **<u>one</u>** external gate   **{3 Mark}**

Cannot be implemented as requested (G is neither 1, 0, nor any variable or its complement).