Experiment NO.6

Sequential Logic Circuit using Breadboard and IC's

Post Lab

Name : Mohammed Jamil Saada

ID : 1221972

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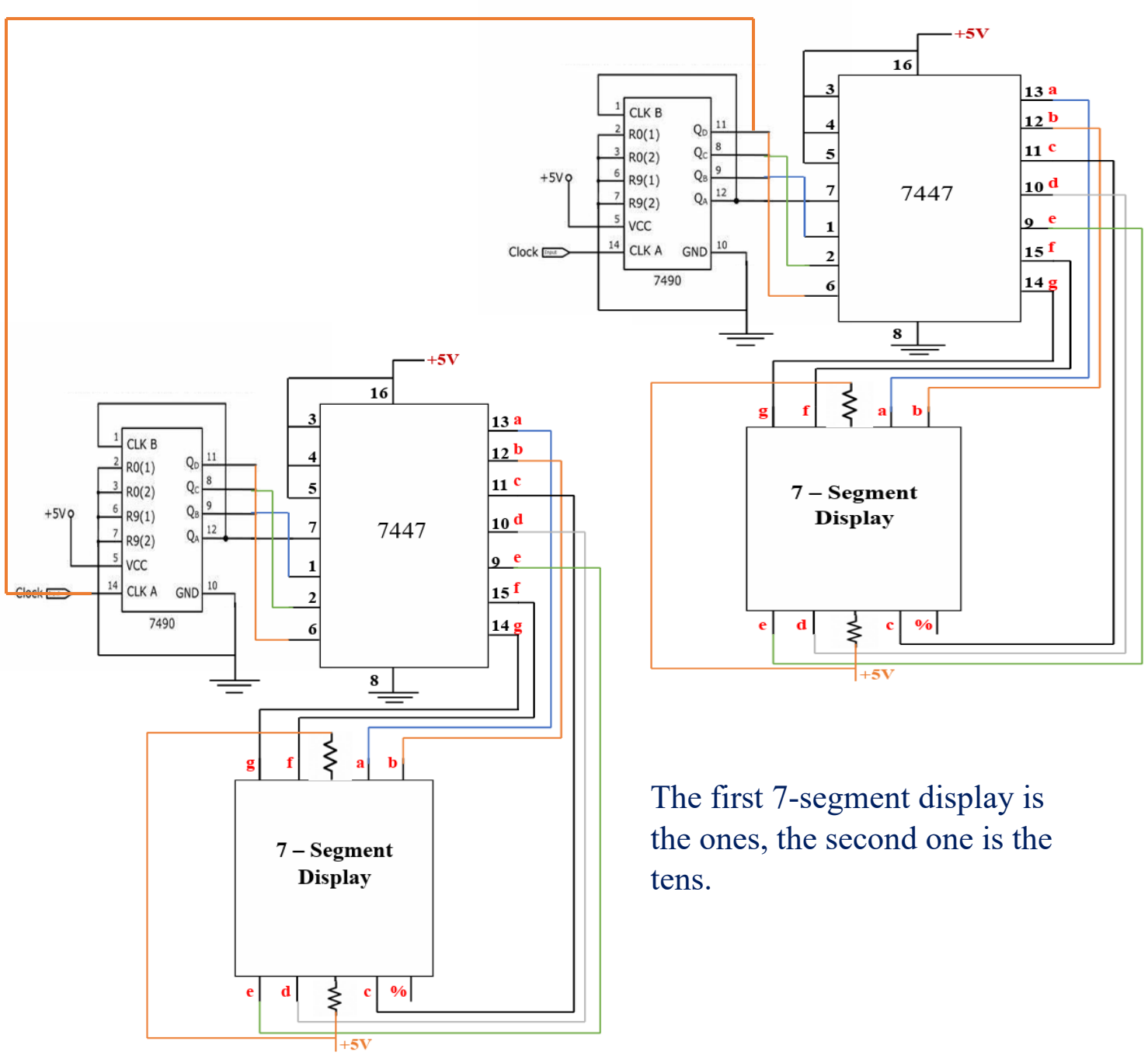
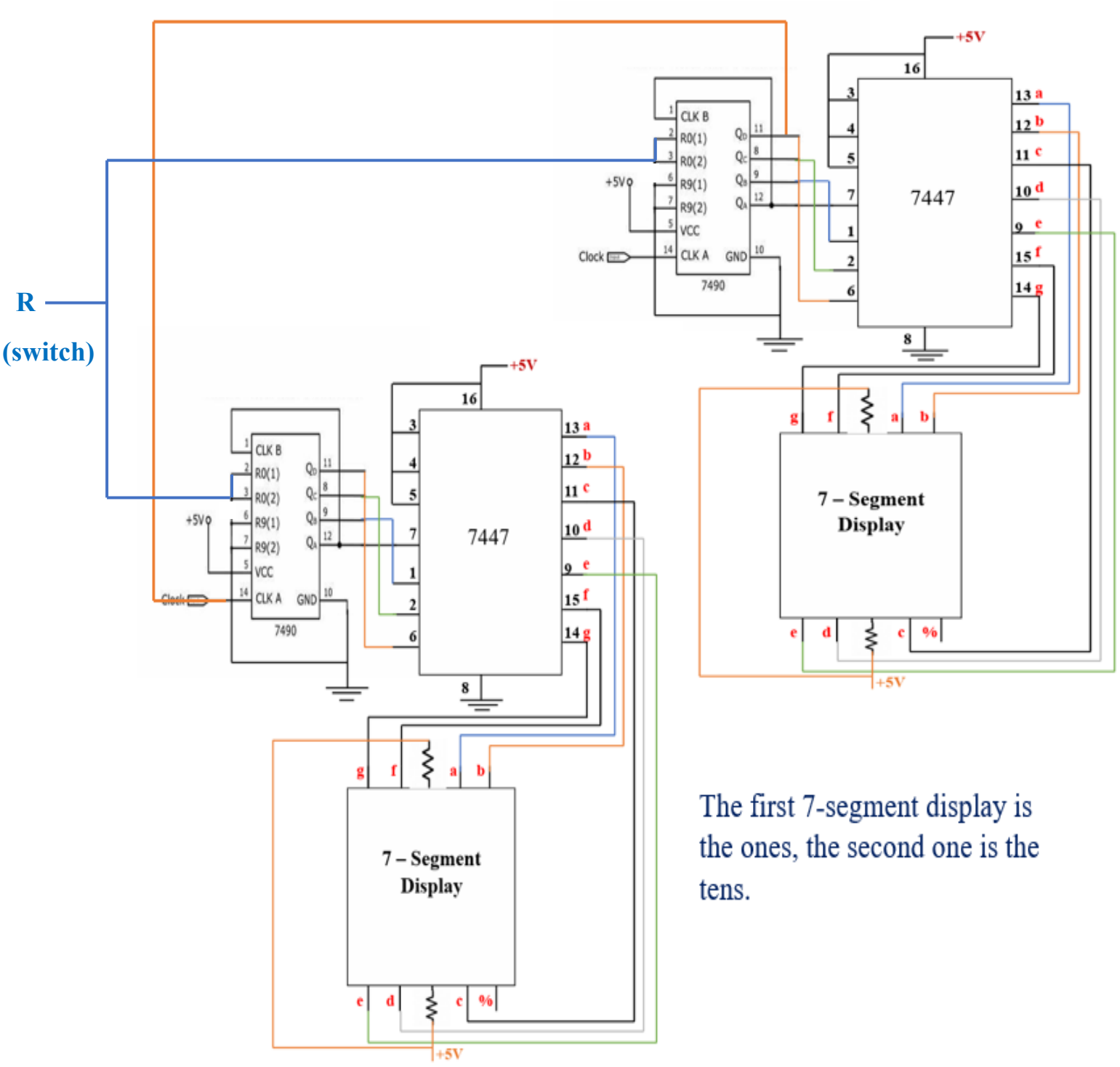
1) Design a two-decade counter that counts from 00 to 99.



The first 7-segment display is the ones, the second one is the tens.

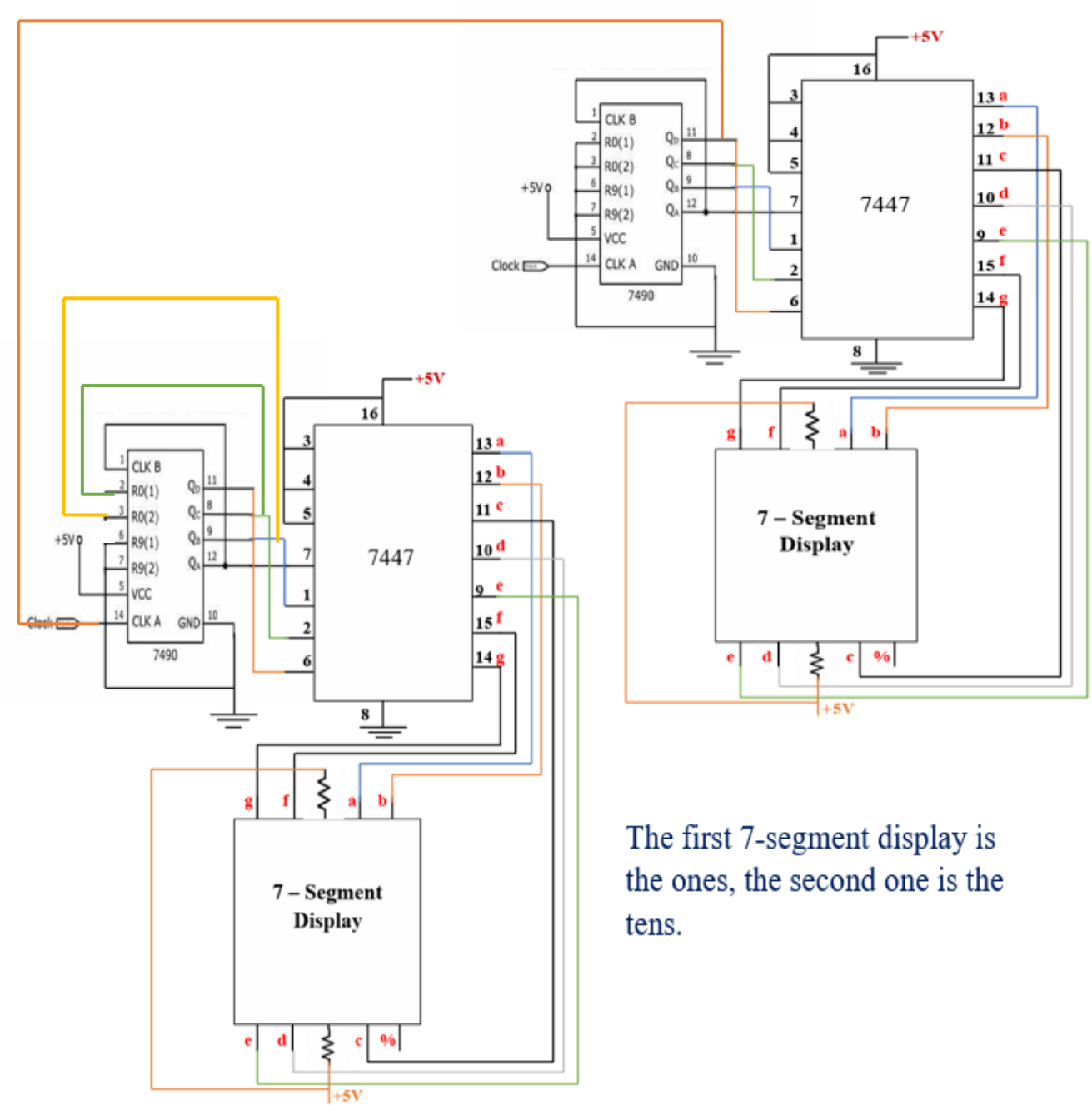
2) Add additional input to your design that can be used to reset the counter.



R input : is a switch that work to reset the counter as following :

a) If the switch R is zero, then the counter work normally. Because R0(1) and R0(2) {pin 2 and 3} are connected to NAND gate and the output of this gate reset the counter if it is zero voltage (work as active low).
b) If the switch R is one, then the counter reset and goes back to 00, since the output of the NAND gate is zero voltage.

3) Modify the counter to count to 59 (without Reset).



The first 7-segment display is the ones, the second one is the tens.

To Modify the counter to count from 00 to 59 then return to 00, the 7-segment that show the tens don't reach 6 (0110). So, we connected pin 8 and 9 ($Q_C Q_B$) to the pin 2 and 3 {R0(1) and R0(2)}, since R0(1) and R0(2) connected with NAND gate then, when the tens display reach 0110 the input of NAND gate is 1,1 and the output of the gate is 0, and the reset work in active low so its return to 0.