Lesson 8: Worksheet 8.2 – Drive until a black line

In this activity, you will write a program so that your Edison robot will drive forward on a white (reflective) surface until a black (non-reflective) line is crossed.

Look at the following program:

```
1
2   #------------Setup---------------
3
4   import Ed
5
6   Ed.EdisonVersion = Ed.V2
7
8   Ed.DistanceUnits = Ed.CM
9   Ed.Tempo = Ed.TEMPO_MEDIUM
10
11  #-------Your code below-----------
12
13  Ed.LineTrackerLed(Ed.ON)
14
15  Ed.Drive(Ed.FORWARD,Ed.SPEED_6,Ed.DISTANCE_UNLIMITED)
16
17  while True:
18      if Ed.ReadLineState() == Ed.LINE_ON_BLACK:
19          Ed.PlayBeep()
20          Ed.Drive(Ed.STOP,Ed.SPEED_6,0)
```

Look at line 13. This line calls the function Ed.LineTrackerLed() and turns the state to 'on'.

Just like with Edison's obstacle detection beam, to use the line tracking sensor in a program, you must first turn the sensor on. Turning the line tracking sensor on will also activate the line tracker's red LED.

Now, look at line 19. This line calls the Ed.PlayBeep() function. This line doesn't affect the way the line tracking program works. Instead, this line's purpose is for debugging.

Debugging

Debugging is the process of finding 'bugs' or errors in your program. Often, programmers will put lines like line 19 in this program into their code to keep track of the program's flow.

Let's say you run your program, but the robot does not stop at the black line. There are two possible reasons: (1) the robot may not be detecting the black line or (2) there could be a mistake in the final Ed.Drive() command.

If we hear the beep played, we would know that the black line was detected. Therefore, we know that the error was in the next command. This extra debugging code helps us to determine the error more easily.

Other functions could also be used for debugging, such as the Ed.LeftLed() command. For example, you could use this command to turn the left LED on to indicate that a certain point in the program has been reached.

Your turn:

Write the program using the EdPy app and download it to your Edison robot. Use the black line on activity sheet 8.1 to test the program. You can also draw a black line on a piece of white paper or use black electrical tape on a white desk.

> **Note:** Whenever you use Edison's line tracking sensor in a program, always start the robot on the white (reflective) surface – never the black (non-reflective) surface.

Put Edison on the white surface and drive the robot towards the black line.

Then try running the program again using each of the three coloured lines on activity sheet 8.1 one at a time. Drive Edison towards each coloured line to test whether or not the robot will detect the line and stop.

1. Are there colours that Edison can't detect very well? If so, which colour(s)?

   _____

2. Why do you think you got the answer you did for question number 1? Why can't Edison detect that colour(s)?

3. Pretend you were programming your Edison robot to drive a slalom course with three slalom flags. Describe how you could use the Ed.PlayBeep(), the Ed.LeftLed() or Ed.RightLed() functions in a program for debugging purposes and what they would do.