**Rework existing robot control code**

**Write function to control motors**

* Done, accepts linear and angular velocity and sets each wheel velocity. Needs calibration to convert the angular velocity of each motor to a int the motor driver can accept(0-255)

**Write code to count encoder ticks**

* I think the hall effect sensors are on interrupt pins and just tick when they detect a threshold
* Use code to calculate angular velocity at different ints to calibrate
* Use the encoder ticks to calculate the change in x distance, y distance and theta (assuming constant velocity between loops convert ticks over time to velocity and then with angular velocity of each wheel and time change in theta and distance can be calculated)

**Write code to read sensor code**

* Use gyro and accelerometer with magnetometer to develop Kalman filter

**Combine Kalman filter estimation with encoder estimation to determine position and angle of the agent**

* Need to use a weighted average of the two to get estimation

**Wireless networking**

* Use XBees or find other option to send each agent a target position and then have them send signal when they have reached the position asking for next position
* XBee has an API mode that allows sending messages to individual radios instead of all available. There is a Java and Arduino library (one set from digi and another from a independent developer that appear to be compatible with their counterparts)
* Tried to use API mode but can’t get example java programs to run (error trying to run a 32-bit dll) maybe the linux version is working

**PID control for determining linear and angular velocity**

**Fix/rework/rethink localization beacons**

* Maybe cameras would be the way to go but you would need a more powerful host than the RPi
* With cameras correct for lens distortion then use fiducial markers for each robot that way the angle and position of each robot can be tracked fairly fast (could eliminate the need for a lot of the drift correction depending on the accuracy and speed of the camera positioning) camera would need to be mounted on the ceiling I think