

## Problem Set #12

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1. (16 points) A simple state machine must assert three outputs (R, G, B) in sequence for 333ms each. An input signal called "Start" is driven by a pushbutton. Sketch a state machine that can output the required sequence of signals (R, G, and B) once each time the button is pressed. You have a 3Hz clock and a 1KHz clock to work with. The push button can bounce for up to 2ms on any transition. (*Hint: You can use two state machines*).

2. (8 points) A state machine receives an input  $X$  that is synchronous with the system clock. If  $X$  is a 1, then the machine must output a signal RED for one clock cycle. Then, if  $X$  is still asserted, the machine must output a signal GRN for one clock cycle, but if  $X$  is not asserted, the machine must assert an output called BLU. The state diagram below meets these requirements. Can you sketch a machine that can meet these same requirements, but that uses just one flip-flop?



