

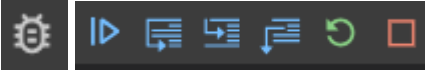
CodeBot Vocabulary By Mission

Mission 1 -- Welcome	
Objective	The steps in the mission; has a goal to accomplish
Text editor	Where you type the code
Code	Instructions to the computer
Debugging	The process of understanding what the computer is actually doing and then changing the code to do what you want it to do
Toolbox	A place in CodeSpace to keep information you learn about programming concepts so you can use it later when you need the information
Simulation	A 3D environment that lets you see the robot move and interact in a virtual world
Mission 2 – Introducing CodeBot	
CodeBot	A computer on wheels with lots of sensors and controls built-in
Peripherals	Devices that give input or output to CodeBot (some CodeBot peripherals are LED lights, speaker, motors, line sensors, proximity sensors, an accelerometer, and pushbuttons)
Motors	Programmable electric engines; powers the wheels
LEDs	Light emitting diodes; tiny and efficient electronic components that produce light. CodeBot has 17: 8 user LEDs, 5 line sensor LEDs, 2 proximity sensor LEDs, 1 USB LED and 1 power LED.
Wheel encoders	Discs that rotate, counting the invisible IR light beam pulses through its slots
Mission 3 – Light the Way	
API	Application Programming Interface; describes how code interfaces with other code.
Library	A module that contains code outside your own source file. It contains pre-built functions and code that can be referenced after the library is imported.
Byte	8 bits, which are binary digits.
Binary	Base 2 (digits are 0 and 1, or off and on)
Bit	Binary digit
Comment	Code that doesn't get run; notes in the code about what you are doing
Shift register	An electronic circuit that allows an array of output pins to be set HIGH or LOW based on a sequence of binary digits that are shifted into a single pin.
Animation	A sequence of changes, at a controlled speed.
Delay	Functions that slow down program execution, like sleep().

Mission 4 – Get Moving!

No new vocabulary is introduced.

Mission 5 – Dance Bot

Sequential	Running code in order (sequence) one line at a time.
Loop	Repeating a section of code, subject to a condition.
Indenting	A way to structure blocks of code by offsetting a block of code four spaces; blocks of code are indented following a statement with a colon (:).
While loop	A while loop repeats a block of indented code while a condition is true.
Variable	A label, or name, for a container that stores information for a computer to use.
Initialize	The first, or initial, value assigned, or stored, in a variable.
Increment	Updating a variable by adding 1 to it (like counting).
Bug	A problem with the code where it doesn't do what you expect it to do.
Debugger	An advanced tool in CodeSpace that gives more control over a program being debugged. The buttons are available in the debugger: step next, step into and step out. Also, variables are tracked under "Locals" and "Globals". 
String formatting	You can change the formatting of printed text using key arguments. end=',' will add a comma after each item printed. end=' ' will add a space after each item printed.
For loop	Repeating a section of code across a range of numbers or items in a list. It automatically initializes and updates the loop variable.
Readability	Code that is easy to read and understand. One way to increase readability is to use blank lines to separate sections of code.
Algorithm	A precise sequence of instructions that the computer can follow exactly, one step at a time, to complete a task or solve a problem.
Function	A named chunk of code you can run anytime just by calling its name; a way to reuse code without retyping it. The code in a function doesn't run until you call it.
Editor shortcuts	Keyboard hotkeys to write code faster; combinations of keys to complete a task.
Iterating	Moving through a sequence, like in a for loop or list, one item at a time.
Parameter	A variable defined as part of a function definition that receives an argument (value) from the function call.

Mission 6 – Robot Metronome

Intervals	Time related functions available in Python to track time. A common function for a delay is sleep(). Common functions for checking the current elapsed time are
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	time.time() and time.ticks()).
Infinite loop	A loop that doesn't end because the loop condition is always true.
Literal	An actual value, like 1 or "hello" or True.
Variable	A name to which you assign some data, any type of information your program uses; must be defined before it is used.
State	The status of a system with transitions. Your program can only be in one of a known set of states at any given time.
Transition	Moving between states. A program can transition from one state to another when certain conditions are met.
Boolean data type	A data type that has two values: True or False
Not (logical operator)	A special kind of logical operator that needs only one Boolean operand, and inverts it; it can be used to toggle a Boolean variable.
Branching Control flow	Decision points in code; code will take a different branch or path depending on a condition.
Data type	The kind of value stored in a variable. Common built-in data types are str (string), int (integer), float (decimal number), and bool (Boolean).
List data type	A sequence of items that you can access with an index.
Index	The position of an item in a list. The first index of a list is 0.
Logical operators	Operators that compare multiple conditions: 'or' and 'and'.
Magic number	A literal value used in a code.
Single equal (=)	Assignment – used to assign a value to a variable.
Double equal (==)	Comparison operator to determine if two objects are the same.
Mission 7 – Line Sensors	
Line sensors	Photo reflective sensors that detect lines and boundaries beneath your 'bot.
Analog	Infinite variation, like from dark to light or cold to hot.
Int data type (integer)	A value that is an integer; designated by int in Python; can be positive or negative.
ADC	Analog to digital converter.
Constant	A name, like a variable, that represents data in your code that doesn't change.
Iterative process	Repeatedly taking small steps to build a whole solution.
Matrix	A list of lists; also known as a 2-dimensional array.

Mission 8 - Boundary Patrol

Threshold	A value halfway between two distinct sensor readings, like a white surface and black line.
Default parameter	A parameter that uses a default value if an argument is not passed for it specifically.
Globals	Variables defined outside a function. They are available throughout the entire program.
Parameter	A named variable that is listed in a function definition; the variables receive values from arguments.
Argument	Values passed when you call a function; the values correspond to parameters.
Positional argument	An argument that must be passed to a parameter in the correct order; it is assigned to a parameter based on its position.
Keyword argument	An argument assigned to a parameter by name instead of position.
Docstring	A way to document functions using triple quotes at the beginning and end of the documentation comments.

Mission 9 – Line Following

Global variables	Variables defined outside a function. They are available throughout the entire program. If a global variable is changed inside a function, you have to declare it in the function with the 'global' keyword.
Local variables	Variables created inside functions; they only exist while the function is running and can only be used inside the function.
REPL	Read Evaluate Print Loop – the command line that lets you type Python statements directly and observe what happens.
List comprehension	A shortcut for appending items to a list using a for loop inside the square brackets.
Tuple	An immutable sequence of items that you access with an index. It is similar to a list, but the items in the tuple cannot be changed or added to; it is read-only. Use parentheses to define a tuple instead of square brackets.
Logical operators	Operators that are used to compare multiple conditions. 'And' and 'or' are logical operators, and 'not' is a special kind of logical operator. When 'or' is used, at least one condition must be true for the compound condition to be true. When 'and' is used, all conditions must be true for the compound condition to be true.
None	'None' means no value, or null. It is a special object with type 'nonetype'
Dictionary	A container that holds keys and values. It supports fast lookup of a value based on a given key. Dictionaries are defined with curly braces { }
KeyError	Result when a key is given that is not in a dictionary.
get() method	Returns an item when the key is found, but also returns a supplied default when the lookup fails.

PID controller	A control loop mechanism employing feedback that is widely used in industrial control systems by continuously calculating the error value.
Mission 10 – Fido Fetch	
Dictionary	A container that holds keys and values. It supports fast lookup of a value based on a given key. Dictionaries are defined with curly braces { }
KeyError	Result when a key is given that is not in a dictionary.
Refactor	Improving the structure of your code by making major changes to the code while accomplishing the same task.
Mission 11 – Airfield Ops	
Increment	Adding 1 to a variable (like counting)
Decrement	Subtracting 1 from a variable (like counting down)
Augmented assignment	A shorter way to write common expressions
// operator	Integer division – divides a number and then truncates the answer to an integer (the quotient)
% operator	Modulo division – it gives the integer remainder of division
** operator	Gives the power of the base number by the exponent.
Mission 12 – King of the Hill	
Accelerometer	A sensor that measures the force of acceleration in 3 directions: X, Y and Z. It can detect motion, impacts and orientation.
MEMS	Micro-Electro-Mechanical-System; inside the chip are tiny silicon structures that really move, and electronic components to sense them.
Vector	A mathematical or geometric representation of magnitude and direction. Examples of vectors in nature are velocity, momentum, force, and weight.
Math module	A scientific calculator for your code; a module that includes a set of mathematical functions and constants.
Replacement fields	A template for formatting a string by using { } to designate where and how to print the values of variables.
Format specifiers	Information added inside the replacement field that dictates how to display a number.
Escape sequences	A way to insert special characters in a string; begins with a backslash \
Hexadecimal	Base 16. A single hex digit holds exactly 4-bits of information and ranges from 0 to 15. In an escape sequence, a hex value is designated with \x
Autonomous	A device that can sense its environment and respond to change.

Mission 13 – Going the Distance

Wheel encoders	A disc with slots that rotates with a wheel so that an IR light beam can pass through its slots. The pulses of light can be counted to see how much the wheel has rotated.
Integer division	// operator – divides a number and then truncates the answer to an integer (the quotient)
Wheel track	The circular path wheels take when the 'bot rotates in place. Distance = circumference * (angle / 360) For clockwise, use a positive left and negative right wheel power. For counterclockwise, use a negative left and positive right wheel power.
speed	Speed = distance / time
Closed loop control	Automates control of a system by sensing the output state and comparing it to the desired state (input).
Feedback loop	Continuously adjusts the system to keep the error, or difference between input and output, close to zero. In our mission, the feedback comes from the encoders, the input is the desired speed and the output is the actual speed. Disturbance can be friction, surface, etc.

Mission 14 – Music Box

Scientific Pitch Notation	Writing musical notes in the form C ₅ or C5. The letter is the note, and the number is the octave. C ₄ is middle C on the piano.
split() function	Turn a string into a list.
File operations	Reading and writing, and using files in a Python program.
Mode	The way a file is accessed, such as read-only, read and write, write-only, etc.
Flush	Guarantee that any buffered data is saved to the filesystem (close or flush function).
Matrix	Multidimensional list (lists inside a list).
int() function	Takes a value (string or float) and converts it to an integer.

Mission 15 – Cyber Storm

With statement	A type of for loop for files that automatically closes the file.
Escape sequence	A way to insert a special character using \. Common escape sequences are: 'n' for new line, 'r' for carriage return, 't' for tab
strip() function	A function that removes characters from the beginning and end of a string.
Whitespace	Whitespaces include a space, a tab, a carriage return and a new line (escape sequences).
Concatenation	Appending (or joining) a string
startswith(prefix)	The function returns True if the string starts with the given prefix

'in' and 'not in' keywords	Used in a for loop to check if a value exists (or doesn't exist) in a sequence.
replace() function	Takes two arguments and replaces the first argument with the second in a string.
blocklist	A list of disallowed senders.