# Task 1
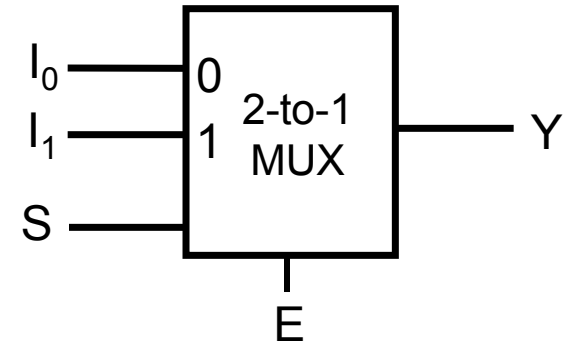
Design and validate
2-to-1 Multiplexer with enable.
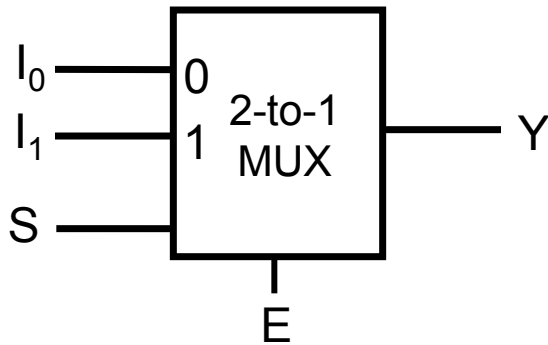


The design procedure:
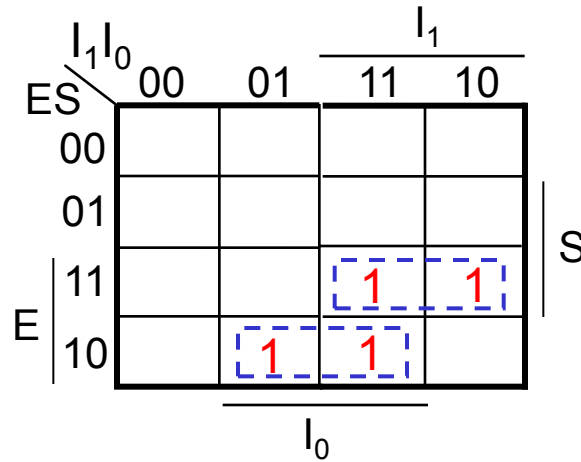
1) Determine the required number of inputs and outputs and assign variables to them.

2) Derive the truth table that defines the required relationship between inputs and outputs.

3) Obtain and simplify the Boolean function (K-maps, algebraic manipulation).

4) Draw the logic diagram.

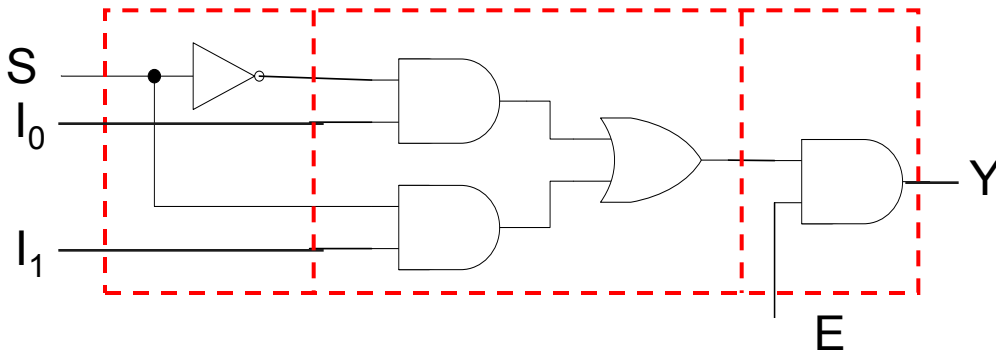5) Verify the correctness of the design.

# Solution

## Logic Symbol



## K-map



## T-table

| E | S | $I_1$ | $I_0$ | | Y |
|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | | 0 |
| 0 | 0 | 0 | 1 | | 0 |
| 0 | 0 | 1 | 0 | | 0 |
| 0 | 0 | 1 | 1 | | 0 |
| 0 | 1 | 0 | 0 | | 0 |
| 0 | 1 | 0 | 1 | | 0 |
| 0 | 1 | 1 | 0 | | 0 |
| 0 | 1 | 1 | 1 | | 0 |
| 1 | 0 | 0 | 0 | | 0 |
| 1 | 0 | 0 | 1 | | 1 |
| 1 | 0 | 1 | 0 | | 0 |
| 1 | 0 | 1 | 1 | | 1 |
| 1 | 1 | 0 | 0 | | 0 |
| 1 | 1 | 0 | 1 | | 0 |
| 1 | 1 | 1 | 0 | | 1 |
| 1 | 1 | 1 | 1 | | 1 |

Equation: $Y = ESI_1 + ES'I_0 = E(SI_1 + S'I_0)$
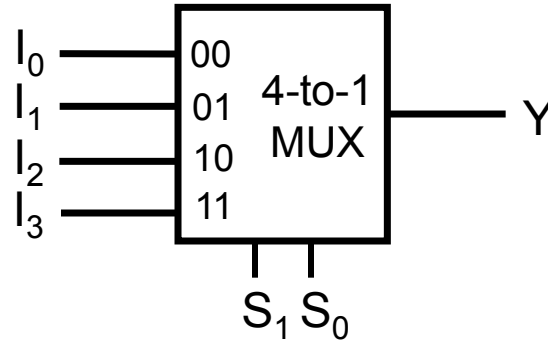
## Logic Circuits

# Task 2

Design and validate
4-to-1 Multiplexer.



Hint: Use two 2-to-1 Multiplexers