

Go, Sphero, Go!

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Vocabulary

Algorithm: a set of steps that describe a method of solving a problem. More formally, an algorithm is a well-ordered sequence of unambiguous and effectively computable operations that produces a result and halts in a finite amount of time.

Chip: An integrated circuit that packs millions of transistors and other parts into a tiny package.



Code: A set of commands, written by a human, which can be used to make a computer solve some problem. The code implements one or more algorithms.

Comment: Information included in a computer program that is not used by the computer. Instead, it explains to human readers how the program works. In Sphero's block programming, you can right-click a block to add a comment.

Computer: A computer is a machine that takes simple actions in response to commands. The commands can be stored, to be used over and over.

CPU (central processing unit): The part of the computer that actually executes commands. In modern computers, it is a small chip.

Function: Computer code intended to be used more than once at different times during the program's execution. Functions usually perform only one action, such as a calculation or displaying an item on the screen.

Input device: Anything that can provide data to a computer program. Keyboards, mice, and microphones are examples of input devices.

Machine language: A language of only ones and zeros (binary digits, or *bits*) that can be used directly by the CPU.

Memory: Electronic storage connected directly to the CPU. The running program and its data are stored in memory. Also called "main memory" or "RAM (random access memory.)" The contents of memory are lost when power is turned off.



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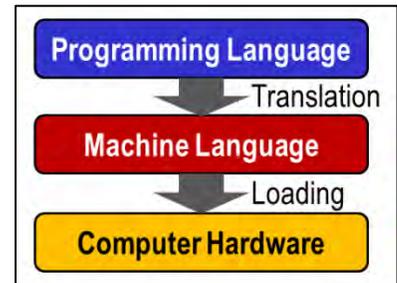


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Output device: Anything to which a computer program can send data. Screens, printers, and speakers are examples of input and output devices.

Program: A set of stored commands that can be run on a computer as often as needed.

Programming language: A structured, but human-readable language that is used to write programs for computers. The programs must be translated to machine language before the CPU can use them. There are many programming languages, including Python, Java, JavaScript, and Sphero's Blocks..



Storage: Electronic or magnetic storage that holds programs and data that can be loaded into main memory when needed. A storage device is *both* an input device and an output device. Also called “hard disk.” Flash drives and solid state disks are storage. The contents of storage are *not* lost when power is turned off.

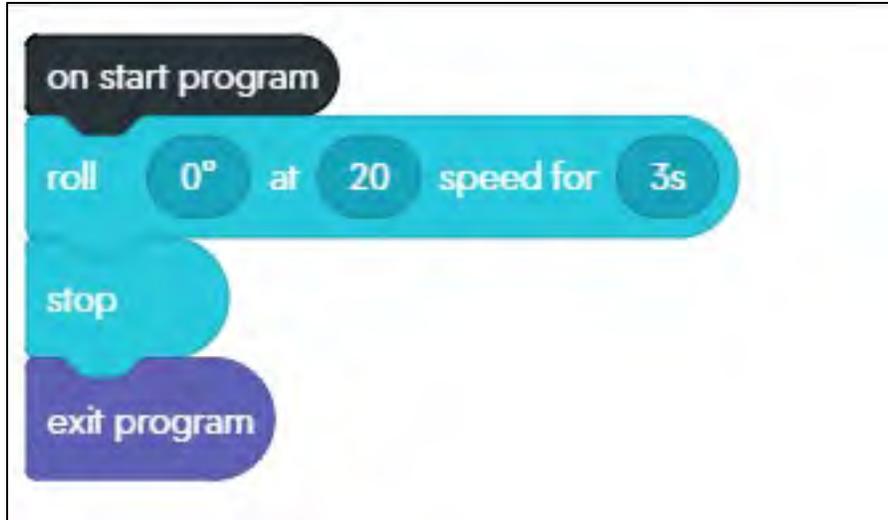
How Fast is Sphero ?

Algorithm:

- When “Start” is clicked:
 - Make Sphero roll
 - Duration 3 seconds
 - Speed 20
 - Heading 0
- Stop

Code:

Start the Sphero app, click *Programs*, then *Create*. In the next screen, give your program a name: “speed,” and click *Create*. Arrange the blocks like this.



Put a piece of masking tape on the floor. Place the Sphero on the tape. Use the *aim* function of the Sphero app to be sure the tail light points toward you and away from the direction you want Sphero to go. Click the *Start* icon and watch your Sphero go!

Thought Challenges

- Measure the distance your Sphero traveled.
- Compute the speed in inches per second.
- What would happen if you changed the speed?
- What would happen if you changed the number of seconds?
- Try it!

Programming Challenge

- Can you make your Sphero go out and come back?
- *Hints:*
 - The opposite of 0 degrees is 180 degrees.
 - You need a short delay after the “Stop” when your Sphero is heading away, then use another “roll” command to make it come back.
- Test it!

Explore a Little More

- Right click on one of the blocks in the program area. What happens?
- Right click on one of the blocks in the band at the bottom. What happens?
- Click the different colored words along the bottom of the screen.
- Left-click one of the blocks in the band at the bottom and slide left or right.