

Announcements


- You're going to sit with your TAs for the rest of the quarter.

Yuan (Back 4 rows)
Kayhan (3 rows)
walkway
Shreyas (Front)

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Announcements

- New CLUE tutor!
 - Rick Chen
 - Senior in the Informatics program
 - Webmaster for ASUW Arts & Entertainment



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Get With the Program:


Fundamental Programming Concepts Expressed in JavaScript

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Overview: Programming Concepts

- Programming: Act of formulating an algorithm or program
- Basic concepts have been developed over last 50 years to simplify common programming tasks
- Concepts will be expressed in JavaScript

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At the Espresso Stand

Espresso is concentrated liquid coffee produced by passing steam through finely ground coffee beans. Some people enjoy drinking espresso straight, but others prefer a café latte, espresso in steamed milk; a cappuccino, espresso in equal parts of steamed milk and milk foam; or an Americano, espresso in near-boiling water. Espresso drinks are sold in three sizes: short (8 oz.), tall (12 oz.), and grande (16 oz.). These drinks are made with a single unit of espresso, called a shot, but coffee addicts often order additional shots. The price of additional shots is added to the base price of the drink, and tax is figured in to produce the charge for the drink. The program to compute the price of an espresso drink is:

Input:
 drink, a character string with one of the values: "espresso", "latte", "cappuccino", "Americano"
 ounce, an integer, giving the size of the drink in ounces
 shots, an integer, giving the number of shots

Output:
 price in dollars of an order, including 8.8% sales tax

Figure 18.1. Sample JavaScript computation to figure the cost of espresso drinks. (continues next page).

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```


Program:
var price;
var taxRate = 0.088;
if (drink == "espresso")
    price = 1.40;
if (drink == "latte" || drink == "cappuccino") {
    if (ounce == 8)
        price = 1.95;
    if (ounce == 12)
        price = 2.35;
    if (ounce == 16)
        price = 2.75;
}
if (drink == "Americano")
    price = 1.20 + .30 * (ounce/8);
price = price + (shots - 1) * .50;
price = price + price * taxRate;
    
```

Figure 18.1 (continued). Sample JavaScript computation to figure the cost of espresso drinks.

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Names, Values, and Variables

- Names Have Changing Values
 - Example: U.S. President has current value of George W. Bush, previous values of Bill Clinton, George Washington
 - Example: Office Manager was Julie; now it's Jake
- Names in a Program Are Called *Variables*
 - Values associated with a name change in programs using the *assignment* statement (something = something else)




The value of a variable can change.

1. True
2. False




Identifiers and Their Rules

- A variable name refers to the present value of the variable, just like “The President” refers to the current president.
- Case sensitive
 - HOME ≠ Home ≠ home




Identifiers and Their Rules

Valid	Invalid	Why Name is Invalid
firstOne	1stOne	Begins with number
first1	first-1	JS thinks hyphen is a minus sign
first_1	first\$1	\$ not allowed
first_One	first One	Space not allowed
FirstOne	First1!	Exclamation point





A Variable Declaration Statement

- Declaration: State what variables will be used
 - Command is the word *var*
 - For example, a program to calculate area of circle given radius, needs variables area and radius:
 - `var radius, area;`
 - Put variable declarations at the top of your script
- The declaration is a type of *statement*



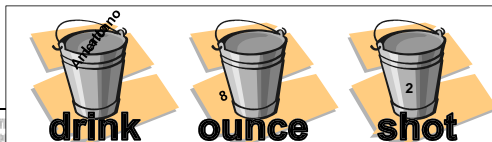
The Statement Terminator

- A program is a list of statements
- The statements may run together on a line
 - Use white space to help you
 - read your code
 - understand your program
- End each statement with the *statement terminator* symbol
 - In JavaScript, all statements terminate with the *semicolon* (;)

Names, Values, And Variables

- Declaring a variable
 - Names a particular area in computer memory where you can store values
 - Gives you a name, or handle, that is independent of the current value



Rules for Declaring Variables

- Every variable used in a program must be declared (before it is used)
 - In JavaScript declaration can be anywhere in the program
 - Programmers prefer to place them first
- Undefined values
 - Variable has been declared but does not yet have a value

```
var number1;           // undefined value
var number2 = 42;     // initialized to the value 42
```

Initializing a Declaration

- We can set an initial value as part of declaration statement:
 - `var taxRate = .088;`
- Related variables may be grouped in one declaration/initialization; unrelated variables are usually placed in separate statements

```
var num1 = 42, num2, num3;      var num1 = 42;
                                var num2;
                                var num3;
```

Comments

- HTML
 - <!-- HTML comments -->
- JavaScript
 - //Single-line JavaScript comment
 - /*Multi-line JavaScript comment continues for more than one line*/

Comments

- Annotate your code
 - Notes to yourself and that programmer six months down the road who has to change or add something to your program

Exercise

- Part 1: Variable names
 - A name is a name is a name

Three Basic Data Types of Javascript

- Numbers: 1345345
- Strings: "Americano"
- Booleans: true and false
 - These kind of values are called *data types* or just *types*

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Numbers

- Rules for Writing Numbers
 - There are no "units" or commas
 - Can have about 10 significant digits and can range from 10^{-324} to 10^{308}

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Strings

- Strings are sequences of keyboard characters
- Strings are always surrounded by single (' ') or double quotes (" ")
- Strings can initialize a declaration
 - var hairColor = "black";
- Quotes can nest
 - firstLine = "Johnson called, 'Dude!'"


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Literals

- How string literals are stored
 - Quotes are removed (they are only used to delimit the string literal)
 - *Delimit* means that the quotes set the starting and stopping points of the literal
 - Any character can be stored in memory
 - Even a character that cannot be typed can be stored, using escape mechanism – in JavaScript, the backslash (\)

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Assignment Statement




<Variable> <assignment><expression>

- Flow moves from *right to left*.
- Results of the <expression> replace the value stored in the <variable>.

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Assigning Values to Variables and Variables to Variables


We can also assign one variable to another:



Line	Assignment Statement	myName	yourName
1	var yourName = "Sarah";		Sarah
2	var myName = "Andrea";	Andrea	Sarah
3	var yourName = myName;	Andrea	Andrea
4	var yourName = "myName";	Andrea	myName

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Other Assignment Operators



Line	Assignment Statement	Value in myAge
1	var myage = 32;	32
2	myAge = myAge + 2;	34
3	myAge += 2;	36
4	myAge ++;	37
5	myAge -= 3;	34
6	myAge -;	33

Assignment

■ Three Key Points

- <variable ><operator><expression or value>
- All three of the components must be given
 - if anything is missing, the statement is meaningless
- Flow of value to identifier is always right to left
- Values of any variables used in the expression are always their values before the start of the execution of the assignment

Exercises

- Parts 2 and 3
 - What's the value of Dude?
 - Scissor, Rock, paper