

Chapter 4: Boe-Bot Navigation

Vocabulary words used in this lesson.

- **Accelerate** begin to move more quickly.
- **Address** a unique location in computer memory. In the PBASIC program example, the address variable is the location of each byte in EEPROM that is holding a code letter.
- **BASIC Stamp** is a microcontroller with a small, specialized BASIC language interpreter (PBASIC) built into Read only Memory (ROM).
- **Case** A condition similar to multiple IF statements. A SELECT...CASE...ENDSELECT statement can be used to select a variable and evaluate it on a case-by-case basis and execute code blocks accordingly.
- **Complex** consisting of many different and connected parts.
- **Consecutive** in unbroken or logical sequence.
- **Counter Clockwise** Rotation can occur in two possible directions. A clockwise (typically abbreviated as CW) motion is one that proceeds in the same direction as a clock's hands: from the top to the right, then down and then to the left, and back up to the top. The opposite sense of rotation or revolution is counterclockwise (CCW): from the top to the left, then down and then to the right, and back up to the top.
- **DATA directive** is a PBASIC command for storing data (numbers or text) into memory.
- **Dead reckoning** a tactic to make your robot go to one or more locations and then return to exactly where it started. In navigation, dead reckoning is the process of calculating one's current position by using a previously determined position, or fix, and advancing that position based upon known or estimated speeds over elapsed time and course.
- **Decelerate** to reduce or cause to reduce in speed.
- **Diameter** a straight line passing from side to side through the center of a body or figure, especially a circle or sphere.
- **Directive** an official or authoritative instruction.
- **DO...LOOP** A section of computer code in which a group of instructions is executed repeatedly in a *loop* until some condition is met.
- **EEPROM memory** is a type of non-volatile memory used in computers and other electronic devices to store relatively small amounts of data but allowing individual bytes to be accessed. The BASIC Stamp's EEPROM can hold 2048 bytes (2 KB) of information. What's not used for

program storage (which builds from address 2047 toward address 0) can be used for data storage (which builds from address 0 toward address 2047).

- **For...Next** A section of computer code in which a group of instructions is executed repeatedly in a loop until some condition is met.
- **Hexadecimal** In mathematics and computing, hexadecimal (also base 16, or hex) is a positional numeral system with a base of 16. It uses sixteen distinct symbols, most often the symbols 0–9 to represent values zero to nine, and A, B, C, D, E, F (or alternatively a, b, c, d, e, f) to represent values ten to fifteen.
- **IF command** is a programming conditional *statement* that, *if* proved true, performs a function or displays information.
- **Increment** is to increase. In the PBASIC program, a variable is incremented each time it goes through the loop, by adding 1 to the variable.
- **Maneuvers** a movement or series of moves requiring skill and care.
- **Pivots** the central point, pin, or shaft on which a mechanism turns or oscillates. To rotate about the center point.
- **Predetermined** establish or decide in advance.
- **Pulses** a single vibration or short burst of sound, electric current, light, or other wave.
- **PULSOUT** command generates a pulse of length time.
- **Ramping** is a way to gradually increase or decrease the speed of the servos instead of abruptly starting or stopping.
- **READ command** reads one line from standard input and assigns the values of each field in the input line to a shell variable using the characters in the IFS
- **SELECT command** is the most commonly used data query language (DQL) *command*. A SELECT...CASE...ENDSELECT statement can be used to select a variable and evaluate it on a case-by-case basis and execute code blocks accordingly.
- **Subroutine** a set of instructions designed to perform a frequently used operation within a program. In other programming languages it is called a function. There are two parts of a PBASIC subroutine. One part is the subroutine call. It's the command in the program that tells it to jump to the reusable part of code, then come back when it's done. The other part is the actual subroutine. It starts with a label that serves as its name and ends with a RETURN command. The commands between the label and the RETURN command make up the code block that does the job you want the subroutine to do.

- **Variable** is a holding place for data in a program, which is given a unique name. A variable can be used in commands to allow data to be incremented or decremented, or operated on with math statements. Variables are initialized and assigned a name and type of data. If you do not initialize a variable, the program will automatically start by storing the number zero in that variable, called the variable's default value. In some computer languages, variables must be defined as holding strings (text) or integers (numbers).
- **Veer** to change direction suddenly.