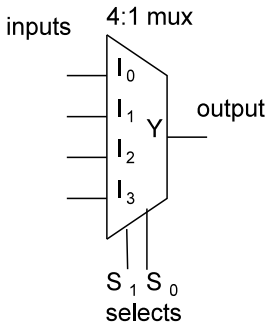
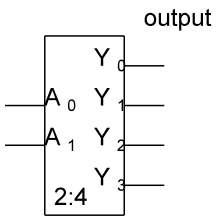
HW#6 ENGR-354

These problems focus on two components that are discussed in the first few sections of chapter 6 in the Brown text. The goal here is to become familiar with them.

The first part is the 4-to-1 multiplexer (4:1 mux for short). In class last week we showed logic for creating one. The second part is a 2-to-4 binary decoder (2:4 decoder). Symbols for these parts are:





2:4 binary decoder

1) Show how the function $Y = A\bar{B} + \bar{A}B$ can be implemented (i.e. draw a circuit) using only a 4:1 mux.

2) Show how a 2-bit binary decoder and some other gates (AND, OR, NAND, NOR, INV) can be used to create a 4-to-1 multiplexer.

3) Use one 2-bit, i.e. a 2:4, binary decoder and one two-input OR gate to create a circuit for this function: $Y = AB + \bar{A}\bar{B}$

4) Create a circuit using one 4:1 mux and one inverter to implement this function:

$Y = \bar{A}BC + AB\bar{C} + \bar{A}\bar{B}$

Note: If a constant logic zero is needed then place a ground symbol  on an input of a logic part or alternatively use a zero in quotes: “0".

If a constant logic one is needed then place the characters Vdd on the gate input. Alternatively use a one in quotes: “1"