Lab Number and Title: *Lab 9: Solar Panel Tracking the Sun*

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Purpose of Lab

*The purpose of this lab was to write a program which basically controls a solar panel. The program was to be written with maximum effectiveness which constantly adjusts its orientation to point directly at the moving ‘sun’ (flash light). Alongside the light values being read and compared to know what orientation the panel should be facing, user commands will also be accepted to perform different functions.*

Description of Solution(s)

*We started the lab using incremental programming. We wrote one piece of code that performs one function then move on to the next, and so on. First, we worked on initializing and operating the motor and panel so we can have the basis of the whole project finished. We used a lot of previous code from previous labs for some of the program such as the motor running. Once we got the motor up and running, we moved on to the functions and organization. This included the return, reset, park, and query functions. Once we had the logic and reasoning of how each function should work, we moved on to writing the code and testing each function to see if it operates correctly.*

Test Results

*First, we tested the motor to make sure it functions correctly. We did this by uploading the program to the board, and using code from a previous lab, we got the motor to run. At first, our motor ran very slowly and then stopped working all together. So, we had to get a replacement motor. Next, we started testing the panel and its functions. We first tested it by making sure the panel was following the light source, and it was, but not incrementally. This was rather a challenge as we had to figure out how to stop the panel from switching to either side immediately, rather than slowly, mimicking a ‘following’ of the light source. We then tested each of the user command functions (return, reset, etc.) by calling them using the serial monitor screen. Again, we had a few minor debugging to do, which included getting the dark functions to work properly and reset after no light value was being read by the photo sensors.*

Answers to Questions

*N/A*

Discussion

*In this lab, we learned how to write and use interrupt and timer on assembly and C. This final lab required much more thinking and logic to go behind it but it was a challenge that we enjoyed working on toward a solution. We mainly learned how to piece together everything we’ve learned throughout the semester and how it can be implemented into, working a bigger piece of machinery, in this case a solar panel.*

Contribution to Team Work

*We first started designing the lab solution on paper and on a sketch on Arduino. At first, we each started by throwing down brainstorming ideas (such as just using code from previous labs for the photo sensors and motor) then we started testing each piece of code. Antonio designed most of the hardware for the solar panel using the Legos provided and hooked everything up to the boards. Meanwhile, Devon started each of the functions and function calls and loops in the C code. Once we realized that a particular function didn’t work correctly, we would each attempt at debugging and finding the solution to the bugs. We mainly worked together on most of the code and debugging, although Devon did more of the coding while Antonio did most of the hardware.*

References

*N/A*