**AP CSP CodeBot**

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| **MISSION 4 Obj 8-12 Animatronics** | | **Time: 45 minutes** |
| **Project Goal:** Students will create an Animatronic robot exhibit based on customer requirements.  **Learning Targets**   * I can plan a project using a flowchart or pseudocode. * I can use buttons.was\_pressed to control a variable. * I can write a function. * I can import the random library and use it to generate random numbers. | **Key Concepts**   * A function is a named chunk of code you can run anytime by calling its name. * Python’s random library makes it easy to work with random numbers. * Button presses (inputs), LEDs (outputs) and speaker sounds (outputs) are part of the user interface, so the user can interact with CodeBot. | |
| **Assessment Opportunities**   * Mission 4 Obj 8-12 Assignment * Submit the “SweepLEDs\_final” program (part 2) * [Mission 4 Obj 6-12 Kahoot Review](https://create.kahoot.it/share/firia-labs-codebot-mission-4-obj-6-12/1b909d22-067e-4135-ac7f-bba9273c70ad) | **Success Criteria**   * Use randrange to play a random pitch. * Define a function to play a single note. * Execute all elements from the napkin sketch. | |
| **AP CSP Framework**  **AAP-2.K** Write iteration statements.  **AAP-3.C** Develop procedural abstractions to manage complexity in a program by writing procedures.  **AAP-3.D** Select appropriate libraries or existing code segments to use in creating new programs.  **AAP-3.E** Write expressions to generate possible values, and evaluate expressions to determine the possible results.  **Computational Practice 2.B** Implement and apply an algorithm.  **Computational Practice 4.C** Identify and correct errors in algorithms and programs, including error discovery through testing. | **Materials**   * Mission 4 Obj 8-12 Assignment / Answers * [Mission 4 Obj 6-12 Kahoot Review](https://create.kahoot.it/share/firia-labs-codebot-mission-4-obj-6-12/1b909d22-067e-4135-ac7f-bba9273c70ad) * Solution code for SweepLEDs\_final * [Flowchart of Mission 4](https://learn.firialabs.com/teacher-resources/CodeBot/Flow%20Charts/Mission%204%20Animatronics%20Flowchart.pdf) | |
| **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 8: Two lines of code need to be added to the end of the program to meet the requirements for validation. The code is given to the students in the assignment. They can keep the code there or delete after Objective 8, it doesn’t matter which. * Objective 9: Students should start a new file: test\_code to use for this objective. * Objective 10: Students continue to use test\_code. Once the code is ready, they copy and paste into SweepLEDs. Two small changes need to be made to meet the validators. Students will add **global count** to their function and add **count = 0** in the main program, below turning on the motors. * Objective 11: Students can still use test\_code for this objective. They can delete the earlier code (not the imports) and type the new code. It is easier for testing. * Objective 12: Students can continue working in test\_code and then copy and paste the function, or they can go directly to SweepLEDs. Either way they will copy and paste the **note()** function into **SweepLEDs** and call the notes for a fanfare. * Code snippets for all the objectives, when changed, are included in the answer document. * A file of the complete code, with changes for functions, is included. See link above. * 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. | | |