SANTA CLARA UNIVERSITY
Electrical and Computer Engineering Department
DYLAN THORNBURG

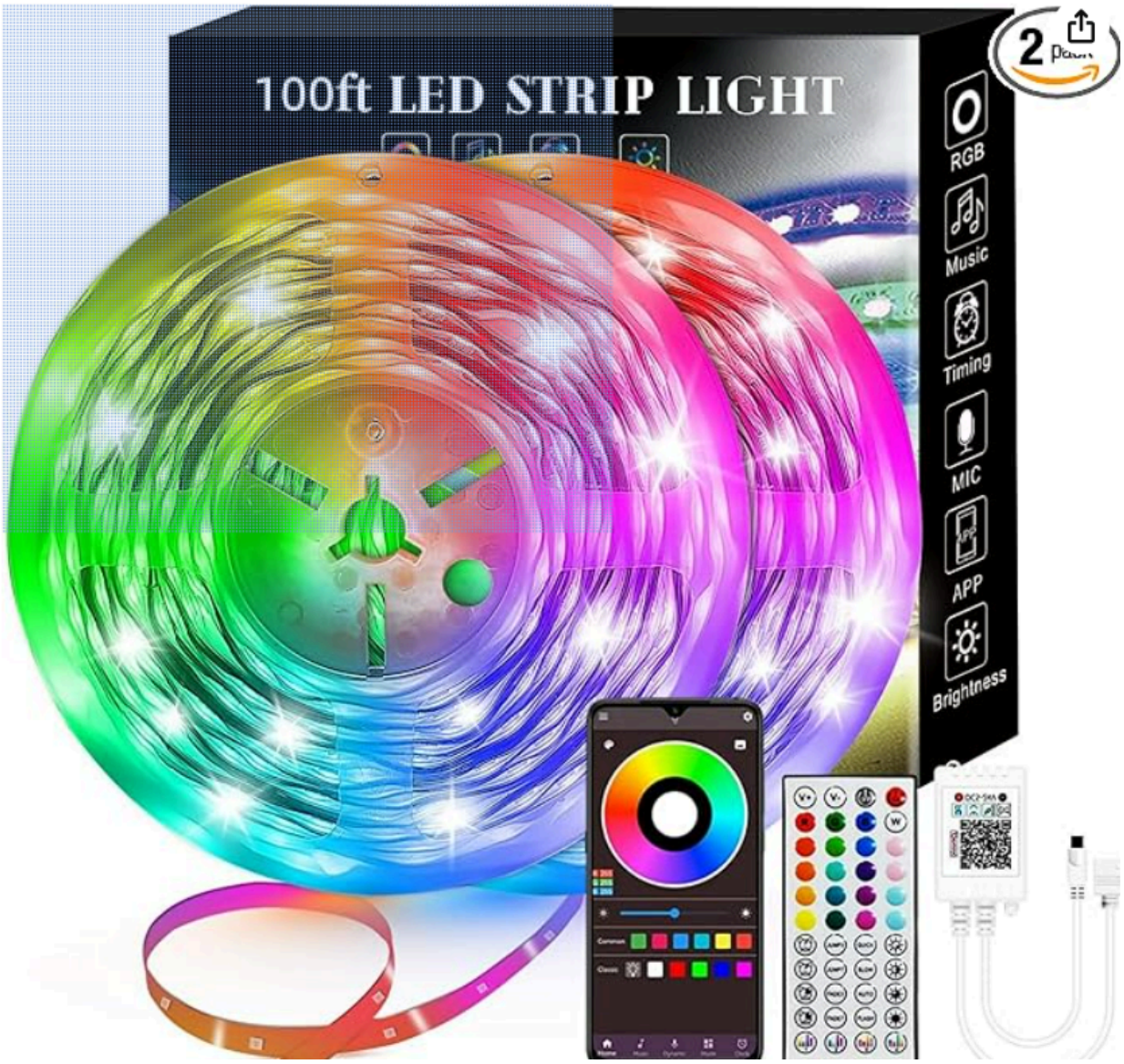
Real-Time Embedded Systems - ECEN 121
Assignment - Week 9 (20 points)

Andrew Wolfe

Answer the following questions.

1. Think of an interesting and useful device you could build with an STM32L476VGT6 Discovery board. Describe what the device is and generally how it works.

I could build a remote controlled LED strip similar to this:
https://www.amazon.com/Controller-Bedroom-Christmas-decration-Multi-Colored/dp/B0BQLZ55R4/ref=asc_df_B0BQLZ55R4/?tag=hyprod-20&linkCode=df0&hvadid=693128046677&hvpos=&hvnetw=g&hvrand=17544627084535289378&hvpone=&hvptwo=&hvqmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=9032151&hvtargid=pla-1934551152899&mcid=08dfff0c88f936b88ef4f047bdbe272b&gad_source=1&th=1



The device would change LED colors and patterns based on remote control input.

2. Identify the peripherals, both on chip and off chip, that you would use in order to implement this device.

I would need the LED Strip itself, the LED strip controller (SK9822), the remote control, the IR receiver (TSOP38238), the stmicro chip itself, and the step up chip (74HCT244).

3. Identify the output pins on the STM32L476VGT6 that each of these peripherals would need. Confirm that it is possible to configure the chip to use these peripherals without a pinout conflict.

   The LED strip will need ground and 3.3 V, LED controller will need PE13 and PE15, and the IR receiver will need ground, 3.3V, and PD0. The step up chip will help connect all of these and there is no pinout conflict.

4. Assume that we are going to make Jack implement this software. Also assume that Jack has not been paying attention much this quarter and remembers nothing from this class. Identify the chapters/page ranges that Jack should review in order to understand the STM32L476VGT6 Discovery board functions he will need. Consider all the documentation on the Google Drive (including all the directories).

   OK JACK since you don't wanna listen, you will need to read the TSOP38238 datasheet, SK9822 datasheet, and 74HCT244 datasheet(s). After reading all of these data sheets, you should know how to hook up all components and code for the lights. To understand how the IR remote works better, I recommend also going through the Class 10 slides and reviewing the LED project Jack did for ELEN 120. I know Jack took ELEN 120 as he couldn't enroll in 121 unless he had passed 120 with a C- or better.