EECS3216

Lab 4

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**Problem Statement**

Write a Systemverilog code to do the following:

* Push button 0 rests the system and displays 00
* SW0 increases the time by 5 seconds
* SW1 increases the time by 10 seconds
* SW2 increases the time by 20 seconds
* SW4 is normally in the 0 position, move it to 1 start countdown
* The time decreases every second and the updated time is displayed on the displays.
* The time is displayed as decimal
* Countdown stops at 00
* Maximum time is 99 seconds, any deposit after that saturates at 99 seconds.
* Advanced part 1: when the time is less than 10 seconds, the display blinks (0.5 sec on

and 0.5 sec off)

* Advanced part 2. You do advanced part 1, and the countdown starts with the first

deposit, and you can deposit in the middle of the countdown (no need for SW4).

**The Demonstration**

[**https://youtu.be/pIMUoCQyy9I**](https://youtu.be/pIMUoCQyy9I)

**Design**

My code works as follows:

It is based on the Mealy Finite State Machine.

We have 5 States: RST, C5, C10, C10 and Timer.



It initially checks for the state we are in depending on the switches that are in the 1 position.

Graphical user interface, text

Description automatically generated

If SW4 is active, the state is Timer, if no SW are active, the state if reset. Otherwise the state is relegated to NextState following the below depending on our current State and our inputs.

Graphical user interface

Description automatically generated with low confidence

The time we get is decided by the state (e.g. C5) we are in and if the enable is equal to 1 (e.g C5Enable)

Text

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Here we see the logic for SW0 (C5) and SW1 (C10). The ignore and IgnoreTimer variables are part of a debouncer used to account for the signal. For C5, if the enable is 1 and state is C5, we will check what the current time is to see if our time will be saturated at 99 and then either add 5 to the time or set it to 99. Afterwards we will set the enable (C5Enable) variable to 0 to prevent further time change. It is the same for SW1 and SW2.

To reenable the enable variable, we will have to flip the switches such that our State is in RST.

Text

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We will also set time to 0 when our Reset button is pushed.

To keep track of time, we use the variable count to sync with the DE-10 Lite Clock.



Whenever our time count reaches a certain value, and State is in Timer, our time will decrement by 1 and will be displayed on the 7-Segment display

Chart, table

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Diagram

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