

Su22-ENGR-40M-01 Lab 2b

Jannah Sabic El-Rayess

TOTAL POINTS

60 / 60

QUESTION 1

1 Lab Completion 15 / 15

- ✓ - **0 pts** Complete box with 2 tricks
 - **1.5 pts** Complete box with 2 very similar tricks
 - **3 pts** Complete box with only one trick
 - **6 pts** Complete box with no tricks (basic useless box works)
 - **10 pts** Some attempt but box not complete
 - **15 pts** Incomplete/Not attempted
 - **7.5 pts** Complete box with 2 tricks; Late
 - **9 pts** 15% penalty for late submission

QUESTION 2

2 Analysis 10 / 10

- ✓ - **0 pts** Correct
 - **2.5 pts** Figured out the 2 switches should be in parallel but some errors wiring them
 - **5 pts** Problem attempted but major conceptual errors
 - **2 pts** Did not mention how this simplifies their code or incorrect simplification mentioned
 - **5 pts** Limit switch not used
 - **10 pts** No attempt
 - **2 pts** Other error (see comment)
 - **3.5 pts** Toggle switch incorrectly connected to power or input
 - **3 pts** Errors wiring circuit but understands concept
 - **5 pts** Answered conceptual question correctly, but did not submit a schematic or incorrect schematic
 - **2.5 pts** Second triad of toggle switch not connected in parallel with limit switch
 - **4 pts** Didn't include battery
 - **2.5 pts** One triad of toggle switch not connected to an input

QUESTION 3

3 Software 10 / 10

+ **5 pts** Plus

- Not only is code easy-to-read and well-commented, but it implements a complex behavior in a creative and efficient manner, beyond the requirements of this course

✓ - **0 pts** Check Plus

- **Code is easy to read: well-commented; functions, variables and constants appropriately named**
- **Consistent in its own naming, case and indenting conventions**
- **Avoids excessive inefficiency, unnecessary nested loops and repetition of large chunks of logic**
- **Avoids patterns (e.g., delay()) that would cause it to dangerously miss events**
 - **1 pts** More comments would be helpful
 - **1 pts** delay() may cause irregular behavior as batteries die or if arm gets caught on something..
 - **2 pts** Minor errors/unclear
 - **2.5 pts** Check
- Mostly well-commented and with appropriate variable/constant names, but has some lapses
- Indentation is consistent, but variable/function naming and case are sometimes confusing
- Avoids patterns that may cause the program to crash or hang
 - **5 pts** Check Minus
- Difficult to understand, due to confusing logic, unhelpful/sparse comments and/or unclear names
- Indentation, variable/function naming and/or case are messy and confusing
- May crash or hang in certain (foreseeable) circumstances

QUESTION 4

4 Build Quality 20 / 20

+ **5 pts** Plus

✓ - **0 pts** Check Plus

- **5 pts** Check

- **10 pts** Check Minus

- **15 pts** Minus

QUESTION 5

5 Cleanup 5 / 5

✓ - **0 pts** Spotless

- **3 pts** Missed a spot

- **5 pts** Poor cleanup

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8. Submit your code.

Include the program listing for both your basic useless box program (step 6) and your more awesome program (step 7) with your lab report. Make sure that you have used good coding style, and that the code can be easily understood by others.

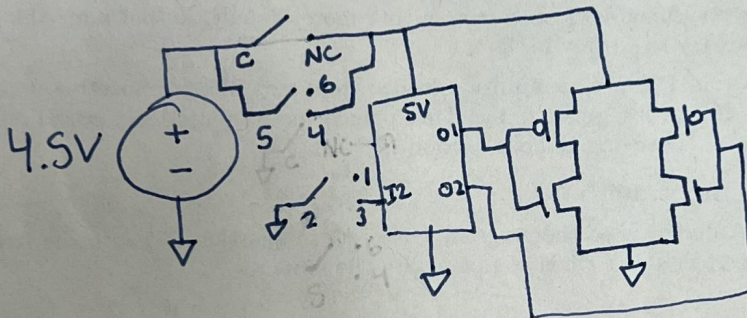
on limit = not in use
 turn on limit → disconnect battery

4 Analysis

When your useless box is idle, although your motor's not running, the Arduino still draws a small amount of current. Over time, this will eventually use up your batteries. If you want to run your Arduino on batteries and have it ready all the time, it would be better to have the Arduino take no power when no-one is playing with it. It turns out you can make a few small changes to your box to have it behave this way. The key is to power down the Arduino when it is in the "stop" state.

- A1:** Using only the switches in the box, figure out how to wire the Arduino to the battery so the battery is disconnected from the rest of the circuit in the stopped state, but the Arduino does get power in the forward/reverse states. Draw a schematic of this new design.

Note: You do not need to actually build this design unless you want to make your box last longer.



1 = R
 3 = F
 6 = R
 4 = F

If you power the Arduino this way, how can you simplify your code?

Since the limit switch automatically disconnects the battery I don't need to hard code the motor stopping, for example.

2 Analysis 10 / 10

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