

ENEL 384 Project Report

By: Muhammad Zaman

SID: 200449177

I chose the number of days in a month. First when making it, I had to figure out how it would work. I thought to myself, it needs to increment in a cycle, because that is generally how it would work in real life as well. A year is a cycle, except every year is a different year, but each year has the same months, unless it's a leap year, which then February would be 29 days instead of 28. I also knew from my previous labs that the seven segment display has to refresh when incrementing, meaning I would have to do this for the basys3, except this time it's for 4 of them. I also learned that the display is all working as one unit as opposed to 4 different LEDs, meaning that each LED would turn off the others when refreshing very quickly in order to increment. Ex. LED 1 wants to increment, so it turns off LED 2, 3, 4, then increments, and quickly turns them back on, and all of that happens for the other 3 LEDs as well. Once I got the incrementing and refresh working, I had to get the actual numbers to display, so in order to do that I had to disable one of the LEDs from incrementing because then it would throw off what you're seeing.

My process started off by firstly displaying the hexadecimal numbers 1-F because then we would have access to display all of the available numbers that are relevant. Next was the refresh counter, which would have to be in sync with the increment counter because if they're not, then it would not display the correct thing at the correct time, I give both of them a 26 bit number, because the number is long enough so that by the time it processes the number, it simulates a delay enough to keep it in sync. Then as stated above, I implemented the LEDs which would be on and off, in this case I chose the LED 1, 3, and 4 to be on simple because 1, would display current month, 3, and 4 would display the days in the month. After that I made a month increment, which would increment the months, which would lead to it reading the `displayed_number` which would feed it 12 bits, the first 4 being the month, and the final 8 bits being the days. I did this because I essentially disabled LED 2 from receiving any information other than to just be 0. After that I implemented the function where it would feed the LEDs the 12 bits, and as a special feature, every month it increments, the switch LEDs will increase by in a pattern going left to right every single time, whilst also flashing all the switch LEDs on my birthday month, being October.