DES 206-PIS EndSem Evaluation

Group 52

Interactive Toy: PINBALL MACHINE

Target age selected: Pre Teens

- **Pre-teens develop a sense of complex decision making that is more instantaneous and show usage of formal logical operations**
- **This means children at this particular age group are able to quickly plan an organized method of solving a problem presented to them**
- **Fine motor skills in preteens involve coordinating movement of the hands and fingers with the eyes, hence hand-eye coordination**

Why Pinball?

- **Pinball machines require on the spot strategies and movement, and are great for mental exercise**
- **It is a great teacher of patience and timing, and is a great tool for relaxation and fun**
- **They are excellent for a quick dose of adrenaline and are much more of a personalized experience than most video games**
- **Further, pinball has been scientifically proven to help children with Autism promotes improvement of motor skills, learning tactics and building coping strategies**

Concept and Design

- **Pinball machine operate on propelling a ball through player-controlled flaps as the ball hits bumpers and other flaps according to the design**
- **The base, bumpers and flaps of the pinball were made using laser cutting on MDF sheets, while the inclination and boundary was done through cardboard cutting**
- **DC Motors were used to operate the flaps with Arduino Uno implementing sensors to control them**
- **Rubber bands were used to provide cushioning as well as a bit of elasticity when the ball hits a few of the bumpers**

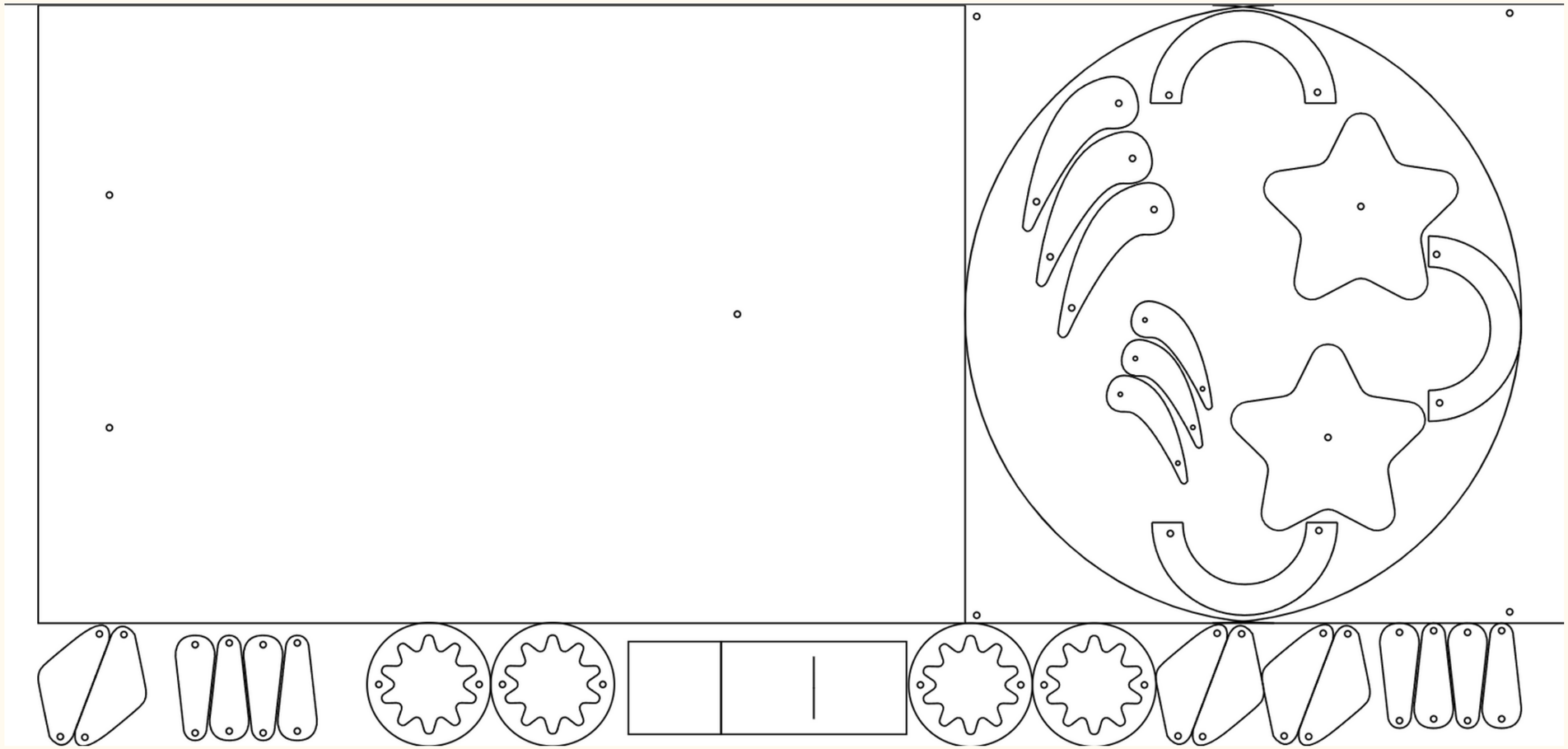
Concept and Design

- **The bumpers are colored to pop out for a child, with main usage of bright primary and secondary colors**
- **The target age is attracted to bolder colors and the danger bumpers are colored as such, while the base itself is covered using a bright yellow sheet to maintain a clear look at the ball**
- **The bumpers are positioned in a manner that the ball rolls towards the centre**

Arduino conditional logic

- Arduino makes use of HC SR04 ultrasonic sensors
- Whenever player reaches a particular predefined proximity of the sensor it sends the signal to the Arduino of the distance between the user hand and the sensor
- We set the trigger distance at a particular value and when this value is reached the DC motor operates the flaps and hence the game is played

Laser cutting design



Components used

- Arduino Uno
- MDF Sheets
- Cardboard
- sensor
- Breadboard
- Jumper wires
- Rubber bands
- Marble
- DC Motors
- HC SR04 sensors

Model Making Process

Model Making Process

Final Project

Group 52- Members

Kanishk Singh 2020073
Mehul Singh 2020081
Shreyanshu Sharma 2020130
Rahul 2020107