Team 03

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Project Name: *Solved*^{3}

Project Synopsis:
Software and Hardware application that will use motors to solve a rubik's cube in any state by using an algorithm.

Project Description:

The project came to light by exploring the unique problem of solving a rubik's cube. Our team shares the joy of solving rubik's cubes. We then decided it would be interesting to develop software that can use known algorithms to indicate what steps to follow to solve a cube in any state. The project will also involve image processing as we'll have to use cameras to capture the state of the cube and translate the data Fearing that our project lacked complexity, a hardware component was decided upon where claw-like components powered by motors will physically change the state of the cube based on the encoded algorithm to solve it. The opportunity to work with hardware was appealing to all team members since we were all computer science majors who don't have many opportunities to work with hardware in our degree program. It will also be to great benefit that our team works with hardware because we'll learn more about the integration of software and hardware. Ultimately, the end result of our project is to have a fully functional hardware application that can be given a rubik's cube in any state and be solved mechanically by the integration of hardware, software, and algorithms.

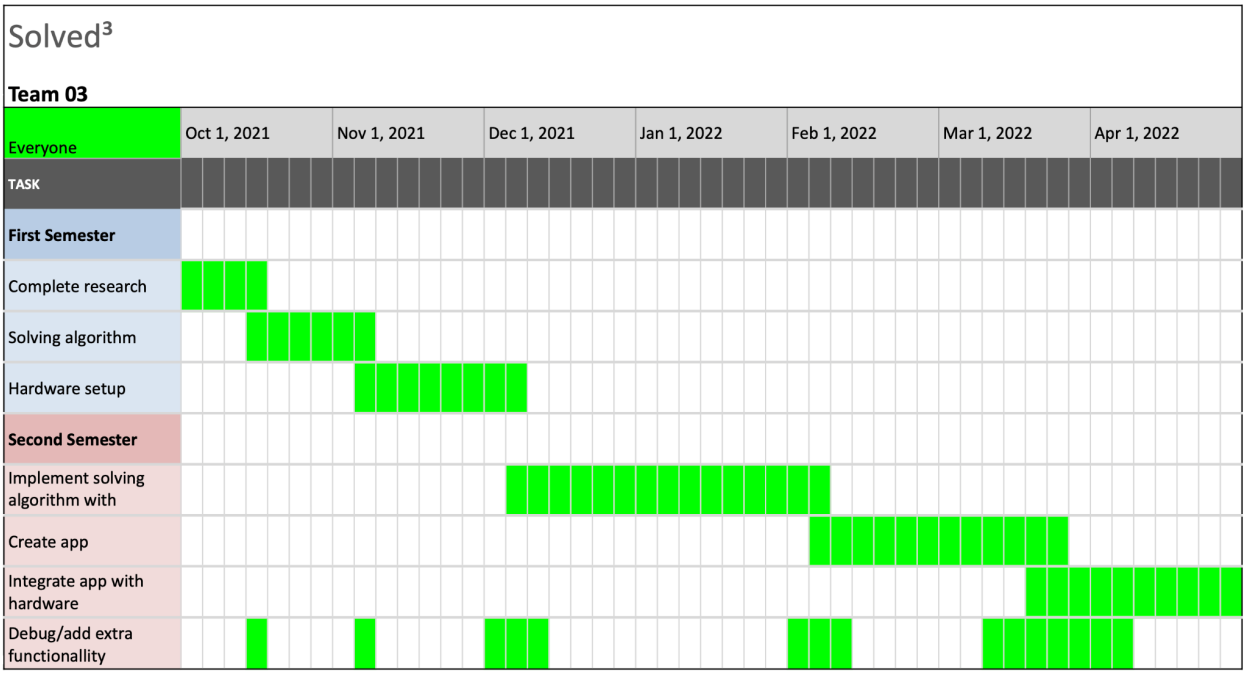
Project Milestones:

First Semester:

- Finish initial research on hardware and software implementation, for hardware research best parts to use, potential 3-D printing, integration of all the different systems together.
  Deadline: 10/17/2021
- Have the Rubik's cube solving algorithm ready, this means that the application will be able to tell what is the next step based on the state of the cube.
  Deadline: 11/8/2021
- Have our hardware set up so that we have the mechanics of how to move the cube. Essentially just making sure that our hardware implementation will be ready to begin.
  Deadline: 12/3/2021

Second Semester:

- Implement the solving algorithm with hardware so that the Rubik's cube is solved physically.
  Deadline: 2/11/2022
- Create an app that will use our algorithm to tell a user the move required to solve the cube.
  Deadline: 3/11/2022
- Integrate the app with our hardware so that the app shows what the next step is, while the hardware physically does it.
  Deadline: 3/25/2022
- Add extra functionality depending on how much we have advanced. Fine tune any small details and optimize our implementation.
  Deadline: 4/29/2022



Project Budget:

Hardware:

Raspberry pi ~ $150
Servo Motors x6 ~ $25
3-D Printing ~ $25 - $400
Wiring kit ~ $40
Raspberry pi Camera
Rubiks cubes x10 ~ 10x $17.99
PCA9685 or a Hi5 board ~ $15

Software, Computing Resources:

Server (AWS)

Estimated Cost: $300 - $600

When will they be required:
We would like to get the hardware as soon as possible so we can start experimenting and get
Make sure the components work together and potentially make changes.