

## LAB 3: Adding Functionality

### Due: Thursday, October 12<sup>th</sup> 3pm

The purpose of lab 3 is to further explore cozmox capabilities and establish a good code base for future labs. In this lab you will implement continuous driving, finite state machine behaviors, and AR code reading on top of your lab 2 code.

**Continuous driving [20 points]:** If you have not already, implement cozmox motion using the `drive_wheels` command. This is necessary for the ability to drive and turn in place which is essential for the second part of the lab.

**FSM [30 points]:** Adapt your code to include the capabilities of a finite state machine. There are many ways of doing this but it must be object oriented not a series of `if, elif` statements. We require at least three states to be demonstrated during the demo, use of the cozmox screen to display the current state, an auditory signal for a state change, and a print statement on your terminal to show state changes. To summarize when your code runs we need to be able to see the current state on the cozmox screen, hear a beep when the current state is changed and see on your terminal the exiting state and the entering state.

**Reading AR Codes [30 points]:** One cube will be placed in the Arena with your robot. Your robot must navigate to a pre designated face of this cube and then face it. Note that in this step, you use the AR marker on the cube. Before demoing you will tell your TA which face your cozmox will go to and your TA will take this into account when placing the cube.

**Follow moving target [20 points]:** After your robot has reached the cube it should switch to a color searching and tracking state. While searching the colored cube will be moved in front of the robot and cozmox must follow it. If the colored leaves the robots sight, it should begin its search pattern in the direction it was last seen.

**Evaluation:** The point breakdown for this lab is as follows:

The robot uses <code>drive_wheels</code> for its motion and is able to demonstrate this.	20 pts
The robot displays the current state on its face.	5 pts
The robot beeps to indicate a state change.	5 pts
Your terminal displays the exiting state and the entering state.	5 pts
Your code makes use of at least three distinct states.	15 pts
Your robot successfully navigates to the designated face of the cube.	30 pts
The robot tracks a moving cube and is able to move toward it.	10 pts
The robot begins its search pattern in the direction in which the cube exited its view	10 pts

The demo will take place in class on the day the assignment is due. Please make sure to bring your cozmox, phone, USB cable, and laptop as well as any chargers that may be required on this day.

**Submission:** Submit a zip file containing all code used for this assignment in one python file with the file name following the form `WilliamsJake_GoksalKaan.zip` where you substitute your partners and your name for ours. Only one partner should submit to T-Square.