

// Vocabulary: If, parenthesis, curly brackets

The If statement is one of the most basic building blocks in computer programming. The easiest way to understand a computer language If statement is to look at real life If statements first. If statements have two different parts, the question and what happens if the answer to the question is yes. Below are a bunch of real life if statements. On the left are the questions or “if” portions of the If statements. On the right are the actions that happen when the answer to the questions are true. Unfortunately only the first If statement is connected to the correct action, the rest are up to you.

Draw a line between the two that make the most sense together.

The first one is done for you:

If you play around with electronics	→	Then you can build some cool stuff.
If you run over a porcupine with your bike		Then your feet will smell funny.
If you are an alien		Then you pollute less.
If you do push ups and pull ups		Then you say Arrrrr a lot.
If you put peanut butter in your sock		Then you have feathers and don't like cats.
If you eat too much candy		Then you might catch a fish or fall in.
If you bike everywhere you go		Then you might have six arms and one eye.
If you go fishing in a canoe		Then someone might sing Happy Birthday.
If you are a pirate		Then you get stronger.
If you today is your Birthday		Then you get a flat tire.
If you are a parakeet		Then you get sick.

In computer programming the If statement works the same way as real life. There is a question and something that happens if the answer to the question is “yes”. The question is written inside of the parenthesis () and whatever happens if the question is true is written inside of the curly brackets { }.

Here are a couple examples of pseudo-code versions of If statements:

```
If (you play around with electronics){then you can build some cool stuff}
```

```
If (you remember parenthesis and curly brackets){then If statements are easy}
```

```
If (you understand If statements){then you are on your way to learning programming}
```

```
Just remember: If (the answer to this question is yes) {then do this}
```

Example of an If statement in Arduino:

```
if ( val == HIGH ) {  
  digitalWrite ( ledPin, LOW );  
}
```

All If statements start with “if” followed by the question in parenthesis. In this example the question is; does the variable “val” equal HIGH? (HIGH is a boolean value that is the same as true. HIGH means there is electricity present and LOW means there is not.) If “val” does equal HIGH then Arduino does whatever is inside of the two curly brackets { }. In this case it tells ledPin it should not conduct electricity. Here is a pseudo-code of the same If statement:

```
If (the variable “val” has electricity running through it) {then tell (the pin ledPin, to turn off) }
```

If parts of this last example don't make sense don't worry, the important thing is to understand what an If statement is. So... If (the last example didn't make sense) {don't worry.}

CHAPTER 3 Programming Concepts, If Statements

Write three of the funniest, or most interesting, If statements you can think of in the space below, don't worry about putting them inside of parenthesis and curly brackets, we'll get to that later.

Example 1: If dinosaurs were still alive then we would have to run a lot more.

Now write your If statements the way they would look with the parenthesis. Don't forget the difference between the two different kinds of parenthesis!

Example 1: If (dinosaurs were still alive) {then we would have to run a lot more.}

But what if there are two or more things that could happen if the question is true?

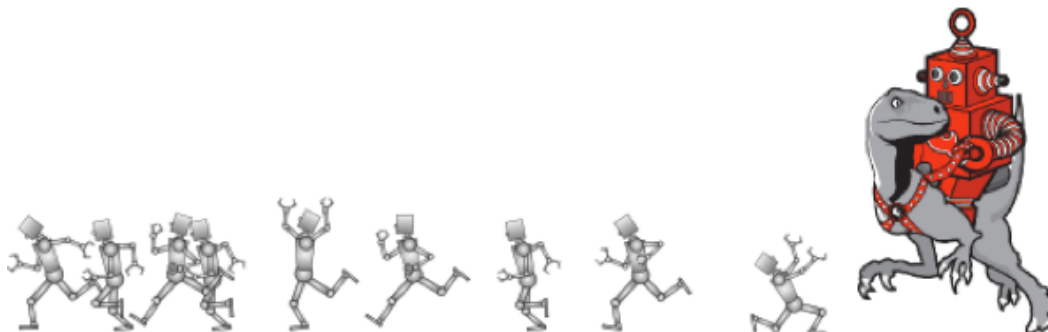
Example 2: If dinosaurs were still alive then we would have to run when we were outside, but if they were our pets we could walk and we would need really big litter boxes.

Is this really just one If statement? No, it's actually two, and one of the If statements is inside the other. Don't worry! This is ok, in fact it happens all the time. Here is how it looks in pseudo-code:

Example 2:
If (dinosaurs were still alive){
then we would have to run a lot more, but
If (they were our pets) {
we could walk and we would need really big litter boxes} }

It may look complicated but it's just one If statement inside of another. There is no limit to how many Ifs you can put inside of another If statement. Go ahead and write one If statement with another If statement inside of it in plain English below. Make sure you use the word "if" twice.

Now you're going to take that sentence and turn it into pseudo-code. Pay attention to where the parentheses and curly brackets are and how many there are. Start with writing the first question, put a curly bracket just after the question like this { and then put a curly bracket at the very end of the lines like this }. Now put what happens when the question is true and the second If statement inside of your first two curly brackets. If (you're confused) {look at example number two.}



CHAPTER 3

Programming Concepts, If Statements

Now that you understand the basics of If statements you're going to practice filling in various parts of some If statements. These If statements are not written in code, but you should be getting comfortable with what goes where as well as the parenthesis and curly brackets. Remember, you will only do what is in the curly brackets if the question is true. Fill in the blanks and if you feel like it make them funny.

____(you build a robot)
If (_____) { _____ }
{ then you can fly. }

____(your dog runs away)
{ then you need to go looking for your dog. }

If (you build an electronic drum set)
then you can practice quietly.

If (you are hungry)

If (you are an elephant)

{ _____ } { _____ }

If (_____) ____ (you make pancakes)
{ then you burp. }

{ _____ }

If (you want to become an astronaut)

If (_____)
{ you should hit the pinata. }

{ _____ }

If (_____) ____ (you want pizza)

{ _____ } { _____ }

