

Variables

- A variable is stored in a robot memory
- Examples include whole numbers, decimal numbers, and words
- Variable names use the same rules for naming a motor or sensor, including capitalization, spelling, and availability
- Variables can improve the **readability** and **expandability** of your programs

```
int cleared = 0;  
SensorValue[rightEncoder] = cleared;
```

Variable Creation

- Declare a variable by stating the type and a name once before task main:

```
int speed;
```

Type of data

- integer
- float

Name of variable

- Starts with letter
- Letters, numbers, and underscores are allowed
- Cannot be a reserved word

Variable Types

Data Type	Description	Example	Code
Integer	Positive and negative whole numbers, as well as zero	-35, -1, 0, 33, 100	int
Floating Point Number	Numeric values with decimal points (even if the decimal part is zero)	-.123, 0.56, 3.0, 1000.07	float
Boolean	True or false – Useful for expressing the outcomes of comparisons	true, false	bool
Character	Individual characters, placed in single quotes. Not useful with POE kits.	'L', 'f', '8'	char
String	Strings of characters, such as words and sentences placed in double quotes. Not useful with POE kits.	"Hello World!", "asdf"	string

Variable Creation

- Initialize a variable by stating an initial value

```
int speed;
```

```
speed = 0;
```

- *Declare* and *initialize* are typically combined into a single statement

```
int speed = 0;
```

Variable Usage

- The value of a variable can be referenced by using the variable name in place of the value

```
startMotor(leftMotor, -1*speed);
```



- Value of a variable is only referenced when a line with a variable is executed
- In the example above, the motor speed is set when the line is executed and the motor does not change automatically as the variable changes

Assigning a Value to a Variable

- An assignment operator is a single equal sign
- The statement right of the equal sign is evaluated, and then the value is assigned to the variable on the left side
- This is not the equality from algebra!

`int speed;` ← Declaration

`speed = 0;` ← Initialization
Assignment

`speed = speed+1;` ← Assignment

Assigning a Value to a Variable

- The left side of the assignment operator must be a variable name

Correct:

```
speed = speed/2;
```

Incorrect:

```
speed/2 = speed;
```

Variable Applications

Variables can be used for most programs

Examples:

1. Repeat a code 5 times
2. Count button presses by a user
3. Remember if a user EVER pushed a button
4. Remember a maximum value
5. Debug a program by remembering which branch of code has been executed