CMPT 165

INTRODUCTION TO THE INTERNET AND THE WORLD WIDE WEB

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UNIT7: WORKING WITH JAVASCRIPT

TOPICS

1. Variables, Again
2. JavaScript Operators Types
3. Iteration: the for-loop
4. Working with Strings
5. Making Decisions
6. HTML Forms

VARIABLES, AGAIN

WHAT VARIABLES ARE FOR

to store some value so we can use it later!

if you don't need it later,
just the function call will be enough!

VARIABLE VALUES

There are two things you can do with variables:

- store values in them with a variable assignment statement
- retrieve the stored value by referring to the variable by name

VARIABLES

- help the code be more readable
- aid modification of their values
- just sometimes make the code more wordy!

```
setup = function() {
    $('button').click(do_things)
}
$(document).ready(setup)
/////////Equal to/////////
$(document).ready(function() {
    $('button').click(do_things)
})
```

JAVASCRIPT OPERATORS TYPES

JAVASCRIPT ARITHMETIC OPERATORS

Operator	Description
+	Addition
-	Subtraction
*	Multiplication
/	Division
%	Modulus (Remainder)
++	Increment
--	Decrement

content from https://www.w3schools.com/js/js_operators.asp

JAVASCRIPT ASSIGNMENT OPERATORS

Operator	Example	Same As
=	x = y	x = y
+=	x += y	x = x + y
-=	x -= y	x = x - y
*=	x *= y	x = x * y
/=	x /= y	x = x / y
%=	x %= y	x = x % y

content from https://www.w3schools.com/js/js_operators.asp

JAVASCRIPT COMPARISON OPERATORS

Operator	Description
==	equal to
===	equal value and equal type
!=	not equal
!==	not equal value or not equal type
>	greater than
<	less than
>=	greater than or equal to
<=	less than or equal to
?	ternary operator

content from https://www.w3schools.com/js/js_operators.asp

JAVASCRIPT OPERATORS PRECEDENCE

Value	Operator	Description	Example
19	( )	Expression grouping	(3 + 4)
18	.	Member	person.name
18	[]	Member	person["name"]
17	()	Function call	myFunction()
17	new	Create	new Date()
16	++	Postfix Increment	i++
16	--	Postfix Decrement	i--

content from https://www.w3schools.com/js/js_arithmetic.asp

ITERATION: THE `for` LOOP

in most programming languages (including JavaScript)

`for` loop is used when you have

a "definite" number of times to iterate

```
for (step = 1; step <= 10; step += 1) {
    $('#example1').append('<p>One more paragraph.</p>')
}
```

```
for (n = 1; n <= 6; n += 1) {
    $('#example2').append('<p>Paragraph #' + n + '</p>')
}
```

ITERATION: RAPHAËL EXAMPLE

```
paper = Raphael('container', 400, 200)
circle_attrs = {
    'stroke': '#c50',
    'stroke-width': '2'
}
rect_attrs = {
    'fill': '#292',
    'stroke-width': '1.5'
}
for (count = 0; count <= 11; count += 1) {
    c = paper.circle(10 + count*14, 20 + count*12, 6)
    c.attr(circle_attrs)
    r = paper.rect(250, 100, 40, 40)
    r.attr(rect_attrs)
    r.rotate(count*3)
    r.scale(3 - count*0.25)
}
```

You can find the implementation of this example here !

BUILDING STRINGS

when the + operator is applied to strings,
it joins them together or **concatenates** them

```
r = 'f'
g = '5'
b = '0'
newstyle = {
    'color': '#' + r + g + b
}
```

BUILDING STRINGS

when you try to add
a string and a number together in JavaScript

the number is automatically converted to a string,
and the strings are joined

```
a1 = 'abc' + 123
a2 = 'abc' + '123'
a3 = 'abc123'
```

```
a1 === a2 === a3
```

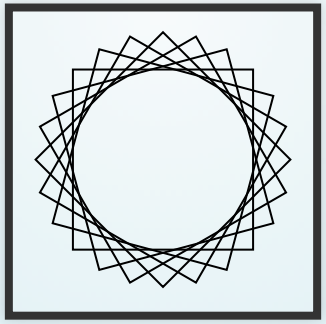
BUILDING STRINGS: RAPHAËL USE CASE EXAMPLES

`.scale()` and `.rotate()` functions are convenient, but they won't let us animate either scaling or rotation

to do that, we need `.animate()` and the `'transform'` attribute

BUILDING STRINGS: RAPHAËL USE CASE EXAMPLE 1

```
for (count = 1; count <= 6; count += 1) {
    r = paper.rect(30, 30, 90, 90)
    animation_attrs = {
        'transform': 'r' + (count*15)
    }
    r.attr(animation_attrs)
}
```



* Image from http://www.cs.sfu.ca/CourseCentral/165/common/study-guide/figures/for-build-result.svg

BUILDING STRINGS: RAPHAËL USE CASE EXAMPLE 2

```
paper = Raphael('container2', 140, 140)
rect_attrs = {
    'fill': '#292',
    'stroke-width': '1.5'
}
for (count = 0; count <= 11; count += 1) {
    r = paper.rect(50, 50, 40, 40)
    r.attr(rect_attrs)
    angle = count*3
    scale = 3 - count*0.25
    anim_attrs = {
        'transform': 'r' + angle + 's' + scale
    }
    r.animate(anim_attrs, 2000)
}
```

let's try the result of this code here

STRINGS AS OBJECTS

Strings we have been using in JavaScript have the fundamental job of holding characters

they also behave as objects:
they hold variables (including functions) that do useful things with the contents of the string

STRINGS AS OBJECTS: `.toLowerCase()`

gives back a **copy** of itself
converted to entirely lowercase

```
greeting = 'Hello World!'
lower_greeting = greeting.toLowerCase()
```

```
lower_greeting === 'hello world!'
```

STRINGS AS OBJECTS: `.charAt()`

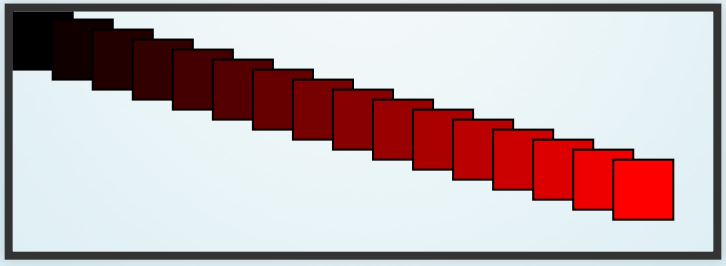
extracts individual characters from a string (counting from zero)

```
letters = 'abcdefg'
third = letters.charAt(2)
```

```
third === 'c'
```

STRINGS AS OBJECTS: RAPHAËL USE CASE EXAMPLE

```
color_values = '0123456789abcdef'
paper = Raphael('container', 350, 120)
for (red = 0; red <= 15; red += 1) {
    r = paper.rect(red*20, red*5, 30, 30)
    rect_attrs = {
        'fill': '#' + color_values.charAt(red) + '00'
    }
    r.attr(rect_attrs)
}
```



* you can try this example here

* Image from http://www.cs.sfu.ca/CourseCentral/165/common/study-guide/figures/for-build-2-result.svg

MAKING DECISIONS

sometimes we need to be able to make decisions
based on something the user enters
or some value we calculate, or the time of day, or …

`if` STATEMENT

we use the `if` statement in JavaScript to make decisions about what code to run

the `if` statement means

"should this block of code run or not?"

```
if (count > 100) {
    $('#error').html('That is too many.')
}
```

REVIEW OVER JAVASCRIPT COMPARISON OPERATORS

the `if` statement condition can be any expression that results in a true or false result

Comparison	Meaning	Example is…
`23 == 3`	is equal to	false
`23 != 3`	is not equal to	true
`4 < 9`	less than	true
`4 > 9`	greater than	false
`8 <= 6`	less than or equal	false
`8 >= 6`	greater than or equal	true

`if-else` STATEMENT

"do this if the condition is true, but that if it isn't"

the **`else`** which can be added to an **`if`**

lets us do exactly *that*:

code that will run if the condition is false!

```
if (count > 100) {
    $('#error').html('That is too many.')
} else {
    $('#sucess').html('Count is reasonable')
}
```

MAKING DECISION EXAMPLE

Let's look at Hiding Optional Content Example

Any Questions?