Programming Fundamentals with JavaScript

Variables



- 1) Start with the foreground image you want (fgImage)
- 2 And with the background image you want (bgImage)
- 3 Make a blank image of the same size (output)
- 4 For each pixel (currentPixel) in fgImage
 - 1. Look at currentPixel and if it is green,
 - Look at same position in bgImage
 - And set output's corresponding pixel to bgImage's pixel
 - 2. Otherwise: set output's corresponding pixel



Give names to values, use later

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Make images

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Examine colors in pixels, Set pixels in an image

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Repeat steps for each pixel

- 1) Start with the foreground image you want (fgImage)
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Make a decision, pick what to do next

- 1 Start with the foreground image you want (fgImage)
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- 4 For each pixel (currentPixel) in fgImage
 - 1. Look at currentPixel and if it is green,
 - Look at same position in bgImage
 - And set output's corresponding pixel to bgImage's pixel
 - 2. Otherwise: set output's corresponding pixel



```
var x = 3;
```

- Can name values with variables
 - This example: declares a new variable
 - And initializes it to 3



Let us break down the syntax

```
var x = 3;
```

Keyword "var": "I'm declaring a new variable"

- Can name values with variables
 - This example: declares a new variable
 - And initializes it to 3



Let us break down the syntax

```
var x = 3;

The name of the variable
```

- Can name values with variables
 - This example: declares a new variable
 - And initializes it to 3



Let us break down the syntax

```
var x = 3;

An equals sign
```

- Can name values with variables
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 - And initializes it to 3



Let us break down the syntax

$$var x = 3;$$

The value to initialize the variable to

- Can name values with variables
 - This example: declares a new variable
 - And initializes it to 3



Let us break down the syntax

$$var x = 3$$
; A semicolon: ends the statement

- Can name values with variables
 - This example: declares a new variable
 - And initializes it to 3



Variable Declaration/Initialization: Semantics

$$var x = 3;$$

- Semantics: meaning
 - Create a box labelled "x"
 - ...and put 3 in it



Variable Declaration/Initialization: Semantics

x 3

- Semantics: meaning
 - Create a box labelled "x"
 - ...and put 3 in it



```
var x = 3;
var y = 4;
var z = x + 2 * y;
```

- Three variables:
 - Each has its own "box"
 - With its own name/value



```
var x = 3;

var y = 4;

var z = x + 2 * y;
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- Three variables:
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```
var x = 3;

var y = 4;

var z = x + 2 * y;

3 + 2 * 4 = 11
```

- Three variables:
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```
var x = 3;
var y = 4;
var z = x + 2 * y;
```

- Three variables:
 - Each has its own "box"
 - With its own name/value



Assignment Statements

```
var x = 3;

var y = 4;

var z = x + 2 * y;

x = z - 1;

y = y * 2;
```

- Assignment Statements:
 - Update value of a variable that already exists
 - No "var"



Assignment Statements

```
var x = 3;

var y = 4;

var z = x + 2 * y;

x = z - 1;

y = y * 2; (Not an algebra equation to solve)
```

- Assignment Statements:
 - Update value of a variable that already exists
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Assignment Statements

```
var x = 3;
var y = 4;
var z = x + 2 * y;
x = z - 1;
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```

- Assignment Statements:
 - Update value of a variable that already exists
 - No "var"



Could Variables Hold Other Things?

- Saw some variables with numbers
- Can we hold things other than numbers?
 - Everything is a Number....
- But can use other types of data
 - Numbers interpreted in other ways



Variables Holding Images

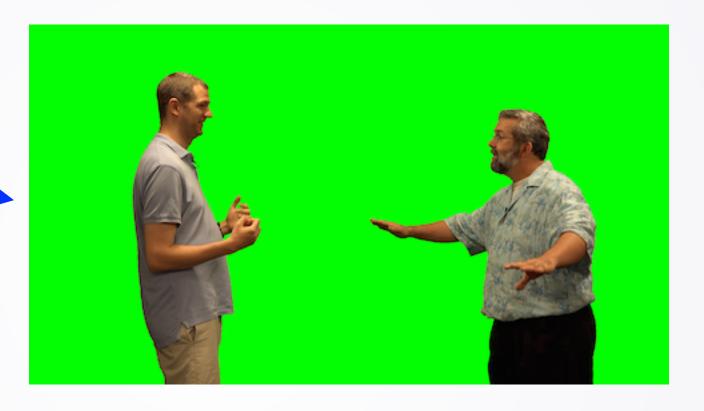
```
var fgImage = new SimpleImage("drewRobert.png");
var bgImage = new SimpleImage("dinos.png");
```



Variables Holding Images

```
var fgImage = new SimpleImage("drewRobert.png");
var bgImage = new SimpleImage("dinos.png");
```

fgImage





Variables Holding Images

```
var fgImage = new SimpleImage("drewRobert.png");
var bgImage = new SimpleImage("dinos.png");
    fgImage
    bgImage
```



```
var fgImage = new SimpleImage("drewRobert.png");
var bgImage = new SimpleImage("dinos.png");
```



```
var fgImage = new SimpleImage("drewRobert.png");
var bgImage = new SimpleImage("dinos.png");

Keyword "new": "Make an object"
```



```
var fgImage = new SimpleImage("drewRobert.png");
var bgImage = new SimpleImage("dinos.png");

Name of type to create
```





```
var fgImage = new SimpleImage("drewRobert.png");
var bgImage = new SimpleImage("dinos.png");
```

Learn more about objects, construction in later courses.



Variable Summary

- Variables
 - "Boxes" that hold values
 - Declare with var
 - Assign with =
- Expressions
 - Combinations of variables, constants, operations
- new SimpleImage("name")
 - Create an image

