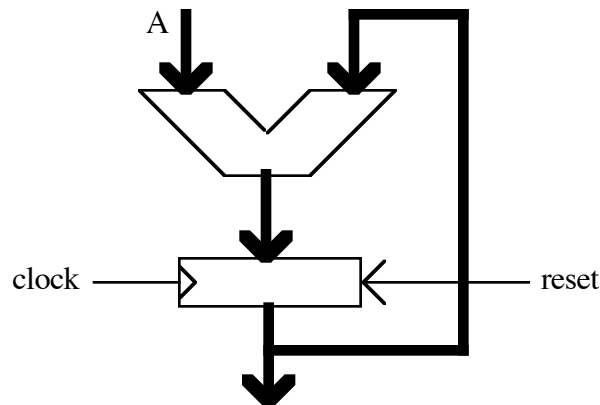


CSC258 Computer Organization Lab 2

- 1 A typical ALU can perform a variety of arithmetic and logical operations, but we will build one that only adds. Here is its picture.



To add two numbers, first clear the register so it contains zeros. Then apply one operand at input A. That causes the same operand to appear as input to the register. Now apply a clock pulse to the register so it will contain the first operand. Now apply the second operand to input A. That causes the sum to appear as input to the register. Now apply a clock pulse to the register so it will contain the sum.

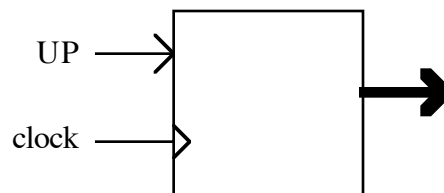
Build and test the circuit using a 4-bit full-adder chip 74LS283, and a 4-bit edge-triggered register 74LS175. Does the register need to be edge-triggered for this design, or would a level-sensitive register also work? Why?

- 2 Design a 2-bit counter that can count up or down. Counting up is the sequence

... 0 1 2 3 0 1 2 3 0 1 2 3 ...

Counting down is the sequence

... 3 2 1 0 3 2 1 0 3 2 1 0 ...



When the UP input is high, it counts up. When the UP input is low, it counts down. Counting (up or down) occurs at each clock pulse. You may use a register chip provided in the lab, but do not use the up-down counter provided in the lab; the idea is to design your own.