Andrew Karnes – Project Writeup

Automatic Drink Server

Purpose:

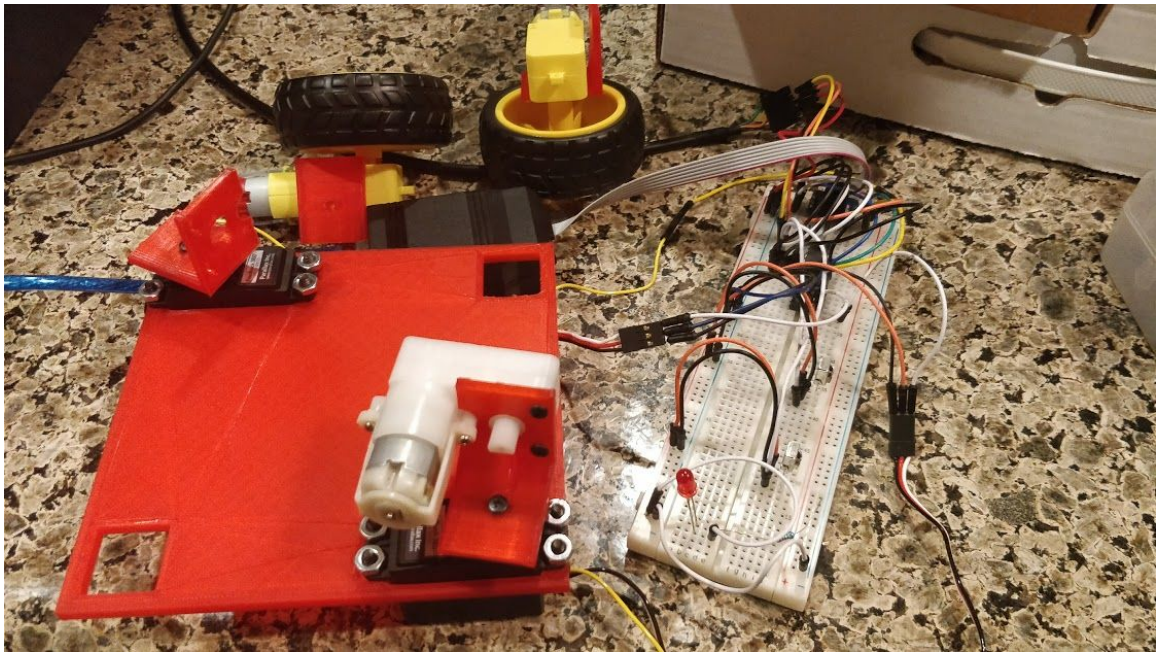
I enjoy sitting down for long gaming sessions on the weekends which sometimes causes me to forget about the basic needs of the human body. This includes but is not limited to eating and drinking. The idea behind this project is to solve that lack of drinking by providing a mostly filled cup of water next to me that can go to the fridge and fill the cup with water for me.

Final Setup(Broken):

The new motors under load drew too much power and the H Bridge stopped working.

The Servo Motors are no longer spinning with old or new code and might be blown up.

The IR Receivers are not polling correctly and when set to Pin Change Interrupt it delayed my program even more than before, likely due to IR in the lights constantly interrupting it.



Parts List:

Part	Quantity	Description
Atmega168	1	This is the controller of the base that controls its course for the water refilling station
Base	1	Holds the water cup and the motors as well as the sensors for determining location. 3D Printed
Parallax 360 feedback servo	2	The direction control of the motors which rotates them to whichever direction is needed (Likely Dead)
Servo to Motor Mount (DC Motor Without Wheel)	2	For the old motors no longer useful. 3D Printed
Servo to Motor Mount (DC Motor With Wheel)	2	For the new motors to connect to broken servos. 3D Printed
DC Motor with wheel	2	These are the motors that drive the base around
H Bridge Relay	1	This is used to control each of the DC Motors movement (Dead)
IR Receiver	2	One on each front corner for determining where the base is in relation to the two end points.
DC motor without wheel	1	Original Motor that peralta did not have more of
Red Wheel	2	For the Old peralta motors that are gone. 3D Printed.
IR Recievers	3	It was a 5 pack. Only 3 were needed.
IR Transmitters	5	These were to guide the bot along between destinations but it won't move.
Miscellaneous Nuts and bolts	20	I don't know sizes off the top of my head but 4 nuts and bolts per servo (16), and then 2 bolts per DC Motor (4).

User Manual:

Begin by attaching the 360 Servos to the Servo to Motor Mounts. Attach the DC Motors with wheels to the motor mounts. Attach the wheels to the DC motors. Slide the Servo assembly through the opening in the base with the wires on the side of the indent for the cup. Secure the servo assembly in place. Follow the Fritzing Diagram for wiring of the rest of the system. The parallax servos follow the below table for their pwm duty cycles.

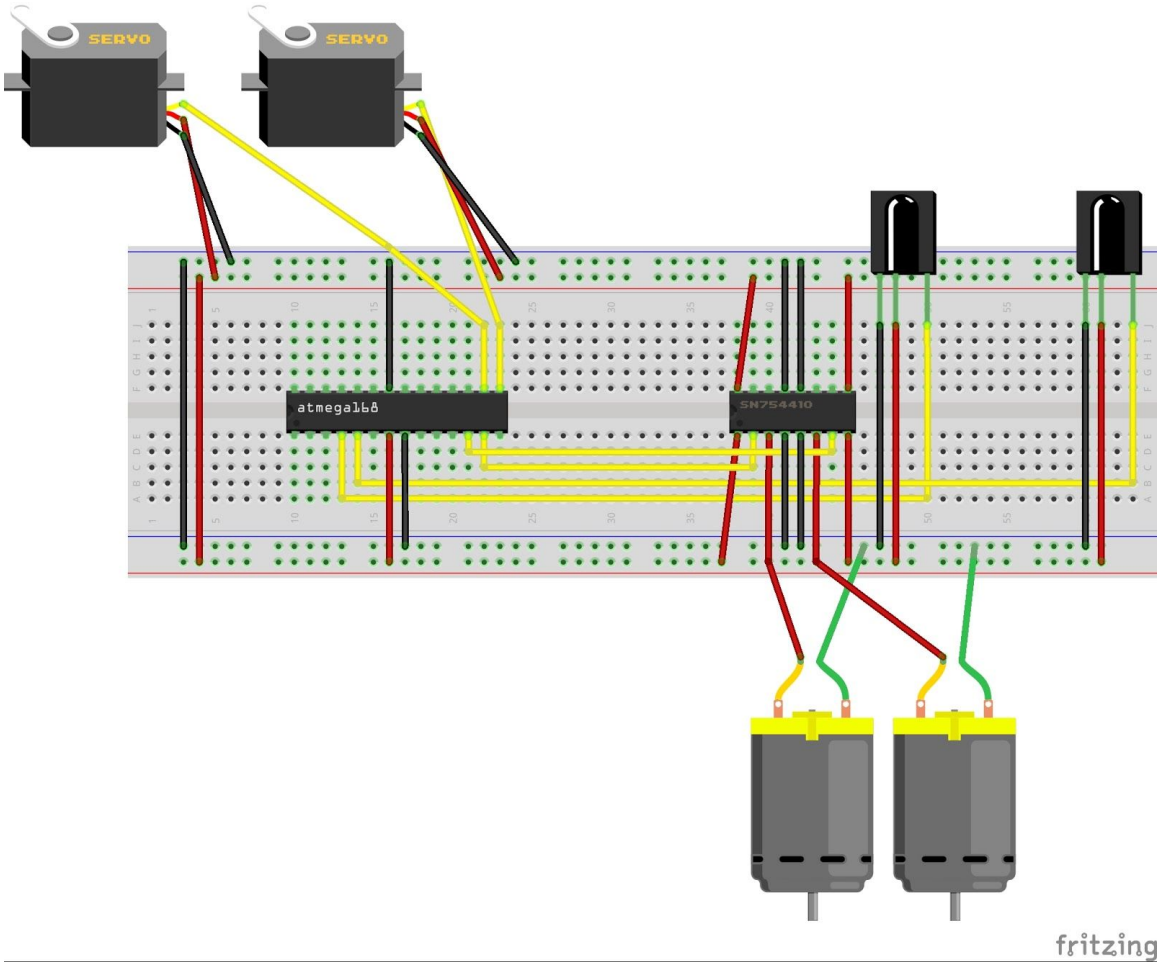
	Clockwise (faster to slower)	Stop	Counterclockwise (slower to faster)
tControl, +/- 10 µs	1280….1480	1480...1520	1520….1720
RPM, +/-15	140...0	0	0…-140

The atmega can show some basic errors using the standard wiring with TX on the FTDI to RX on the atmega and so on. The H Bridge was on or off based on the IR state and communicated with a single pin per motor.

ATmega168 explanation:

The Atmega is the brain of the autonomous bot. It is useful for destroying the H Bridge, and the 360 Servos. It is supposed to be used to navigate between two points using the IR sensors and a waving back and forth motion based on line follower robot locomotion. The 360 servos would rotate the base while the DC motors would remain in line so as to constantly be moving forward.

Schematic Diagram:



C Code Files:

The project.c file is the main file that is to contain all of the code. The usart.c and usart.h files are only for debugging purposes.

Additional Code Files:

It was to be self contained on the atmega alone so there are no additional files.

Specific Features and lack of:

Monday:

The 360 Servos can rotate synchronously or asynchronously.

Wednesday:

The 360 Servos can rotate synchronously or asynchronously.

The Old Peralta DC Motor can rotate at the same time as the 360 servos.

Friday:

Lacking features:

The 360 Servos can rotate synchronously or asynchronously.

The DC Motors can rotate at the same time as the 360 servos.

The IR Receivers are able to detect the transmitters.

The robot can navigate between two sets of IR Transmitter Beacons.

Additional Information:

I had an interesting learning experience. What would be nice in the course is if we had an assignment that covers making a servo move with PWM. I learned a lot about that on my own but I feel as though I played with stuff in a way that caused tremendous amounts of wear and tear on the system as I did not know exactly what I was doing and I just kept testing it till it worked. Also the STL Files are in the labeled folder.