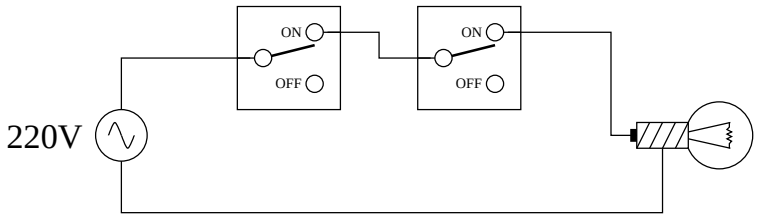
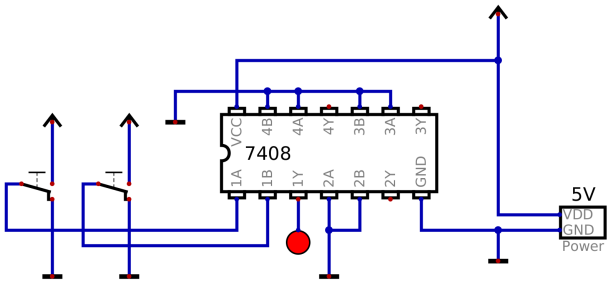
CS 303 Logic and Digital System Design Sessions : 27/02/2024
Laboratory Assignment #01 Preliminary Work due : 26/02/2024 23:59

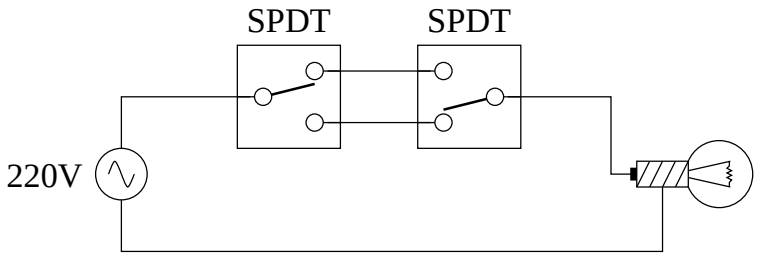
An electrician installing a light bulb controlled by two switches connects two switches in series, so that the light is turned on when both switches are in the ON position.



This is functionally equivalent to controlling an LED using two switches and an AND gate. The same functionality has been implemented in *Digital* using 1/4 of a 74LS08 quad AND gate as shown in the figure, where the LED illuminates only when all switches are ON (or, in the upward position):



The owner of the property finds this configuration very inconvenient, and wants is to be replaced by a multiway switch circuit (French: Montage va-et-vient, Turkish: vaviyen bağlantı) in which the state of light bulb is independently controllable from multiple locations, as at the two ends of a long hallway:



In a similar fasion, we would like to modify the AND circuit in *Digital* to achieve the digital implementation of a multiway switch circuit. To do so, replace the 74LS08 in the circuit (which is provided on SUcourse as a file named 74LS08.dig) with an appropriate member of the 74LS family. Once correctly designed, the LED should be controllable (i.e., can be switched ON or OFF) through any of the switches, regardless of the state of the other switch.

As your preliminary work, submit your modified circuit as a .dig file.

In-lab Session:

Be ready at your venue for CS303L, and bring along your laptop computer with *Digital* installed. You will be asked to make modifications on the circuit you have designed.

Note: This assignment to be done individually.

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