**AP CSP CodeBot**

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| **MISSION 5 Obj 6-9 Fence Patrol** | | **Time: 45 minutes** |
| **Project Goal:** Students will gain an in-depth understanding of CodeBot’s line sensors  **Learning Targets**   * I can make a contact counter to show each line-detect on the user LEDs. * I can teach the ‘bot to stay inside the lines. * I can define a function that returns a Boolean value. | **Key Concepts**   * Engineers build in safety features, like waiting for a button press before starting. * Autonomous robots use sensor data to make decisions and take action in its unique environment. * A dark line on a light background will have a smaller value (use > ); a light line on a dark background will have a larger value (use < ). | |
| **Assessment Opportunities**   * Mission 5 Obj 6-9 Assignment * [Mission 5 Kahoot Review](https://create.kahoot.it/share/firia-labs-codebot-mission-5/20d9499d-fe50-45a7-9f2c-623975832277) * Submit the “LineSense” program (final) | **Success Criteria**   * Define a function that turns on the LED above a sensor if a line is detected. * Count each time a line is detected. * Reuse code from Mission 3 to drive the ‘bot. | |
| **AP CSP Framework**  **DAT-2.D** Extract information from data using a program.  **AAP-2.G** Write conditional statements and determine the result of conditional statements.  **AAP-2.K** Write iteration statements.  **Computational Practice 4.C** Identify and correct errors in algorithms and programs, including error discovery through testing. | **Materials**   * Mission 5 Obj 6-9 Assignment / Answers * Analog and Digital slides * Test surfaces document * [Mission 5 Kahoot Review](https://create.kahoot.it/share/firia-labs-codebot-mission-5/20d9499d-fe50-45a7-9f2c-623975832277) * Code Solutions for: LineSense\_Obj7, LineSense\_Obj9, LineSense\_final | |
| **Teacher Notes**   * Students will follow the instructions and CodeTrek, but then make modifications to the code using these instructions so they use functions in their code and become familiar with creating them and using parameters. * Objective 6: The code already has 2 functions. The new while loop will go under the functions but above the current while True loop. You can use a comment to designate the section as the main program. * Objective 7: CodeTrek has several changes to make in the code. Students need to move carefully and not skip anything. Something that is changed is the variable **n**, which changes to **n\_sens** throughout the function. Students need to pay particular attention to punctuation: when to indent, add a colon, etc. * Objective 7: The new variable line\_count can be added near the top with threshold. * Objective 9: Students need to follow CodeTrek to define two functions without parameters. After the goals are met, then they can modify the code with parameters, random numbers, etc. * Refer to the CodeBot Curriculum Guide for specific information about this mission. * Another suggestion for assessment is for students to keep a daily journal, or use a reflection form for students to process information they learned and reflect on questions they may still have. | | |