

Std.no:: 1210084

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lab5 postlab

lab 6 prelab

## postlab 5

1) Although latches are useful for storing binary information, they are rarely used in sequential circuit design, why?

Latches are not often used in sequential circuit design because they are not inherently clocked, and cannot be used to synchronize data flow between different parts of a circuit. Additionally, latches can suffer from issues such as race conditions, which can cause the circuit to malfunction. Instead, flip-flops are typically used in sequential circuit design as they are clocked, allowing for precise timing and synchronization between different parts of a circuit.

2) What is the disadvantage of the RS flip flop.

The main disadvantage of the RS flip flop is that it has no memory of its past state, meaning it must be reset in order to return the output to its original state. This makes it more difficult to use in certain applications. Additionally, the RS flip flop is sensitive to noise, leading to potential errors in the output.

3) What is the difference between “synchronous” and “ripple” counters?

Synchronous counters are digital counters that count in a predetermined sequence based on clock pulses. Ripple counters, on the other hand, are asynchronous counters that count at a rate determined by the frequency of the input signal. Ripple counters operate one bit at a time, while synchronous counters operate multiple bits in parallel. Additionally, synchronous counters are more stable and reliable than ripple counters.

## Prelab 6

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 type that must be used with 7447 display decoders is a common cathode display. This is because the 7447 display decoder is designed to provide active-low outputs. This means that the output will be low (or at ground) when the corresponding digit should be displayed. A common cathode display will light up when the input is at a low voltage, which is needed to make the 7447 display decoder work properly.

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?

The proper value of the resistor is 170Ω.

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

The current flowing into the LEDs would be approximately 0.945 Amps ( $I = V/R$ , where  $V = 3$  Volts and  $R = 220$  Ohms).

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.

7490 (PIN NUMBERS):

1-A, 2-B, 3-CarryIn, 4-CarryOut, 5-Reset, 6-D, 7-Clock, 8-VCC, 9-GND

7447 (PIN NUMBERS):

1-GND, 2-A, 3-B, 4-C, 5-D, 6-L, 7-DP, 8-VCC

SEVEN SEGMENT DISPLAY:

A-G, DP

7490 (COUNTER 1):

Pin 1-A connected to Pin 2-B

Pin 3-CarryIn connected to Pin 4-CarryOut

Pin 5-Reset connected to ground

Pin 6-D connected to Pin 7-Clock

Pin 8-VCC connected to +5V

Pin 9-GND connected to ground

7490 (COUNTER 2):

Pin 1-A connected to Pin 2-B

Pin 3-CarryIn connected to Pin 4-CarryOut of Counter 1

Pin 5-Reset connected to ground

Pin 6-D connected to Pin 7-Clock

Pin 8-V

UNTITLED - Proteus 8 Demonstration - Schematic Capture

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DEVICES  
7SEG-COM-ANOD  
16SEG-MPX8-CA-F  
7447  
7490  
BATTERY  
SWITCH

2 Message(s) ANIMATING: 00:00:14.700000 (CPU load 1%) x: -3600.0 y: -1700.0