Programming Fundamentals with JavaScript

Types

Types of Data

```
var fgImage = new SimpleImage("drewRobert.png");
var w        = fgImage.getWidth();
```

fgImage

w   480

- You've seen code that works with

  - Images

  - Numbers

Types of Data

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

var w        = fgImage.getWidth();

var z        = w.getWidth();
```


fgImage

w	480

- What if we do something nonsensical?

Types of Data

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

var w         = fgImage.getWidth();

var z         = w.getWidth();
```

Crashes!

fgImage

w	480

- What if we do something nonsensical?

Why Is One OK, but Not the Other?

This call to `getWidth()` is fine...

```
var w       = fgImage.getWidth();
var z       = w.getWidth();
```
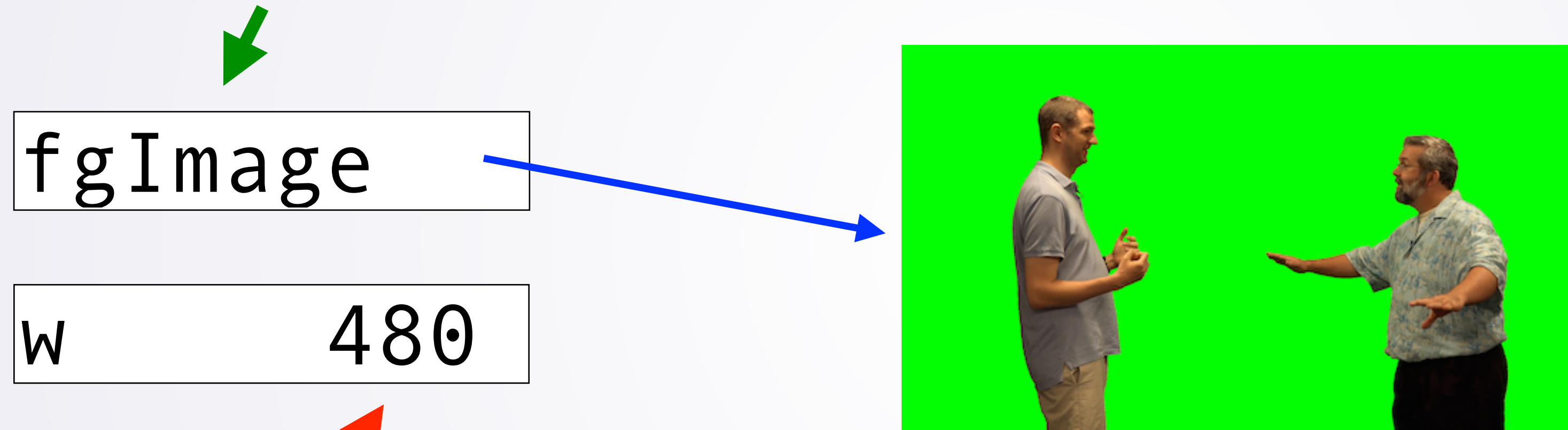
...but this one is not, why?

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Types of Data

What Is a Type?

- So what is a type?

  - Everything is a Number…

  - …but what does a number mean?

- A type specifies

  - How to **interpret** that number

  - How to **operate** on that number

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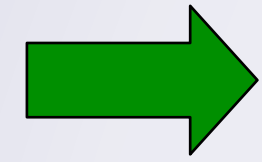# Type: How to Operate on Data

```
var n1 = 26;
var n2 = 16;

var s1 = "a";
var s2 = "b";

var n3 = n1 + n2;
var s3 = s1 + s2;
```
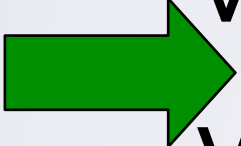
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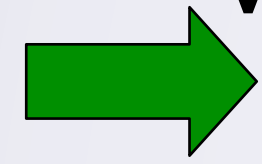UNIVERSITY

Type: How to Operate on Data

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```

n1	26

Type: How to Operate on Data

```
var n1 = 26;
var n2 = 16;
➡️

var s1 = "a";
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var n3 = n1 + n2;
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```

n1	26
n2	16

Type: How to Operate on Data

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var s1 = "a";
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```

n1	26
n2	16
s1	"a"

Type: How to Operate on Data

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var n1 = 26;
var n2 = 16;


var s1 = "a";
var s2 = "b";


var n3 = n1 + n2;
var s3 = s1 + s2;
```

n1	26
n2	16

s1	"a"
s2	"b"

Type: How to Operate on Data

```
var n1 = 26;
var n2 = 16;

var s1 = "a";
var s2 = "b";

→ var n3 = n1 + n2;
  var s3 = s1 + s2;
```
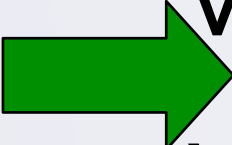
n1	26
n2	16
s1	"a"
s2	"b"
n3	42

Type: How to Operate on Data

```
var n1 = 26;
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var s1 = "a";
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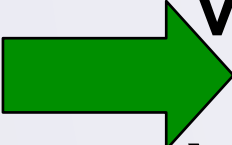
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What is "a" + "b"?

For strings "+" means concatenate

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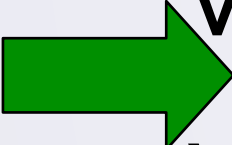
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What is "a" + "b"?

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"ab"

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```

n1	26
n2	16
s1	"a"
s2	"b"
n3	42
s3	"ab"
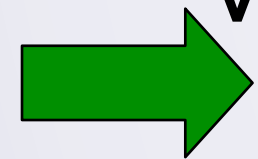
How Does a Language Know the Type?

- How does JavaScript know the type?

  - Keeps track of it with the value

  - Called "dynamically typed"

- Java (Courses 2+)

  - "Statically typed"

  - Write types down in code

  - Checks for mistakes before you run!

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