

Functions

INFO/CSE 100, Autumn 2004
Fluency in Information Technology

<http://www.cs.washington.edu/100>

Readings and References

- Reading
 - » *Fluency with Information Technology*
 - Chapter 20, Abstraction and Functions

- Other References

- » W3Schools JavaScript tutorial

<http://www.w3schools.com/js/default.asp>

- » W3Schools JavaScript HTML DOM Objects

http://www.w3schools.com/js/js_obj_htmlDOM.asp

- » Mozilla Browser

<http://www.mozilla.org/>



Functions

A *function* is a way to bundle a set of instructions and give them a name so that you can reuse them easily

Functions have a specific layout

- » *<name>* ← the function name is an identifier
- » *<parameter list>* ← list of input variables for the function
- » *<statements>* ← the statements do the work

```
function <name> ( <parameter list> ) {  
  <statements>  
}
```

Example Function

template

```
function <name> ( <parameter list> ) {  
  <statements>  
}
```

Write a simple function to compute the Body Mass Index when the inputs are in English units (ie, US units)

example

```
// Calculate Body Mass Index in English units  
// weight in pounds  
// height in inches  
// returns body mass index  
  
function bmiE(weightLBS, heightIN) {  
  var heightFt = heightIN / 12; // convert to feet  
  return 4.89 * weightLBS / (heightFt * heightFt);  
}
```

Develop the function

First, make sure you understand what you want the function to do and how it will accomplish the task.

```
// Calculate Body Mass Index in English units
// weight in pounds
// height in inches
// returns body mass index

function name(parameter list) {

    statements

}
```

Pick a name for the function

Function names are identifiers

- » start with a letter
- » should have a fairly obvious meaning

```
// Calculate Body Mass Index in English units
// weight in pounds
// height in inches
// returns body mass index

function bmiE(parameter list) {

    statements

}
```

Pick the parameters

Parameter names are also identifiers

- » these are the variable names that your function will use when it is performing its calculations
- » should have a fairly obvious meaning

```
// Calculate Body Mass Index in English units
// weight in pounds
// height in inches
// returns body mass index

function bmiE(weightLBS, heightIN) {

    statements

}
```

Write the function body

The function body includes whichever statements are required to implement the desired capability.

```
// Calculate Body Mass Index in English units
// weight in pounds
// height in inches
// returns body mass index

function bmiE(weightLBS, heightIN) {
    var heightFt = heightIN / 12; // convert to feet
    return 4.89 * weightLBS / (heightFt * heightFt);
}
```

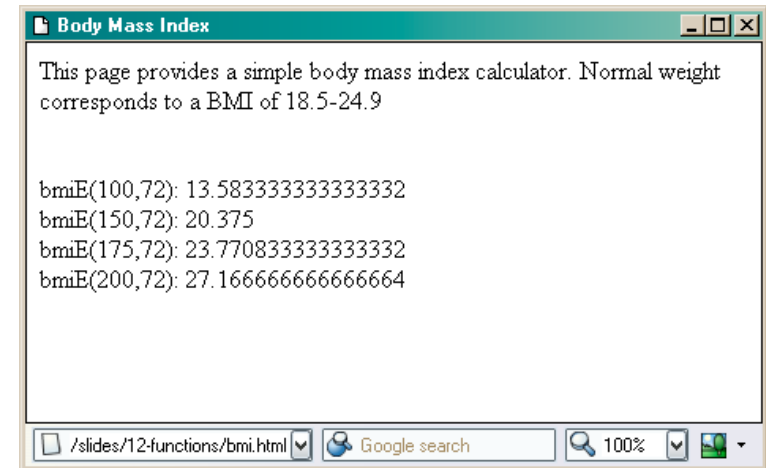
A Simple Testing Template

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">
<html>
<head>
<title>Body Mass Index</title>
<script type="text/javascript">
// Figure Body Mass Index in English units
function bmiE( weightLBS, heightIn ) {
  var heightFt = heightIn / 12; // Change to feet
  return 4.89 * weightLBS / (heightFt * heightFt);
}
</script>
</head>
<body>
<p>This page provides a simple body mass index calculator.
Normal weight corresponds to a BMI of 18.5-24.9</p>
<script type="text/javascript">
document.writeln("<br>bmiE(100,72): "+bmiE(100,72));
document.writeln("<br>bmiE(150,72): "+bmiE(150,72));
document.writeln("<br>bmiE(175,72): "+bmiE(175,72));
document.writeln("<br>bmiE(200,72): "+bmiE(200,72));
</script>
</body>
</html>
```

The new function

Test statements

Try the function and see how it works



Fancy Function Features

```
<head>
<title>Body Mass Index</title>
<script type="text/javascript">
// Calculate Body Mass Index in English units
// weight in pounds
// height in inches
// returns body mass index
function bmiE(weightLBS, heightIN) {
  var heightFt = heightIn / 12; // convert to feet
  return 4.89 * weightLBS / (heightFt * heightFt);
}
</script>
</head>
```

<script> in <head> location, comments, keywords, formal parameters, curly brackets, parentheses, operators, expressions, assignment statement, return statement, semi-colon

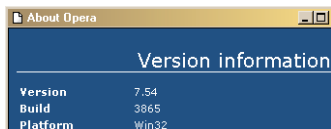
Using Fancy Functions

```
<body>
<p>This page provides a simple body mass index
calculator.
Normal weight corresponds to a BMI of 18.5-24.9</p>
<script type="text/javascript">
document.writeln("<br>bmiE(100,72): "+bmiE(100,72));
document.writeln("<br>bmiE(150,72): "+bmiE(150,72));
document.writeln("<br>bmiE(175,72): "+bmiE(175,72));
document.writeln("<br>bmiE(200,72): "+bmiE(200,72));
</script>
</body>
```

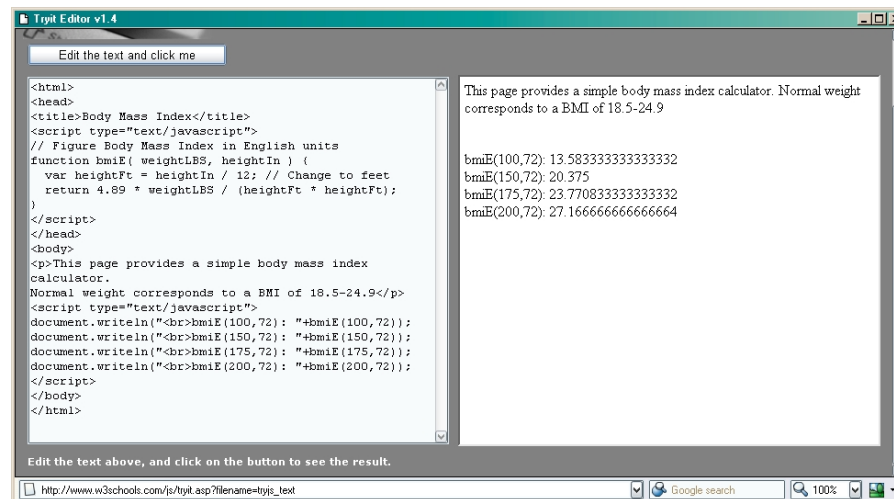
<script> in <body> location, document, writeln function call, strings, string concatenation, bmiE function call, arguments (aka actual parameters)

Comments on Debugging

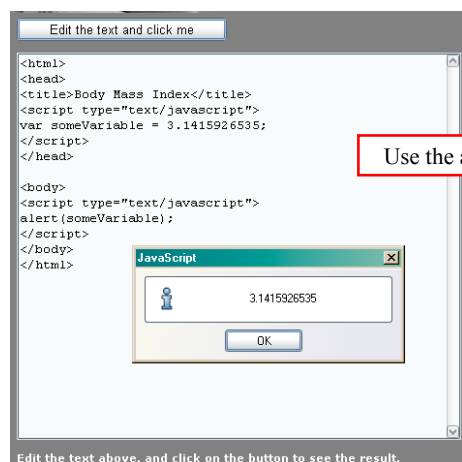
- Debugging JavaScript can be hard
 - » The browsers all implement things a little differently, particularly old browsers
 - *upgrade* if you are using something old!



Use the W3Schools TryIt Editor

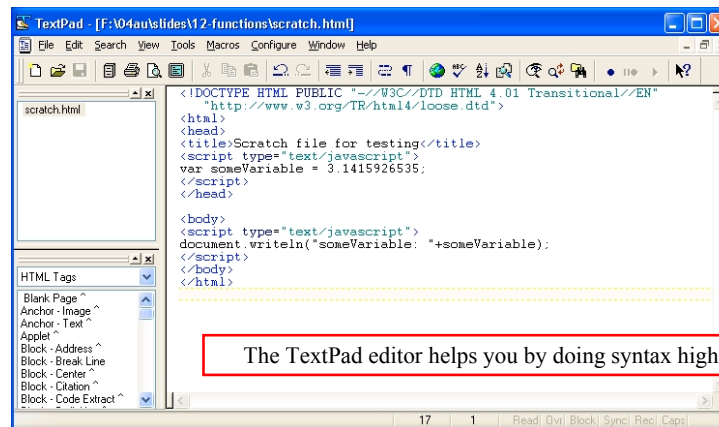


Display results using alert(...)



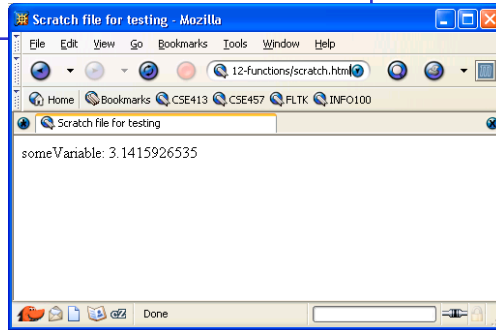
Use the alert("This is a message") function

Use an editor that helps you



Display results using writeln(...)

```
<body>
<script type="text/javascript">
document.writeln("someVariable: "+someVariable);
</script>
</body>
```

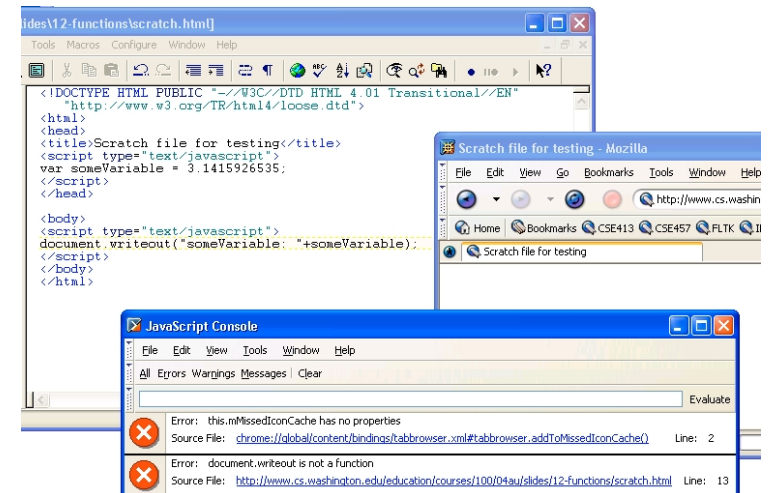
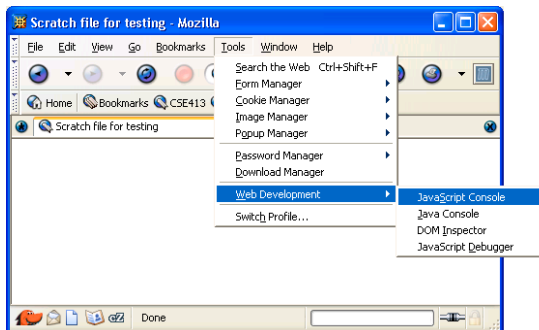


Use a browser that helps you

- All browsers try to be forgiving of errors, which means that they generally don't produce a lot of error messages
 - » use a browser that *helps you debug* like Mozilla



enable Mozilla JavaScript Console



The Mozilla JavaScript console helps you by showing good error messages.

By the way ...

- Why don't these pages have a `<META>` tag with the `charset` attribute?

```
<META HTTP-EQUIV="Content-Type" CONTENT="text/html; charset=ISO-8859-1">
```

- Because there's another way to fix the encoding issue.
 1. Create a file named `.htaccess` in your `public_html` directory on dante.
 2. Put the following text in that file using `pico`:

```
AddType 'text/html; charset=ISO-8859-1' html
```