A Ten Transistor Transparent Latch

The transparent latch designs used up to now require at least 18 transistors. In this problem, you will design and use a ten transistor implementation.

**Part A** Design a 2-to-1 multiplexer using only six transistors. Label the inputs \( IN_0, IN_1, \) and \( Select. \) Label the output \( OUT. \) If you use pass gates, you must hook up both control inputs.

**Part B** Now design a static transparent latch using only ten transistors. **Your design should never produce contention.** If you use the multiplexer from part A, redraw the circuit rather than using an icon. Label the signals \( In, Out, \) and \( Enable. \) (Hint #1: The minimum storage device is two cross-coupled inverters.) (Hint #2: How did the register use a 2 to 1 MUX?)

**Part C** Complete the timing diagram for circuit below based on the specified inputs. Assume all latch values are initially zero.