

**AP CSP Python with Robots
Mission 4 Obj 8-12 Assignment**

Name:

Mission 4 Introduction

Read the introduction and project goals. During this assignment, you will complete the last three goals.

Mission 4 Objectives 8-12

Take the quiz.

How did you do? Is there anything you need to practice or review?

Answers will vary

Complete Objective 8. Use functions for this objective by making these changes:

See code below

This objective has the 'bot moving forward and then spinning. You already coded this with functions in NavSquare_functions. Define a function for **go_straight()** and a function for **spin()**, which is just like the turn_90() function. Then call the functions in the main program (but not the while loop). Remember to enable the motors!

Test your code until you meet the requirements of moving forward 3 feet and spinning 360 degrees. Your goals will not be validated even though the code works great. You will need to add a few lines of code to the end of your program to meet the goals. Then you can delete the lines of code and move forward. Add this to the end of your program AFTER you get the moving forward and spinning correct:

```
motors.run(LEFT, 0)
motors.run(RIGHT, 0)
```

Code added should be similar to:

```
def go_straight(speed, delay):
    motors.run(LEFT, speed)
    motors.run(RIGHT, speed)
    sleep(delay)

def spin(speed, delay):
    motors.run(LEFT, speed)
    motors.run(RIGHT, -speed)
    sleep(delay)
```

```
# -- move forward and spin
motors.enable(True)

go_straight(60, 3.0)
spin(30, 2.2)
motors.enable(False)

motors.run(LEFT, 0)
motors.run(RIGHT, 0)
```

added code here

Complete Objective 9. Use the suggestion to start a new file for testing the code:

test_code

What is the purpose of the outer loop?

The outer loop will iterate until the count is greater than 9. It will iterate the inner loop 10 times.

In test_code:

```

from botcore import *
from time import sleep

count = 0
while count < 10:
    count = count + 1
    f = 100
    while f < 1000:
        f = f + 1
        spkr.pitch(f)

spkr.off()

```

Complete Objective 10. Finish trying the code in **test_code**. After adjusting the condition to make the cute beeps last long enough for the spin, you will add the code into **SweepLEDs**.

Use another function for this objective by making these changes:

[See code below](#)

1. **from random import randrange** (near top of the code)
2. In SweepLEDs, define another function for **cute_beeps()**. Copy and paste your code for the cute beeps into the function.
3. Add **global count** to the **cute_beeps()** function, indented just below the definition.
4. Modify **spin()** by deleting the **sleep()** command and calling **cute_beeps()** instead. Test and debug your code until it is working correctly.
5. You will need to make one change to validate the last goal. Add **count = 0** just below **motors.enable(True)**. All goals should be validated and you have a nice robot animation.

```

def cute_beeps():
    global count
    while count < 22:
        count = count + 1
        f = randrange(100, 1000)
        spkr.pitch(f)
        sleep(0.1)
    spkr.off()

```

```

def spin(speed, delay):
    motors.run(LEFT, speed)
    motors.run(RIGHT, -speed)
    cute_beeps()

```

```

# -- move forward snd spin
motors.enable(True)
count = 0
go_straight(60, 3.0)
spin(30, 2.2)
motors.enable(False)

```

Complete Objective 11. Use **test_code** for this objective. Delete the code already there, and type the code for the function and note.

```
from botcore import *
from time import sleep
from random import randrange

def note(freq, duration):
    spkr.pitch(freq)
    sleep(duration)
    spkr.off()
    sleep(0.05)

note(349, 0.4)
```

Complete Objective 12. Follow the instructions below.

Final code file is available; link in Lesson Plan

Copy and paste the **note()** function into **SweepLEDs** in the section with all the functions.

Define the variables **F4** and **C5** near the top with the other variables.

Call the **note()** function at the bottom of the main program, as instructed by CodeTrek.

Your main program may look similar to this:

```
# -- Main Program --
while True:
    sweep_leds(n_led)
    n_led = n_led + 1
    if n_led == 8:
        n_led = 0

    if buttons.was_pressed():
        count_guests(n_guests)
        n_guests = n_guests + 1
        if n_guests == 5:
            break

motors.enable(True)
count = 0
go_straight(60, 3.0)
spin(30, 2.2)
motors.enable(False)

note(F4, 0.4)
sleep(0.2)
note(F4, 0.1)
note(F4, 0.1)
note(C5, 0.8)
```

After Objective 12, submit your completed **SweepLEDs** program to the teacher.