

JavaScript Functions

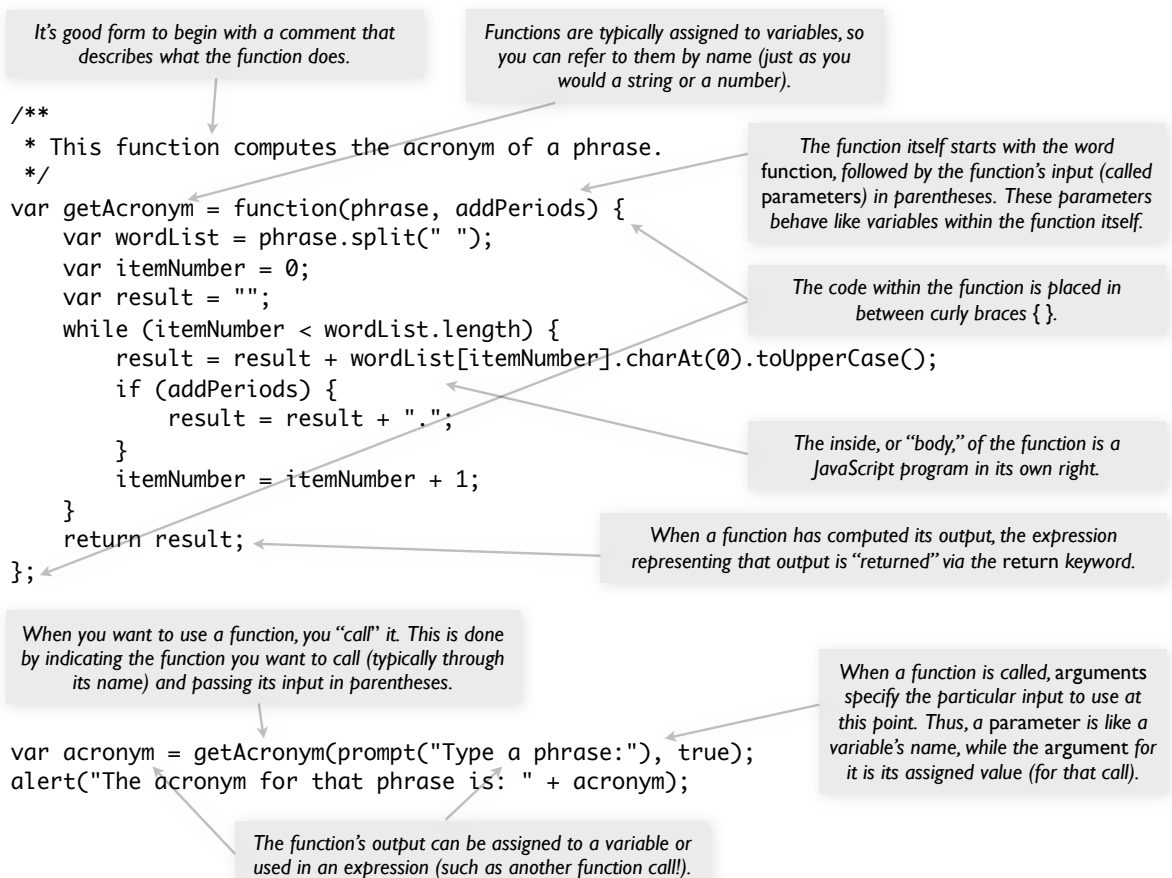
- A *function* is a major programming construct that you have not yet seen — but, I'd argue, once you've seen it, you might wonder how you ever lived without it 😊
- The reality is that you've already been using functions — *alert*, *prompt*, *parseFloat*, *parseInt*, among others, are actually functions
- What you haven't done yet is to *make your own* functions — until now

What is a Function?

- A function is an object that carries out a specific computation (i.e., it represents an algorithm)
- Functions are written (“defined”) once, but can be used or run (“called”) over and over again
- Functions allow you to express an algorithm once, then use it as many times as you like without having to copy its instructions all over the place
- Since they represent algorithms, functions have explicit constructs for working with their *input* and *output*

Anatomy of a Function

- As with any other JavaScript construct, a function must be defined using a particular format
- This format is likely more complicated than anything you have seen before; your reward for mastering it is the ability to define sequences of code that you can use over and over, for the life of a program
 - ◆ Experienced programmers build “libraries” of useful functions, and frequently share them with (or sell them to) others
- To illustrate this format, we have chosen to “annotate” a sample function and an instance of its use



A Small “Function Library”

- The code on the following pages demonstrates how functions can be called as much as you need, as well as how functions can call other functions
- In the first part of the program (below), three of the “Intro 8” have been rewritten as functions
- Note how the *splitCheck* function uses the *addTip* function — the savings may not be clear here since *addTip* is fairly short, but imagine the typing (and headaches) you’d save if *addTip* were more complicated!

```
/**
 * This function calculates a tip and adds it to a restaurant bill.
 */
var addTip = function(total, tipRate) {
    return total + (total * (tipRate / 100.0));
};

/**
 * This function splits a check.
 */
var splitCheck = function(total, tipRate, guestCount) {
    return addTip(total, tipRate) / guestCount;
};

/**
 * This function calculates a person's age.
 */
var calculateAge = function(birthdate) {
    var today = new Date();
    var difference = today.getFullYear() - birthdate.getFullYear();
    if ((today.getMonth() < birthdate.getMonth()) ||
        ((today.getMonth() === birthdate.getMonth()) &&
         (today.getDate() < birthdate.getDate())))) {
        difference = difference - 1;
    }
    return difference;
};
```

Calling the “Library”

- The second half of the sample program (below) assumes that the code on the previous page has been run, thus making the three functions available through the variables (names) *addTip*, *splitCheck*, and *calculateAge*
- This “main” part of the program repeatedly asks the user for a command, and does what the command says (it ignores any command that is not recognized)
- The program keeps on doing this until the user types “quit” as his or her command

```
/**
 * This “main” part of the program allows the user to choose among the
 * three available functions.
 */
var command = "";

// Keep going until the user types “quit” (exactly as shown).
while (command !== "quit") {
    command = prompt("Which function would you like to run (tip/split/age/quit)?");

    // We separate the way we gather the input (in this case, using prompt) from
    // the functions themselves. That way, if needed, we can supply input in a
    // different way (for example, via direct values: addTip(200, 15) ).
    if (command === "tip") {
        var bill = parseFloat(prompt("How much was the bill?"));
        var rate = parseFloat(prompt("How much (in %) would you like to tip?"));
        alert("The total is $" + addTip(bill, rate) + ".");
    } else if (command === "split") {
        var bill = parseFloat(prompt("How much was the bill?"));
        var rate = parseFloat(prompt("How much (in %) would you like to tip?"));
        var party = parseInt(prompt("How many were in the party?"));
        alert("Each person should pay $" + splitCheck(bill, rate, party) + ".");
    } else if (command === "age") {
        var date = new Date(prompt("When is your birthdate (mm/dd/yyyy)?"));
        alert("You are " + calculateAge(date) + " years old.");
    }
}
```