Mission 13 Assignment	**Name:**
Pre-Mission Preparation	
During this mission you will learn a new way to navigate the CodeBot. What techniques have you used so far to move around the CodeBot?	Answers will vary; they can include: • Using motors.run() for both wheels • Using the sleep() command to drive for a period of time • Using the line sensors to detect and stay on a path
Mission 13 Checks	
Objective #1 How many slots does each wheel encoder have? What data is returned when a wheel encoder is read?	Each has 20 slots It is analog – returns an integer from 0 to 4095
Objective #2 How do you filter out duplicate values? Run the code and look at the printed values. What are the ranges of values printed?	Answer can be a summary, or the actual code: a) Read the new value and compare with the previous one. If different, print the new value and update previous with the current value. Repeat in a loop b) prev = 0 val = enc.read(LEFT) if val != prev: print(val) prev = val Low values: 79-304 High values: 3915-4034 (actual numbers will vary)
Objective #3 Write a line of code that creates a string of 10 percent symbols.	'%' * 10
Objective #4 What error is caused by: val / 100	TypeError: '*' not supported between instances of float and str
Objective #5 What caused the error? How do you prevent the error?	A string can only be multiplied by an integer, not a float Use integer division: val // 100
Objective #6 What is the data type of: is_slot `is_slot = val > SLOT_THRESH` What is the algorithm for counting the slots in one complete turn?	Boolean: True or False was_slot = False is_slot = val > SLOT_THRESH if is_slot != was_slot: count += 1 was_slot = is_slot ** Answer can also be a written description

<table>
<tr><td>Objective #7
How did you change the infinite loop to ensure you went exactly 40 counts?</td><td>Answers can vary. Possible answer:
Changed the infinite loop to a while loop and count as the looping variable:. Also used a new drive function with a parameter for the number of counts.</td></tr>
<tr><td>Objective #8
How do you convert centimeters to counts?</td><td>Counts per cent = 40 / 20.4 * distance
–Or– cm * (COUNTS_PER_REV / WHEEL_CIRC_CM)</td></tr>
<tr><td>Objective #9
When the ‘bot needs to turn, what type of power (+ or -) will the wheels need?</td><td><table><tr><td>direction</td><td>LEFT</td><td>RIGHT</td></tr><tr><td>clockwise</td><td>positive</td><td>negative</td></tr><tr><td>counterclockwise</td><td>negative</td><td>positive</td></tr></table></td></tr>
<tr><td>Objective #10
What are the values of the variables & constant?</td><td><table><tr><td>POLL_MS</td><td>100</td></tr><tr><td>t_poll</td><td>ticks_ms() + POLL_MS</td></tr><tr><td>t_now</td><td>ticks_ms()</td></tr></table></td></tr>
<tr><td>Objective #11
What two lines of code do you add before motors.run() to create a feedback loop?</td><td>err = target_speed - cur_speed
power += err * Kp</td></tr>
<tr><td>Objective #12
List at least two changes you made to your code to drive around the free throw circle:</td><td>Answers will vary. They may include:
You have to check both left and right encoders
Modify drve_speed() to accept two arguments
Add more state variables for tracking slot, count, speed
Define a function that creates the global variables
Uses lists for count, count_poll, speed, target_speed and power
Double all the work – once for left and once for right</td></tr>
<tr><td colspan="2">Post-Mission Reflection</td></tr>
<tr><td>On a scale of 1 (not fun) to 5 (the best!), rank this mission. Explain why.</td><td>Answers will vary</td></tr>
<tr><td>On a scale of 1 (too easy) to 5 (very hard), rank this mission. Explain why.</td><td>Answers will vary</td></tr>
<tr><td>What is one tip you would give a new programmer about finding and fixing errors in code?</td><td>Answers will vary</td></tr>
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