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# Team 3958

Cailin Fitzgerald and The Jindal Sisters

# Robot Design

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We re-used the base robot design from last year

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The front was modified for pushing

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The top had a better attachment for lifting

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We optimized code

# Programming

Re-usable MyBlocks for basic navigation

This block was developed on 12/30/22 by Callin Fitz. This block takes a target distance and speed as inputs. The MyBlock converts the target distance to an acceptable value for the default program block. In experiments, I determined that the actual distance traveled is greater than the target by a constant ratio of 1.575.

```
define Drive Straight Forward Actual Distance Speed
  set movement motors to C+E
  move straight: 0 for Actual Distance / 1.575 in at Speed % speed
```

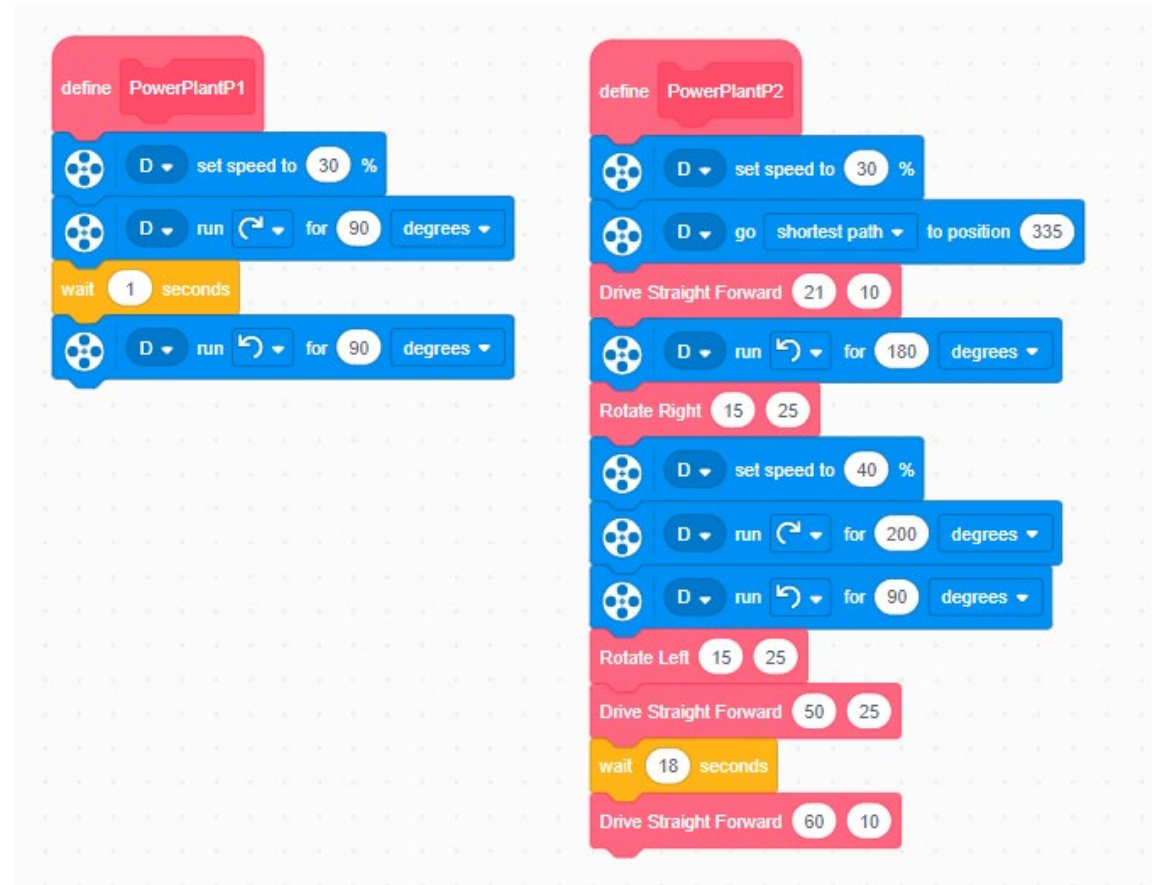
```
define Drive Straight Back Actual distance 2 Speed 2
  set movement motors to C+E
  move straight: 0 for Actual distance 2 / 1.575 * -1 in at Speed 2 % speed
```

```
define Rotate Left direction speed
  set movement motors to C+E
  set InitialYaw to yaw angle
  repeat until yaw angle < InitialYaw - direction
  start moving at speed * -1 speed % speed
  stop moving
```

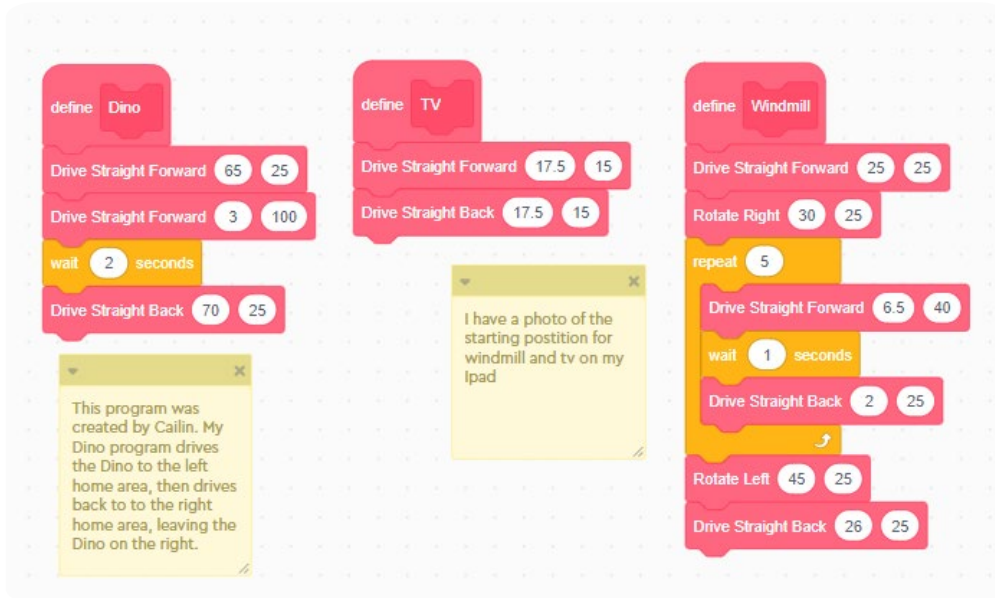
```
define Rotate Right Direction Speed
  set movement motors to C+E
  set InitialYaw to yaw angle
  repeat until yaw angle > InitialYaw + Direction
  start moving at Speed Speed * -1 % speed
  stop moving
```

# Programming

- Each pathway uses custom MyBlocks and other commands to operate the run.



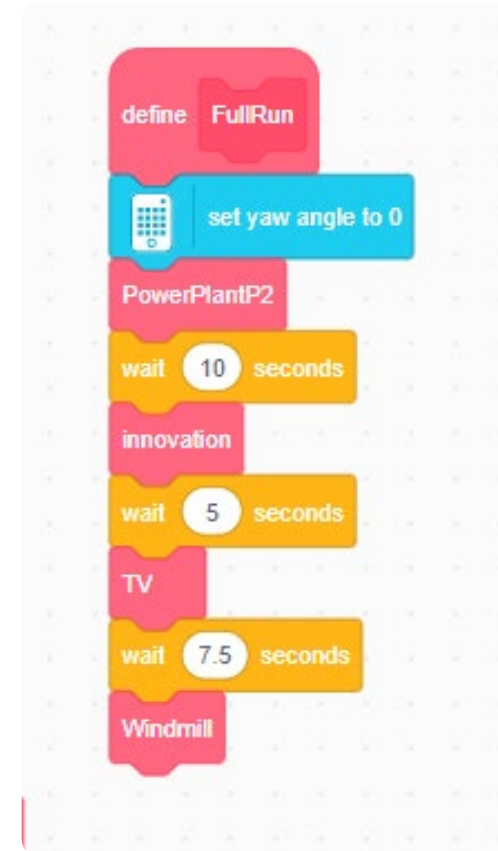
# Programming




- These sections of code are defining MyBlocks with smaller MyBolocks
- They are the code for Dino, TV, and Windmill

# Programming

All smaller programs relate to some waits, to run a full program.



# Missions

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- M00 Equipment inspection
  - M10 Power Plan
  - M09 Dinosaur Toy
  - M01 Innovation Project



# Power Station

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- This attachment used a medium motor to lift up the handle on the power station to release the three batteries.
- Once of the batteries rolled to parnter on far side of table.





# Toy dinosaur

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- Robot carried dinosaur on top of robot and crossed the length of the field.
- Partner on far side of table would grab toy, remove the attachment, turn the robot around for the return trip. This was done by a timer so that another program did not need to be selected.
- After the robot returned the partner would place a battery inside the toy.



# Innovation Project Placement

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- For the innovation project, our robot pushes our set of white Legos into the circle, then comes back to home base
- For this mission, we made a pusher, built out of 2 long bumpers



# Television

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- On this mission, we remove all attachments while a timer counts off automatically, instead of coding a separate program to worry about
- When the timer ends, the robot makes its way to the couch and television, flips the TV up, and returns back to base



# Windmill

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- After getting back from TV, there is another timer in which we will set the robot up at the location that we need
- The robot will then drive to the windmill, and start pushing to unload the energy
- Initially, since there were three energy blocks, we had the robot push three times
- We then discovered that the robot did not push a block out every time
- So, we had it push five times instead of three to ensure success
- After pushing, the robot returns to base, and we're done!



# Total Score: 185



Team #  Round #  Score **185** Referee Signature   
 Team Name  Team Signature

	<b>M00 Equipment Inspection</b> Does the team's equipment all fit in one launch area and under 12 in. (305 mm)?	20	<input checked="" type="radio"/> Yes <input type="radio"/> No		<b>M09 Dinosaur Toy</b> The dinosaur toy is completely in the left home area?	30	<input checked="" type="radio"/> Yes <input type="radio"/> No
	<b>M01 Innovation Project Model</b> Does the innovation project model have at least two white LEGO pieces, measure at least 4 studs in some direction, and is at least partly in the hydrogen plant target area?	10	<input checked="" type="radio"/> Yes <input type="radio"/> No		The dinosaur toy lid is completely closed with the following inside:		<input checked="" type="radio"/> Rechargeable Battery <input type="radio"/> Energy Unit <input type="radio"/> Nothing or Not Closed
	<b>M02 Oil Platform</b> Number of fuel units in the fuel truck?	0	<input type="text" value="0"/> 0-3		<b>M10 Power Plant</b> Number of energy units no longer touching the power plant?	25	<input type="text" value="3"/> 0-3
	Is the fuel truck at least partly over the fueling station target?		<input type="radio"/> Yes <input type="radio"/> No		<b>M11 Hydroelectric Dam</b> Is the energy unit is no longer touching the hydroelectric dam?	0	<input type="radio"/> Yes <input type="radio"/> No
	<b>M03 Energy Storage</b> Number of energy units completely in the energy storage bin? (cannot be touching equipment)	0	<input type="text" value="0"/> 0-3		<b>M12 Water Reservoir</b> Number of looped water units completely in the water reservoir, touching the mat? (cannot be touching equipment)	0	<input type="text" value="0"/> 0-3
	The energy unit is completely removed from the energy storage tray? (cannot be touching equipment)		<input type="radio"/> Yes <input type="radio"/> No		<b>M13 Power-To-X</b> Number of energy units completely in the hydrogen plant target area?	0	<input type="text" value="0"/> 0-3
	<b>M04 Solar Farm</b> Number of energy units completely removed from their starting circles?	0	<input type="text" value="0"/> 0-3		<b>M14 Toy Factory</b> Number of energy units at least partly in the slot in the back of the toy factory (or in the red hopper)? (cannot be touching equipment)	0	<input type="text" value="0"/> 0-3
	<b>M05 Smart Grid</b> Your field's orange connector is completely raised? (cannot be touching equipment)	0	<input type="radio"/> Yes <input type="radio"/> No		The mini dinosaur toy has been released? (cannot be touching equipment)	0	<input type="radio"/> Yes <input type="radio"/> No
	Both team's orange connectors are completely raised? (cannot be touching equipment)		<input type="radio"/> Yes <input type="radio"/> No		<b>M15 Rechargeable Battery</b> Number of energy units completely in the rechargeable battery target area? (cannot be touching equipment)	0	<input type="text" value="0"/> 0-3
	<b>M06 Hybrid Car</b> The hybrid car is no longer touching the ramp?	0	<input type="radio"/> Yes <input type="radio"/> No				
	The hybrid unit is in the hybrid car?		<input type="radio"/> Yes <input type="radio"/> No				
	<b>M07 Wind Turbine</b> Number of energy units no longer touching the wind turbine?	30	<input type="text" value="3"/> 0-3				



# Performance Video

This is the link:

<https://youtu.be/K6eMdeM6FR4>

