

Understanding the Transition from Free Movement to Line Following

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Introduction

There are some very subtle nuances involved when Evo transitions from free movement to line following. A good understanding of these nuances empowers you to program Evo in some creative ways. This lesson contains two quick hands-on investigations that will allow you to uncover the nature of the transition.

Our OzoBlockly Program

We'll make use of the short OzoBlockly program shown in Figure 1 to learn about Evo's transition from free movement to line following. When the program begins, Evo's top light will be red for 2 seconds, giving you time to place Evo. Then the light turns green and Evo moves forward at a speed of 30 mm/s until a line is found "and then follow the line". But does he always "follow the line", or are there circumstances where he behaves differently?

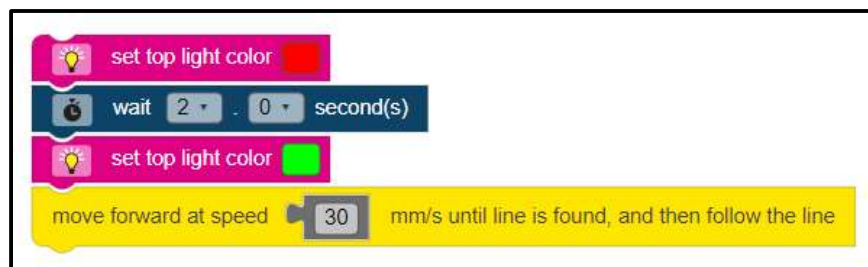


Figure 1

Investigation #1

Your teacher will provide you with a full-page version of the Ozomap shown in Figure 2. With the OzoBlockly program of Figure 1 running on Evo, start by placing Evo at 0° facing directly to the left. Does he follow the line? Continue this process from 10° through 90° in sequence. Make sure that Evo is carefully lined up at the specified angle in each case. Is there an angle at and above which Evo refuses to follow the line?

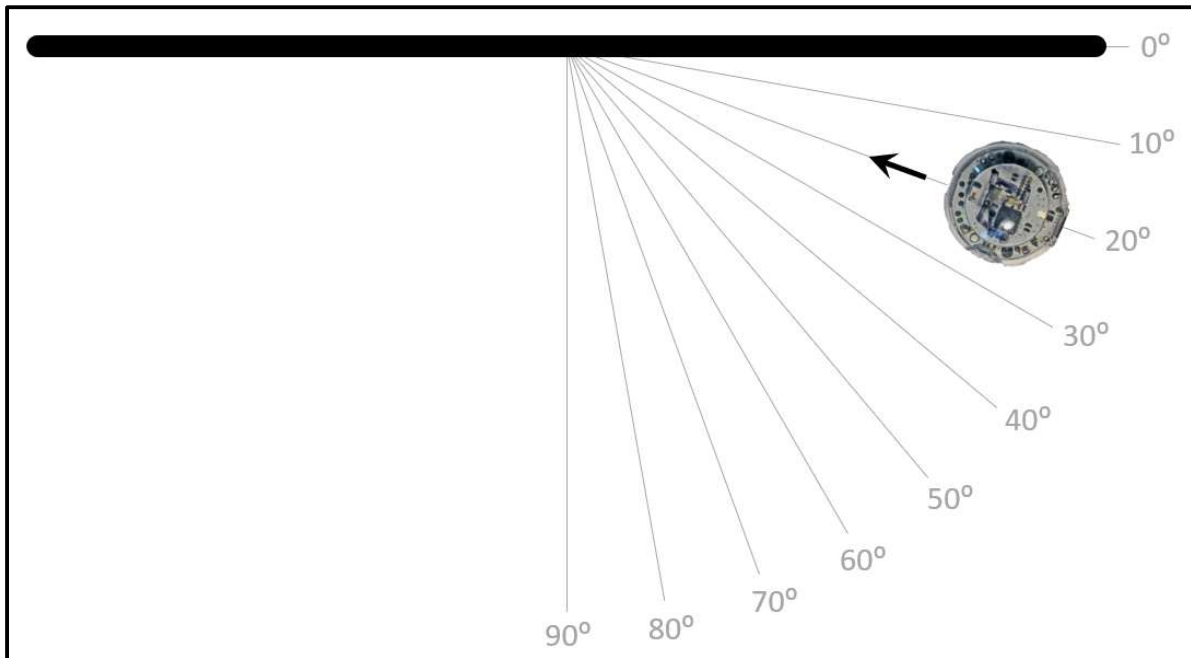


Figure 2

You have probably discovered in your investigation that when Evo approaches the line at an angle of about 50° or greater, Evo simply stops and turns off. But at angles from 10° through about 40° , he starts following the line. In these situations, he doesn't turn off until he reaches the end of the line.

Conclusion—when Evo approaches a line at large angles, it will treat the line as a T-intersection. In these situations, there is an option to go either to the right or to the left. As a result, Evo simply stops when detecting the line.

Investigation #2

In the first investigation, Evo approached the line *near the center* of the line. In our second investigation, we will consider what happens if Evo approaches the line *at an end of the line*, as shown in Figure 3. Start at 0° and proceed through 170° . Evo needs to be heading straight toward the end of the line. If he misses the end, he will just keep going past the line. When approaching the end of a line, what can you say about how Evo's behavior depends on the angle of approach.

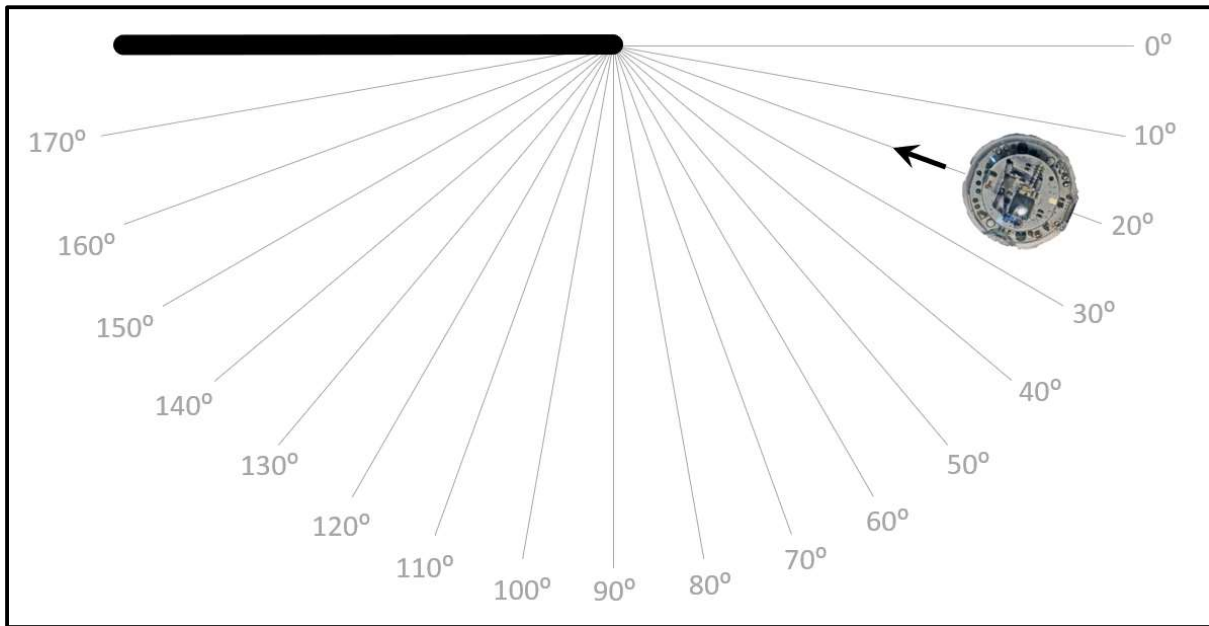


Figure 3

Conclusion—As long as Evo precisely approaches the end of a line, from about 0° to 120° , he seems to follow the line. 30° is a little iffy. At 40° or more, Evo generally will not follow the line correctly.

In closing, you now have a strong foundation on which to design OzoBlockly programs that involve transitions from free movement to line following.