🤖 CODEBOT MISSION 9 LOG - Lesson 2

Pre-Mission Warm-Up	
What do you know about temperature?	This is a very broad question, and answers will vary. They may know an approximate temperature of the air. They could mention it is measured in degrees (Fahrenheit or Celsius).

Mission 9 Lesson 2 – All Systems Go!	

Mission 9 Introduction	
What is the goal of this lesson?	Use the CPU temperature to detect changes in the local "weather".

Mission 9 Objective 5	
What are two ways to measure temperature with CodeBot?	You can measure in Celsius or in Fahrenheit. system.temp_C() and system.temp_F()
What is the difference between sleep() and sleep_ms()?	The sleep() function uses seconds and the sleep_ms() function uses milliseconds (or thousandths of a second).
How do you find the average of 5 numbers?	Add up the numbers and divide by 5.
Fill out the table with your results from the console panel. Run the program for a few seconds. Then stop the code and record the last five readings. *The readings will all be slightly different. Here is an example.*	(see table below)

Reading	Temperature (C)
1	38.5547
2	38.9933
3	38.6688
4	38.8574
5	38.603
Average:	38.73544

Mission 9 Objective 6	
How does the computer find the average of 5 numbers?	Answers may vary. Students could give the code for the average (while loop). Or they may explain it, like this:: The 5 numbers are stored in a list. Then the computer traverses the list and adds up all the numbers into a sum. The sum is divided by 5, or the count, to get the average.
After completing and running the code, fill out the table with your results. Use different sample sizes for each reading. *The temperature readings will vary. Here is an example.*	

Sample size: 5			Sample size: 10			Sample size: 15			Sample size: 20	
Reading	Avg Temp		Reading	Avg Temp		Reading	Avg Temp		Reading	Avg Temp
1	38.6819		1	38.6455		1	38.6398		1	38.618
2	38.7275		2	38.6529		2	38.4719		2	38.7463
3	38.7284		3	38.6933		3	38.6564		3	38.7332

Mission 9 Objective 7

What is a "baseline"?	The starting point of a control system, or the middle value it is controlling.
What is a "deadband"?	Creating an acceptable range for the system with a specific amount above or below the baseline.
Explain the UI for the temperature-controlled system.	The current average temperature is compared to the baseline plus the deadband. If it is higher, turn on the red user LEDs. Then compare the average temperature to the baseline minus the deadband. If it is lower, turn on the green line sensor LEDs. Otherwise, keep all LEDs off.

Mission 9 Extension – mild

What happens when testing your code the first time for high and low temperatures.	The user LEDs turn on and stay on, even when the line sensor LEDs turn on. All LEDs stay on when they should be off.
How do you fix this "bug"?	Turn off the LEDs when they should be off. This happens in the function's if statement. Also, add an "else" to turn off all LEDs.

Post-Mission Reflection

How could you use the temperature-control system with other CodeBot programs?	Answers will vary. Students could say they would add this to an existing program to make sure the 'bot doesn't overheat.