

11

Figure 8

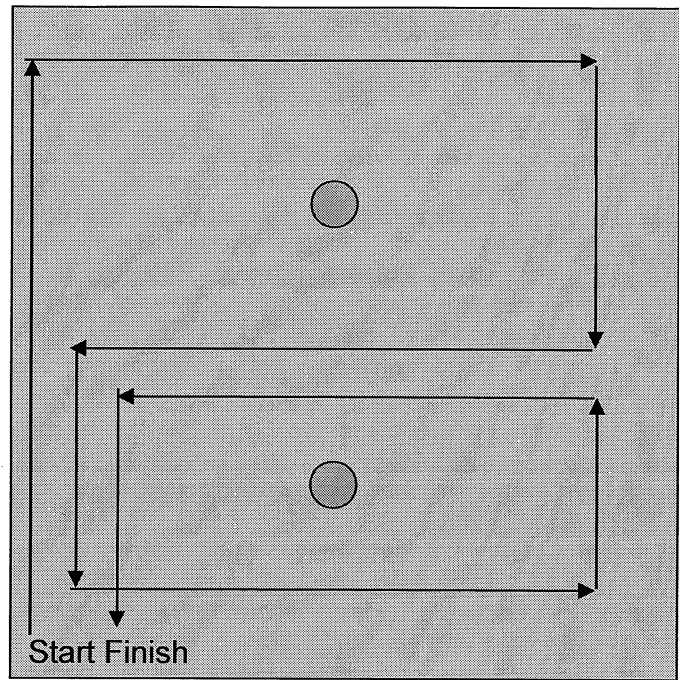
Mission: the robot will do a figure 8 around the course using a combination of straight runs and pivot turns.

Equipment:

2 empty 16 ounce soda or water bottles to use as posts for the robots to go around. Set them up as shown in the illustration.

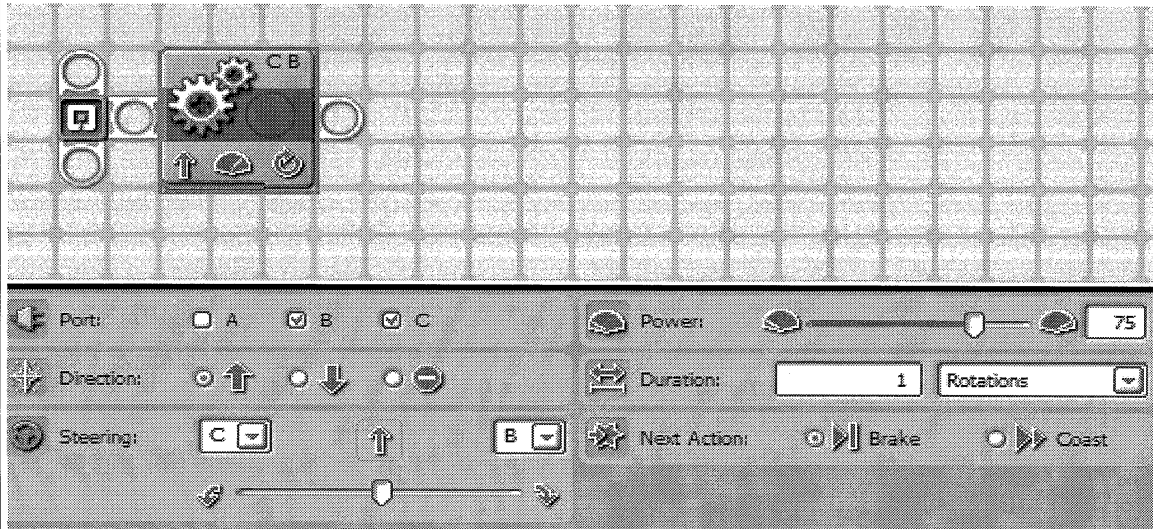
Sensors:

none



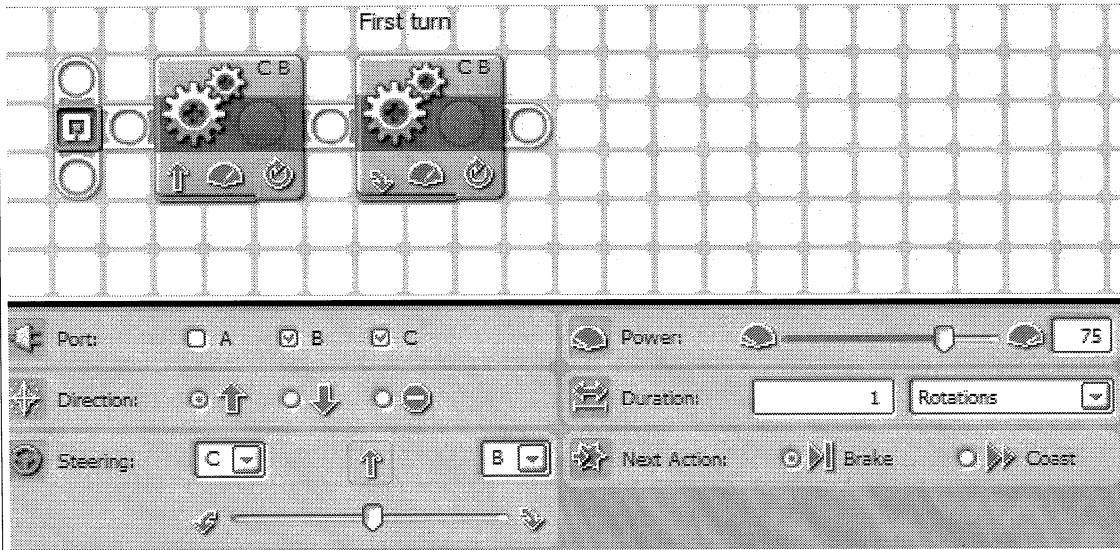
Directions:

1. Place a move block at the first of the program bar. Set the rotations to enough rotations to get it near the far side of the table. This will be about 3.5 feet. Refer to your engineers journal for the amount of rotations to go the distance.



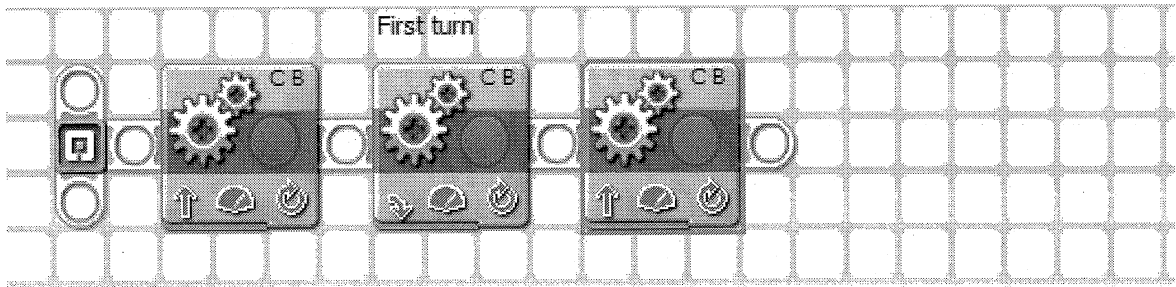
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2. Place a move block on the line and slide the slider all the way tot the side so the robot will spin in place. Set the slider so the robot will turn right and set the rotations so the robot will turn 90 degrees.



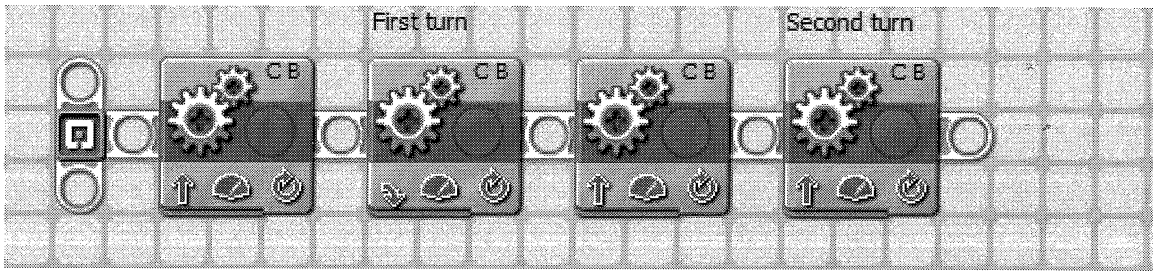
This is the first turn

3. Place a move block on the bar and set the rotations to get near the next wall. The number of rotations will be the same as step 1.



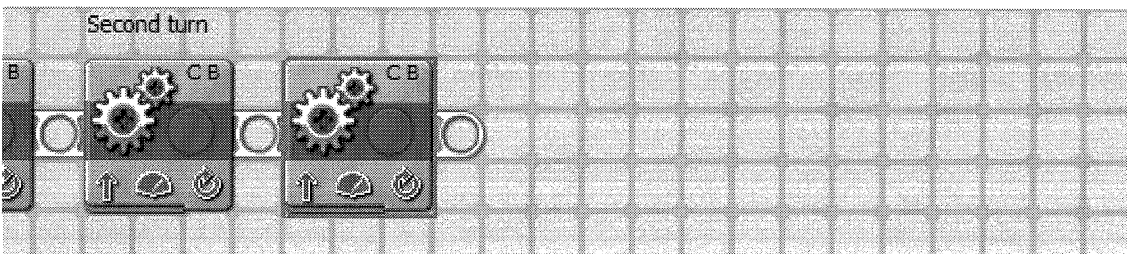
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4. Place a move bar on the bar and set it the same as step 2 so the robot will turn to the right again.

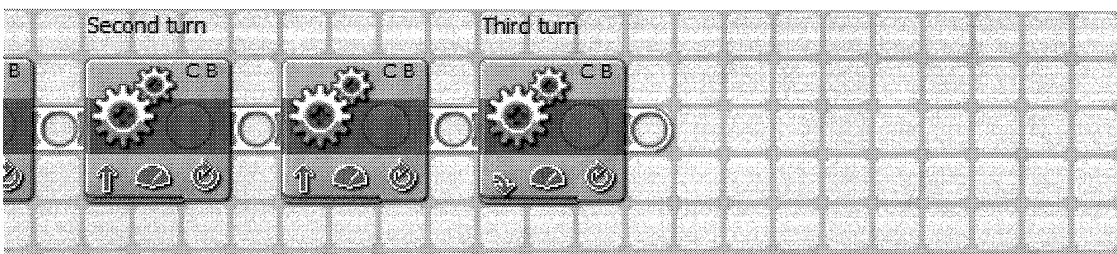


This is the second turn.

5. Place a move block on the bar and set it to go half way down the field. That would be half the rotations you used for step 2.



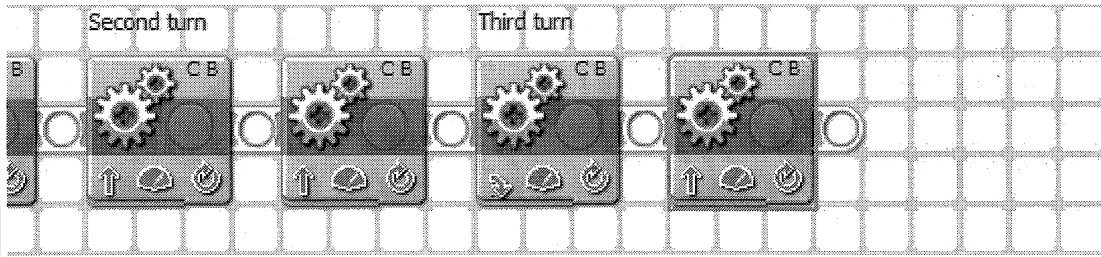
6. Place a move block on the bar and set it for another right turn like you did on step 2.



This is the third turn.

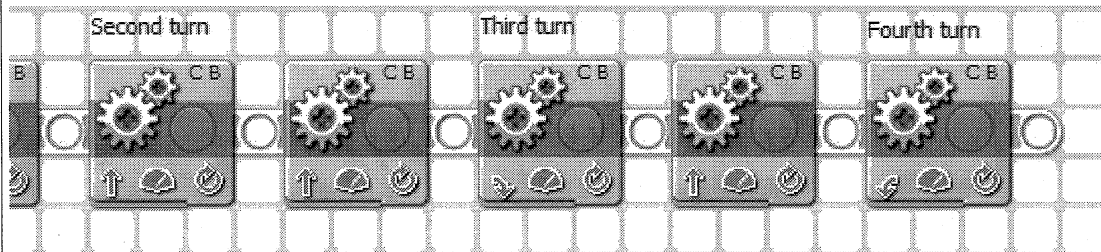
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7. Place a move block on the program bar and set the rotations to the distance you did on step 3.



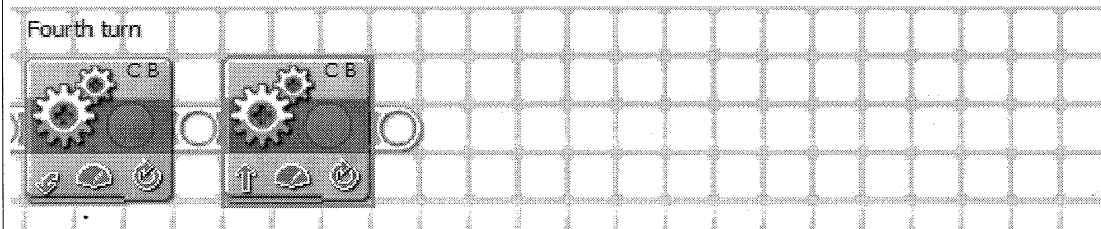
This step moves the robot between the two poles.

8. Place a move block on the bar and set it to turn like the other turns you did but this time it needs to turn the other way. It needs to turn to the left.

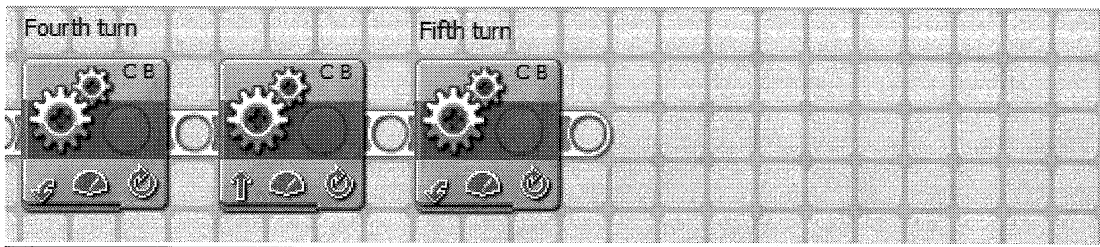


This step makes the robot turn towards the starting point.

9. Place a move block on the bar and set the distance the same as you did for step 5.

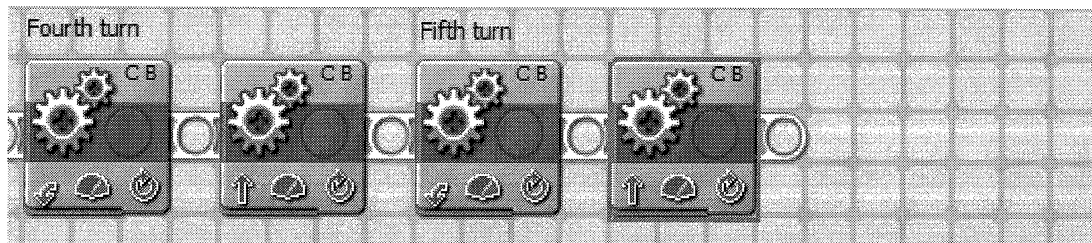


10. Place a move block on the bar and set it to a left turn like you did in step 8.



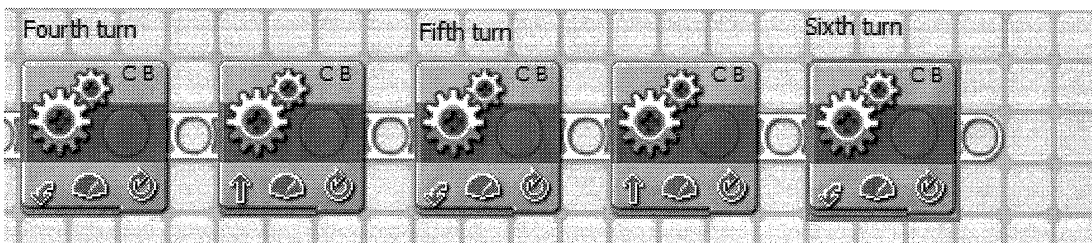
This should get the robot very near the starting point.

11. Place a move bar on the bar and set it to the distance you did for step 7.



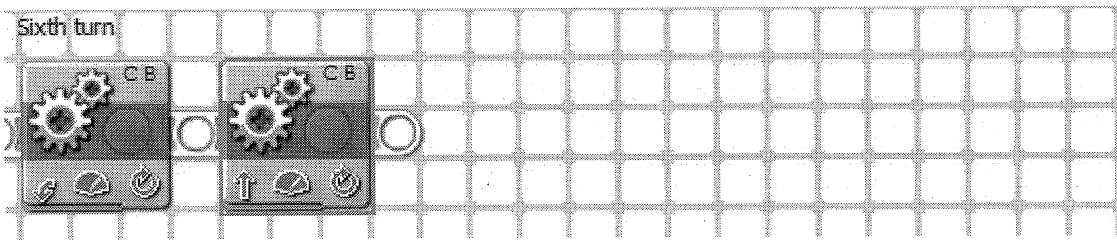
This moves the robot along the bottom of the field and away from the starting point.

12. Place a move block on the bar and set it to a 90 degree left turn like you did on step 8.



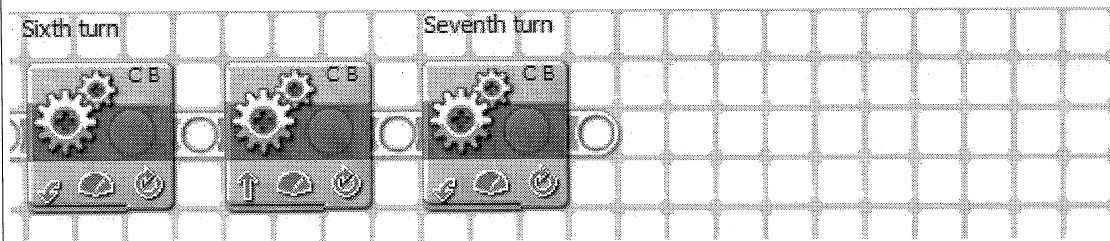
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13. Place a move block on the bar and set it to go half way up the field like you did on step 9.



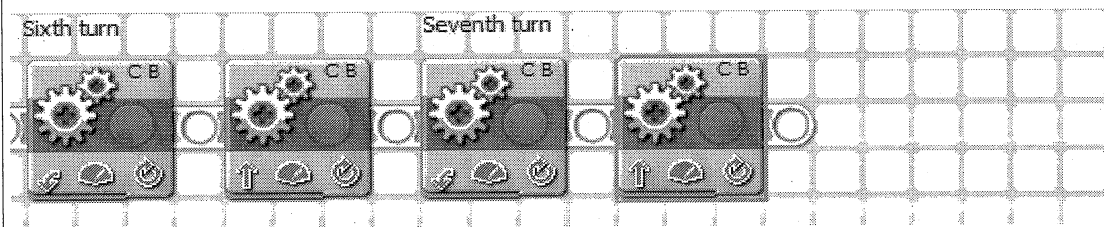
This moves the robot up the right side to the middle from top to bottom.

14. Place a move block on the bar and set it to a 90 degree left turn like you did on step 8.



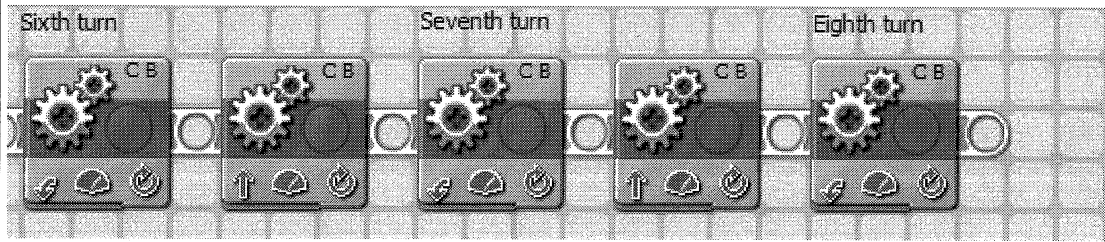
This should turn the robot so it is now facing between the two poles.

15. Place a move block on the bar and set it to the distance you set in step 11.



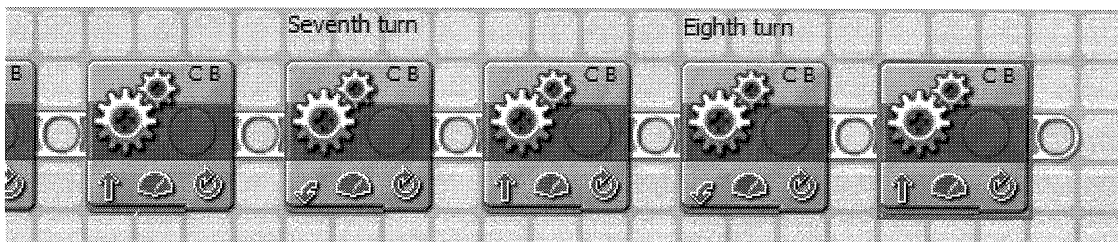
This moves the robot between the two posts and gets it just above the starting line.

16. Place a move block on the bar and set it to turn the robot 90 degrees to the left like you did in step 14.



This will turn the robot so it is now facing the starting point.

17. Place a move block on the bar and set the rotations to what you did on step 13.



This should get you to the starting point.

18. Make adjustments to all the straight move blocks and all the turns so that everything stays straight. It took a lot of blocks, didn't it? You can use loops to make it easier and keep your program shorter.

This can be a challenging mission. When programming this, the secret is to have the 90 degree turns as exact as you can. Tweak the various parts to keep the robot parallel to the walls.

One of the problems you may have is that the robot does not always turn exactly the same way each time, so sometimes your robot will be able to do the maze and other times it will run into a wall. Some ways to help the robot keep pointed in the right way is to use the **Shimmy Forward** and the **Shimmy Back** as explained later in the book. Writing down the number of rotations for a 90 degree turn and the number of rotations for the robot to travel a foot and using these numbers to program your missions is a great way to save time. This way, there isn't so much trial and error so you can program faster.

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Variations on Figure 8

The exercise can be changed to make it easier if you would like. One way to grade this is to give an A grade for doing the course as it is outlined doing the figure eight. Going around only the top bottle and returning back to the starting place can be graded a B, and going all the way around the outside in a big square can be a C grade.

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