Final project algorightm

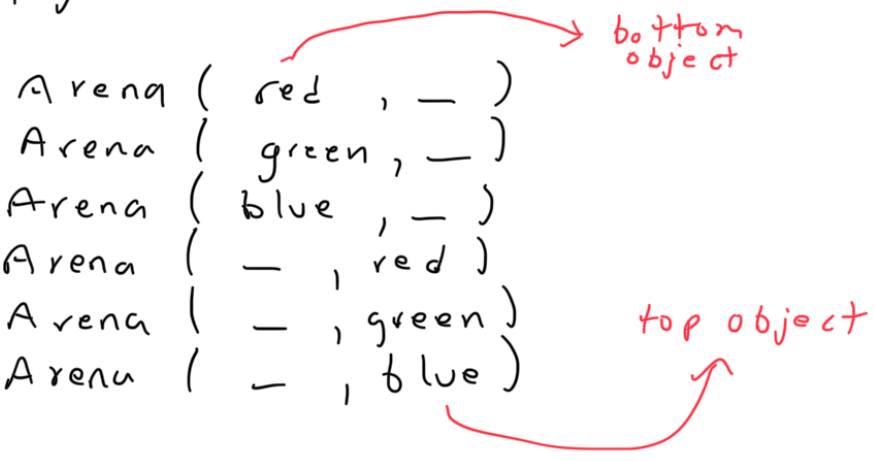
Algorithm

- Find closest point in roadmap for object i
- Navigate to this point
- Determine color of object
- Determine optimal pre-plow point (ppp) in roadmap
- Navigate to ppp in roadmap
- Plow
- Repeat one more time for object i+1

Roadmap design

Find 6 lines the connect each colored object with their respective collection zone.

We need a line for each of the following configurations



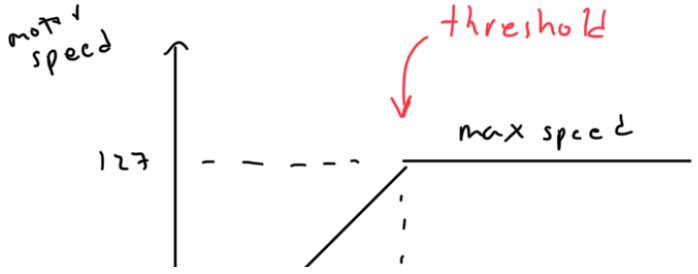
The pre-plow position is a point in this line that allows the robot to plow the object towards the collection zone in one move.

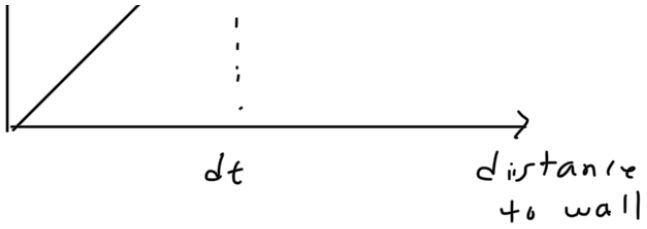
Combining an analytical approach and experimentation we found the following pre-plow-points and zone targets

	PPP	zone target
Arena (red , _)	(-0.4, -2)	(2 , 2.2)
Arena (green , _)	(-1, -1.25)	(2.08 , -1.9)
Arena (blue , _)	(0.75, -2.2)	(-2.25 , 0)
Arena (_ , red)	(-0.75, 1.35)	(2.2 , 2.2)
Arena (_ , green)	(-0.5, 2.2)	(2.2 , -2.2)
Arena (_ , blue)	(0.62, 2.1)	(-2.2, 0)

Wall avoidance

If a it's a long distance trip ($d \geq 3.5m$) reduce speed of the wheel opposite to the wall





$f(d = dt) = 127$

$f(d = 0) = 0$

$f(d) = md + c$

$f(0) = 0 = c$

$f(dt) = 127 = m\,dt \Rightarrow m = \frac{127}{dt}$

Example

If $dt = 1$,

then $m = \frac{127}{1} = 127$

$f(d) = 127d$