

The Information School of the University of Washington

Programming Basics Review

INFO/CSE 100, Spring 2005
Fluency in Information Technology

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

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Readings and References

- Reading
 - » *Fluency with Information Technology*
 - Chapter 18-21
 - Appendix B, JavaScript Rules
- 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/>
 - » *Games and Puzzles*
 - Thomas Jefferson National Accelerator Facility, Office of Science Education
 - <http://education.jlab.org/indexpages/elementgames.html>

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Basic Concepts

- Names, Values, Variables
- Variable Declarations
- Assignment
- Data types
- Expressions
- Functions
- GUIs
- If/else statements
- For loop

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Names, Values, Variables

- Names, Values, Variables
 - » Variables have names and values
 - » Names (also called identifiers) are case sensitive
 - » Values can change but names don't!
 - » Variables must be declared before they can be used

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Variable Declarations

- Variable Declarations
 - » `var <Variable Name>`
 - » Global variables are declared in the script tag outside of function
 - » Local variables are declared in the function body.

```

<script>
  var globalVariable = "April";
  function functionName () {
    var localVariable = 29;
  }
</script>

```

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Assign a value to a variable

- Assignment
 - » Assignment statement changes a variable's value
 - » `<variable> <assignment symbol> <expression>;`

```

greeting =
"Hello";
gas_price =
2.45;
count = count +
1;

```

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Data Types

- Numbers
 - No space, no grouping symbols, no units
- Strings
 - Must be in quotes (single or double)
 - Minimum number of characters in a string is zero ("")
 - All English letters and numbers are valid but there are some special characters that need an escape sequence
- Boolean
 - Two Boolean values: true, false

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Expressions & Operators

- Expressions
 - The right-hand side of an assignment statement
 - Built out of variables and operators
- Operators
 - Numeric operators (+, -, *, /)
 - String operator (+)
 - Relational operators (<, <=, ==, !=, >=, >)
 - Boolean operators (&&, ||, !)

```
totalPrice = salePrice + salePrice*tax;
fullName = "Ammy" + " " + "Phuwanartnurak";
fullName = firstName + " " + lastName;
```

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Functions

- Template


```
Function <function name> (<parameter list>) {
  <statement>
}
```
- Functions do not have to have parameters but we still need the parentheses
- Function definitions in <head></head>, and Function calls in <body></body>.
- Function body is in { }

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Graphical User Interfaces (GUIs)

- We can use JavaScript to create GUI.
- GUIs provide an intuitive way to control a program.
- Layout of the GUIs
 - Forms <form></form>
 - Input controls
 - Button


```
<input type=button value="label" onClick="JS text">
```
 - Text Box


```
<input type=text name="identifier" onChange="JS text">
```
 - Radio


```
<input type=radio name="identifier" onClick="JS text">label text
```

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The if / else statement

The if statement is a *conditional statement*

- a conditional expression is evaluated as being true or false

```
if (<boolean expression>) {
  <then-statements>
} else {
  <else-statements>
}
```

```
if (amount<10) {
  price = amount*2.5;
} else {
  price = amount*1.5;
}
```

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The for loop

- Iteration or looping is a way to execute a block of program statements more than once.

```

initializing      setting a limit      updating the control index
  ┌──────────┬──────────┬──────────┐
for (var i=<number>; i<operator>n; <incremental>){
  <statement>;
  <statement>;
}

for (var i=0; i<9;i++){
  document.writeln("Number: " + i);
}
```

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The for loop

```
for (i=0; i < n; i++)
```

- Starts at $i = 0$
- check the limit before performing the statement(s)
- at the end of every pass through the **for** loop body, do the following:
 - » get the value of i
 - » increment i
 - » store the incremented value
- $i++$ is the same as writing $i = i + 1$
- For others, $i = i + \langle \text{number} \rangle$

4/29/2005 13

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Tips

- Order of events does matter in JavaScript
- Translating from English language to JavaScript language
- Debugging: Logical errors vs. Syntax errors
- Be patient: Programming is an iterative process...
- Practice! Practice! Practice!

4/29/2005 14

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Let's program together!

- Example1: `.length` & `.charAt()`
- Example2: Basics + If/else
- Example3: For loop

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Example1: `.length` & `.charAt()`

- `.length` returns the number of characters in a string.
- `.charAt(index)` returns the character at a specified position.
- Index starts at 0.

```
<script type="text/javascript">
var firstName = "Brandon";
alert("First name:" + firstName);
alert("Length= " + firstName.length);
alert("Character at index2 is " + firstName.charAt(2));
</script>
```

4/29/2005 16

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Example2: Basics + If/else

- Making a payment using your husky card.
- Alert when there is not enough money on the card.
- Display a summary after a payment is submitted.

The screenshot shows a web browser window with a form titled "Enter your name:" and "Enter payment amount:". An alert dialog box is displayed with the message: "Sorry, Ammy! You only have \$100. Please reenter new payment amount". Below the form, a message reads: "Thank you Ammy! Your payment amount is \$40. Your remaining balance is \$60".

4/29/2005 17

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Example3: For loop

- The user inputs "city" and "state", and specifies number of times to display the information.
- If the display times is more than 5, the program will display both "city" and "state." Otherwise it will display only "state"

The screenshot shows a web browser window with a form titled "City:" and "State:". Below the form, a message reads "Display Location: _____ times". To the right, a list of location outputs is shown: "1 Location: Washington", "2 Location: Washington", "3 Location: Washington", "4 Location: Seattle, Washington", "5 Location: Seattle, Washington", "6 Location: Seattle, Washington", "7 Location: Seattle, Washington".

4/29/2005 18