Experiment NO.6

Sequential Logic Circuit using Breadboard and IC's

Pre Lab

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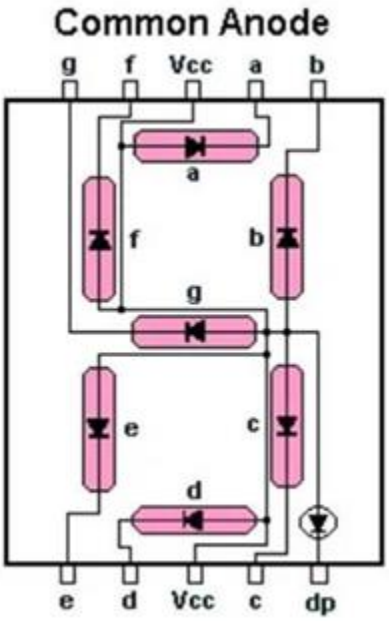
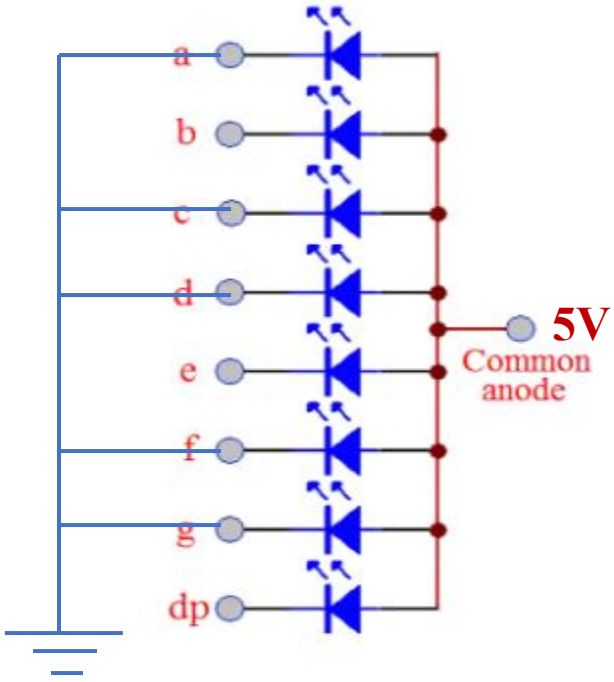
1) What is the appropriate display type (common anode/common cathode) that must be used with 7447 display decoders? Explain your answer.
The appropriate display that must be used with 7447 display decoders is the common anode display, because it's a display that works on active low. So, all the outputs of the common anode display (LEDs) – a,b,c,d,e,f, or g will turn on when its connected to the low voltage (0) e.g. with the ground that giving 0 voltage.
In the common anode display all the outputs a,b,c,d,e,f or g are connected to the VCC (+5 volte) and to turn on these LED segments, the input logic must be set to LOW (ground).
The 7447 display decoder is decoder that work with active low logic, so the outputs will be in active low, because of that we choose the common anode display. So, both of 7447 display decoder and common anode display work with active low logic.





So, in the figure above the number 5 will be displayed, because all LEDs are connected to 5V (common anode) and LEDs a,c,d,f and g are connected to the ground (low voltage) so that allows the current to flow through these LEDs (a,c,d,f and g) then they will turn on.

2) Assuming that the turn-on voltage for the LEDs is 1.7v, what is the proper value of the resistors to be connected between the 7447 decoder and the seven-segment display, to limit the current in the LED segments to 10mA?

$V = I\,R$

$V_{out} - V_{needed} = IR$

$5 - 1.7 = 10 \times 10^{-3}\,R$

$R = \frac{3.3}{10 \times 10^{-3}} = 330\ \Omega$

3) Assume that the resistors provided in the lab are 220Ω. What would the current flowing into the LEDs be?

$V = I\,R$

$3.3 = I\,(220)$

$I = \frac{3.3}{220}$

$= 0.015$ A

$= 15$ mA

4) Design a decade counter circuit using the 7490 counters, the 7447 decoder and a seven segment display. Show the pin numbers on the ICs in your design.