Pet Car Alarm: Challenge #4

In the Pet Car Alarm project, you will create a system that detects if the pet is in the car and measure the temperature. The car will sound a warning with flashing lights and roll down the windows if your pet could be in danger

In this challenge, you will use the TI-Innovator and magnetic Hall Effect sensor to determine if the sensor is near the south pole of a magnet. You will use the skills acquired in this activity to determine if a pet is inside the car in the Pet Car Alarm activity. When designing your pet car alarm, you only want the alarm to sound if there is a pet in danger.

Goals:

1. Use the Hall Effect sensor to measure voltage measurements.
2. Use an If then statement to make decisions
3. Use a loop to repeat measurements.

Background:

What kind of warning systems do you encounter on a daily basis? Have you ever sat in the passenger seat of a car and heard the warning system indicating you needed to buckle your seatbelt? Why does this alarm only go off if there is someone in the seat? How does the warning system know when there is a person in the seat? Are there times this system could mistakenly think there is a person in the seat and sound the alarm but really there isn't someone in the seat?

1.) Can you think of another warning system you've encountered? What type of information does it use to determine if the system should sound an alarm?

The Hall Effect sensor you'll use in this activitiey has values that are related to voltage measurements. The readings are usually under 100 when the south pole of the magnet is close to the sensor. Look at the side of your TI-Innovator, what are the voluts for IN 3? What are the volts for IN 1 and IN 2? Put the Hell Efect sensor in IN 3 to supply enough power for this type of sensor.

2.) The temperature sensors can go into IN 1 and IN 2 while the Hall Effect sensor is recommended for IN 3, what does this tell you about the requirements of the temperature sensor compared to the Hall Effect sensor?

Command	Example	Behavior
CONNECT <type> <number> TO <port>	`Send("CONNECT ANALOG.IN 1 TO IN3")`	Associates the first Analog object with a Hall Effect sensor plugged into port IN3 on the Hub.
Wait <number>	`Wait 3`	Pauses the program for a specified number of seconds. In this case 3 seconds.
READ <type> <number>	`Send("READ ANALOG.IN 1")`	Reads a measurement from the first sensor.
Get(<variable>)	`Get(m)`	Stores the magnetic measurement into a variable named *m*. The value stored will contain the measurement from the immediately preceding READ command. Note: a Get command must immediately follow a READ command.

Output(<line #> ,<column#>, <"text">) <variable name>	`Output(3,1,"Magnetic Sensor (Bits)")`
	`Output(4,1, m)`
	`Output(4,3,"(bits)")`
		When variable *m* has a value of 632 the following lines are displayed on the calculator:
		Magnetic Senor
		26 (bits)

While <Boolean expression>
<statements>
End
	`1→k`
	`While k ≠ 45`
	`Send("READ TEMPERATURE 1")`
	`Get(t)`
	`Output(3,1,"Temperature = ")`
	`Output(3,15,t)`
	`getKey→k`
	`Wait 1`
	`End`
		The statements in the While loop are executed until key 45, the clear key, is pressed. The While loop continues as long as the Boolean expression evaluates to "true". The variable *k* is set to an initial value of 1 using the store function, →. getKey is a function that returns an integer value with the value of the last key pressed while a programming is running. In this program the value of getKey is stored to the variable *k*.

<Boolean expression> and <Boolean expression>	`If t>25`
	`Then`
	`Send "SET COLOR 0 255 0"`
	`End`
		When the expression is "true" the statement is executed. Otherwise, the function returns false and the statement is skipped.

If <Boolean expression>
Then
<statements 1>
Else
<statements 2>
End
	`If t < 75`
	`Then`
	`Output(5,1,"Cool Enough")`
	`Else`
	`Output(5,1,"Too Hot- Fan please")`
	`End`
		The example decision tree has a Boolean expression with corresponding statements to execute if true. It also has an Else condition that executes corresponding statements when the Boolean expression is false. This Else condition ensures that a set of statements will always be executed. When this decision tree executes, focus proceeds from top-down. If the value of *t* is less than 75 the commands after Then are executed. In this case the output "Cool Enough" is

		displayed on row 5. If the value of *t* is greater than or equal to 75 the commands after Else are executed. In this case the output "Too Hot- Fan please" is displayed on row 5.

Challenge:

Challenge: Connect the Hall effect magnetic proximity sensor, which determines if the south pole of a magnetic field is close to the sensor. Display "Magnet is present" or "Magnet is not present" based on the reading of the Hall effect sensor and the position of the magnet.