

Debugging

No readings

What's The Proper Indentation?

```
function max(x,y)
{
    if (x<y)
    {
        return y;}
    else
    {
        return x;}
    alert(max(10,12));
}
```

2

When To Indent?

- Everything between a opening and closing curly brace should be indented in.

```
if (age < 21) {
    alert("Intruder alert!");
    alert("Unauthorized attempt to drink alcohol!");
}
```

- The closing curly brace should be on its own line and should line up with the start of the code block.

```
if (age < 21) {
    alert("Intruder alert!");
    alert("Unauthorized attempt to drink alcohol!");
}
```

3

When To Indent?

- Notice that the indentation rules are the same as the HTML indentation rules. Nothing new to learn!

```
if (age < 21) {
    alert("Intruder alert!");
    alert("Unauthorized attempt to drink alcohol!");
}
JavaScript
```

```
<ol>
<li>First!</li>
<li>If you're not first, you're last.</li>
</ol>
HTML
```

4

Opening Curly Brace

- There are two standard ways to open a code block.

```
if (age < 21) {
    ...
}
```

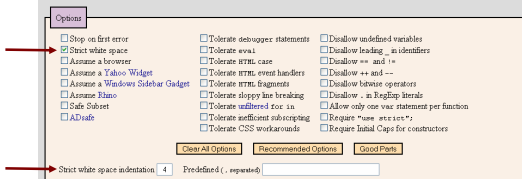
```
if (age < 21)
{
    ...
}
```

- Pick whichever you prefer and stick with it.

5

JSLint (<http://jshint.com>)

- Make sure the option "Strict white space" is checked.
- Change the number for "Strict white space indentation" to whatever number of spaces you like.



6

Using JSLint

- Ignore error messages that do not pertain to indentation.

7

Proper Indentation

```
function max(x, y)
{
  if (x < y)
  {
    return y;
  }
  else
  {
    return x;
  }
}
alert(max(10, 12));
```

```
function max(x, y) {
  if (x < y) {
    return y;
  } else {
    return x;
  }
}
alert(max(10, 12));
```

Remember: Don't mix spaces and tabs when indenting!

8

Debuggers

Why Won't It Toast?

- You arrive at your dorm after a thought-provoking lecture of INFO/CSE 100. To feed your brain, you put some bread into your toaster oven and set the dial for 5 minutes. The toaster oven ticks away. After five minutes, the toaster oven dings. You take the bread out, but it's not even toasted. What do you do?



10

How To Debug

- Find out what values are stored in the variables at different points in time. **Never assume anything.**
 - Don't just say that a variable contains a certain value. Prove it!
 - Use popup boxes to display the variable or watch the variable in the debugger.
- Narrow down the location of the problematic code.
 - Delete code until you get it in a working state, and then add in the broken code in phases.

11

How To Debug

- Simulate the computer on paper. Go line by line.
 - Can also use the debugger go line by line.
- Make sure you understand what every single line does.
 - Computers are neither magical nor mysterious. Everything can be explained!

12

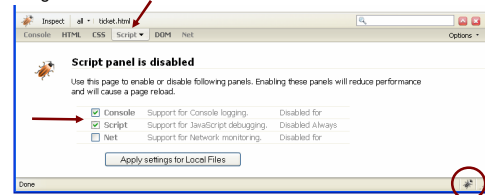
Get Firebug

- Firebug:
 - <https://addons.mozilla.org/en-US/firefox/addon/1843>
- Firefox:
 - <http://www.mozilla.com/en-US/firefox/>
- While you're at it, consider getting Ad Block Plus.
 - <https://addons.mozilla.org/en-US/firefox/addon/1865>

13

Setting Up Firebug

1. After installation, load one of your HTML pages into Firefox.
2. Click the picture of the grey bug on the bottom right of the window.
3. Firebug will open up. Click on the "Script" tab and then select the "Console" and "Script" checkboxes in the window. Apply the settings.



14

Understanding Error Messages

- `document.getElementById("<ID>")` is null
 - The given identifier, `<ID>`, does not exist. Typo perhaps?
- `<name>` is not a function
 - Most likely cause is spelling or capitalization error.
- `<name>` is not defined
 - Most likely cause is spelling or capitalization error or copying from example code without changing the names.

```
document.getElementById("cards") is null
if (document.getElementById("cards").checked) {
```

```
document.getElementById is not a function
if (document.getElementById("cards").checked) {
```

```
times is not defined
for (var i = 1; i <= 1000; i++) {
```

15

Understanding Error Messages

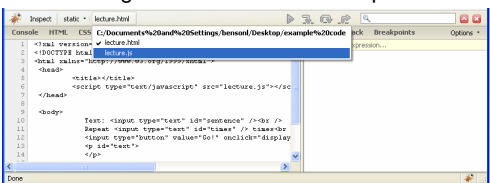
- As the computer is not omniscient, not all error messages are exact.
- What's wrong here? Adding semi-colons before the statement does not fix the problem.
 - `if` is misspelled.
- Firebug can miss some errors.
 - A debugger should be only used as an aid, not a panacea.

```
missing: before statement
if (document.getElementById("cards").checked) {
```

16

Breakpoint

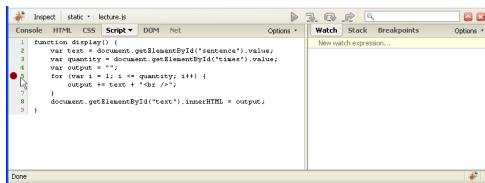
- **breakpoint**: intentional stopping or pausing place in a program, put in place for debugging purposes
- To add a breakpoint, click on the filename on the top bar in Firebug and select the JavaScript file.



17

Adding Breakpoints

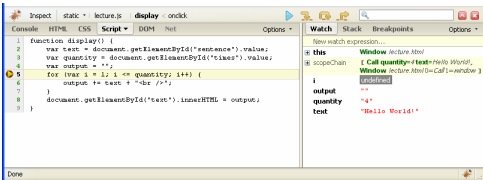
- Clicking on a number on the left-hand side toggles the appearance of a red circle (a *breakpoint*).



18

Breakpoints

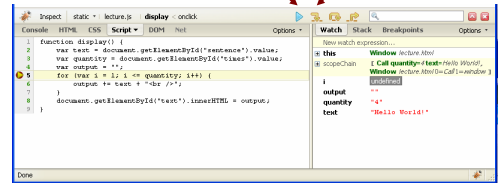
- When the program is running, it will stop on any line that has a red circle.
- All variables that the computer "knows" at that point in time before the line is executed will appear on the right-hand side.



19

Debugging

- Continue executing program until next red circle or end of program
- Execute this line and stop at start of next line



20

Exercise

```
How old are you? <input type="text" id="age" /><br />
<input type="button" value="Can I Enter The Club?"
onclick="checkAge();" /> HTML
```

```
function checkAge() {
  var guestAge = document.getElementById("age").value;
  if (guestAge >= 21) {
    alert("Welcome. Rock on!");
  } else if (guestAge == 20) {
    alert("Close enough; we'll sneak you in.");
  } else {
    alert("I'm sorry, you can't party with us. Scram!");
  }
}
```

 JavaScript

21

Solution

```
How old are you? <input type="text" id="age" /><br />
<input type="button" value="Can I Enter The Club?"
onclick="checkAge();" /> HTML
```

```
function checkAge() {
  var guestAge = document.getElementById("age").value;
  if (guestAge >= 21) {
    alert("Welcome. Rock on!");
  } else if (guestAge == 20) {
    alert("Close enough; we'll sneak you in.");
  } else {
    alert("I'm sorry, you can't party with us. Scram!");
  }
}
```

 JavaScript

22

Exercise

```
Text: <input type="text" id="sentence" /><br />
Repeat <input type="text" id="times" /> times<br />
<input type="button" value="Go!" onclick="display;" />
<p id="text">
</p> HTML
```

```
function display() {
  var text = document.getElementById("text").value;
  var quantity = document.getElementById("times").value;
  for (var i = 1; i <= times; i++) {
    output = sentence + "<br />";
  }
  document.getElementById("text").innerHTML = output;
}
```

 JavaScript

23

Solution

```
Text: <input type="text" id="sentence" /><br />
Repeat <input type="text" id="times" /> times<br />
<input type="button" value="Go!" onclick="display();" />
<p id="text">
</p> HTML
```

```
function display() {
  var text = document.getElementById("sentence").value;
  var quantity = document.getElementById("times").value;
  var output = "";
  for (var i = 1; i <= times; i++) {
    output += text + "<br />";
  }
  document.getElementById("text").innerHTML = output;
}
```

 JavaScript

24