Bubble Making Robot Final Project.

Cs-207: Building Interactive Gadgets.

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INTRODUCTION

This paper is designated to Document the Final project of CS207 Building Interactive Gadgets, using the information taught in the lectures and Labs in CS207, I was able to put together a robot that serves no real purpose but to blow bubbles to entertain adults and children.

This main components to the Bubble Machine are two servos and a Dc motor, the two servos are glued on top of each other, the bottom servo controls the pan of the top servo, and meanwhile the top one has a ring attached the tilts up and down to dip in the soapy water in the plastic cups beside it, after dipping the ring, the top servo moves the hook up and the bottom servo moves to place the ring in front of the DC motor, The DC motor works for 3 seconds to make bubbles and then goes back to do the whole cycle again.

Background

When it comes to bubble blowing Machines, there are thousands of design that work way better than the Robot I made, however, not many of them have a movable arm, when I was researching for a final project to make for this class, I stumbled Across the BubbleSteen Bubble Machine by belliedroot Bernard Katz Glass, I was impressed by this project as it was a simple Idea that can be easily implemented, however I wanted to add my own signature to it, I had a lot of things in mind to add to this Project, but the winner was adding 4 another DC motors to make the bubbles go up when they are made, After more thinking about this novelty, I decided to connect the 4 motors to a potentiometer that can control how hard the motors blow by controlling their speed.

The inventor of the main robot had access to more equipment than I did, but I was able to adapt to whatever equipment and materials I had around me in my Dorm.

Design and Build process

Because I live in a dorm and I don't have access to that much equipment, I had to think of a different way to make the project, I started thinking of how everything needs to be positioned, I was able to find a small pallet that I can use to build my project on, the first thing I did was order all the parts I needed online, and when they arrived, I took the project part by part to adapt it to the pallet instead of what the main project was using, another difference between the main project and mine was the circle used to hold the soapy water, in the main project they used a the part from an actual bubble making toy, however I was not able to adapt this to my project since some of the measurements are different, so I decided to attach a thin iron rod that can be bent to the shape I need, however the problem with this was that if the robot does any small mistake the robot will bend the rod in a different way which will cause it to bend in a different position that no longer works, to counter this I decided to cover the metal rod with hot glue which will make it endure if the robots pushes it against the plastic cups or the fans and it will go back

to the way I shaped it, and for the circle that holds the soapy water, I tried to use a lot of different materials, however hot glue was one of the best, because it was light and you can easily shape it the way you want, So I drew a circle on baking paper and let it dry, when it did I attached it to the end of the hot glue covered rod, after a lot of bending, I was able to get the ring to dip perfectly in the plastic cup next to it.

Since the pallet was a bit small, I had to think of something other than a glass bowl to put the soapy water in since I couldn't find any that fit on the pallet, so I decided to use two party cups, both of them were cut to be way shorter than they originally are, I placed the first one with the cups base up so I can put the other one on top of it, this allows the hot glue circle to easily be dipped in the upper cup and get coated in the soapy solution.

One of the problems I encountered was that the soap kept dripping on the bottom servo causing the glue holding the servo with the pallet so lose its gluiness which causes the servo to fall, I solved this by gluing a towel on top of the pallet so it can catch all the soapy solution that falls without letting it get close to the glued parts.
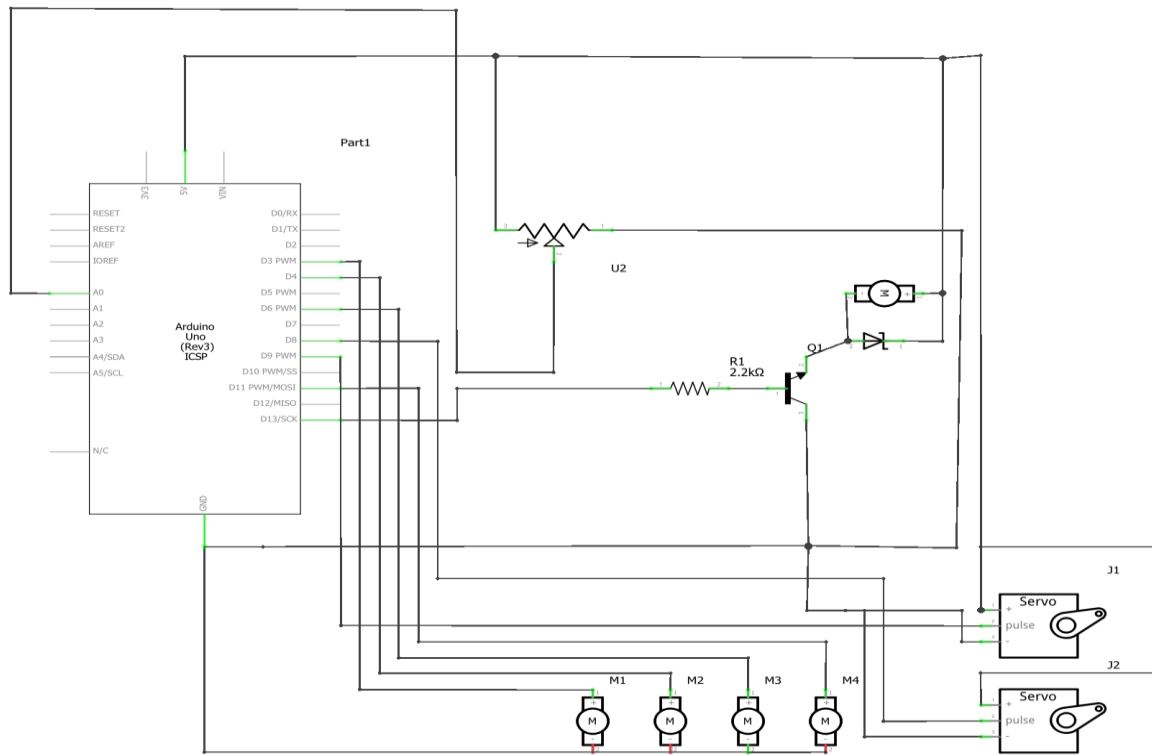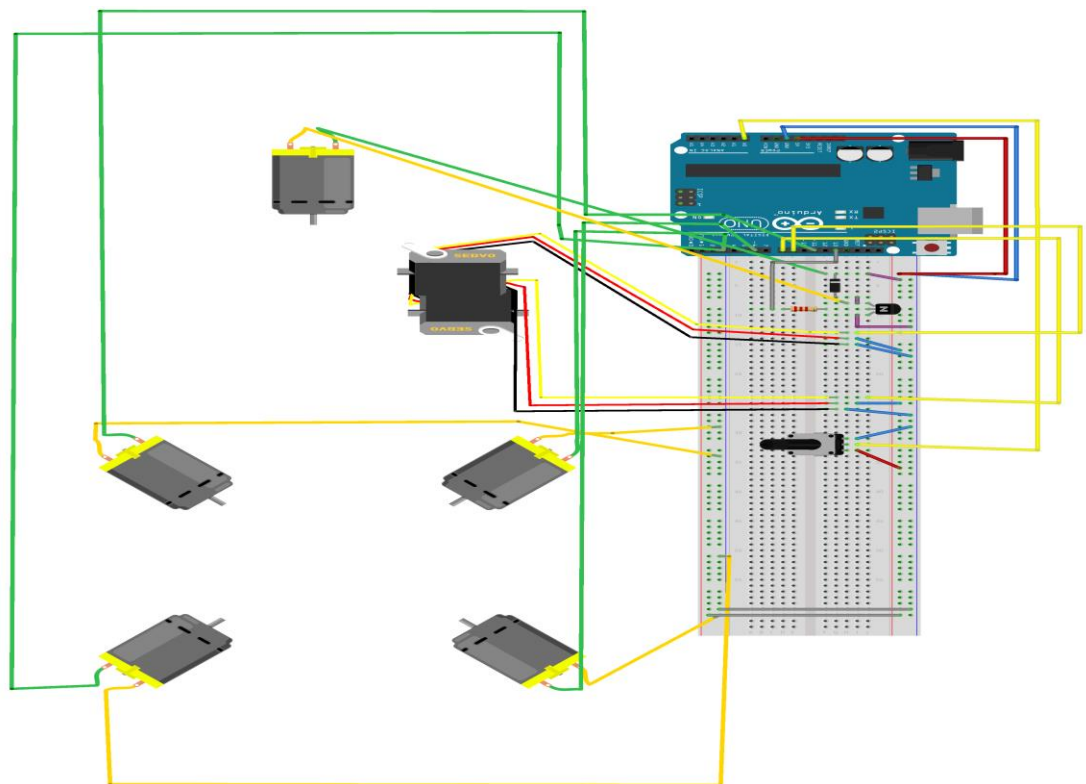
Novelty

The novelty that I added to this project was adding another 4 DC motors that can be controlled by a potentiometer on the breadboard, this can be easily made by programming the Arduino to take the potentiometer value and mapping it and writing it on the motors, and since each motor had its own pin, I had to write the mapped value from the potentiometer to each pin, this allows the user of the robot to control the speed of these fans, which causes the bubbles to go up when they are blown instead of falling.
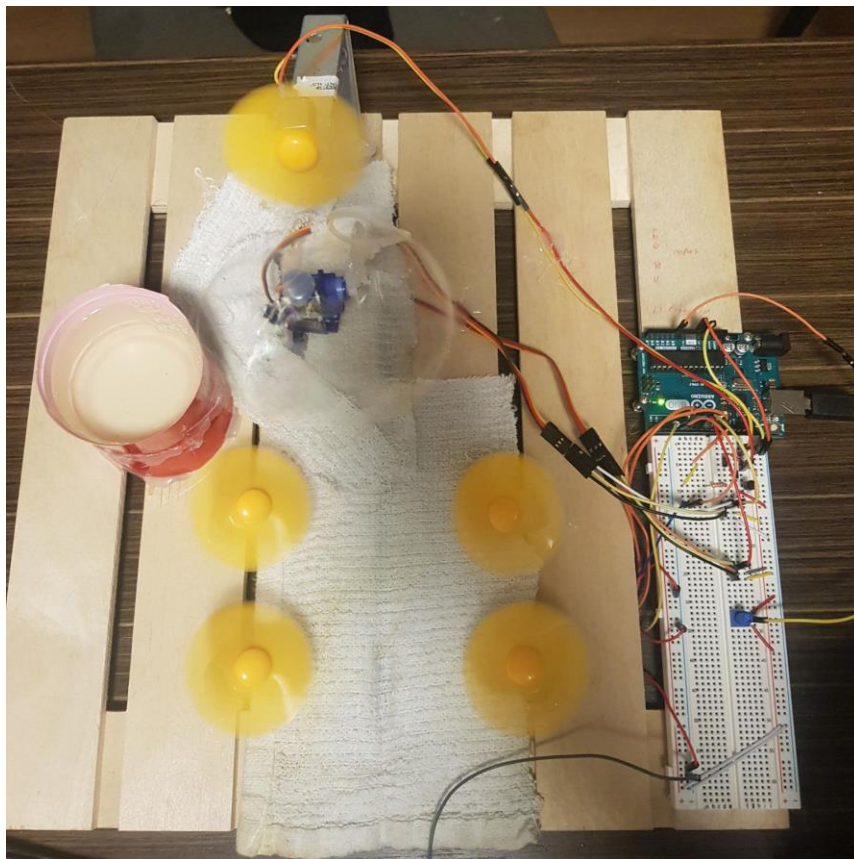
Milestones

Milestone 1	February 15	Have all the parts ordered
Milestone 2	March 1	Start working with available parts and start programming parts.
Milestone 3	March 15	Finish the first Code to run
Milestone 4	April 1	Have a built Version of the robot running and ready
Milestone 5	April 15	Have the rest of the project papers ready and uploaded to GitHub.

Setting the Milestones was easy, however following them was not, my first milestone was met, however I could not get the robot up and running according to the plan, this is because there was some parts missing that I had to order, this caused me to take more time in writing the code because I could not see if it was doing what I wanted it to do or not, however when all the parts arrived I was able to write the code and play around with it to get the Robot to work as I intended.

Code

The code did not cause me that much trouble as it was fairly simple, I was able to use the information I was taught in the sensors, motors and servos labs to write the code I needed for this project, I did not need to use anything complicated, and most of the code was for loops for the servos, I also made a function that turns the main motor on for two seconds then turns it off, the code can be found in the repository under /code.

Credits

The idea for this Robot was taken from:

http://www.instructables.com/id/Bubblesteen-Bubble-Machine/