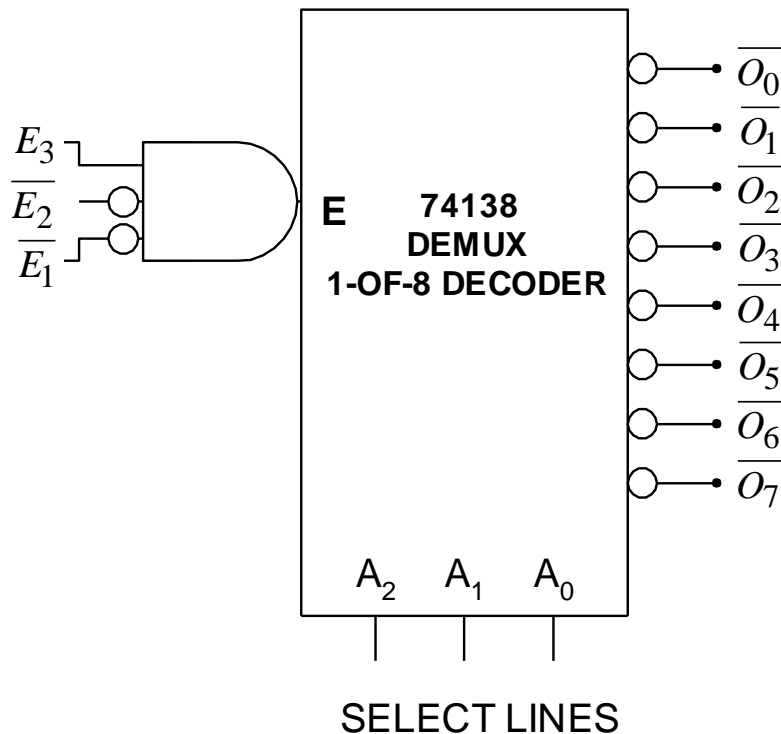


# **Lecture 17:**

# **DEMULTIPLEXER**

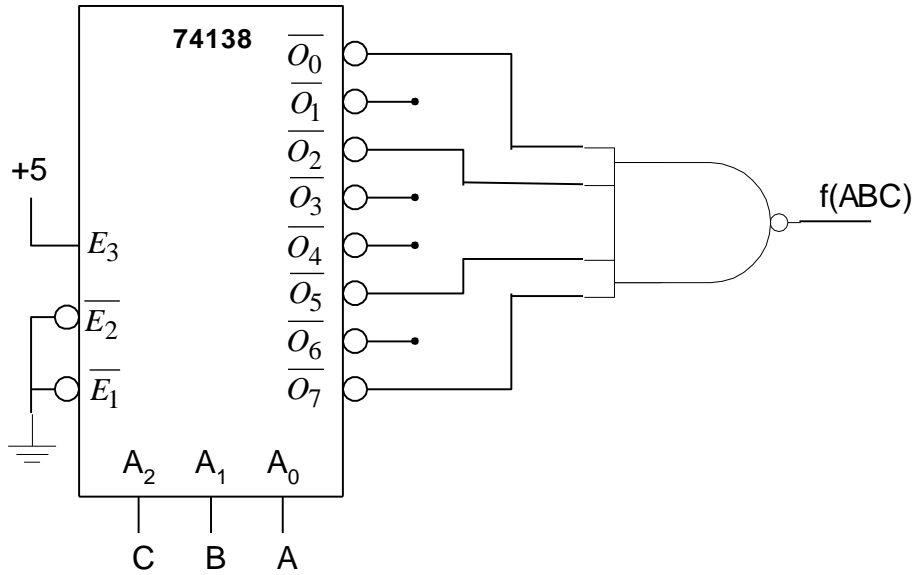
# DEMULTIPLEXER LOGIC DIAGRAM

- Logic circuit that depending on the status of its select inputs will funnel its data input to one of several data outputs.
- Separate enable inputs (useful for cascading decoders) into AND gate which must be high to enable the decoder outputs.



| $\overline{E_1}$ | $\overline{E_2}$ | $E_3$ | OUTPUTS                           |
|------------------|------------------|-------|-----------------------------------|
| 0                | 0                | 1     | RESPOND TO INPUT CODE $A_2A_1A_0$ |
| 1                | X                | X     | DISABLED -ALL HIGH                |
| X                | 1                | X     | DISABLED -ALL HIGH                |
| X                | X                | 0     | DISABLED -ALL HIGH                |

# LOGIC FUNCTION GENERATION



| C | B | A | f |
|---|---|---|---|
| 0 | 0 | 0 |   |
| 0 | 0 | 1 |   |
| 0 | 1 | 0 |   |
| 0 | 1 | 1 |   |
| 1 | 0 | 0 |   |
| 1 | 0 | 1 |   |
| 1 | 1 | 0 |   |
| 1 | 1 | 1 |   |

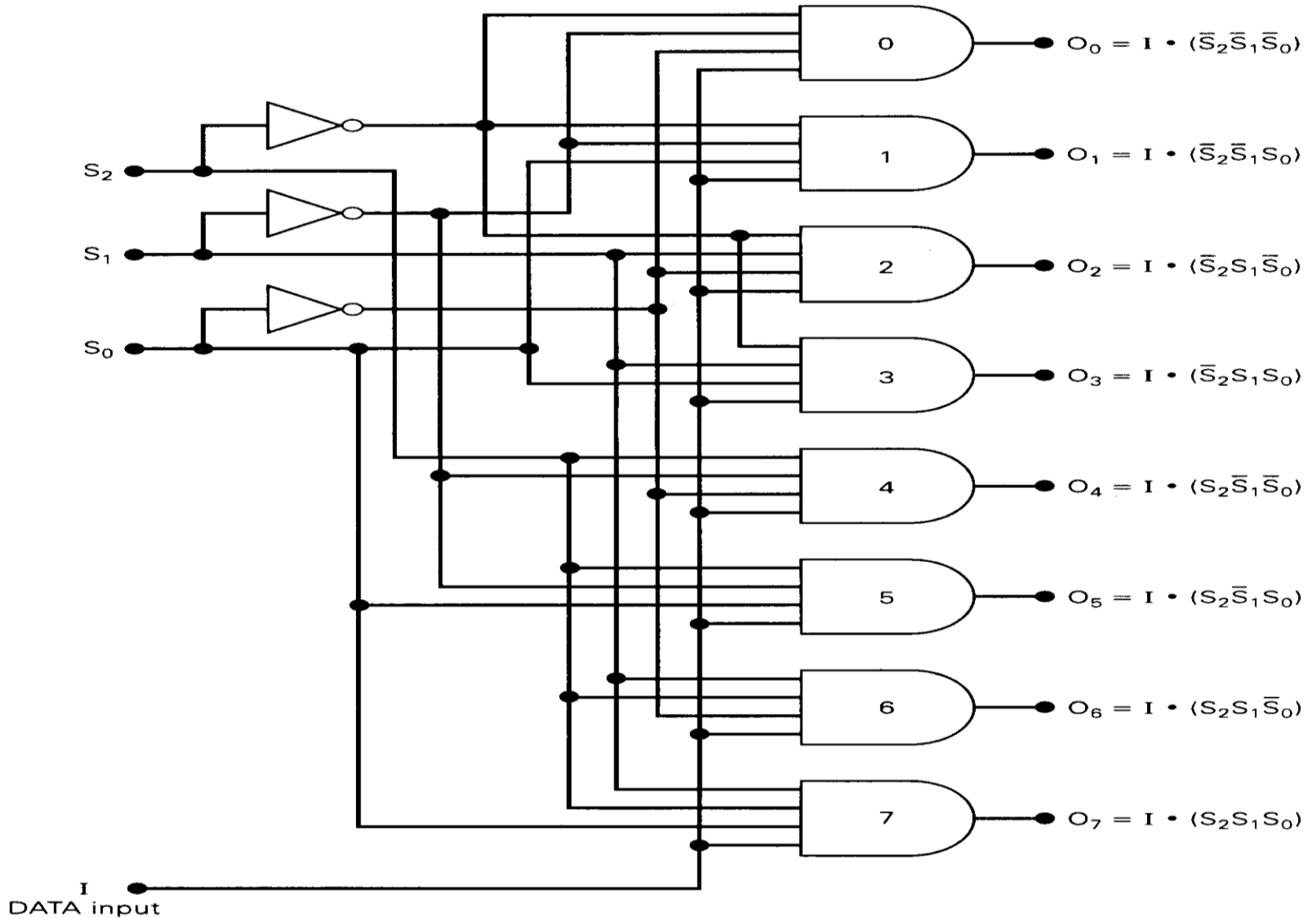
| A | B | X |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

**NAND- any low in gives a high out**

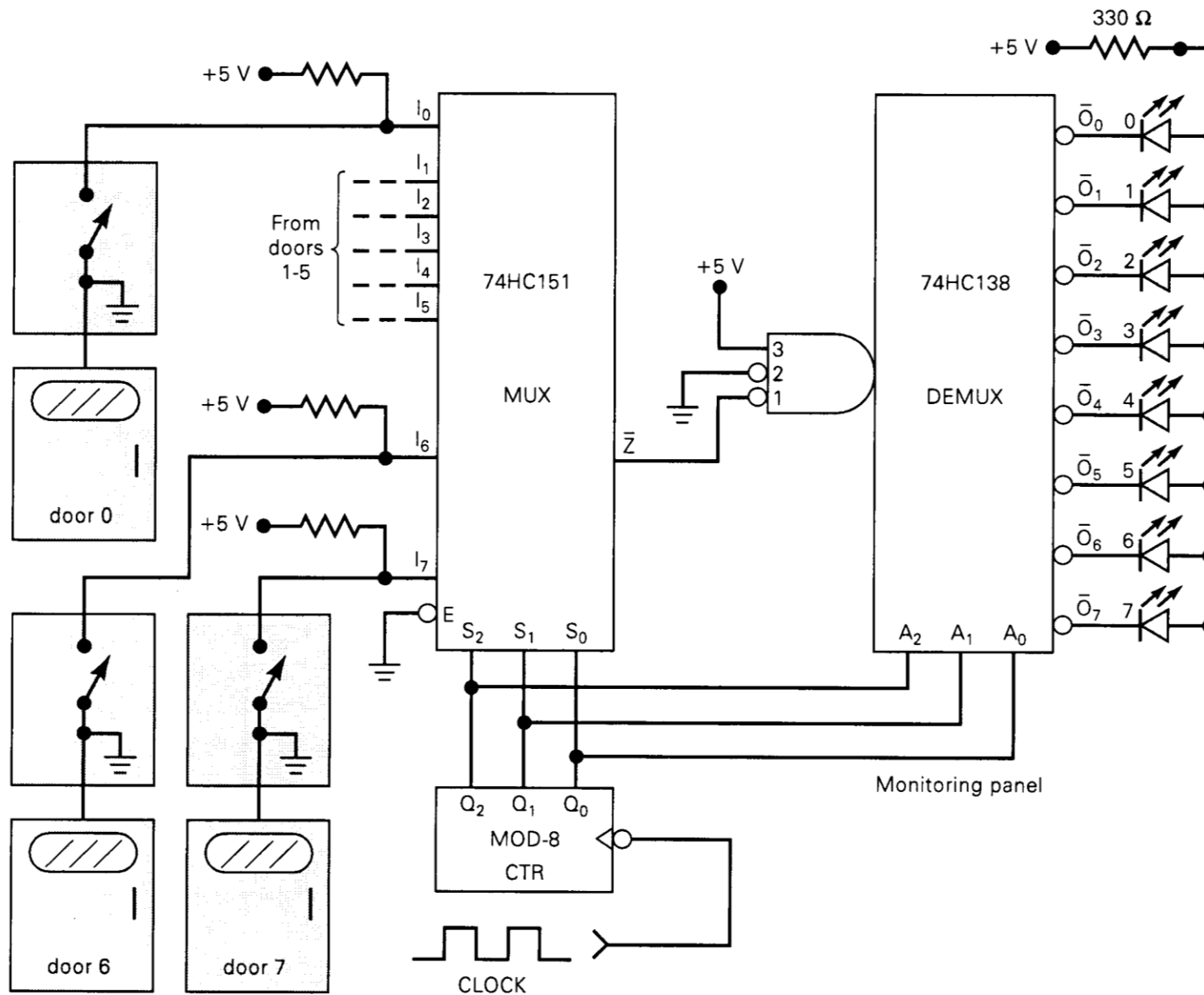
# DEMULTIPLEXER

| SELECT code |       |       | OUTPUTS |       |       |       |       |       |       |       |
|-------------|-------|-------|---------|-------|-------|-------|-------|-------|-------|-------|
| $S_2$       | $S_1$ | $S_0$ | $O_7$   | $O_6$ | $O_5$ | $O_4$ | $O_3$ | $O_2$ | $O_1$ | $O_0$ |
| 0           | 0     | 0     | 0       | 0     | 0     | 0     | 0     | 0     | 0     | 1     |
| 0           | 0     | 1     | 0       | 0     | 0     | 0     | 0     | 0     | 1     | 0     |
| 0           | 1     | 0     | 0       | 0     | 0     | 0     | 0     | 1     | 0     | 0     |
| 0           | 1     | 1     | 0       | 0     | 0     | 0     | 1     | 0     | 0     | 0     |
| 1           | 0     | 0     | 0       | 0     | 0     | 1     | 0     | 0     | 0     | 0     |
| 1           | 0     | 1     | 0       | 0     | 1     | 0     | 0     | 0     | 0     | 0     |
| 1           | 1     | 0     | 0       | 1     | 0     | 0     | 0     | 0     | 0     | 0     |
| 1           | 1     | 1     | 1       | 0     | 0     | 0     | 0     | 0     | 0     | 0     |

# DEMULTIPLEXER

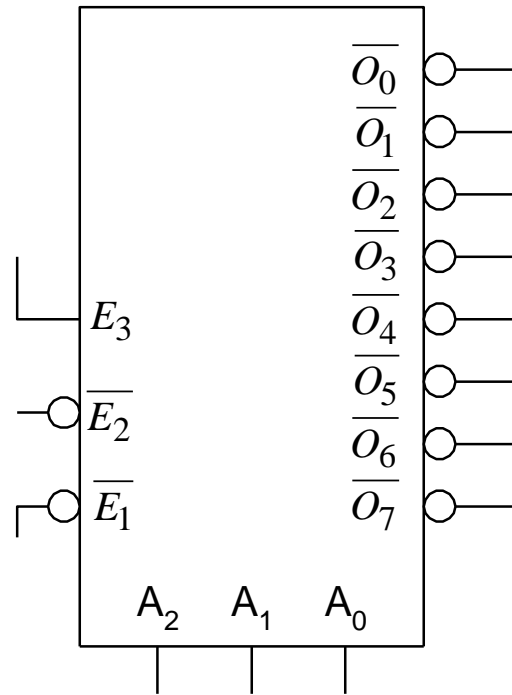


# PROJECT: A SECURITY MONITORING SYSTEM



# Assignment -17

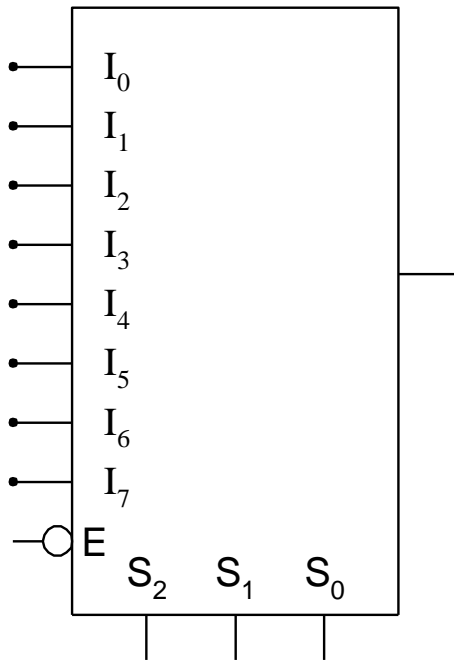
NAME THE CIRCUIT





**TEST**

**NAME THE CIRCUIT**

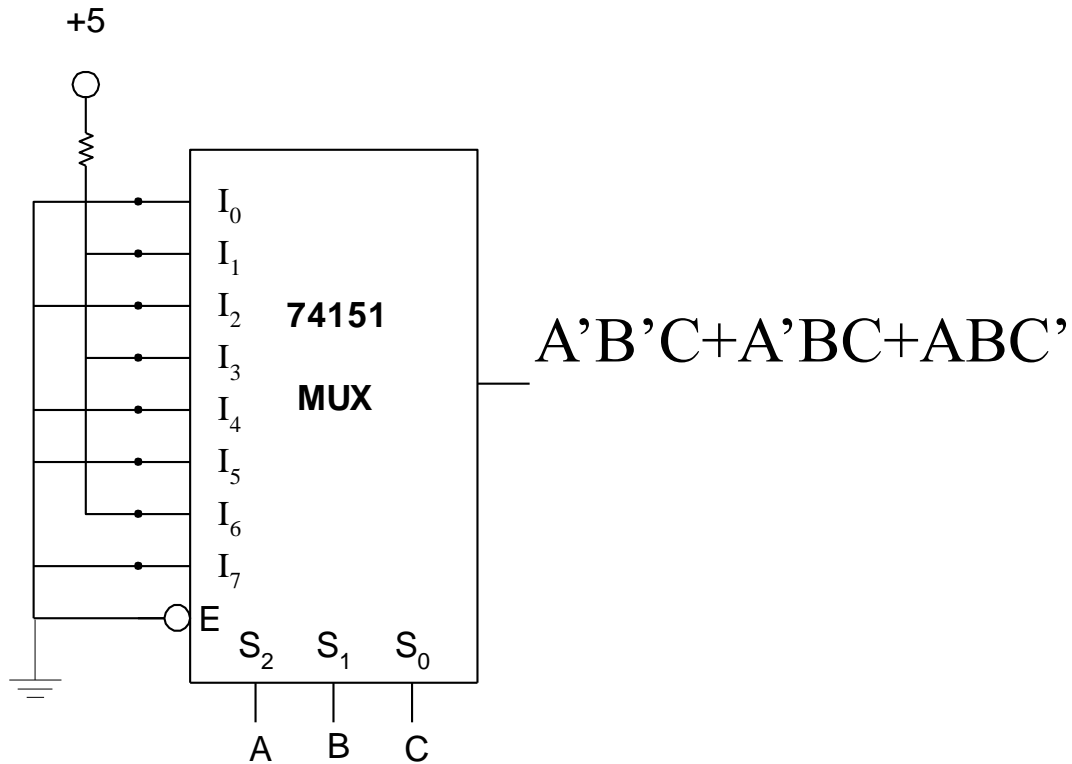






# TEST

STATE THE BOOLEAN EXPRESSION

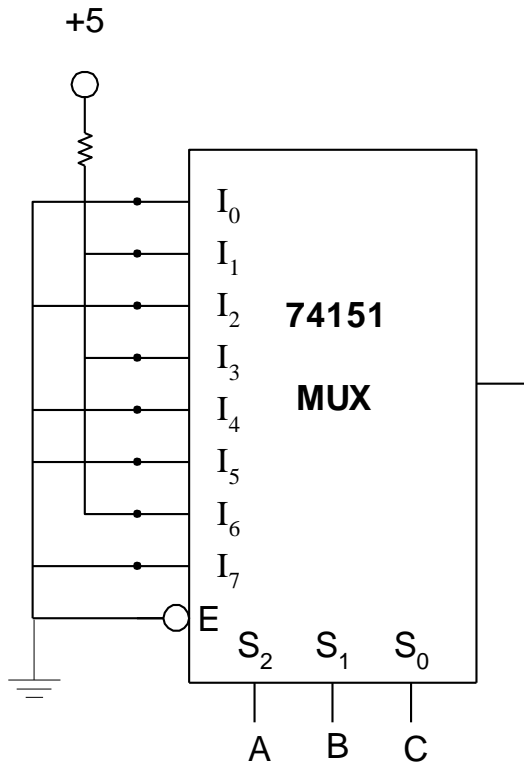


| A | B | C | F |
|---|---|---|---|
| 0 | 0 | 0 |   |
| 0 | 0 | 1 |   |
| 0 | 1 | 0 |   |
| 0 | 1 | 1 |   |
| 1 | 0 | 0 |   |
| 1 | 0 | 1 |   |
| 1 | 1 | 0 |   |
| 1 | 1 | 1 |   |



# TEST

**STATE THE BOOLEAN EXPRESSION**

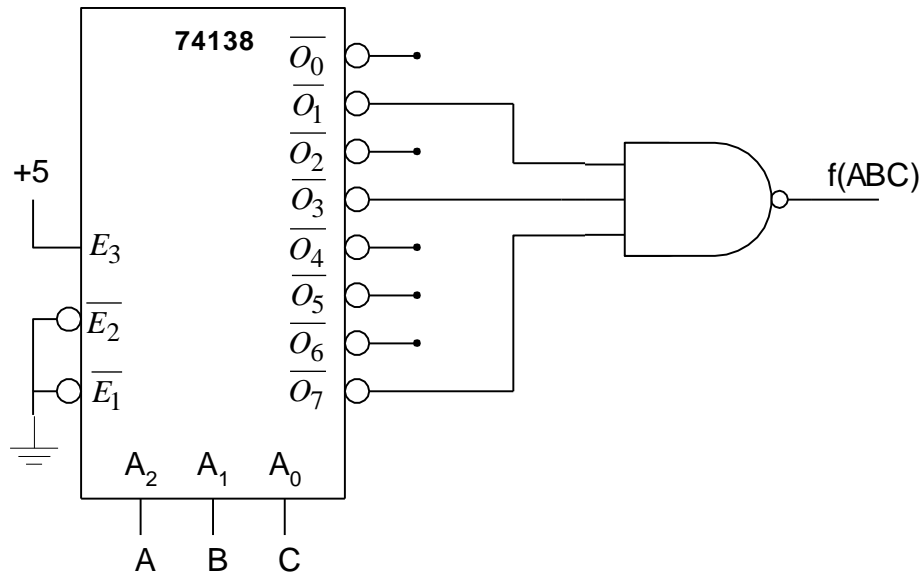


| A | B | C | F |
|---|---|---|---|
| 0 | 0 | 0 |   |
| 0 | 0 | 1 |   |
| 0 | 1 | 0 |   |
| 0 | 1 | 1 |   |
| 1 | 0 | 0 |   |
| 1 | 0 | 1 |   |
| 1 | 1 | 0 |   |
| 1 | 1 | 1 |   |



# TEST

STATE THE BOOLEAN EXPRESSION

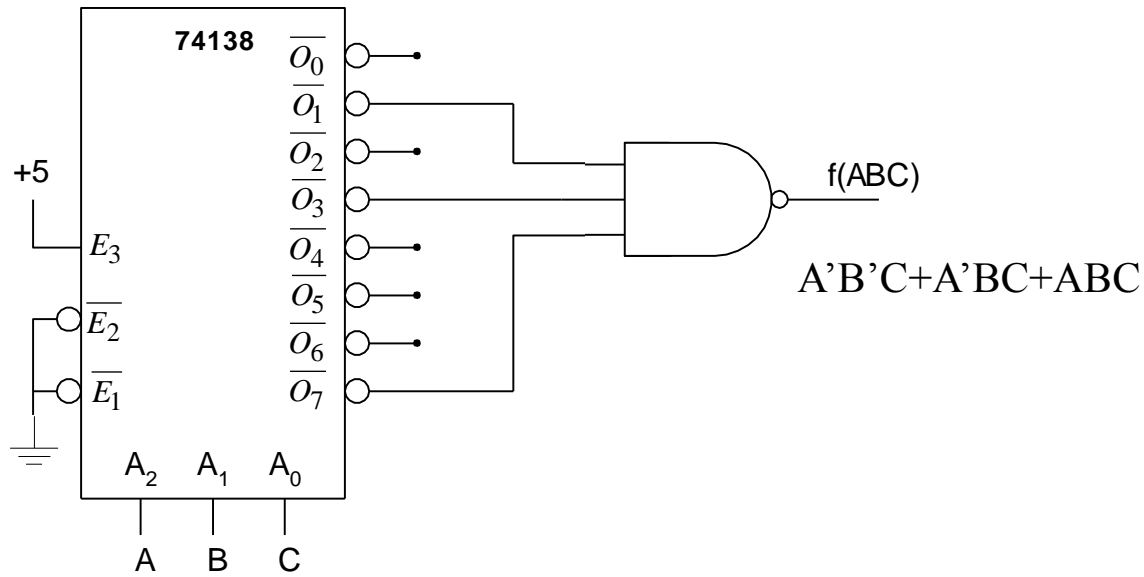


| A | B | C | F |
|---|---|---|---|
| 0 | 0 | 0 |   |
| 0 | 0 | 1 |   |
| 0 | 1 | 0 |   |
| 0 | 1 | 1 |   |
| 1 | 0 | 0 |   |
| 1 | 0 | 1 |   |
| 1 | 1 | 0 |   |
| 1 | 1 | 1 |   |



# TEST

## STATE THE BOOLEAN EXPRESSION



| A | B | C | F |
|---|---|---|---|
| 0 | 0 | 0 |   |
| 0 | 0 | 1 |   |
| 0 | 1 | 0 |   |
| 0 | 1 | 1 |   |
| 1 | 0 | 0 |   |
| 1 | 0 | 1 |   |
| 1 | 1 | 0 |   |
| 1 | 1 | 1 |   |