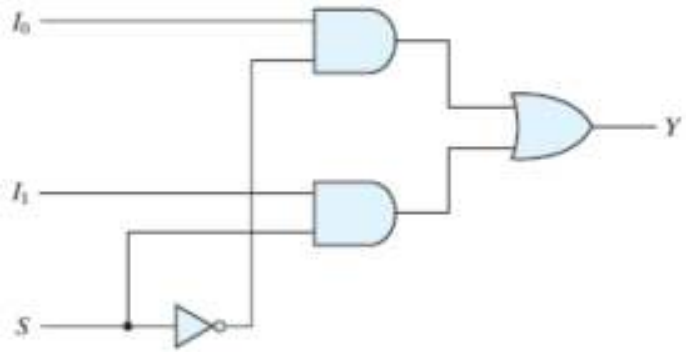
MULTIPLEXERS (MUXs)

A *multiplexer* or (*data selector*) is a combinational circuit that selects binary information from one of many input lines and directs it to a single output line. The selection of a particular input line is controlled by a set of selection lines. Normally, there are 2^n input lines and n selection lines whose bit combinations determine which input is selected.

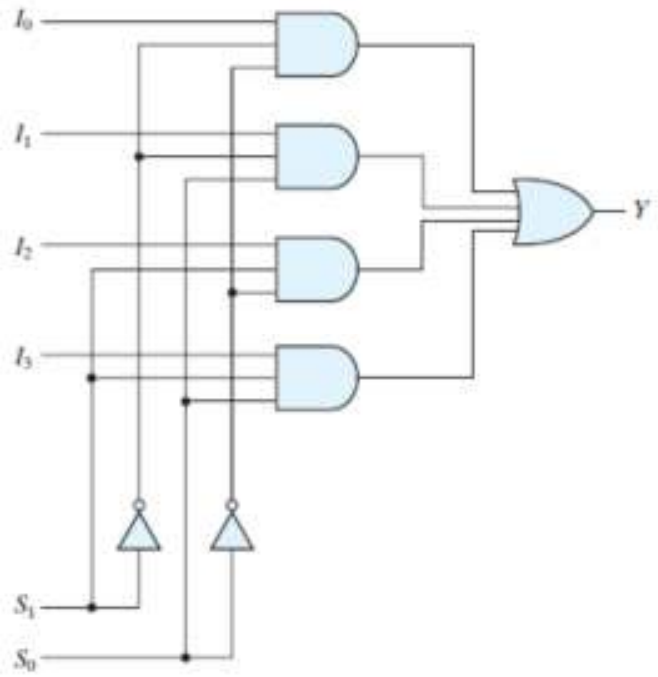
2-to-1line multiplexer:



– logic diagram –

- The circuit has two data input lines, one output line, and one selection line S.
- When S = 0, the upper AND gate is enabled and I_0 has a path to the output.
- When S = 1, the lower AND gate is enabled and I_1 has a path to the output.

4-to-1line multiplexer:



– logic diagram –

Boolean Function Implementation using Multiplexer:

Any Boolean function can be implemented with a multiplexer. A Boolean function of *n* input variables can be implemented with a 2^n*-to-1* multiplexer. The function should be expressed in sum-of-minters form.

Ex: Implement the function F(A, B, C) = ∑ (1, 3, 5, 6) using MUX.

Ex: Implement the function F(A, B, C) = ∑ (1, 3, 5, 6) with a 4-to-1 MUX.