Robot Challenge Journal

Challenge No.: 2
Team 8 Name: Team Gr8
Members' Names: Sean Markus, Abigail Smith, Aaron Chau

Date	Seq. #	Name(s)	Hypothesis/Behavior	Description/Results
4/19	1	Sean - Abigail - Aaron	We need to test the light and sonar sensors, as well as choosing a team robot and figure out how to mount the sensors	We chose Abigail's robot, It's has the best sensitivtiy of bumper, and the front is easy to modify. We decided to use Aaron's wander code. It's well organized and can be modified easialy. The color sensor must be very close to the color to sense in the example code, so will will place it pretty close to the floor. We will put the 2 sensors close to detect if the robot is going off the line quickly and react. Aaron had to leave for class, Sean and Abby stayed behind to clean up the wander code a little bit (we removed all of the bumping code), and we got the color sensors on the robot.
4/21	2	Sean - Abigail - Aaron	We need to test and mount the sonar sensor. We need to begin writing and testing code to detect when the sonar is in front of an object, as well as when one of the color sensor sees a line. -approach an object as fast speed when it is farther away, slow down as it gets closer.	We mounted the sonar fairly close to the color sensors, hopefully not too close. Our code succesfully speeds towards an object it sees and slows down, slthough it does not handle noisy outliers yet. The only problem was our algorithm for slowing down caused the robot to slow down too fast and too much, we wanted more of an exponential curve. We successfully implemented a function that slows the robot down exponentially. At first it didn't work (function was: -(x - 92)^2 + 92). The problem was we just weren't remembering our algebra and the

				function wasn't doing what we wanted. The final function that worked was: $-(.1x - 10)^2 + 100$., wher x = the value being read in by the sonar sensor.
4/21	3	Sean - Abigail	-detect lines on the ground	Aaron had to leave, and we've decided to meet at 3 again today. Sean and Abby stayed behind for about an hour after Aaron had to leave to start working on line detection. Not quite successful, we'll need to wait until we're all together to start testing again.
4/21	4	Sean - Abigail - Aaron	We need to brainstorm how we will implement the line follow. Should we have the two sensors close together and stay within the line. Should we keep them apart and keep the line in the middle? Do we need to follow the edge of the line or stay in the middle of it?	We decided to follow the edge of lines with 2 sensors right next to eachother. We implemented a wieghted moving average for the sonar detection. Doing color calibration like it was mentioned in class might be difficult without global values, so we will implement them for now. We are informed that we can move the robot to the white and black ourselves and calibrate the colors upon button presses to begin, so we implemented that. Even with that in place, our calibration goes terribly wrong.
4/26	5	Sean - Abigail - Aaron	The color calibration is deeply flawed. If we can't get it to work we may have to add in some hard-coded values to also check as a fail-safe, but we'll try some things. .	We started today by fixing our line following method, there was a bug in it where it wouldn't follow the line anymore. Our fix involved changing which direction the robot turned when it detected a black line. Our robot can also now detect a line on the right sensor, where before it would only detect on the left side. Next, we're still having problems where the robot detects black color while still on the white mat. We're not entirely sure what the problem is, but we've implemented a task to keep an updated average for the color we

				see on the right and left sensor. We were about to test it when another class took over the lab and we had to leave. Todo: fix the problem where the robot detects black on white, get the robot to exit a line eventually.
4/28	6	Sean - Abigail - Aaron	We think that we might be getting black readings on white because the color sensors were too low to the ground, so when it ran over a bump, the tarp would block the sensor from reading in any color, so it would read as black. We're going to raise the height of the sensors to try and prevent this.	At an angle, the sensors become unreliable, so we will continue to face them straigt down. We remade the front of the robot so the sensors are not quite as close. This seemed to help slightly. Although we found our real problem, which was a slight bug in our code where we weren't checking the running average for the color, we were only checking the current reading. We fixed this and the robot no longer sees black on the white tarp.
4/28	7	Sean - Abigail - Aaron	There was a logic error in our follow line code that caused the robot to follow a line jerkily.	We fixed the logic error and now the robot follows the line smoothly.
4/28	8	Sean - Abigail - Aaron	With color detection at acceptable quality we just need to package in and handle the sonar object detection behavoir as well.	We're getting weird sonar reads when there shouldn't be any sonar readings, just like what we were getting with detecting black on white. We've tried many things, including attempts to buffer out any outlier readings in a for loop, and calculating the average sonar reading in the same task that calculates colors. We're still getting buggy readings, so we're trying a different strategy, which is to ignore outlier readings completely, until we've seen several readings of that value. After putting in some checks to ignore outliers, the robot seems to work pretty well. We also implemented

				code to check for outliers in color detection.
5/3	9	Sean - Abigail - Aaron	Demo one showed that our robot leaves too early especially on lines like the 90 degree turn. We will have to keep making adjustments so that it can make the turn without messing up the rest of the behavoir. Wander code worked really well.	The robot turns to adjust with much greater speed now. It will sometimes stay on the 90 degree line and always stays on the other lines. Some rejected quick turn ideas helped it stay on better but would make it difficult to exit the normal lines, this might be the best compromise.
5/3	10	Sean - Abigail - Aaron	We've played around with how fast the robot turns and for how long when it's following a line and both sensors leave the line. Also, we're raising our color sensors again to eliminate wringle detection.	We've settled with a bit of a harder turn when both sensors have left the line for a certain time. Otherwise, turn speed is kept smooth. Also, we've increased the amount of time it takes for the robot to decide it's left the line to get around that 90 degree turn. Looks like raising the sensors does the trick and the robot no longer detects large wrickles as lines.
5/5	11	Sean - Abigail - Aaron	Demo 2 went great. The robot handled all line and sonar behavoirs	