Adaptive Technologies
Automated Skee-Ball System for Children with Disabilities

(SPRING 2020) ENME 444: Mechanical Engineering Systems Design
German Bu, Edward Dulaj, Nick Fisher, Brendan Isaac, Samuel Willits

Department of Mechanical Engineering

Since 1961 ST. ELIZABETH SCHOOL

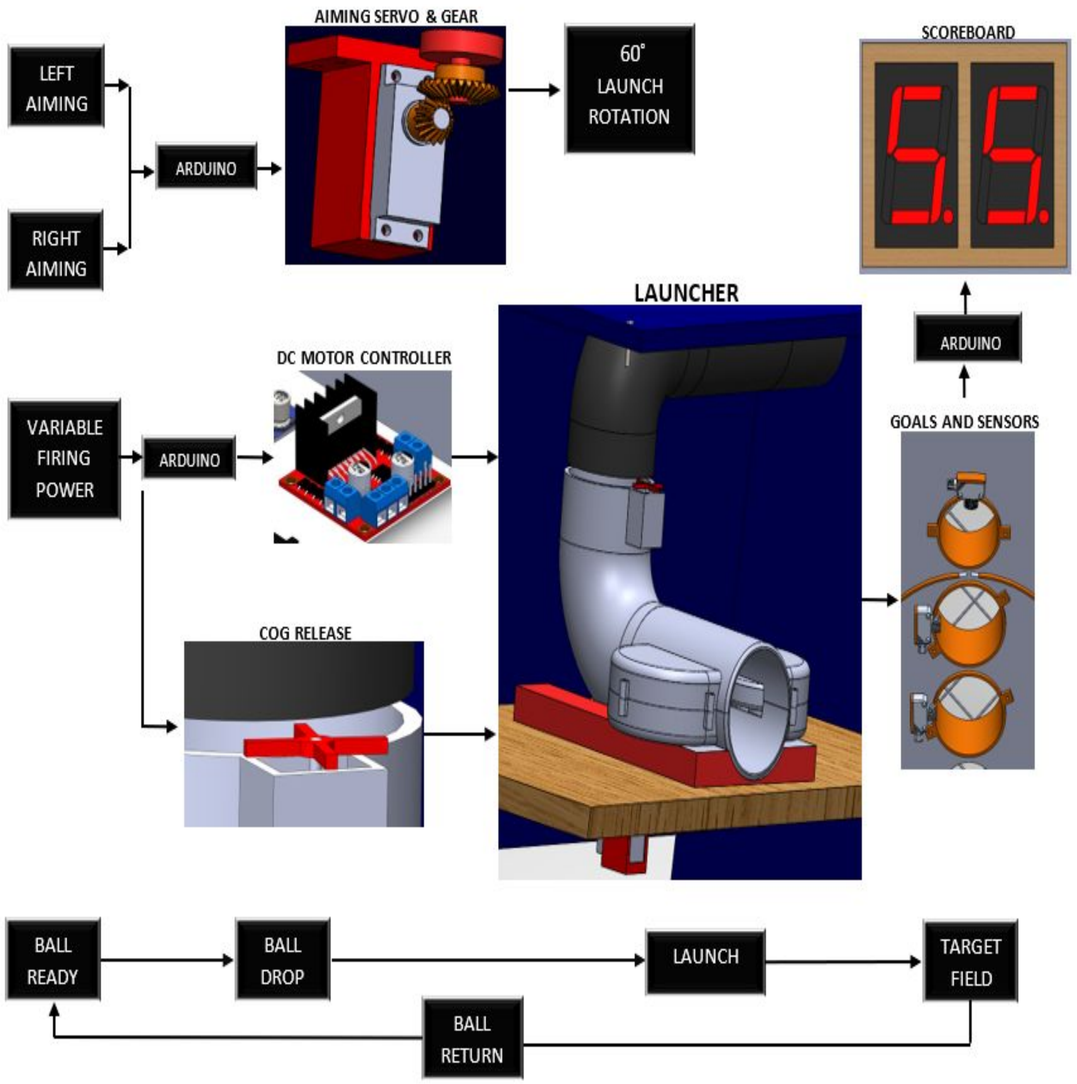
Objective

To design and develop an adaptive Skee-Ball game for the students at the St. Elizabeth School in Baltimore.

Background

- Game designed for use by students with restricted mobility to target widest range of student population
- Occupational Therapy (OTPT) will use the game as a mobility training tool
- Game must be completely operable using adaptive buttons
- OTPT team must be able to maneuver the game with the school

Operational Block Diagram

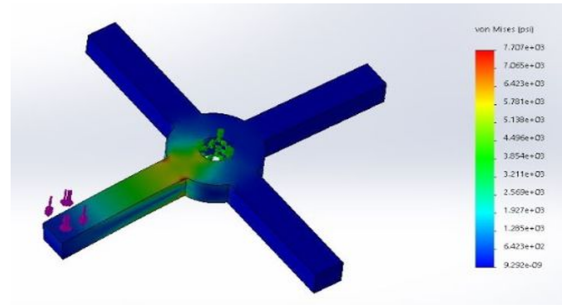


Complete System Design

Future Work

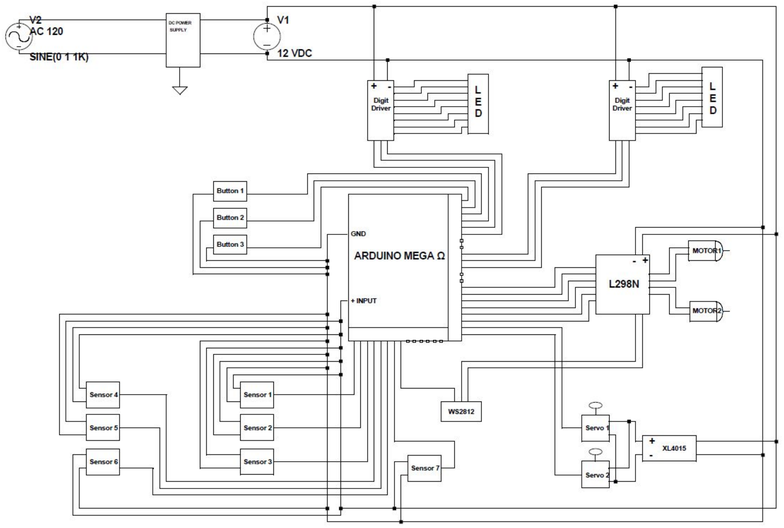
- Fabrication of system components
- Assembly of final system
- Periodic inspection and maintenance
- Optimization of material selection
- Perform testing of final system

Finite Element Analysis



Undergoing a force of 2 lbs, the cog release, which is printed in ABS, experiences stresses near the fillets which are around its yield strength and would likely cause plastic deformation. However, the game balls utilized only weigh approximately 0.1 lbs and are dropped a distance less than 3 inches onto the cog release, so any force experienced is well below the 2 lbf limit.

Schematic Diagram



Total Power Consumption : 36W

$P = I * V\ ; P = 12V * 3A = 36W$

Acknowledgements

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UMBC

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