STONY POINT HS -- ROUND ROCK ISD

Design Problem – Marble Sorter Project 3.3.1 – VEX and RobotC

Adam Frankovic, Bianca Diaz, Fabian Perea, & Kevin Calderon April 12, 2017



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Design Brief

Client Company:	National Recreation and Park Association (NRPA)
Target Consumer:	Society
Designer(s):	Adam Frankovic, Bianca Diaz, Fabian Perea, & Kevin Calderon
Problem Statement:	The National Recreation Park Association (NRPA) has asked your team to develop a solution to a growing problem in their parks. The association has placed dumpsters for recyclable material throughout the parks. They have a sorting facility; however, they need a device that will sort the recyclable material.
Design Statement:	Design, model, and test a device that will separate recyclable materials.
Problem Statement:	 Separation process must be fully automated. Must successfully separate commingled recyclable materials into individual holding bins. Recyclable materials include 3 different ½-in. material spheres totaling 15. Examples could include steel, aluminum, wood, opaque plastic, and clear plastic. Must be efficient—2 minute max for completion of sorting process. Must not be larger than 24"L x 12"W x 18"H Must make efficient use of materials.

FINAL DESIGN PICTURES

<Include pictures of your final robot. You must have a minimum of 2 pictures of each part of your project Dispenser, Sorter, and Bins, as well as at least 2 over all pictures of your robot.>







ROBOTC CODE

rnFlashlightOn(flashLight, 127);	//Turns flashlight on
ile(1==1)	//Sets condition to be true
<pre>if(SensorValue(lineFollower)<=2700 && (SensorValue(lineFollower)>=2400)) startMeton(sightWeton = 23 5);</pre>	<pre>//The sensor value reads in between the two variables I set //The motor turns on at the set speed</pre>
startmotor (Fightmotor, -23.3),	//The motor will way for 10 seconds
stopMotor(rightMotor):	//The motor will stop
scoped to (lighthotto),	//The motor will wait 1 5 seconds
if/SensorWalme/lineFollower) <= 2300 ff (SensorWalme/lineFollower) >=2000))	//The sensor value will read in between two variable I set
(Sensorvalue(Interollower) <- 2000 && (Sensorvalue(Interollower) >-2000))	//ine sensor value will lead in between two vallable i set
setServo/servoMotor2 _40);	//The 2nd serve motor sets to position _40
wait(5):	//The motor will wait for 5 seconds
setServo(servoMotor =127):	//The 2nd serve motor gets set to postion -127
wait(1):	//The motor will wait for 1 second
setServo(servoMotor 0):	//The serve motor gets sets back to original postion
setServo(servoMotor2 5):	//The other serve motor gets set back to its original positi
3	,, the oblice beens motor geod bed bash of 100 original poblor
else if(SensorValue(lineFollower)<=350 && (SensorValue(lineFollower)>=50))	//The sensor value reads in between the two variables I set
{	55-9755 ALTERATE SECTOR STRATE ALTER SCHULTT FLA AND STRATEMENT A ALTER
setServo(servoMotor2, 50);	//The 2nd servo motor sets to position -40
wait(.5):	//The motor will wait for .5 second
<pre>setServo(servoMotor, -127);</pre>	//The 2nd servo motor gets set to postion -127
wait(1);	//The motor will wait for 1 second
setServo(servoMotor,0);	//The servo motor gets set back to its original position
setServo(servoMotor2, 5);	//The 2nd servo motor gets sets back to its original position
}	
else if(SensorValue(lineFollower)<=1300 && (SensorValue(lineFollower)>=400))	//The sensor value reads in between the two variables I set
<pre>setServo(servoMotor, -127);</pre>	//The servo motor gets set to a position of -127
<pre>wait(.3);</pre>	//The servo motor waits 3 seconds
	//The serve motor goes back to its original postion

Reflections

A) How well did you accomplish your objectives, discuss your success for EACH of the 6 constraints?

-Our marble sorter was successful and simple. The marbles that we chose were; metal, wood, and opaque plastic. Our intake roller would release 1 marble at a time and would stop for the marble to be read by the light sensor. Then the servo motor would adjust itself into the right position for the marble to fall in for its specific material. It also sorted every marble out in under a minute! Our design met the correct measurements and didn't go over it, it also did not use many materials because that would make the sorter more expensive but we did make great use out of the materials that we chose to work with.

B) What would your team do differently with your design solution (min 3 things) and why?

- 1.) Made it smaller, to be more cost efficient.
- 2.) Made a better design to where we wouldn't need something to keep the marbles in place from jumping out of place.
- 3.) Made a smaller code, there could've been less code.

C) Do the results fulfill the problem statement, if not what was missing?

-Our results meet all the requirements and it wouldn't cost them much to build it.

D) If you had more time, what would you do differently or what would you add. (*Give a minimum of one thing for each PART: Dispenser, Sorter, Bins*)

-One thing that we would change about our dispenser is make it dispense the marble sorter faster and smoother. For the sorter we would place the line follower in a different position to get better results. Lastly for our bins we would chose better bins because the bins we were using started to bend a little.

References

https://www.youtube.com/watch?v=rpqIDKP5bBc https://www.youtube.com/watch?v=pbOEmqHfaqo https://www.youtube.com/watch?v=GnluqACRATs https://www.youtube.com/watch?v=bmbXOAaNtqg https://www.youtube.com/watch?v=D1_95iwljyw

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https://www.youtube.com/watch?v=EV92YD1_Sd4 https://www.youtube.com/watch?v=JreLXx4o8UI https://www.youtube.com/watch?v=7hkcfO7Bh44 https://www.youtube.com/watch?v=P87aMXONZi0 https://www.youtube.com/watch?v=pbOEmqHfaqo

APPENDICES

DISPENSER BRAINSTORMING

PLTW Engineering

Decision Matrix Template

Criteria											
Ideas	Accuracy	Simplicity- Building	Simplicity- Coding	Time Spent Building			Totals				
1	2	2	4	3			11				
2	3	3	3	4			13				
3	3	4	4	4			15				
4	3	2	2	2			9				

Key: 4 best -- 1 worst Must include a minimum of 4 criteria.

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FINAL:



Sorter Brainstorming

PLTW Engineering

Decision Matrix Template

Criteria												
Ideas	Accuracy	Simplicity	Speed	Time Spent On Building			Totals					
Light Sensor	2	3	3	4			12					
Light Sensor + Seesaw	3	4	4	2			13					
Flashlight + Line Tracker	2	2	2	3			9					
Limit Switch	2	3	3	4			12p					

Key: 4 best -- 1 worst Must include a minimum of 4 criteria.

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FINAL



BINS BRAINSTORMING

PLTW Engineering

Decision Matrix Template

Criteria												
	Simplicity	Speed	Accuracy	Reliability								
Ideas							Totals					
1	4	3	3	3			13					
2	2	1	3	2			8					
3	2	2	3	3			10					
				-								
4	3	3	2	3			11					

Key: 4 best -- 1 worst Must include a minimum of 4 criteria.

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FINAL



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Design Modifications

Design Modifications Chart

Group: 1-3

Use this chart to document all modifications to your final design solution. Describe the design problem requiring modification and your proposed solution. Then sketch and annotate each design modification. List changes to vex parts list and pseudocode changes. <u>Sign and date all entries.</u>

	Window Street				
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	t changes to pse	audocode or write	new pseudocode	and attach	
N/A	f changes to pse	addcode of write	new pseudocode		

Group: 1-3

Use this chart to document all modifications to your final design solution. Describe the design problem requiring modification and your proposed solution. Then sketch and annotate each design modification. List changes to vex parts list and pseudocode changes. <u>Sign and date all entries</u>.

Explain the Problem and Proposed Solution
So our marbles agen't living up right and the marbles are
going everywhere, so we're goin to add a 12" long side
track on top of the c channel



Group:

2

Use this chart to document all modifications to your final design solution. Describe the design problem requiring modification and your proposed solution. Then sketch and annotate each design modification. List changes to vex parts list and pseudocode changes. Sign and date all entries.

Explain the Problem and Proposed Solution	
Our intake roller wasn't working out becau	se it would
Short two markes at a time. On sollution	is switching
the intoxe collex and replace, and 2-wive mos	tor for
a ausset pivot a and a serve motor.	
a gusset, pivot c and a server motor.	



Changes Approved by Teacher:

Group: 1-3

Use this chart to document all modifications to your final design solution. Describe the design problem requiring modification and your proposed solution. Then sketch and annotate each design modification. List changes to vex parts list and pseudocode changes. <u>Sign and date all entries.</u>

Explain the Problem and Proposed Solution	
The serve motor wasn't working out for us so we're	
going to change it back to a 2-wire motor and the	
ausset pivot c wasn't working out for us either so well	
doing back to an intake roller	
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Changes Approved by Teacher:

Date: 21

Group: 3-

Use this chart to document all modifications to your final design solution. Describe the design problem requiring modification and your proposed solution. Then sketch and annotate each design modification. List changes to vex parts list and pseudocode changes. Sign and date all entries.

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