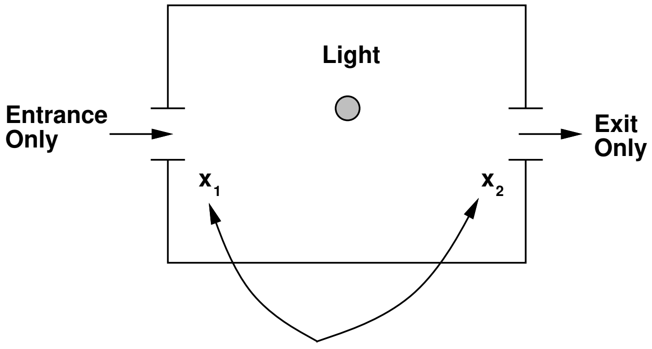
ECE352F: Computer Organization

Lab #3: Asynchronous Circuits

Fall 1998

Two industrious and energy conscious graduate students have hooked up the system shown in the figure below. Instead of light switches, the room has two photocells, one at each door. If either one or both students are in the office, the light is to be on. The students can enter or exit only as shown, with entrances and exits never occurring simultaneously. The photcells indicate a 1 when their beam is interrupted by a student entering or exiting and a 0 at all other times.



Assumptions:

- No one is thin enough that the signal generated by the photocell changes faster than the time that it takes for the control circuit to reach a stable state, i.e., your circuit can distinctly recognize the off to on and on to off transitions of the photocells.
- Once the photocell is triggered, the person is not allowed to back out.

Preparation

1. Find a primitive and a minimum-row reduced flow table that describes the light-control operation.
2. Show a valid assignment and find the excitation and output equations.
3. Prepare a VHDL program that will implement your program on the Xilinx board. Remember that you can use *xsload* to provide inputs to your program. You can use the display to simulate the light.

In the Lab

Implement and test your circuit.