Precision Farming Project (Group A5)

Prototyping

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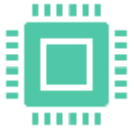
Goal

An autonomous vehicle that can follow lines and collect objects with the help of Sensors.

Hardware used:



Microcontroller (Arduino Uno R3)

Motors, Motor driver

Power

Sensors (line sensor, ultrasonic sensor, RGB colour sensor)

Initial Task to Final rendition

New Hardware and Design

Higher Accuracy

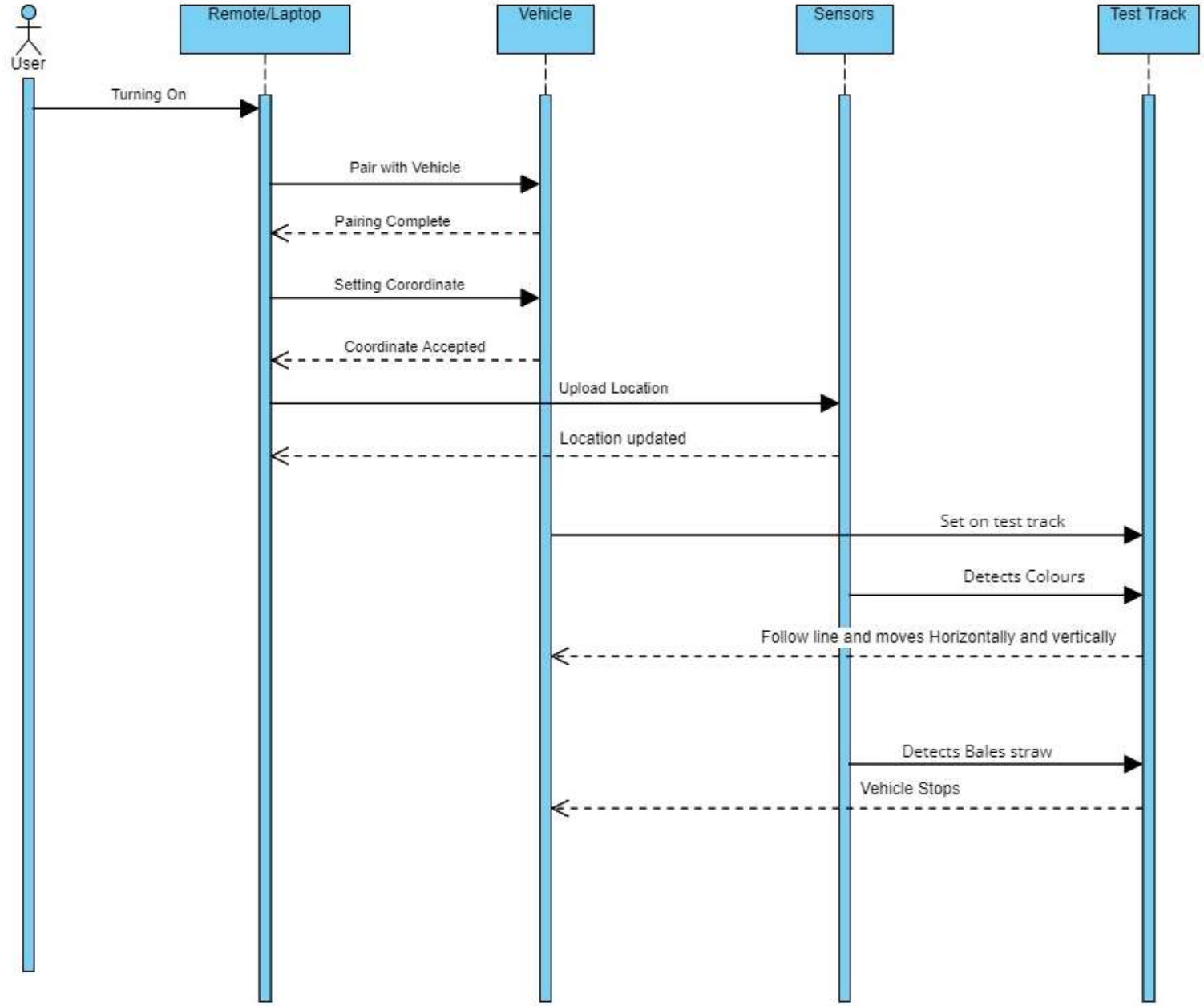
More user control

Implying New Sensors

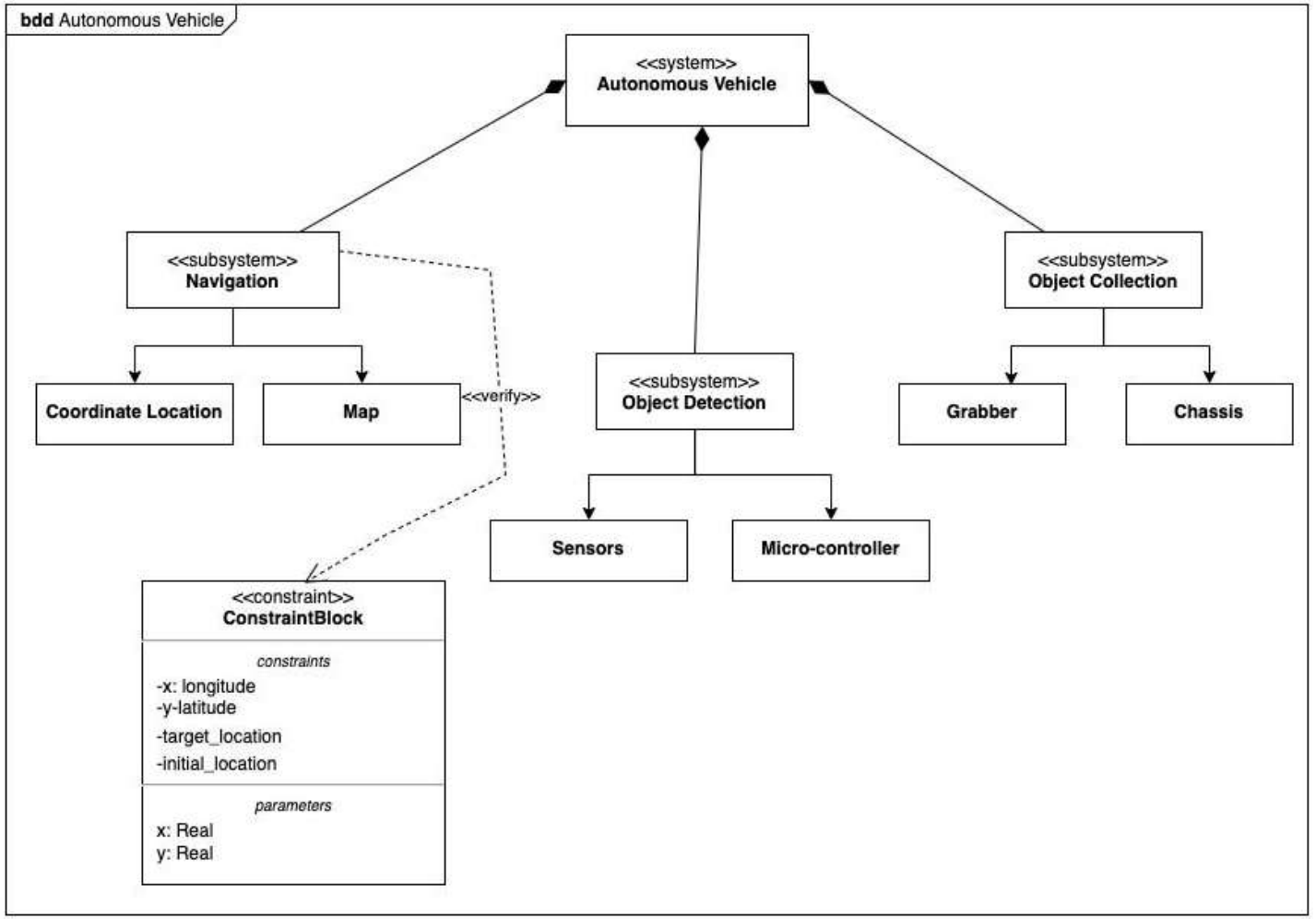
Testing in more Challenging situation

Grabber/Hand Function (Still in production)

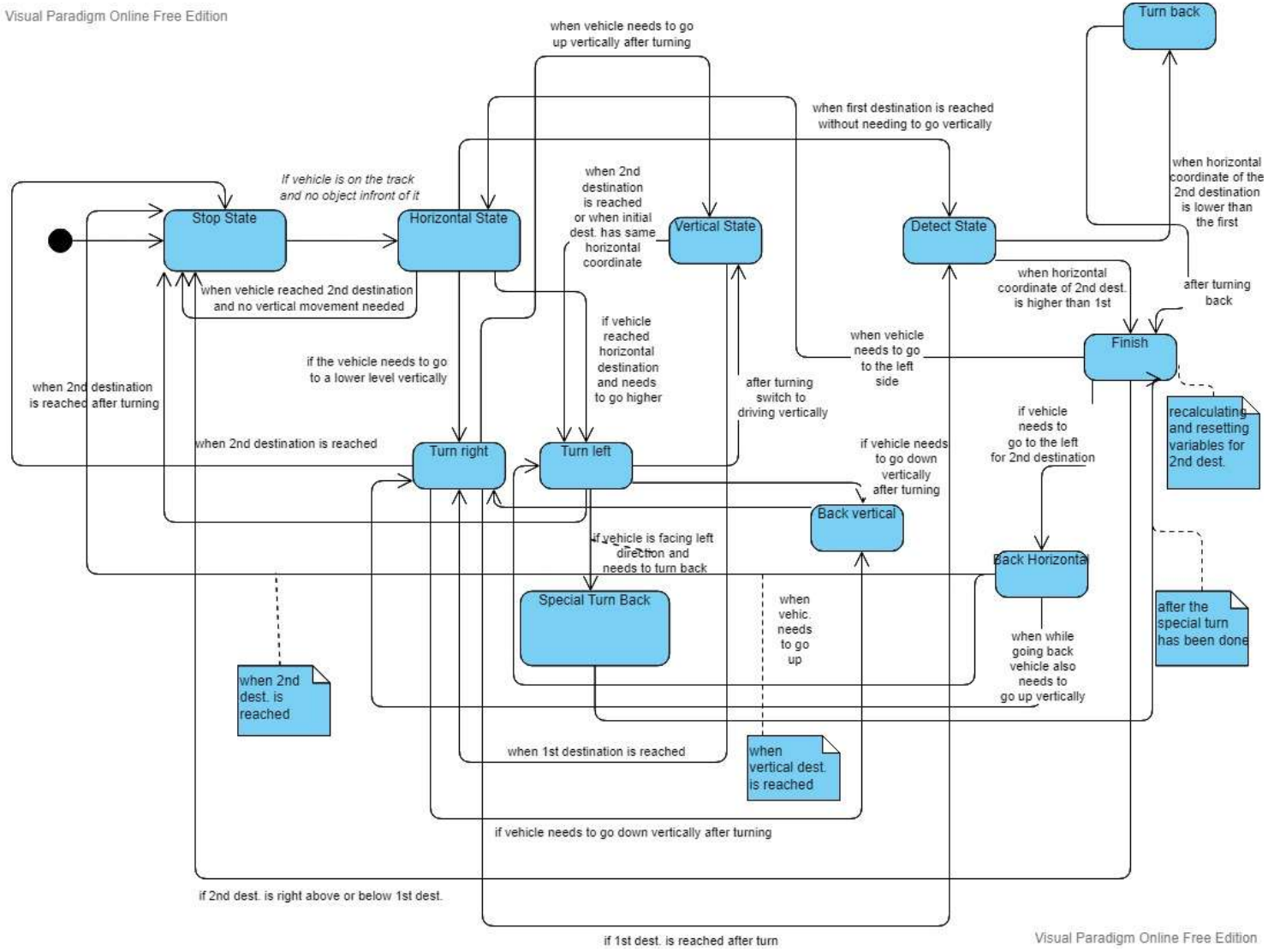
Improvised Sequence Diagram

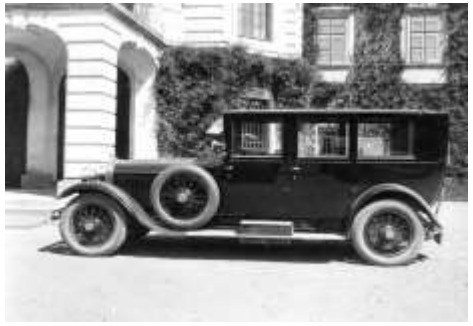


Updated Block Diagram



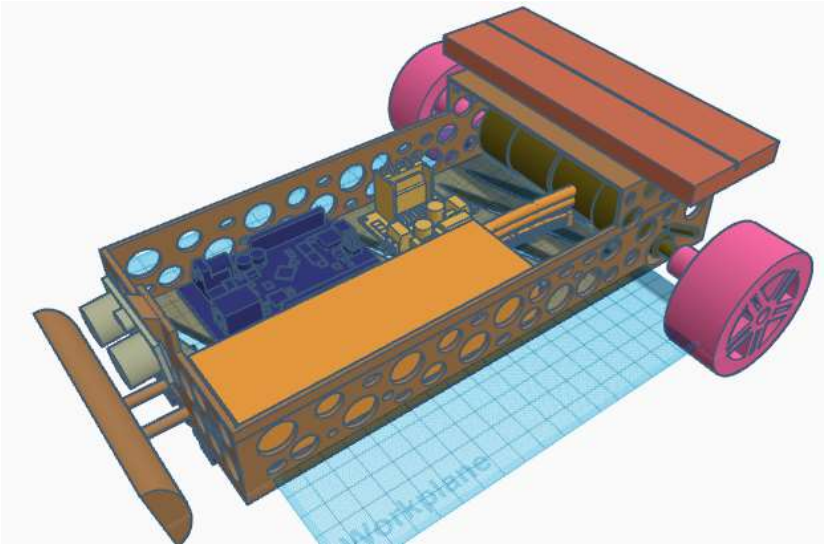
State Machine Diagram

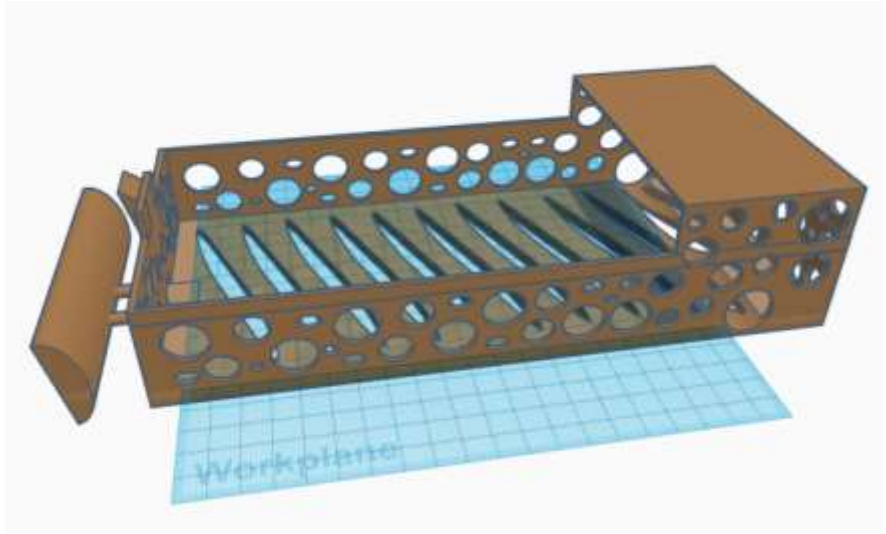


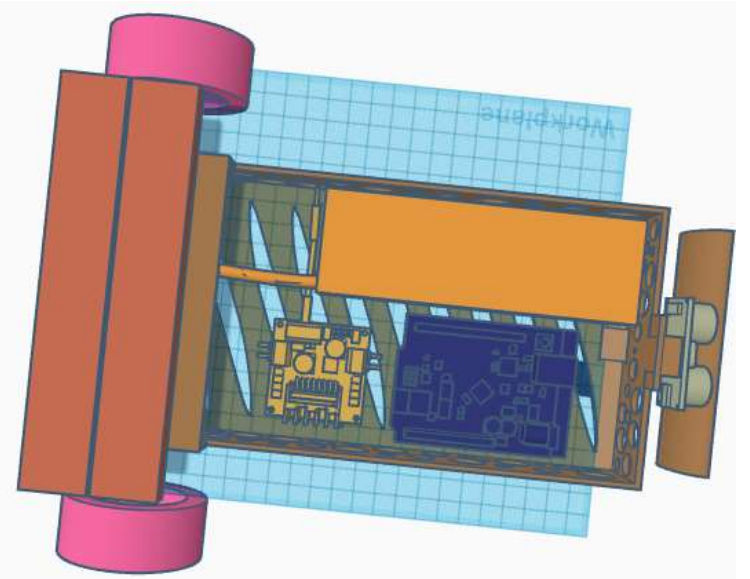


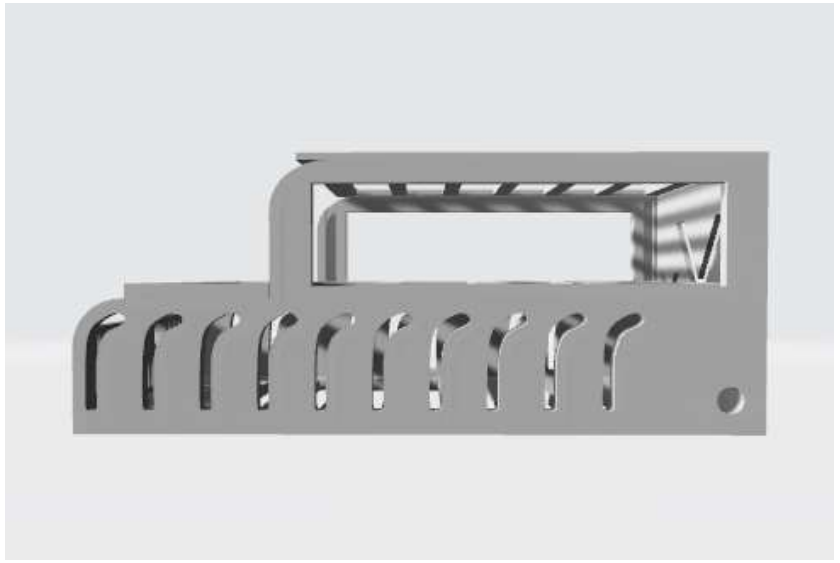
Design – Mood Board

Prototype Models

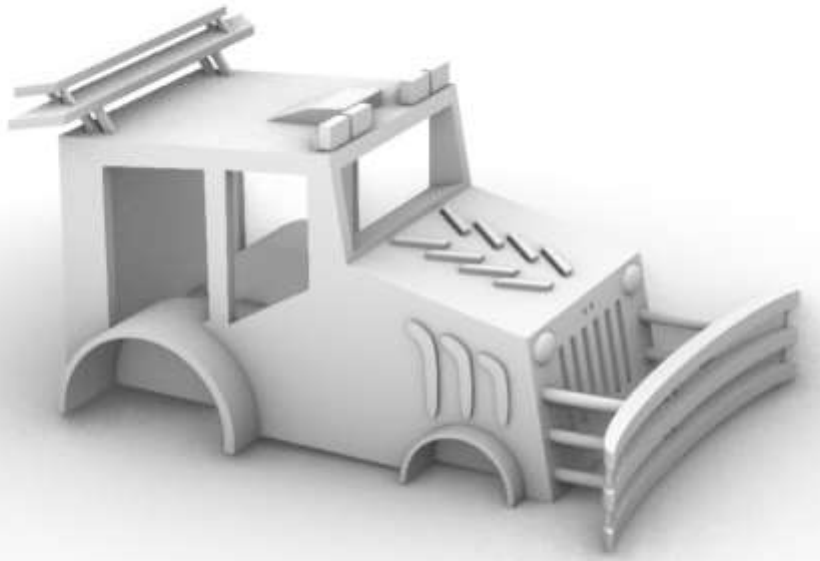


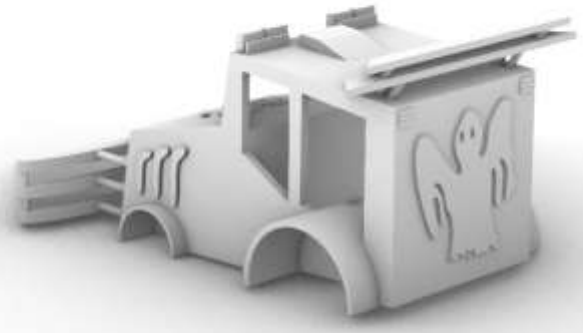






Final Design





Final Code

- Setting up pins and variables
- Put in coordinates of 1st goal and 2nd goal
- Put in in current position
- Put in if the vehicle should go to 1 or 2 locations

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// Code written by Emirkan Sali

#define s0 A0        //pins for RGB Sensor
#define s1 A1
#define s2 A2
#define s3 A3
#define out A4

#define echo 13    //pins for Ultrasonic Sensor
#define trig 12

#define motor1pin1 9   //pins for Motor driver. Enable Pins are always on
#define motor1pin2 8
#define motor2pin1 7
#define motor2pin2 6

#define sensor1 2   //pins for IR sensors
#define sensor2 4

long duration;  //variables for Ultrasonic Sensor
int distance;

int Red=0, Blue=0, Green=0;  //RGB values
int onGreen=0, onBlue=0, onMagenta=0, onOrange=0, onBlack=0, onWhite=0; //Values for if the veh


int vertical=1, horizontal=1; //set initial position of Vehicle

int back=0, forward=0; // variable for turning back. unused

int turnBackminus= 0, turnBackplus = 0;

int process = 0; //unused

int way = 1; //change to 2 when the vehicle should only go to one location

// Please put in the location of the object that will change
int horizonGoal = 4; // possible inputs: 0-13
int verticalGoal = 3; // possible inputs: 0-5
// Please put in the location of the object that will change

// Please put in the location of the object that is set permanently
int horizonGoalset = 4; // possible inputs: 0-13
int verticalGoalset = 3; // possible inputs: 0-5
// Please put in the location of the object that is set permanently

int sechoriGoalset = 1, secvertiGoalset = 5;

int sechoriGoal = 1, secvertiGoal = 5;

int facingfrontback = 0; // variable to indicate which direction the vehicle is facing.
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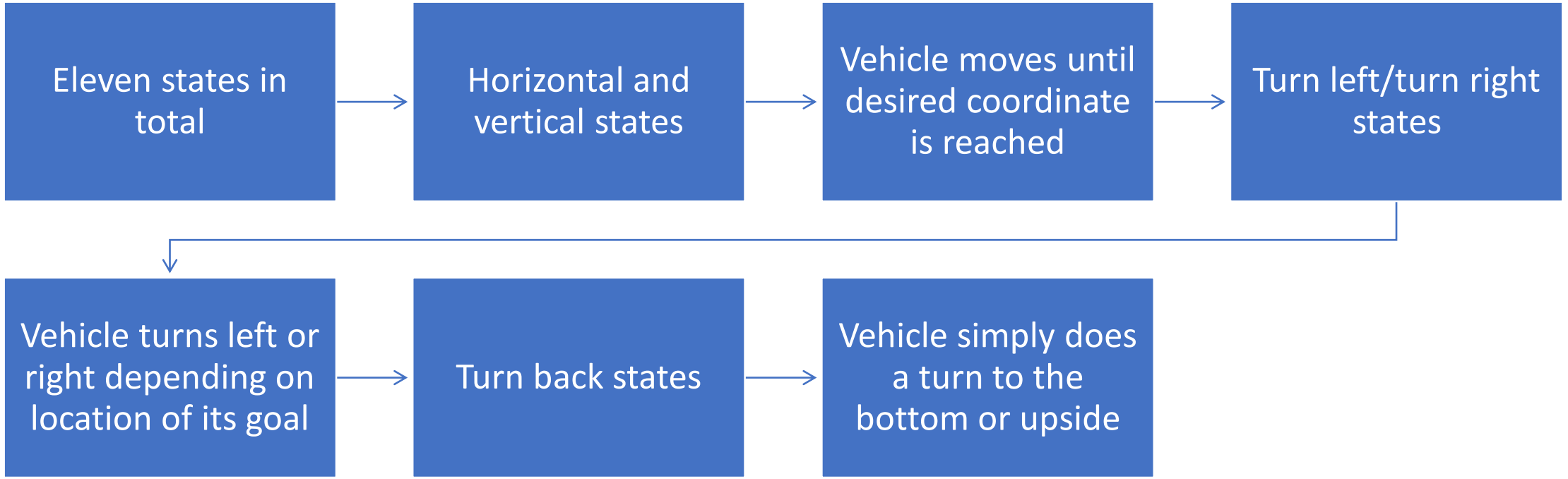
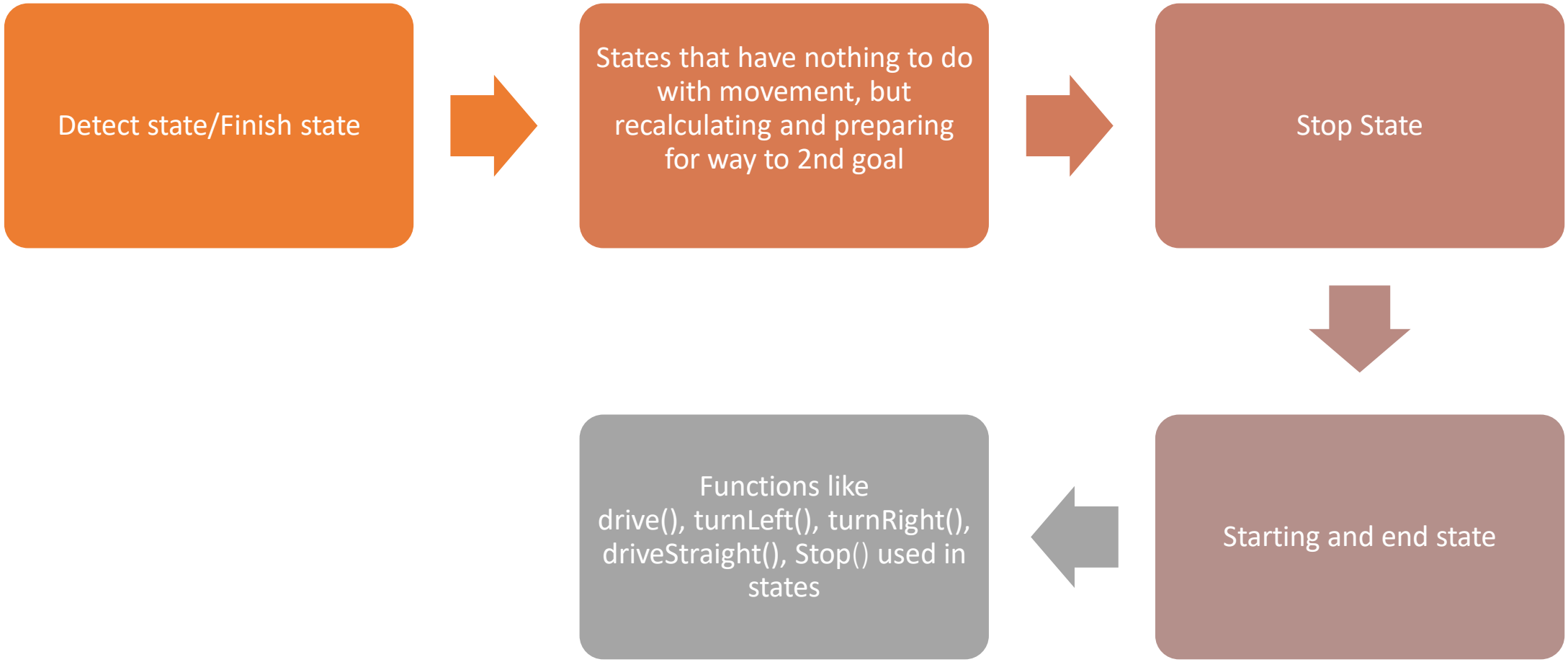
States


Eleven states in total
Horizontal and vertical states
Vehicle moves until desired coordinate is reached
Turn left/turn right states
Vehicle turns left or right depending on location of its goal
Turn back states
Vehicle simply does a turn to the bottom or upside


Detect state/Finish state
States that have nothing to do with movement, but recalculating and preparing for way to 2nd goal
Stop State
Starting and end state
Functions like drive(), turnLeft(), turnRight(), driveStraight(), Stop() used in states

Thank You

- Question?