

DESIGNING ACROSS DEVICES with

Progressive Enhancement



Aaron Gustafson

@aarongustafson

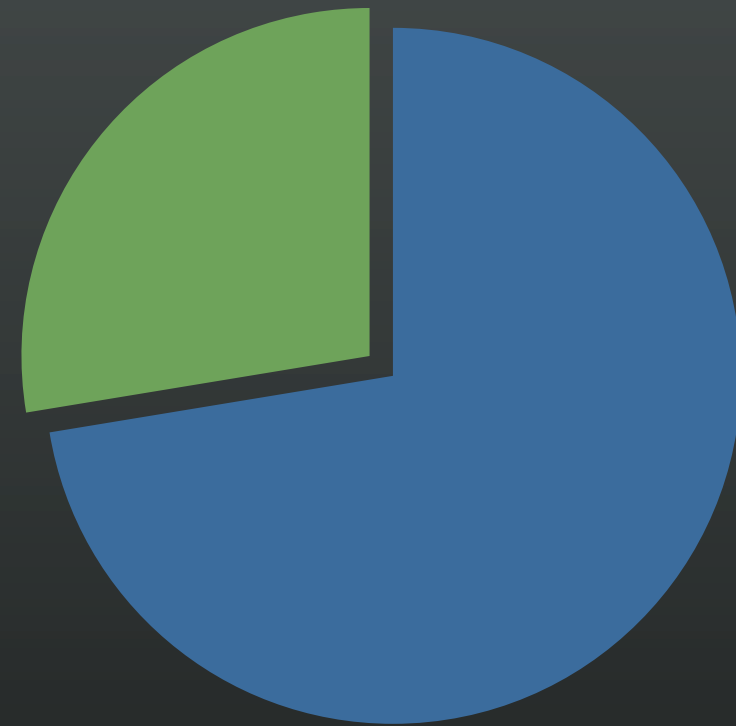
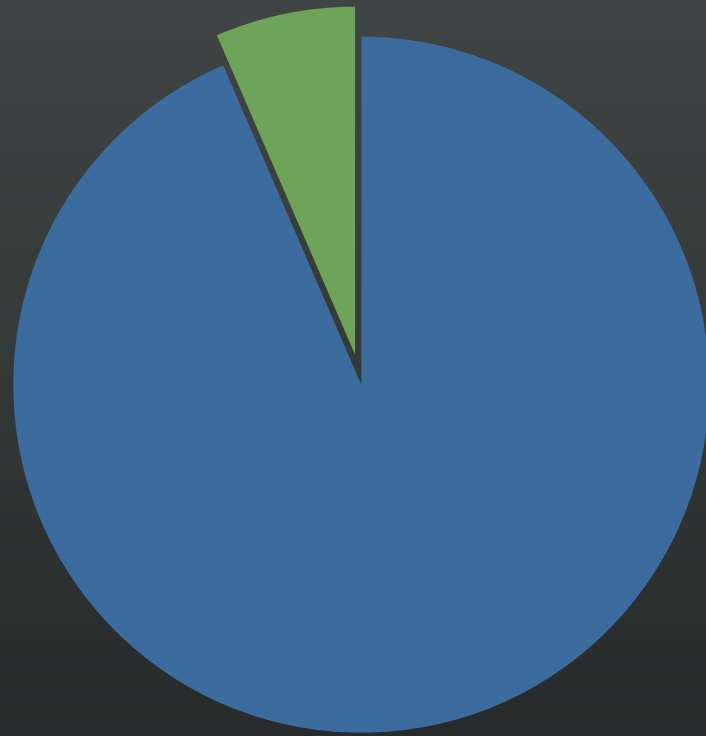
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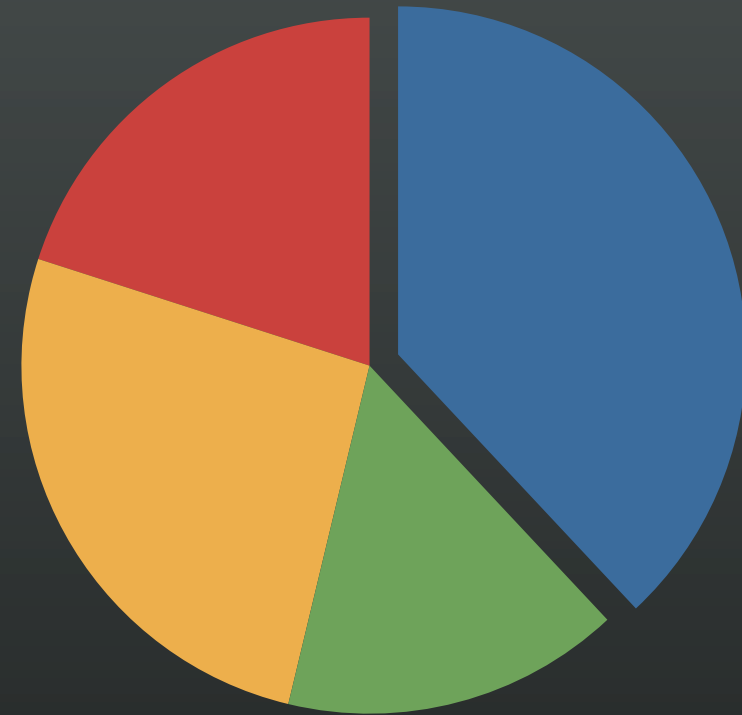
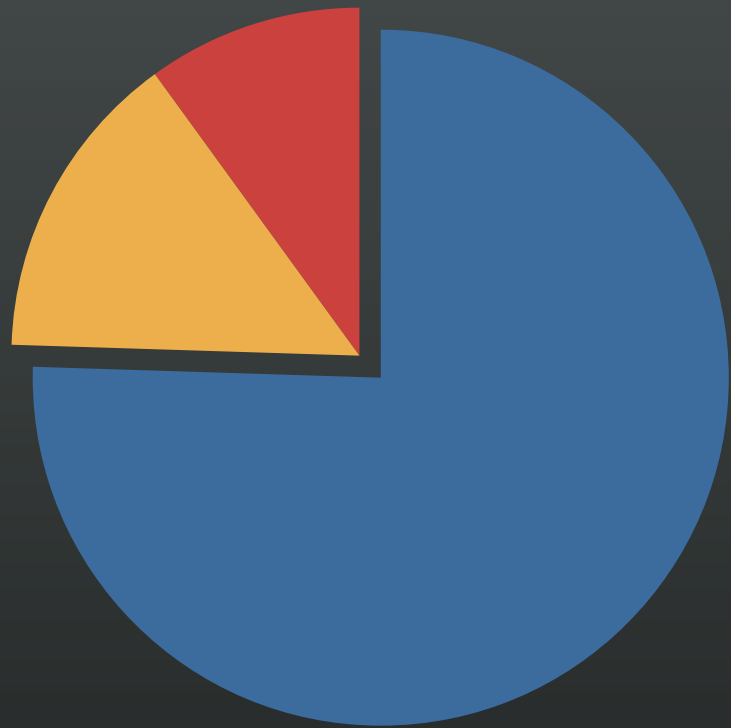
“Just four years ago the majority of our visitors saw our website in Internet Explorer on a Windows computer on a minimum 1,024 pixel wide screen. Times have really changed.

Jason Samuels
IT Manager,
National Council on Family Relations
[Source](#)



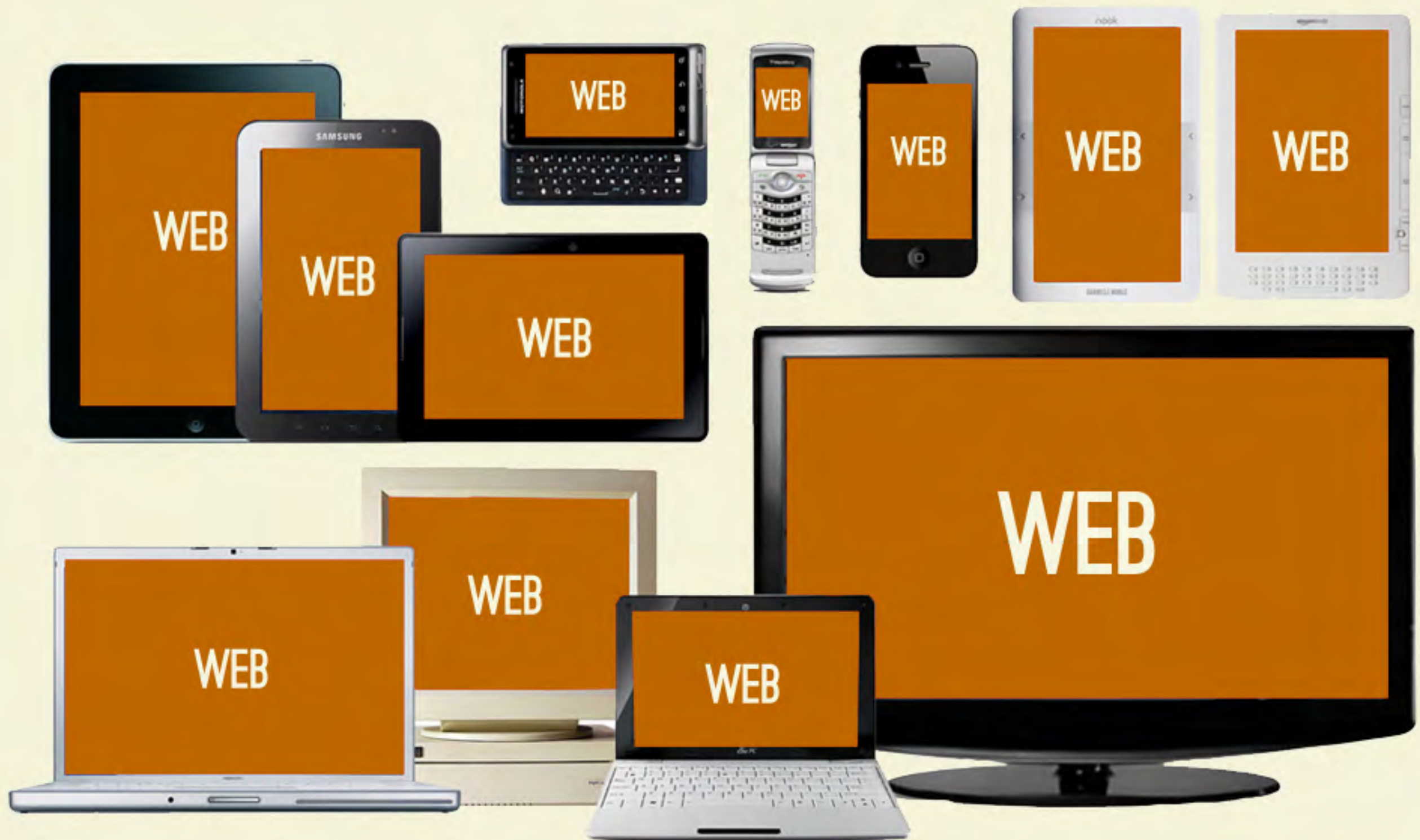
“Windows users used to comprise 93.5% of our web visits. Now that percentage is 72.4%. Visitors using a Mac have more than tripled.”

“The percentage visiting from a mobile device or tablet ... was just 0.1% in 2008. It has since grown exponentially,
200-400% per year,
to 6.2% today.

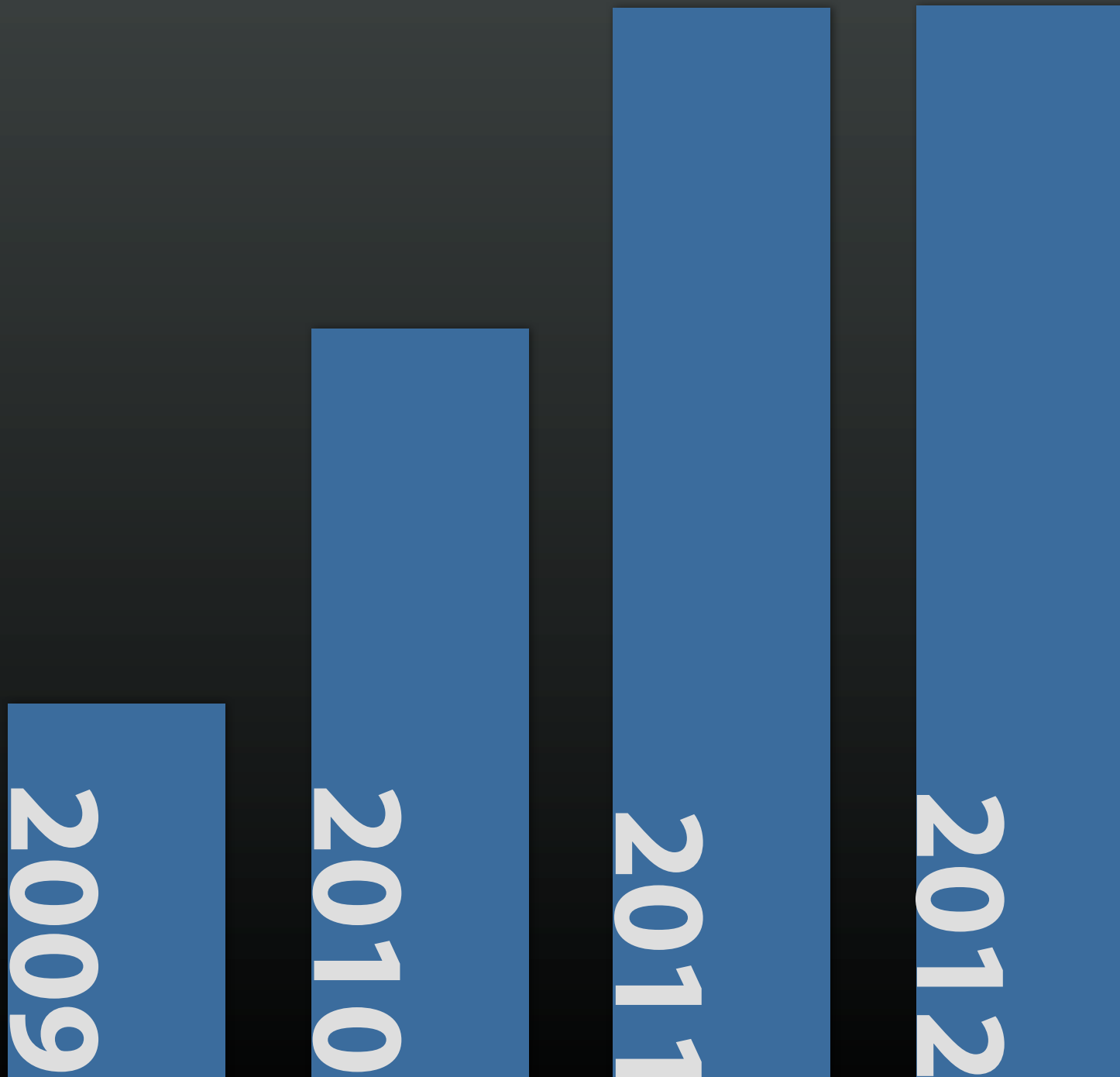


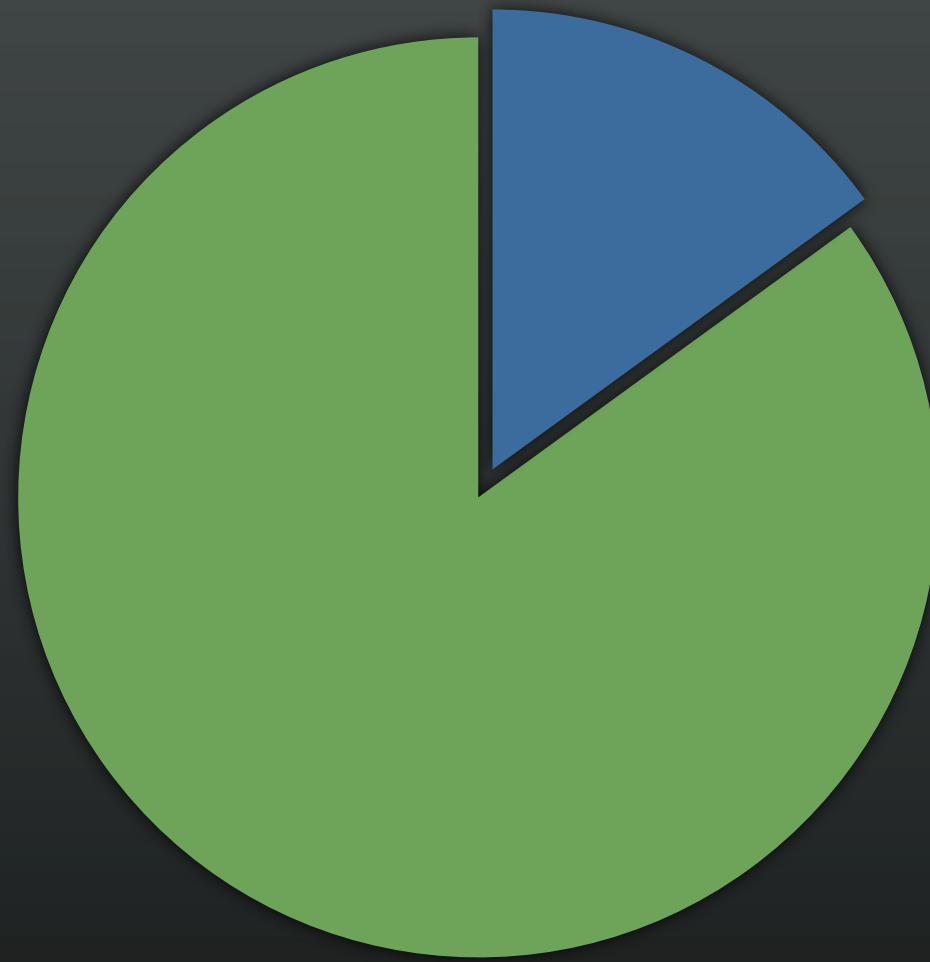
“Four years ago 75.5% of our web visitors used Internet Explorer. That number has fallen to 37%. Firefox now comprises 25.5%, Safari 19.5%, and Chrome 15.3%.”

**“ In the second quarter of 2008
we detected 71 different
screen resolutions among our
visitors. In the first quarter of
2012 we detected 830**



6.8 Billion

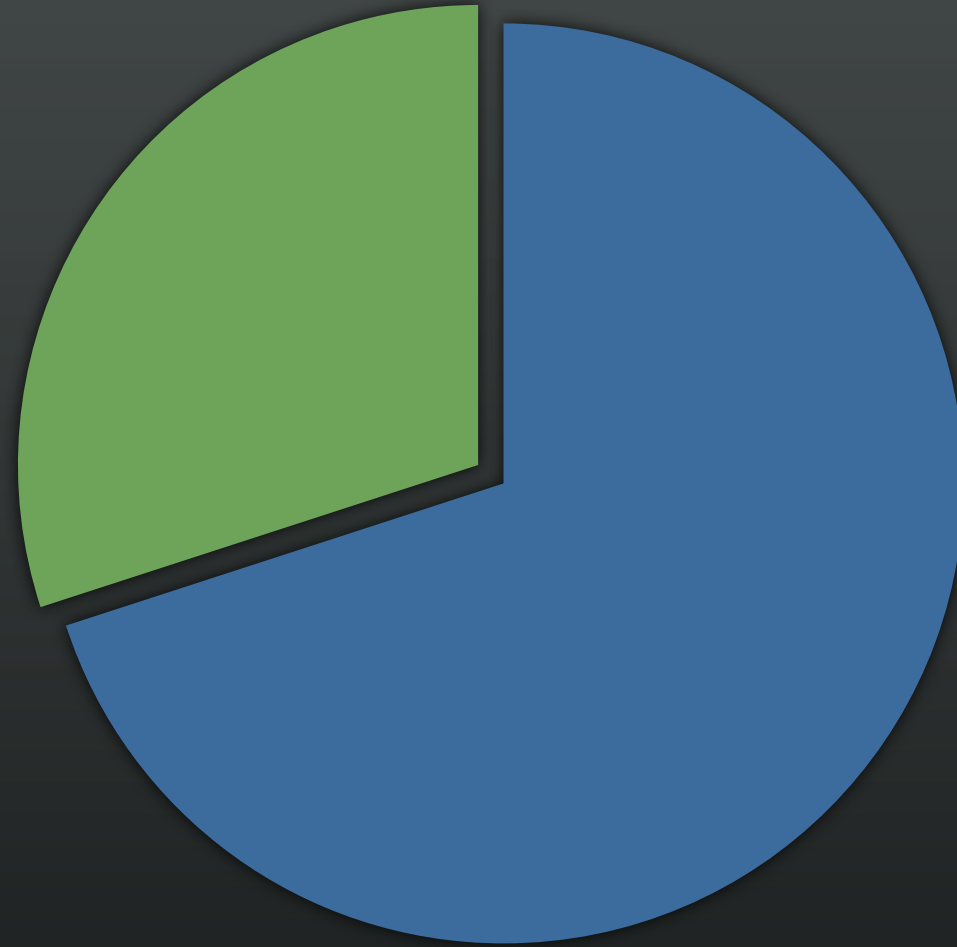




“Smartphone sales accounted for **nearly 85% of all mobile phone sales** in the US in Q1 2013.



“Smartphones have reached
50% penetration in the US...



“...but that’s concentrated in
30% of households”





SYLVANIA

WIRELESS MOBILE INTERNET DEVICE




Microsoft®
Windows CE



E-mail



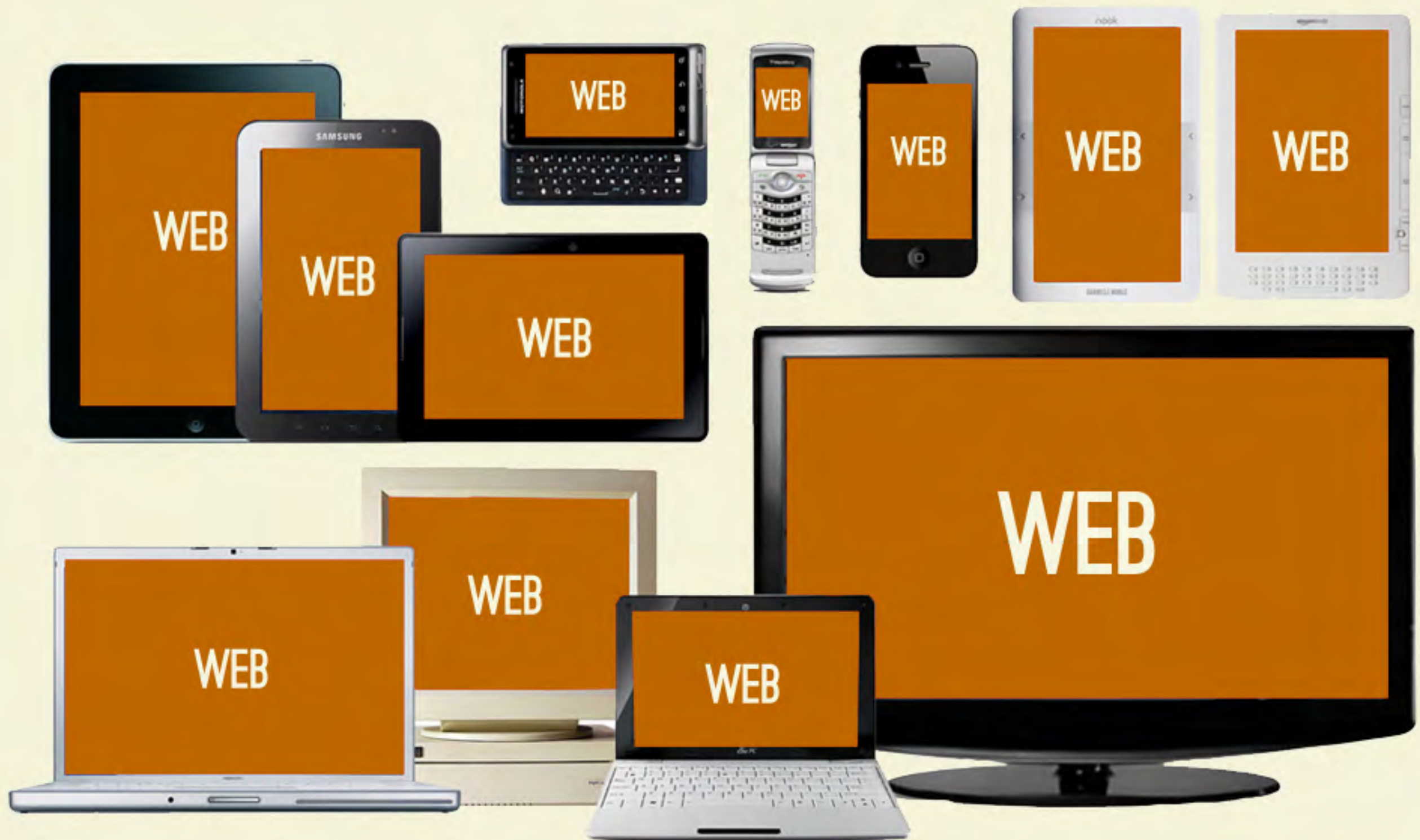
Web Browsing

facebook

Social Networking

You Tube™

YouTube
Video Streaming





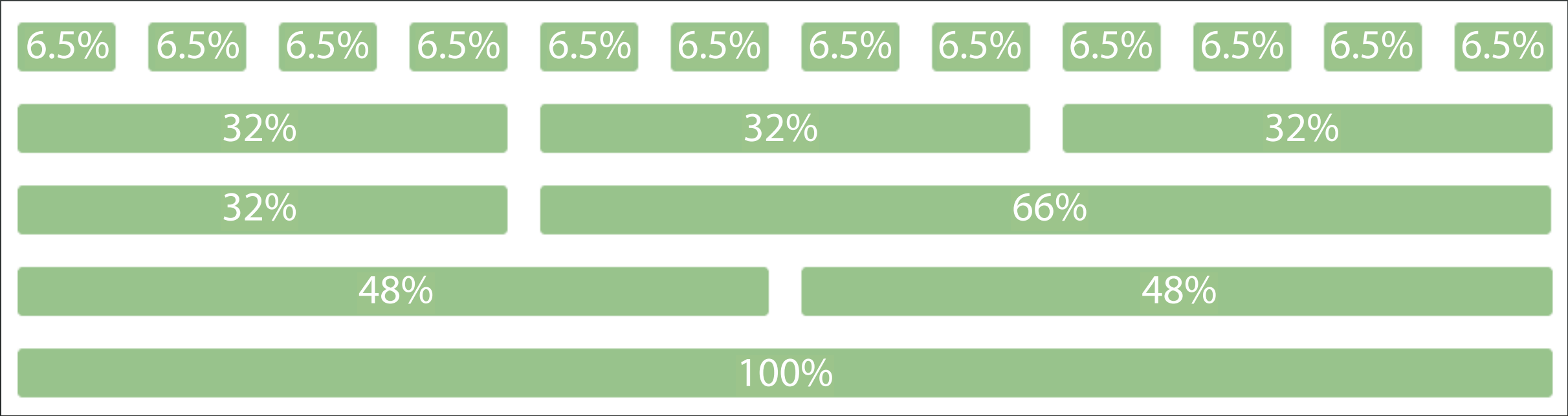
RWD

To the Rescue!

What is RWD?

- Fluid grids
- Flexible media
- Media queries

Fluid Grids



Flexible Media

```
img {  
  max-width: 100%;  
  height: auto;  
}
```


Media Queries

```
@media screen and (min-width:450px) {  
  /* Styles for screen media when browser  
    is 450px wide or larger */  
}
```

Established Nottingham 2003
THE CELEBRATED NEW MISCELLANY OF
MR. SIMON COLLISON
* A.K.A COLLY *

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Catalogued nocturnal matter
EXHAUSTIVE ARCHIVES



[851—A letter of note](#)
[850—An Event Apart](#)
[849—Fictive Kinsman](#)
[848—Meet little Americo](#)
[847—When we build](#)

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NEW ADVENTURES



Images from the field
FLICKR PHOTOGRAPHS



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But That's the *Easy* Stuff

- Content strategy
- Page weight
- JavaScript support
- Interaction methods
- Network latency & performance
- Hardware performance
- Screen resolution
- Sensor availability
- *etc.*

What's in a name?

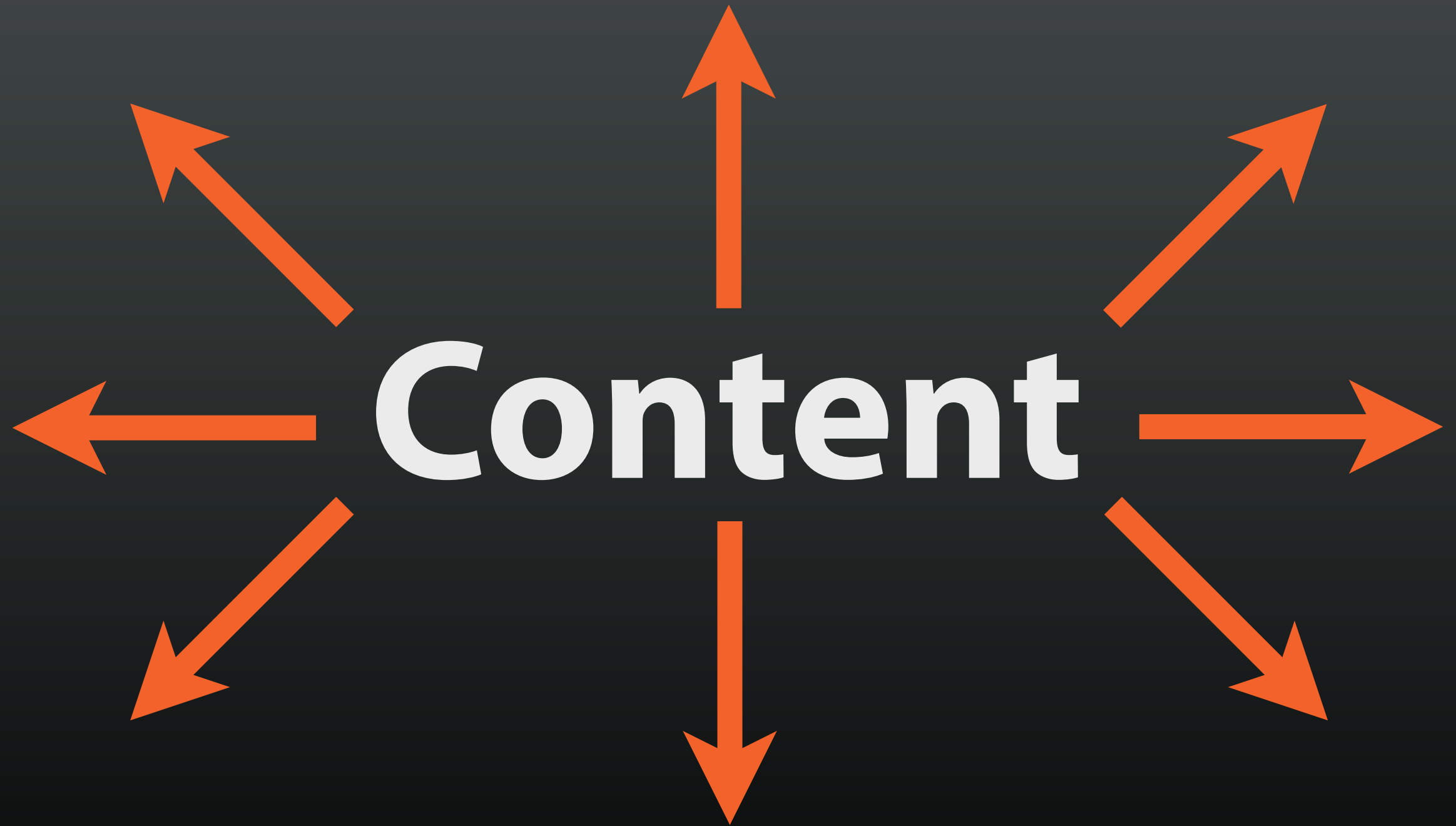
- Responsive Web Design
- Adaptive Web Design
- Progressive Enhancement
- Aggressive Enhancement
- Responsible Web Design



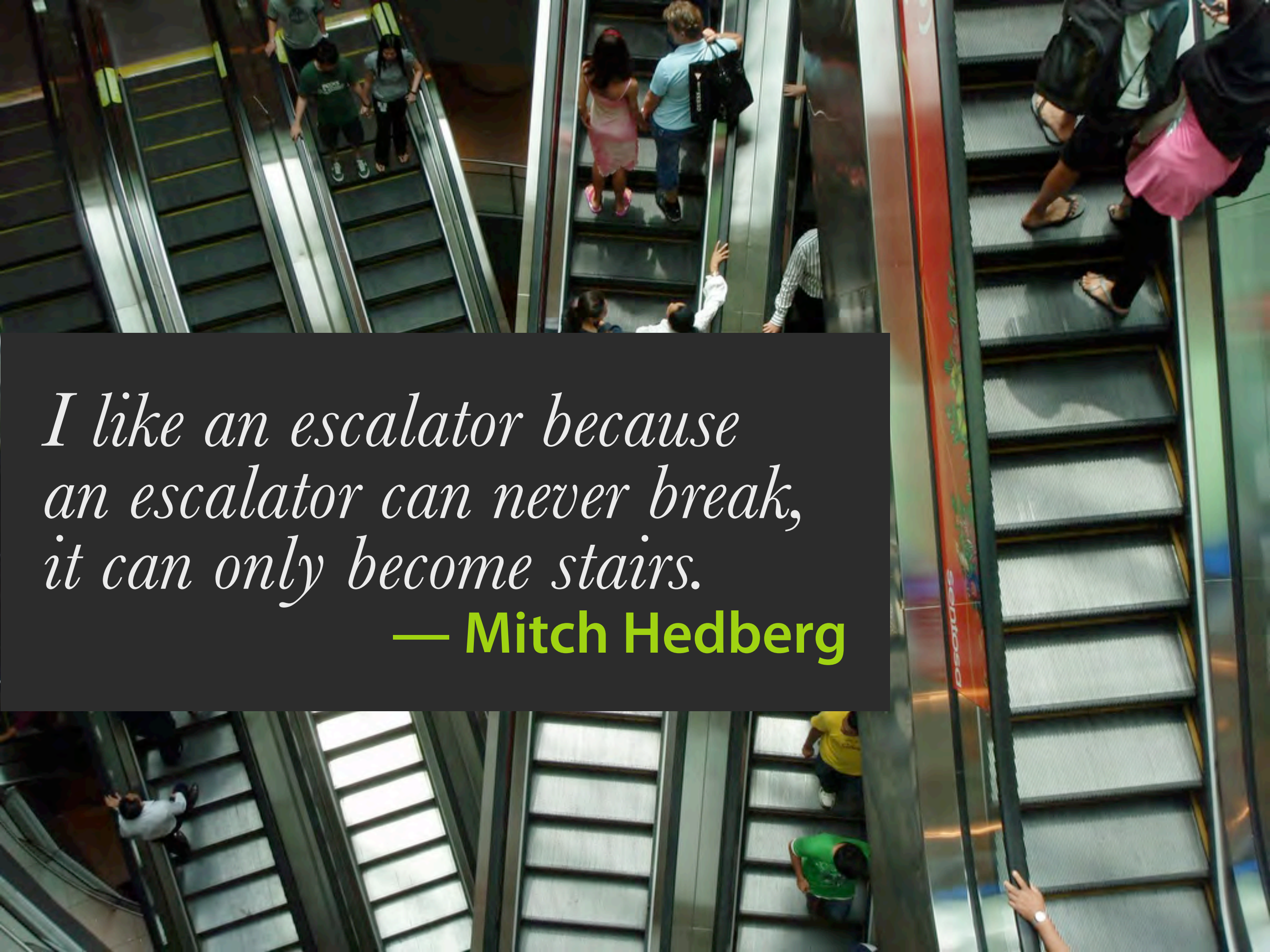
We don't know

**Even when
we think
we know,
we're probably
wrong**

So how
do we cope?







*I like an escalator because
an escalator can never break,
it can only become stairs.*
— **Mitch Hedberg**



Andrew Wight

@AndrewUX

Progressive enhancement is an escalator that becomes stairs.
Graceful degradation is building a lift then having to add stairs.

14 May 12

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Graceful Degradation

Modern Browsers



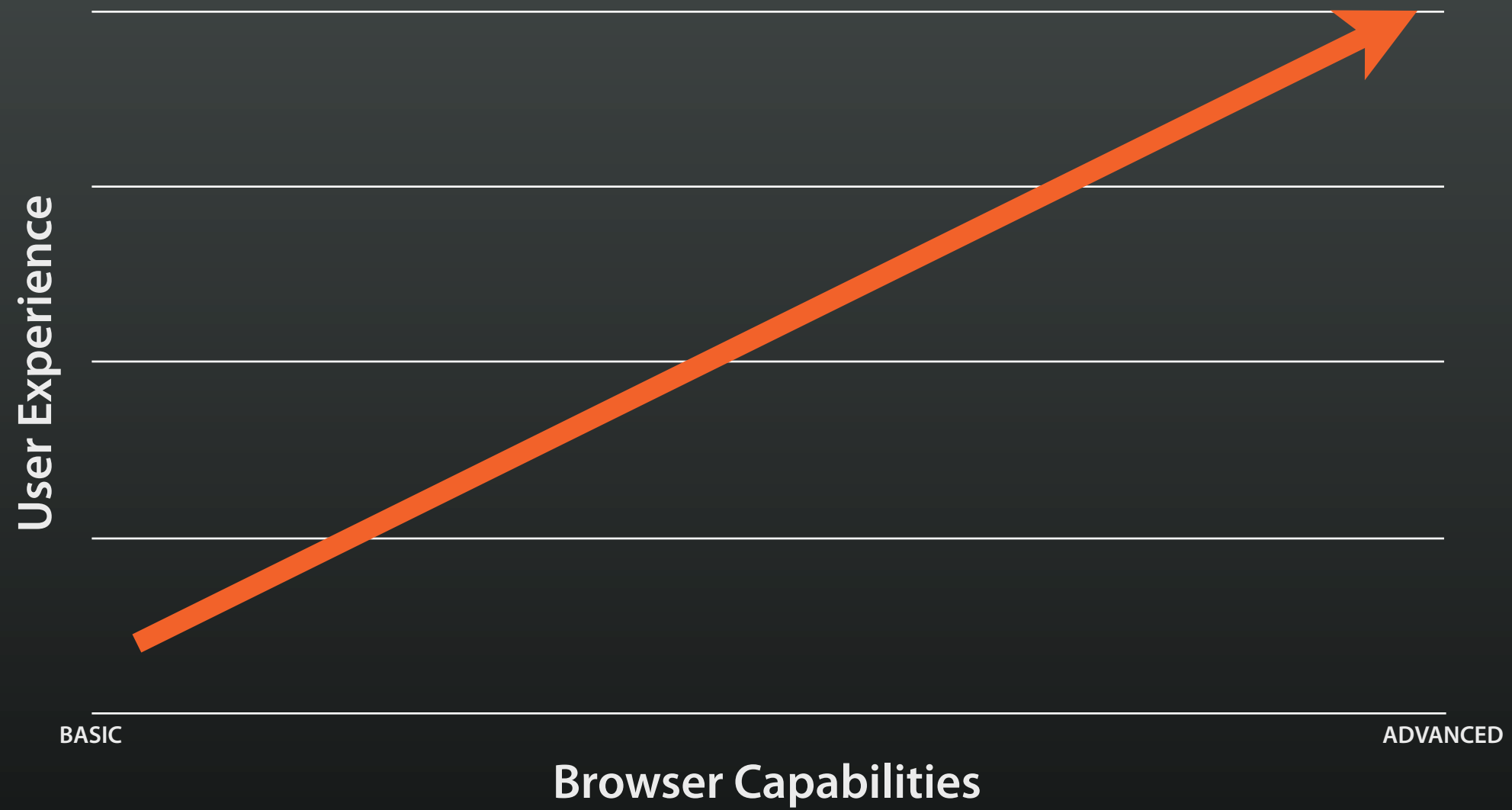
Older Browsers

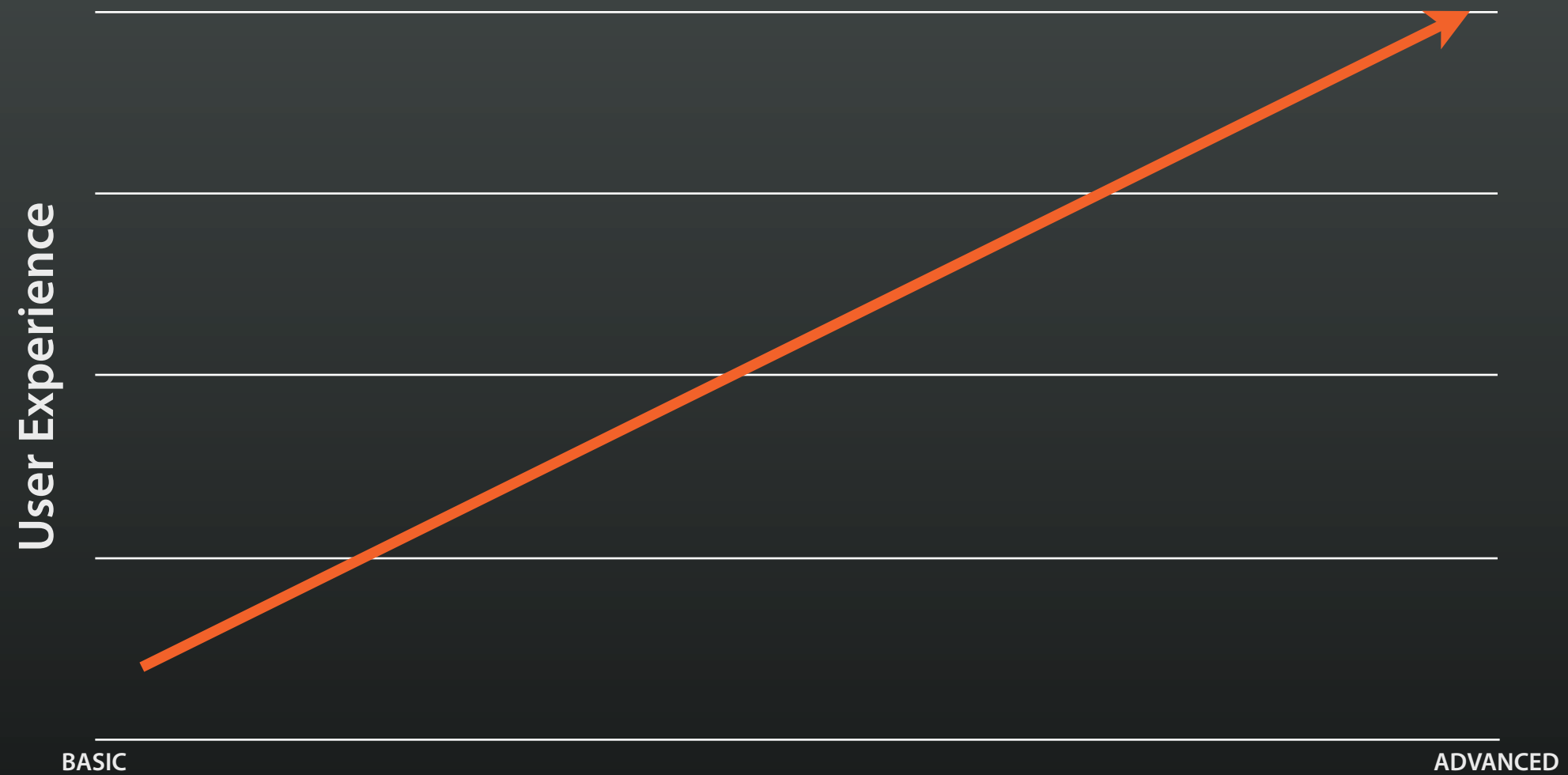
Modern Browsers



YOU MUST BE THIS TALL
TO RIDE WITH AN ADULT

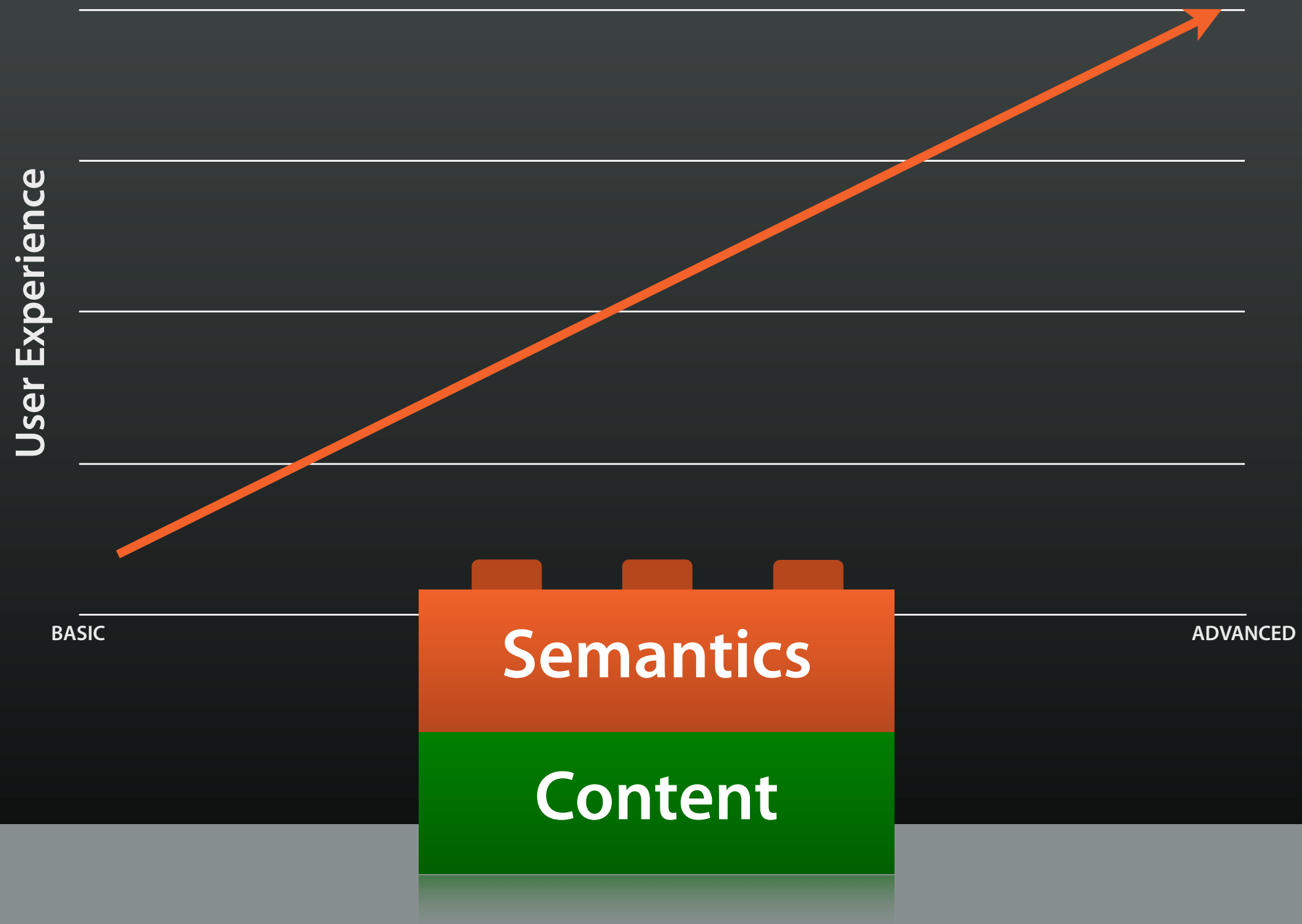






Browser Capabilities

Content



User Experience

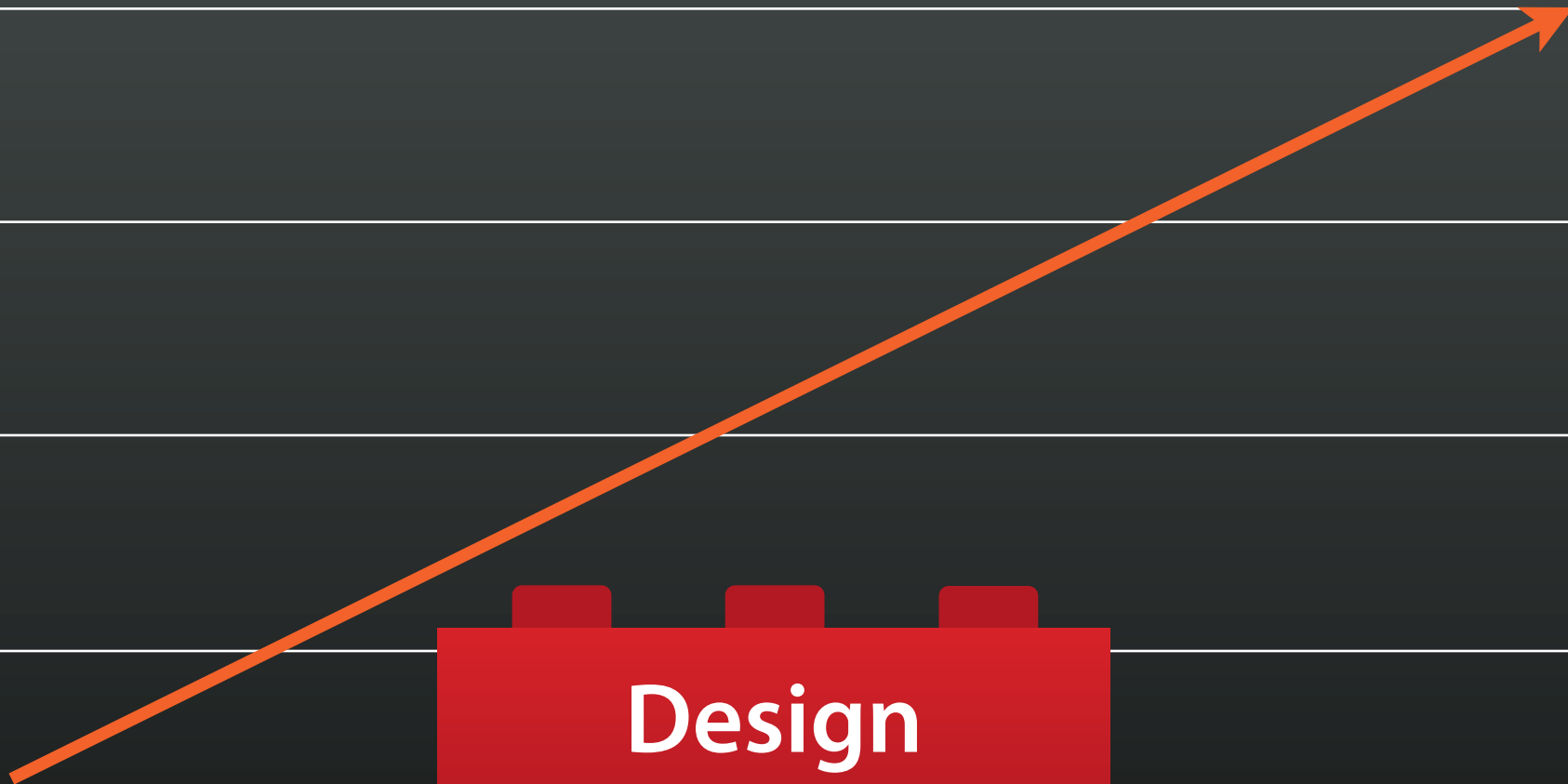
BASIC

ADVANCED

Design

Semantics

Content



User Experience

BASIC

ADVANCED

Interactivity

Design

Semantics

Content



User Experience

BASIC

ADVANCED

Accessibility

Interactivity

Design

Semantics

Content



User Experience

BASIC

ADVANCED





A stylized illustration of a computer keyboard key. The key is a large, horizontal rectangle with a vibrant orange color. It is positioned against a dark gray background. Above the main body of the key, there are three smaller, rounded rectangular shapes, also in orange, which represent the key's mechanism or other keys. The word "HTML" is printed in a bold, white, sans-serif font, centered on the orange surface of the key.

HTML



HTML5

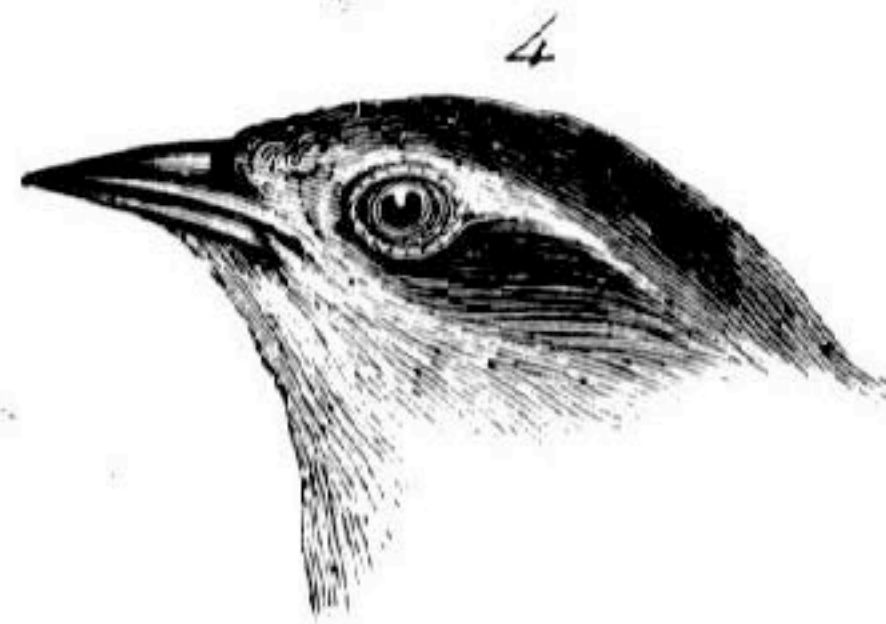
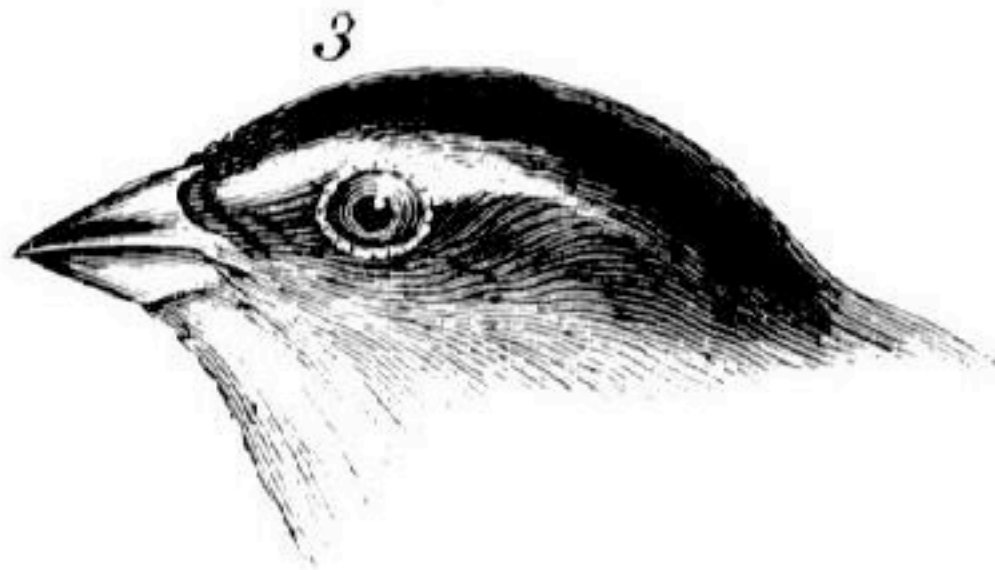
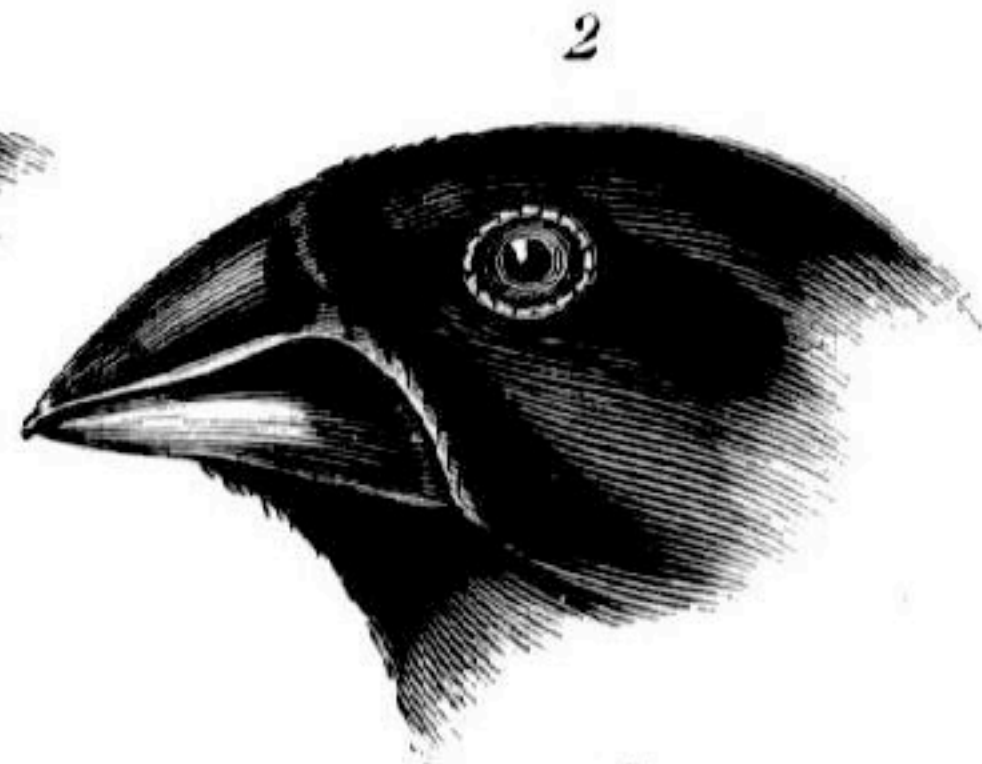
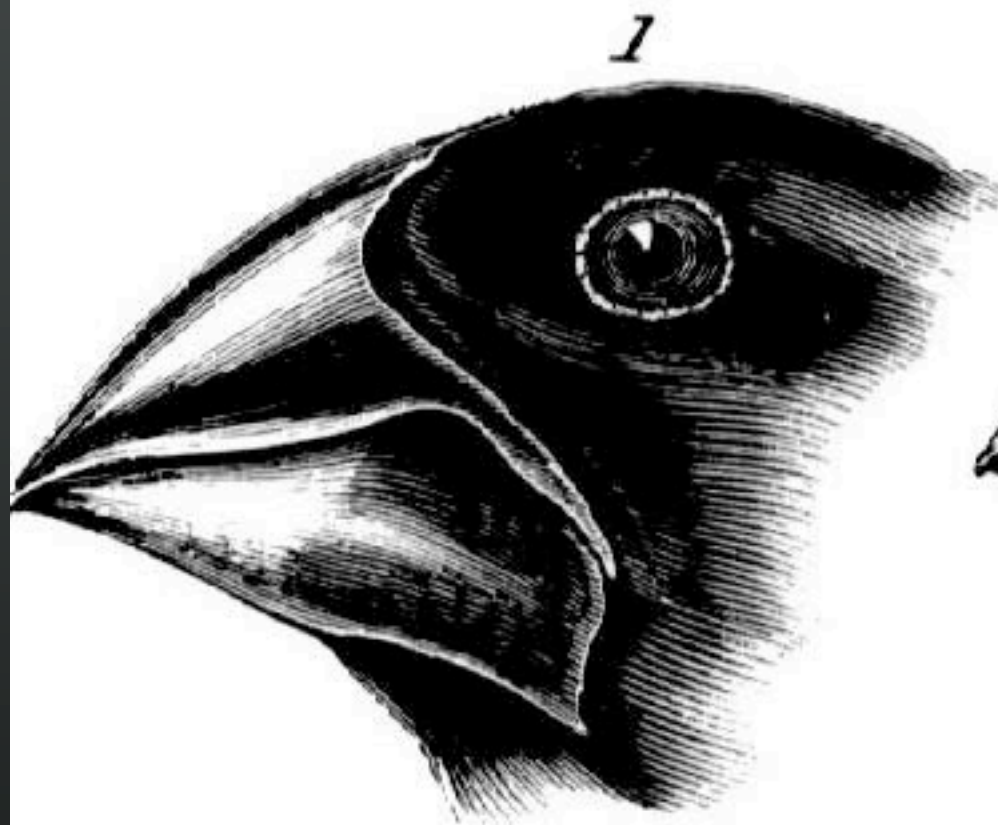
Microformats

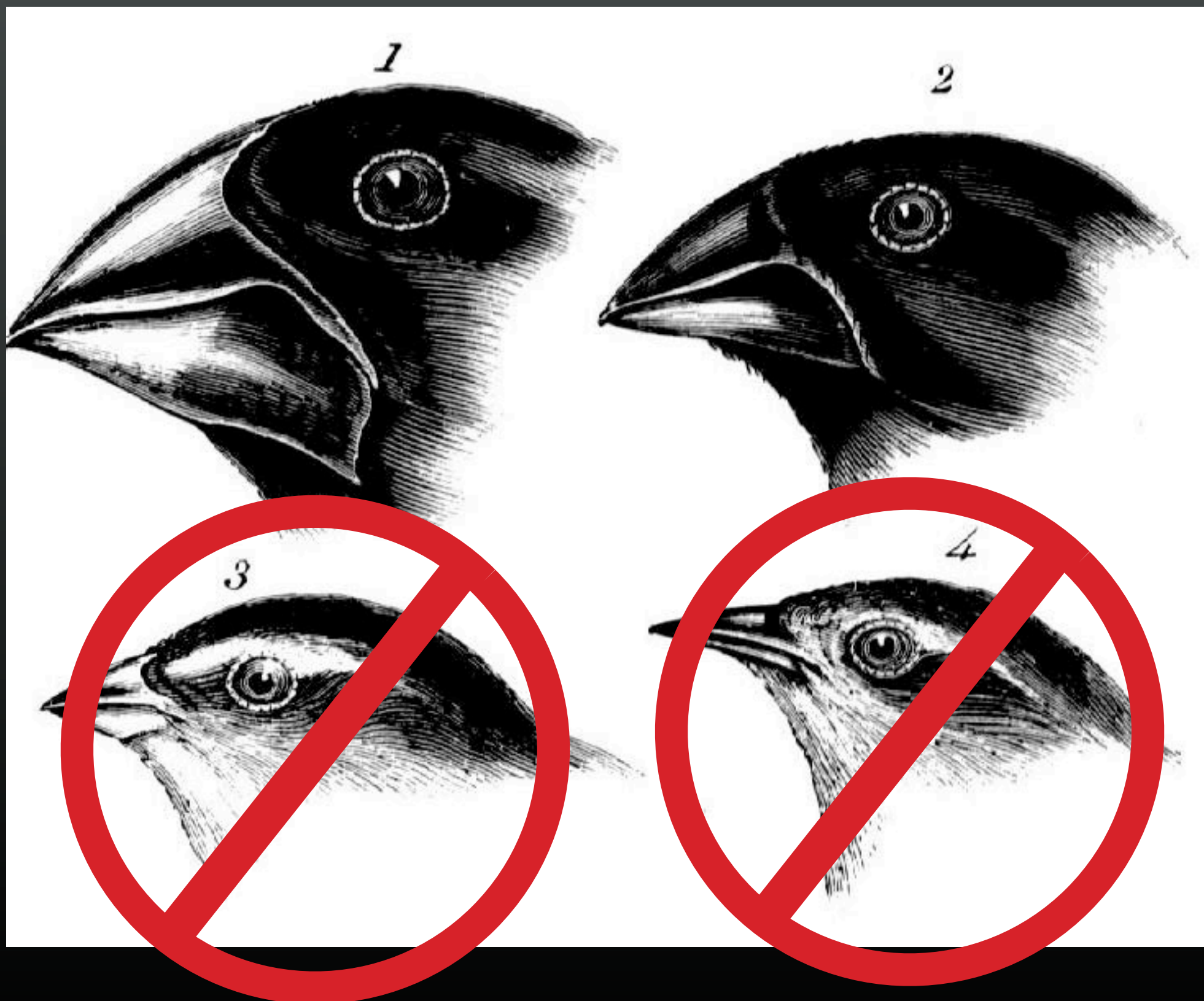
HTML4

MCMMLXXVII

(that's 1977)









HTML



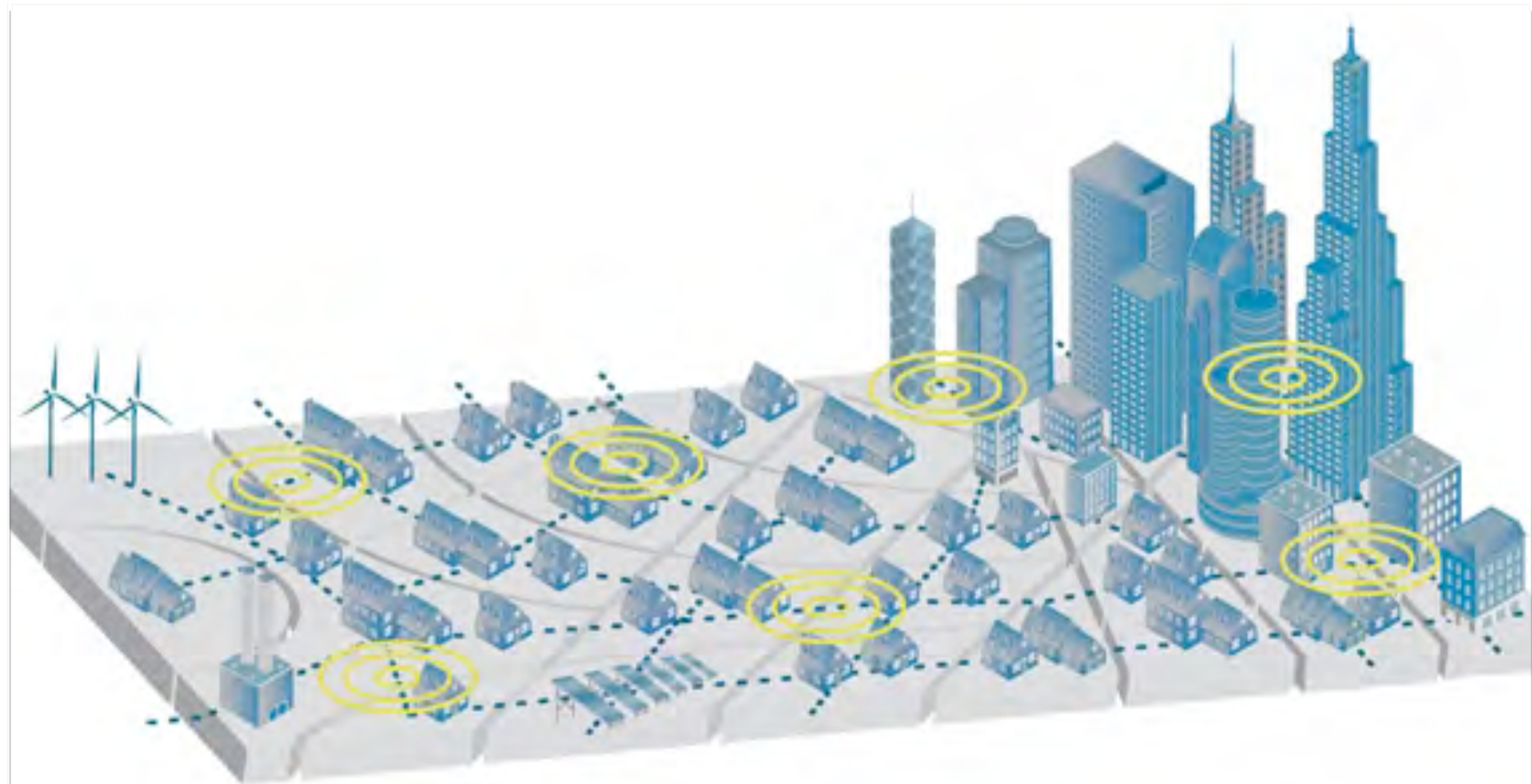
CSS

fault tolerance

n. a system's ability to continue to operate when it encounters and unexpected error.







**Browsers ignore
what they don't
understand**



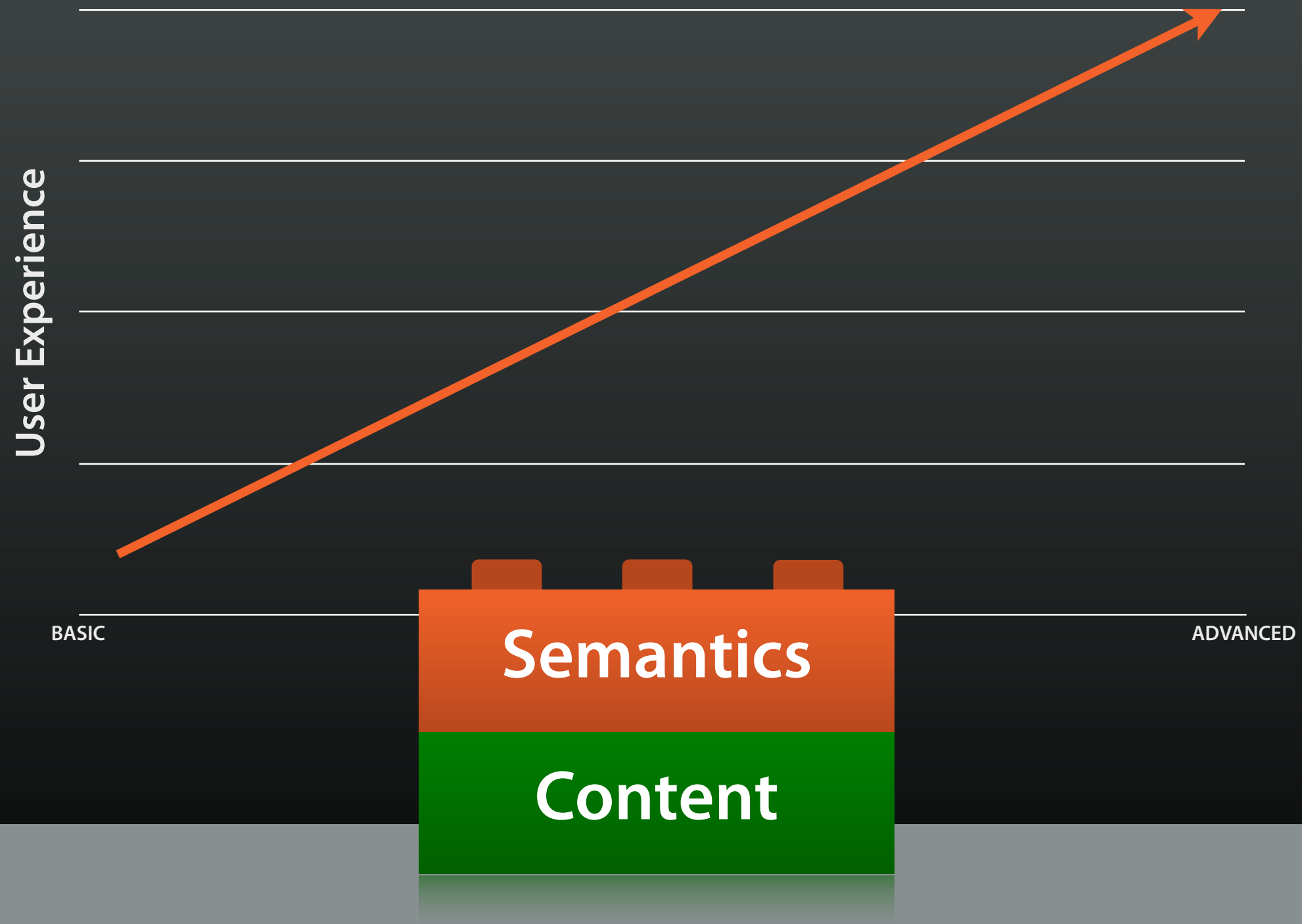
Browser Capabilities

Content

Content
is why
we build
websites

**Users must have
access to key
content & tasks**

**Make sure
markup, styles
& scripts don't
obscure it.**





Semantics 101

```
<p>HTML5 introduces several <em>really</em>  
useful elements and a ton of new APIs.</p>
```

```
<p>Please fill out the form below.  
<strong>Note: all fields are required.</strong></p>
```

```
<p>I like to work with markup languages because  
<strong>they are simple and easy to read</strong>.  
They also have that certain <i lang="fr" title="I  
don't know what">je ne sais quoi</i>.</p>
```

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Iran Begins Loading Fuel at Nuclear Reactor

By WILLIAM YONG and ALAN
COWELL 4 minutes ago

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Laurent Cipriani/Associated Press

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Unions at Critical Point as Strikes Continue

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reputation abroad. Above, Marseille struggles with trash as
sanitation crews remain on strike.

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applies
Western
ideas and the
West doesn't
like it.



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unusual
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works of art
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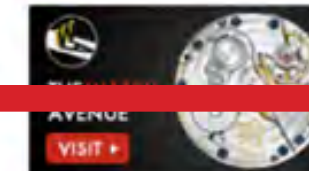


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FTSE 100	5,705.17	-46.81	-0.81%	FTSE 100 BRITAIN
DAX	6,621.16	-18.05	-0.27%	
CAC 40	3,843.10	-26.90	-0.70%	
FTSE Italia	21,937.89	-79.86	-0.36%	
Eurofirst 300	1,088.52	-3.71	-0.34%	Tuesday

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Iran Begins Loading Fuel at Nuclear Reactor

By WILLIAM YONG and ALAN
COWELL 4 minutes ago

TEHRAN — Tuesday's fuel
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the start-up of a facility that
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• Times Topics: Iran's Nuclear
Program

Iraq Court Sentences Tariq Aziz to Death

By JACK HEALY 43 minutes ago

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Shiites under the former
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China Telecom Giant Makes Push for U.S. Market

By JOHN MARKOFF and DAVID
BARBOZA

WASHINGTON — China
Telecom Corp. is making a
push to enter the U.S. market.



Laurent Cipriani/Associated Press

MEMO FROM PARIS

Unions at Critical Point as Strikes Continue

By STEVEN ERLANGER

Ongoing demonstrations led by labor unions risk alienating
some supporters, while hurting France's economy and its
reputation abroad. Above, Marseille struggles with trash as
sanitation crews remain on strike.

2010 Midterm Elections

Divide on U.S. Deficit Likely to Grow After Election

By JACKIE CALMES

A midterm campaign that has turned on the issue of federal
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GLOBAL SPOTLIGHT

OPINION • Roger Cohen: Turkey Steps Out

Ankara
applies
Western
ideas and the
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like it.



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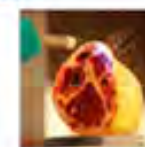
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Because of unusual materials, modern works of art can be hard to conserve.



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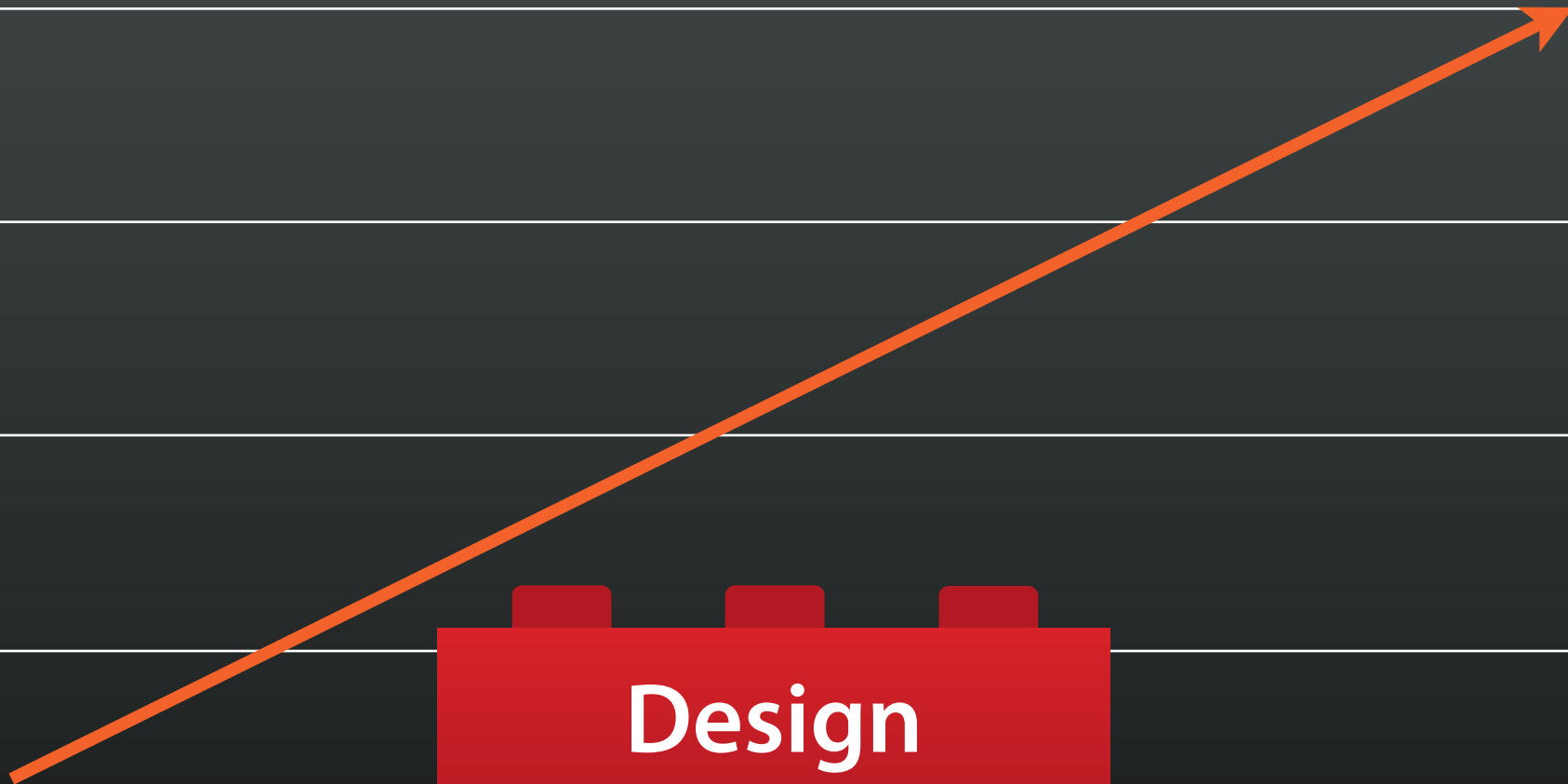
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Semantics

Content



Pumpkin Pie

Overview



Whether you're hosting a festive party or a casual get-together with friends, our Pumpkin Pie will make entertaining easy!

Original recipe yield
1 × 9-inch deep dish pie

Prep Time
10min

Cook Time
1hr

Ready In
1hr 10min

Ingredients

- 1 (9in) unbaked deep dish pie crust
- 1 (9in) unbaked deep dish pie crust

Pumpkin Pie

OVERVIEW

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Original recipe yield: 1 × 9-inch deep dish pie

Prep Time: 10min

Cook Time: 1 hr

Ready In: 1 hr 10min



INGREDIENTS

- 1 (9in) unbaked deep dish pie crust
- ½ cup white sugar
- 1 tsp ground cinnamon
- ½ tsp salt
- ½ tsp ground ginger
- ¼ tsp ground cloves
- 2 eggs
- 1 can (15oz) pumpkin puree
- 1 can (12fl oz) evaporated milk

DIRECTIONS

1. Preheat oven to 425°F

Pumpkin Pie

OVERVIEW

INGREDIENTS

DIRECTIONS

NUTRITION

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User Experience

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Interactivity

Design

Semantics

Content



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**But it's not
only about
no JavaScript**

- Bugs
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- Overzealous Firewalls
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User Experience

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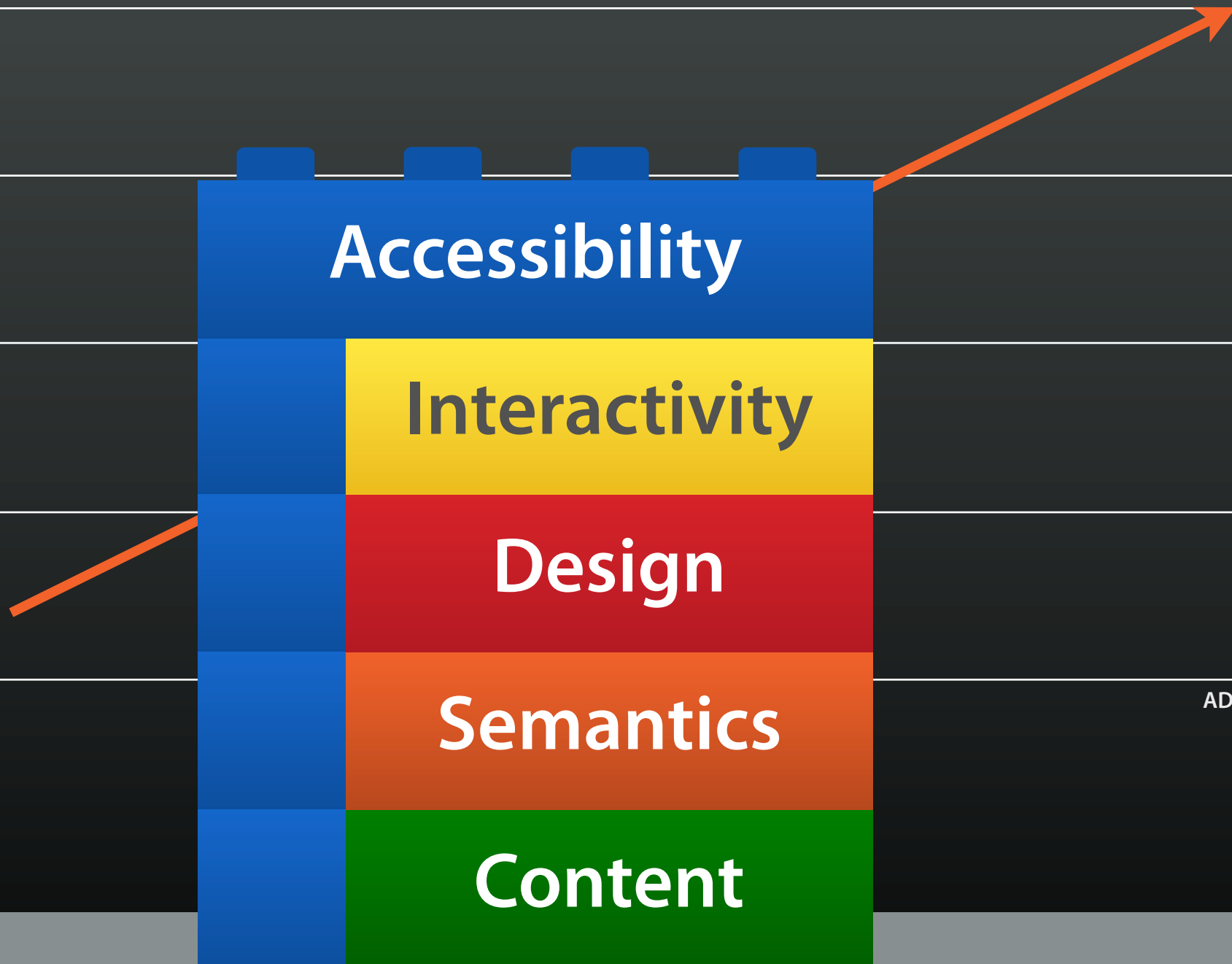
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“special needs”

**“special needs”
can be
CONTEXTUAL**



up to date now — both [here](#) and [here](#). Like most months I account for new user agents that come up this time with a new sightings in the “fun” category:

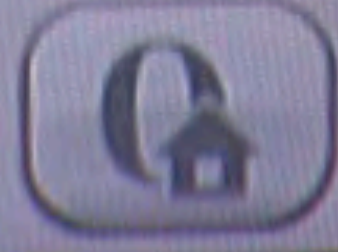
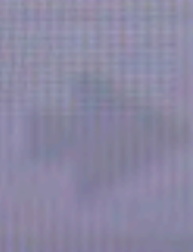
- Opera/9.00 (Nintendo Wii; U; ; 1309-9; en)
- Mozilla/5.0 (PLAYSTATION 3; 1.00)

[Wondering if that means I get to write off my Wii as a business expense]

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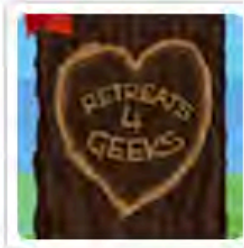
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Retreats 4 Geeks

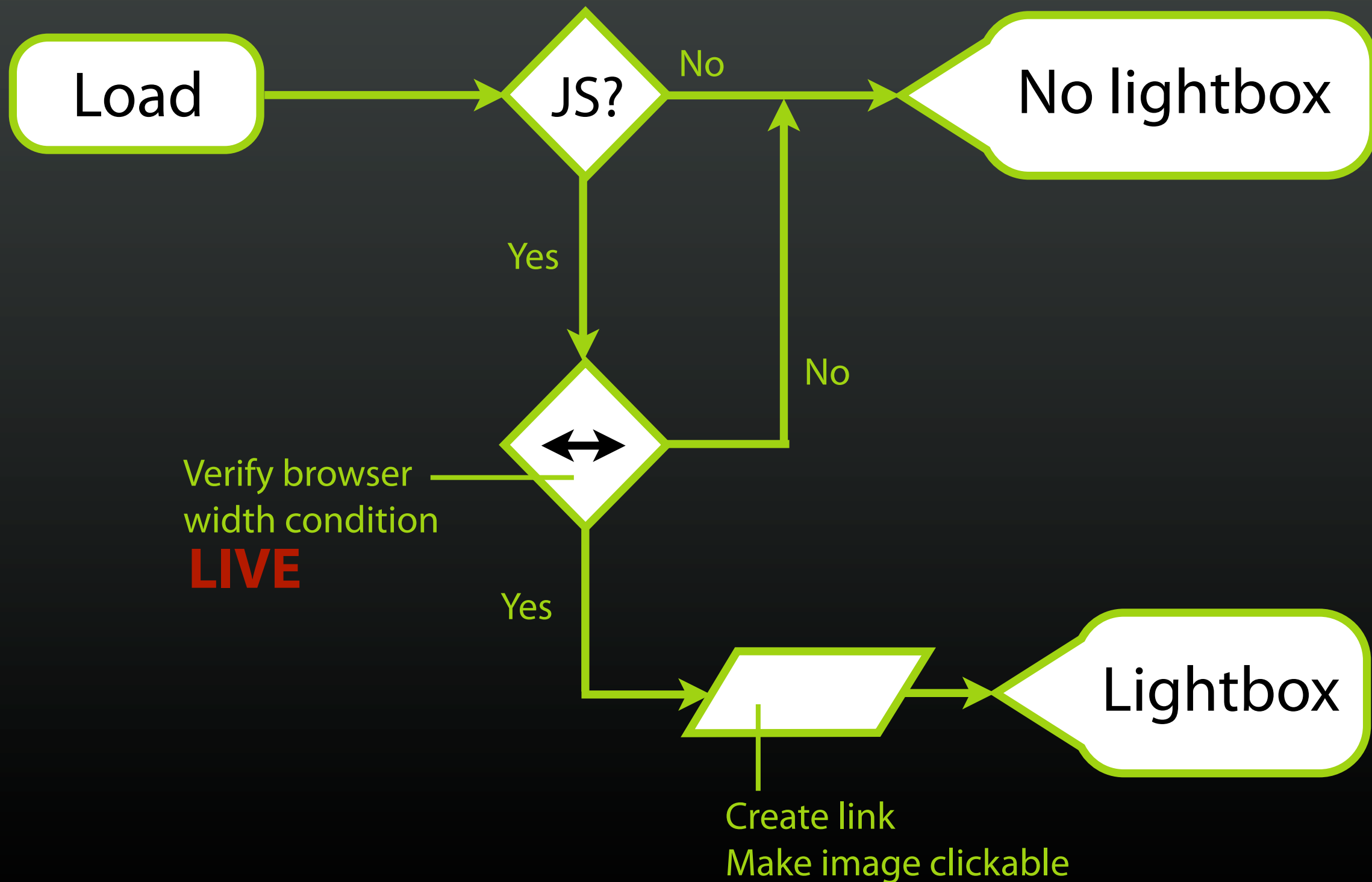
We built this site for our intimate retreat series.

Our curriculum is created for today's practitioner, integrating instruction in web standards with new technologies and emerging trends in both design and development.

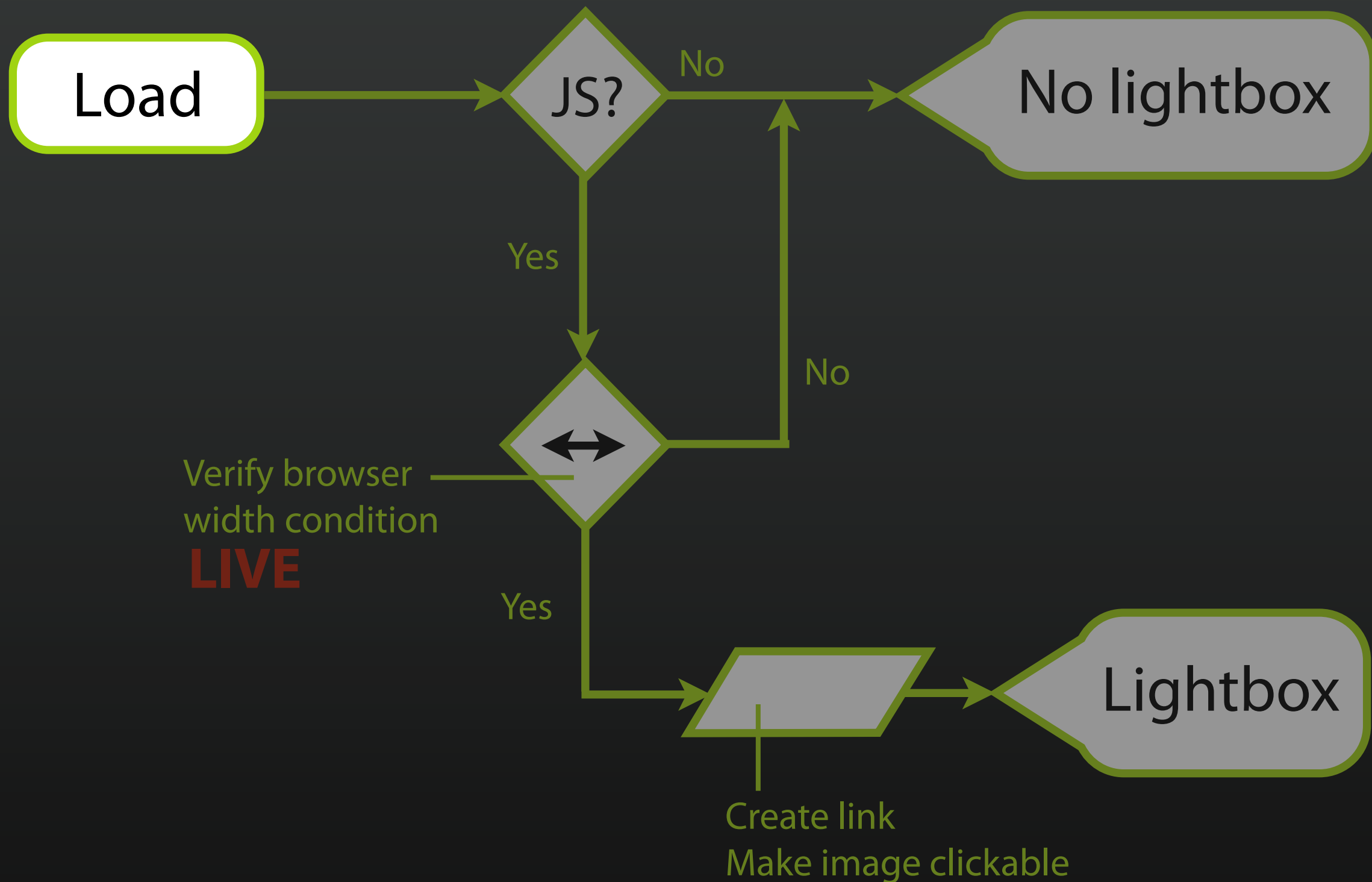
Our facilitators are giants in the field, with years of hands-on experience in the trenches and the classroom.

Our approach to teaching is dynamic, like the web, and at the heart of it all is our love for sharing best practices.

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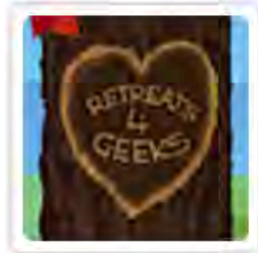
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UI Construction Flow

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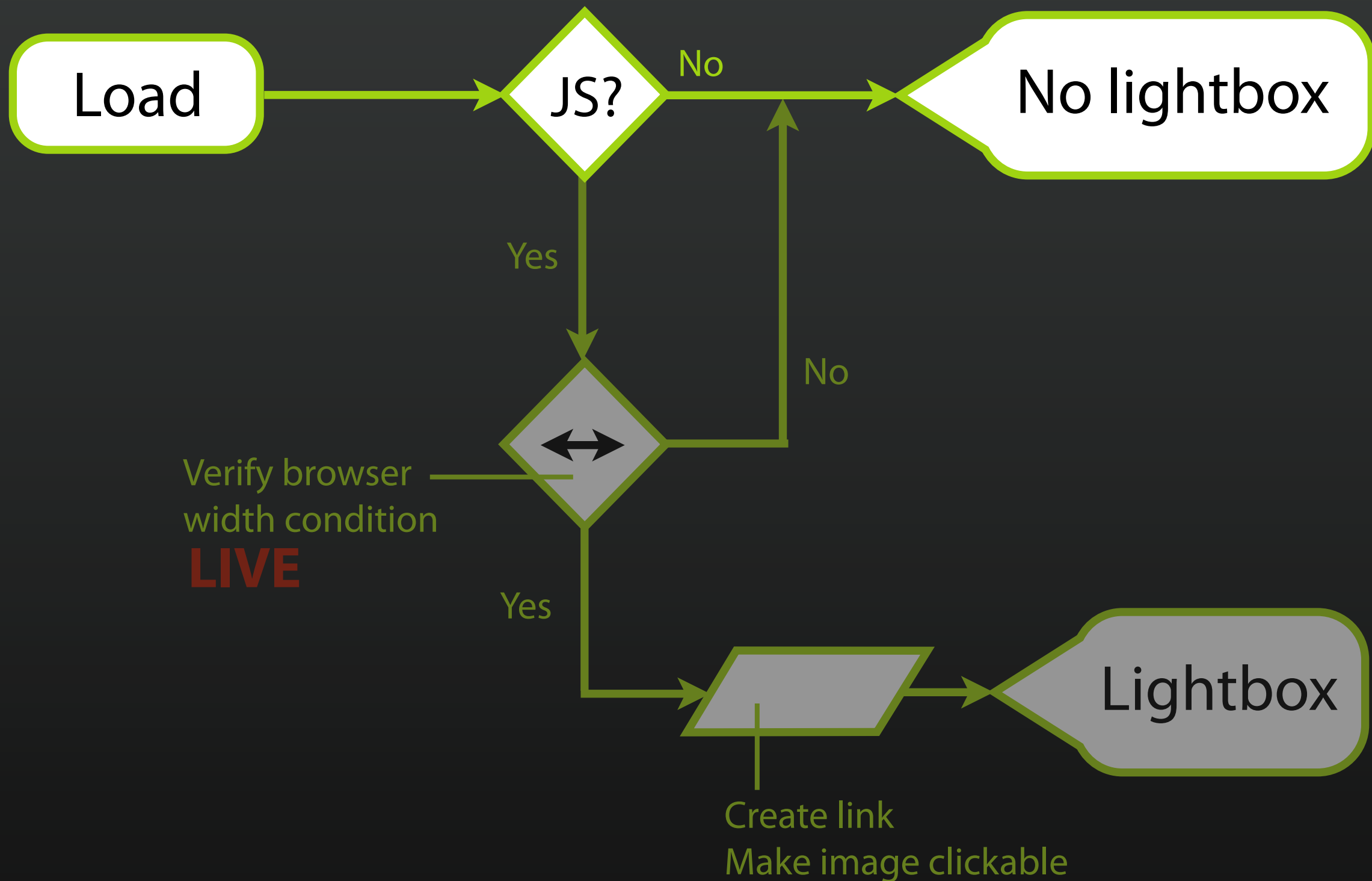
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Create link
Make image clickable

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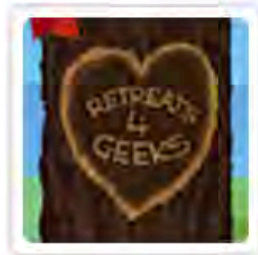
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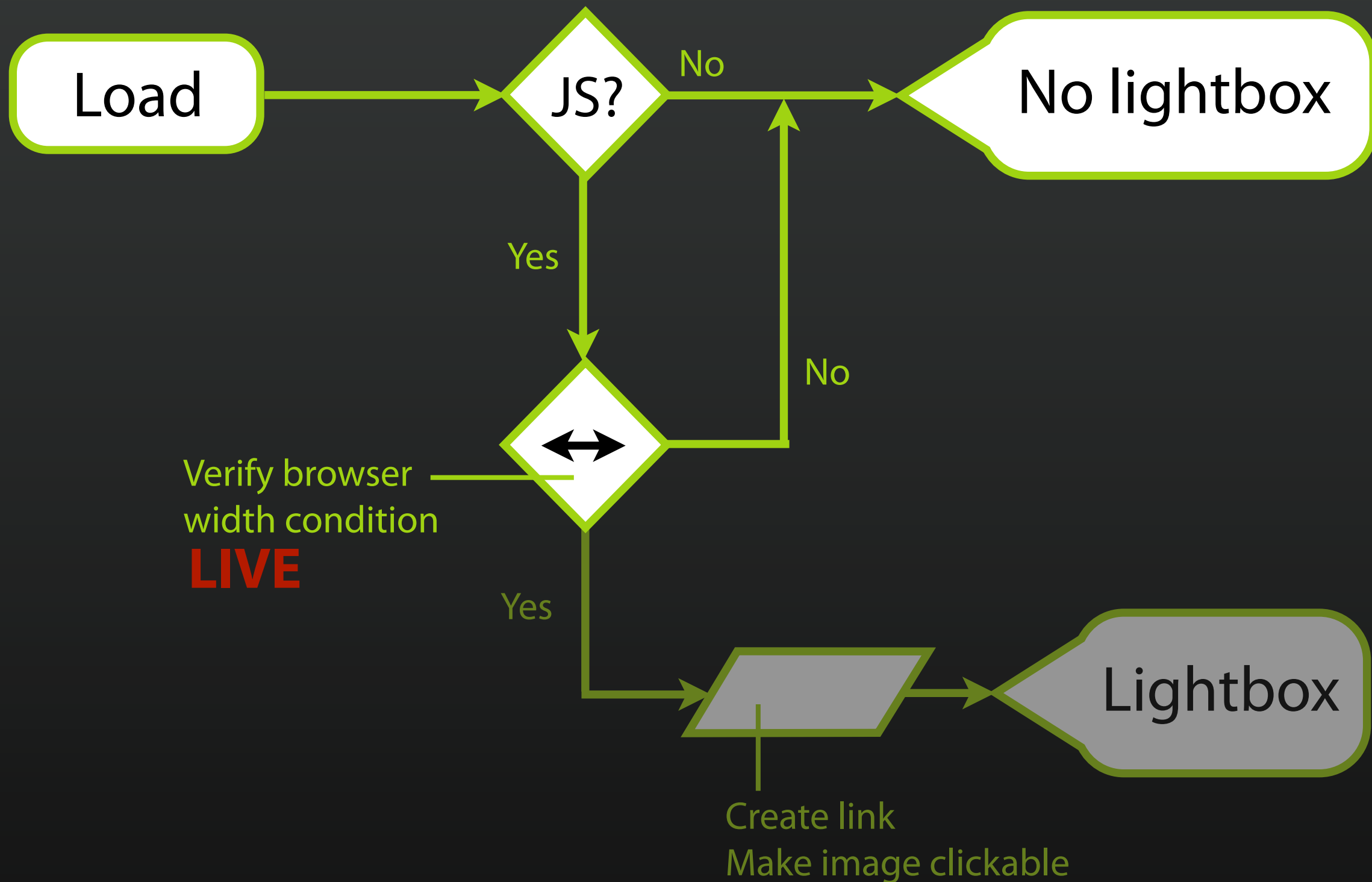
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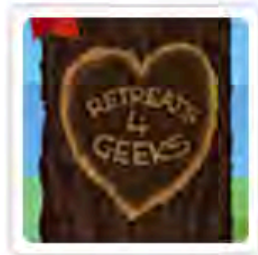
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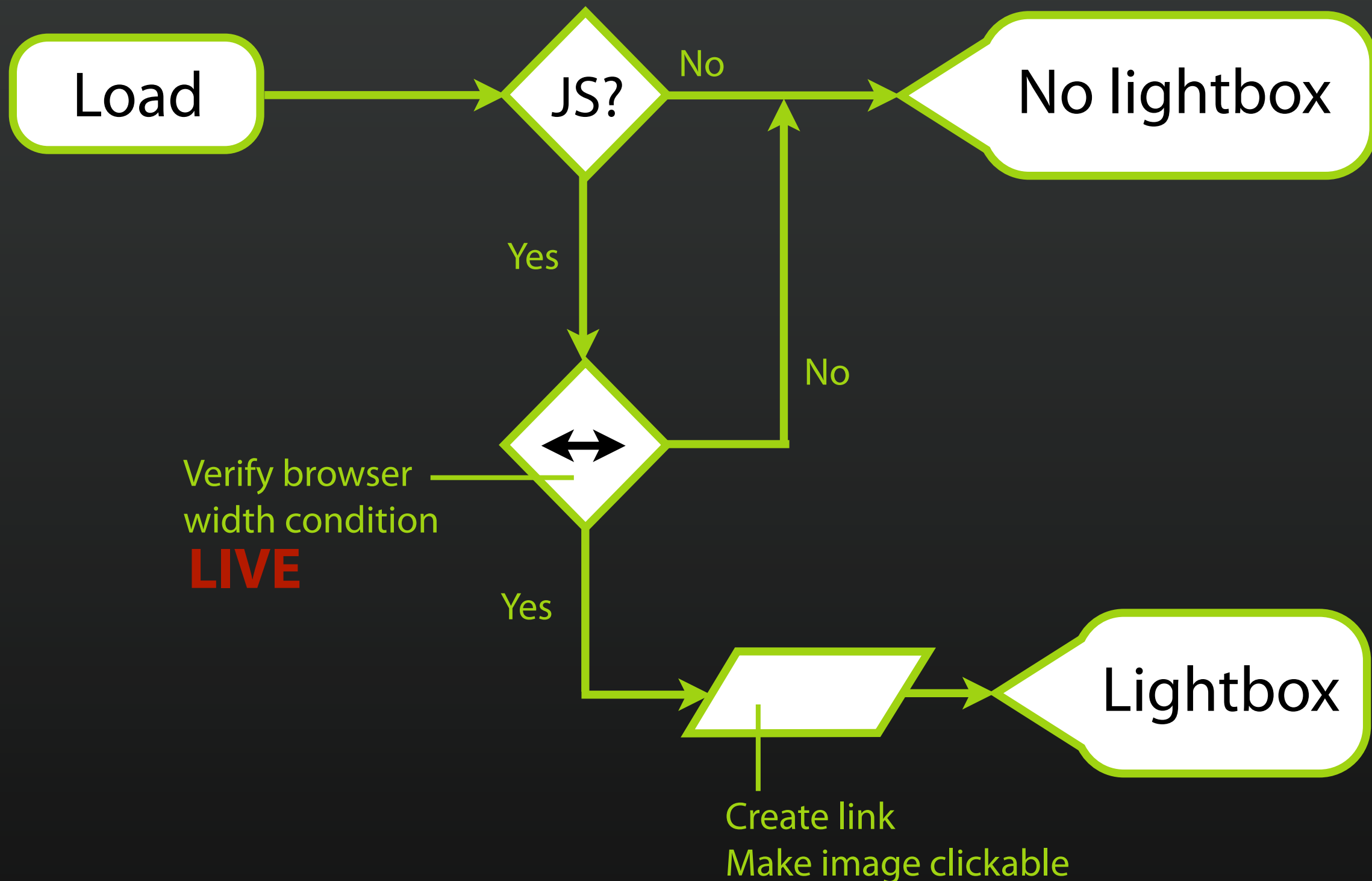
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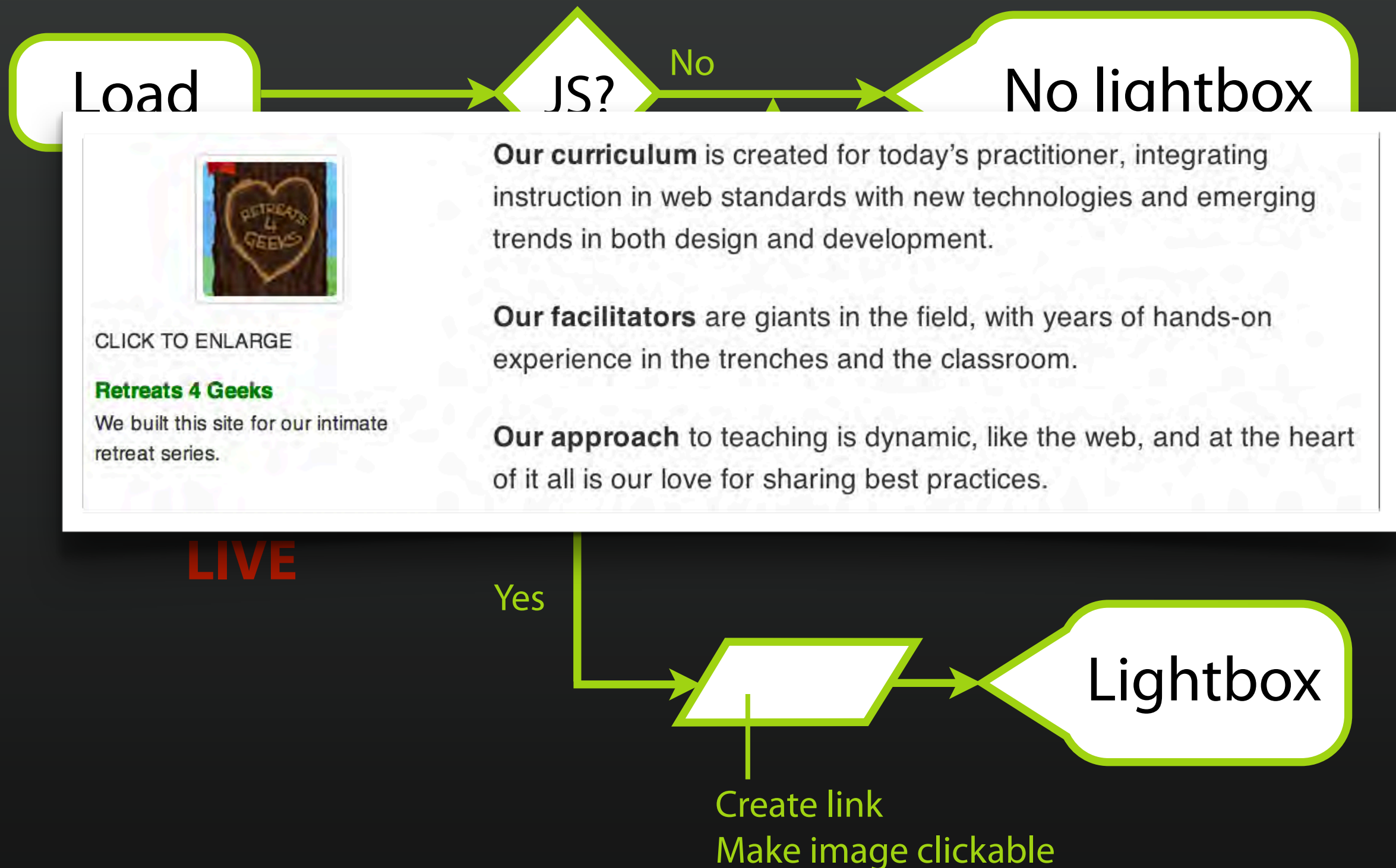
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htbox

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UI Construction Flow



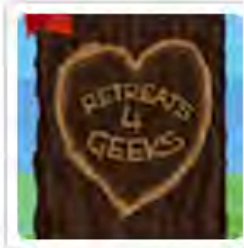
No need to link

```
<figure id="fig-1">
  
  <figcaption>
    <h6>Retreats 4 Geeks</h6>
    <p>We built this site for our intimate retreat series.</p>
  </figcaption>
</figure>
```

Make the connection

```
<figure id="fig-1">
  
  <p class="enlarge"><a href="#enlarge">Click to Enlarge</a></p>
  <figcaption>
    <h6>Retreats 4 Geeks</h6>
    <p>We built this site for our intimate retreat series.</p>
  </figcaption>
</figure>
```

Lightboxes



CLICK TO ENLARGE

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SPORTS > VOLS

Martin excited about Vols' summer progress

Some Vols are working out in Knoxville while others are competing across the globe, but Cuonzo Martin likes how his team is progressing this summer ...

By Daniel Lewis
2 hours ago

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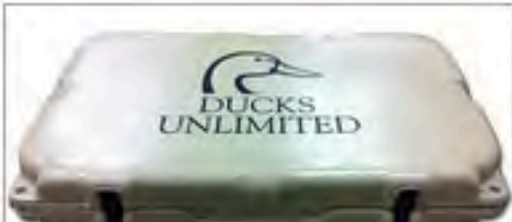
SPORTS > MOCS

ESPN3 to broadcast three UTC football games in 2013

The Southern Conference revealed its eight-game football package with ESPN3 for the 2013 season on Monday, and Chattanooga will have three of its games broadcast over the online network. ...

By Staff Report
3 hours ago

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SPORTS > OUTDOORS

Trucks and Ducks fundraiser is June 27

The Chattanooga chapter of Ducks Unlimited will host Trucks and Ducks 2013 at Mountain View Ford on

By Richard Simms
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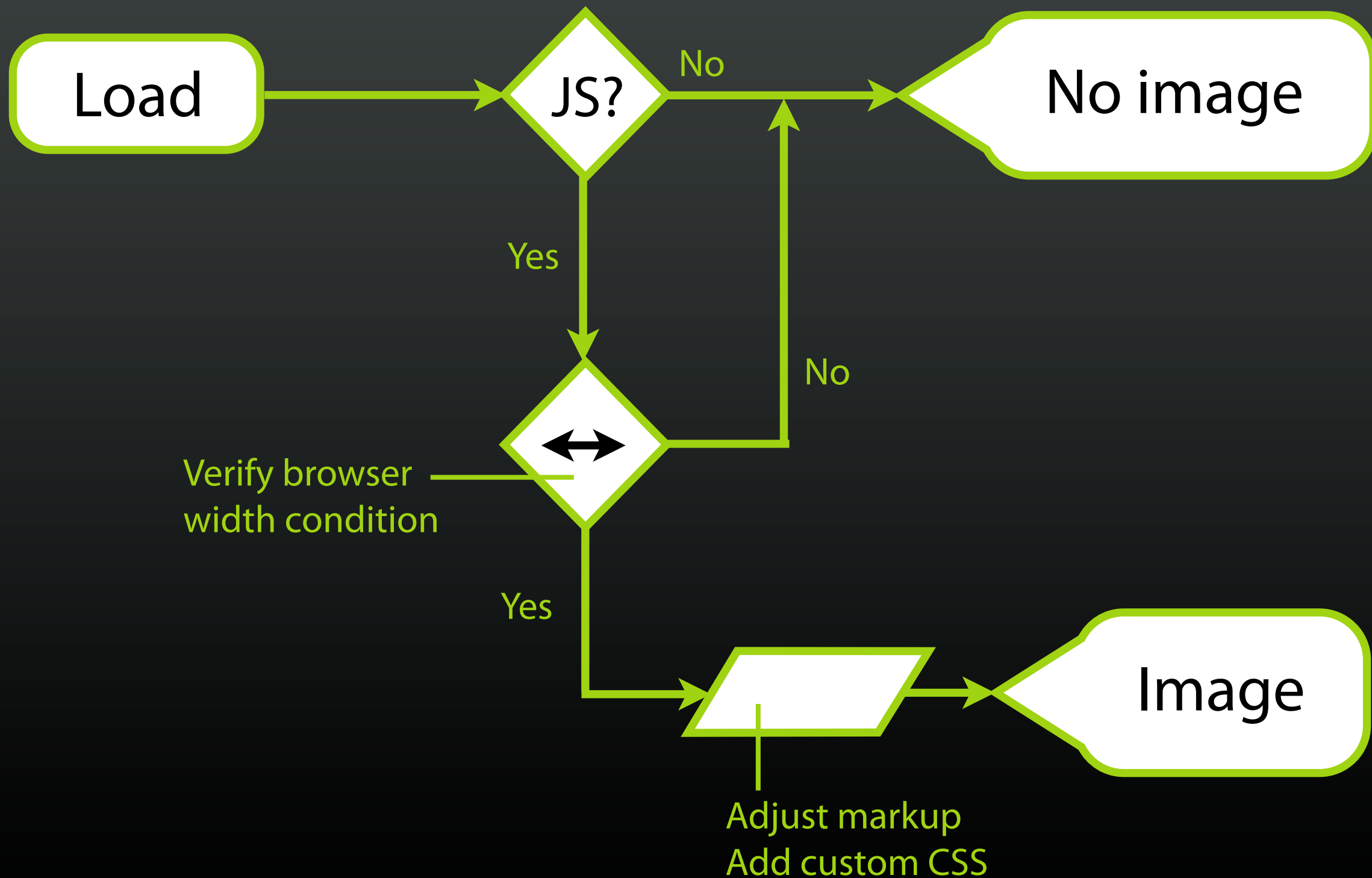
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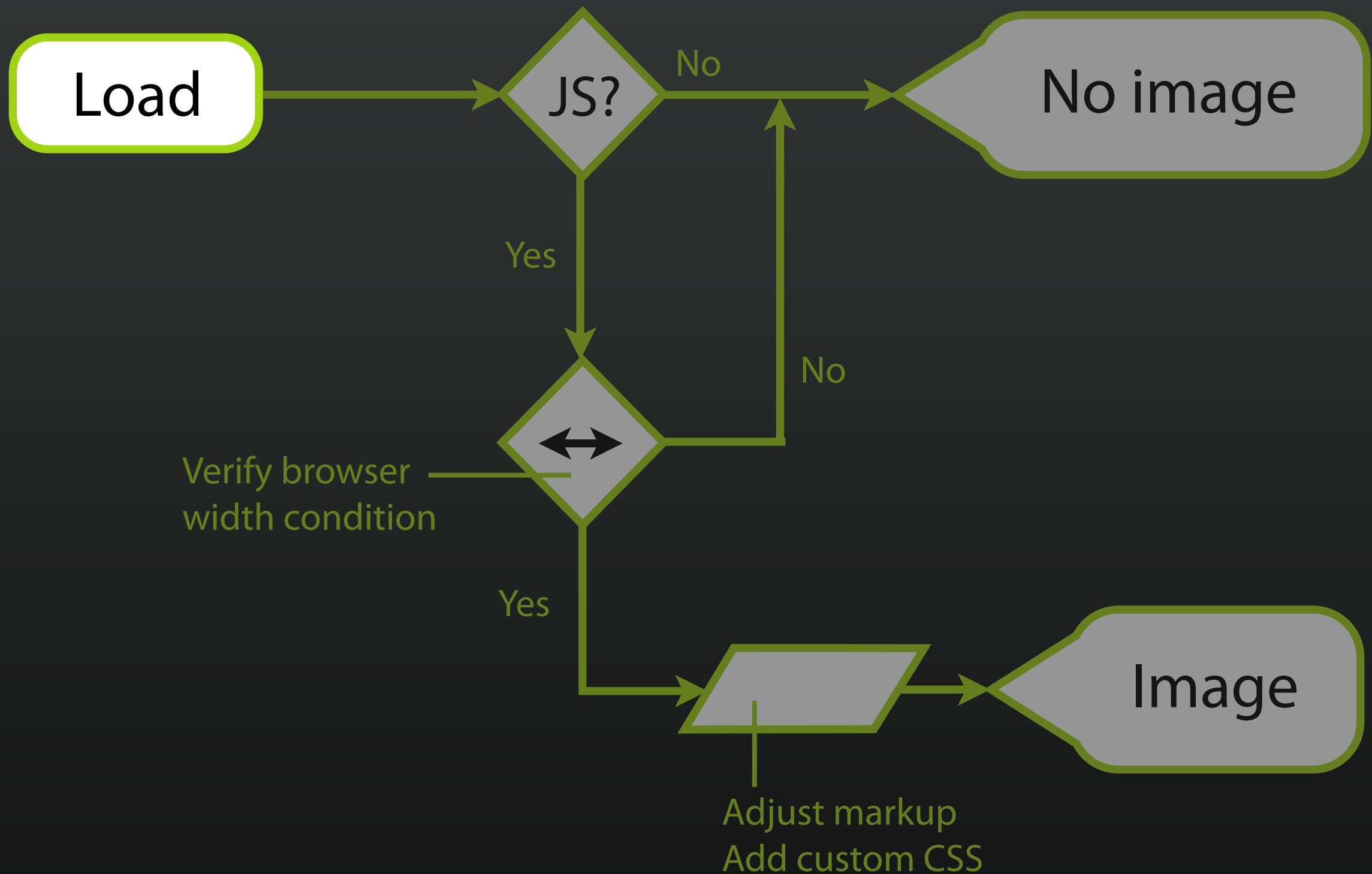
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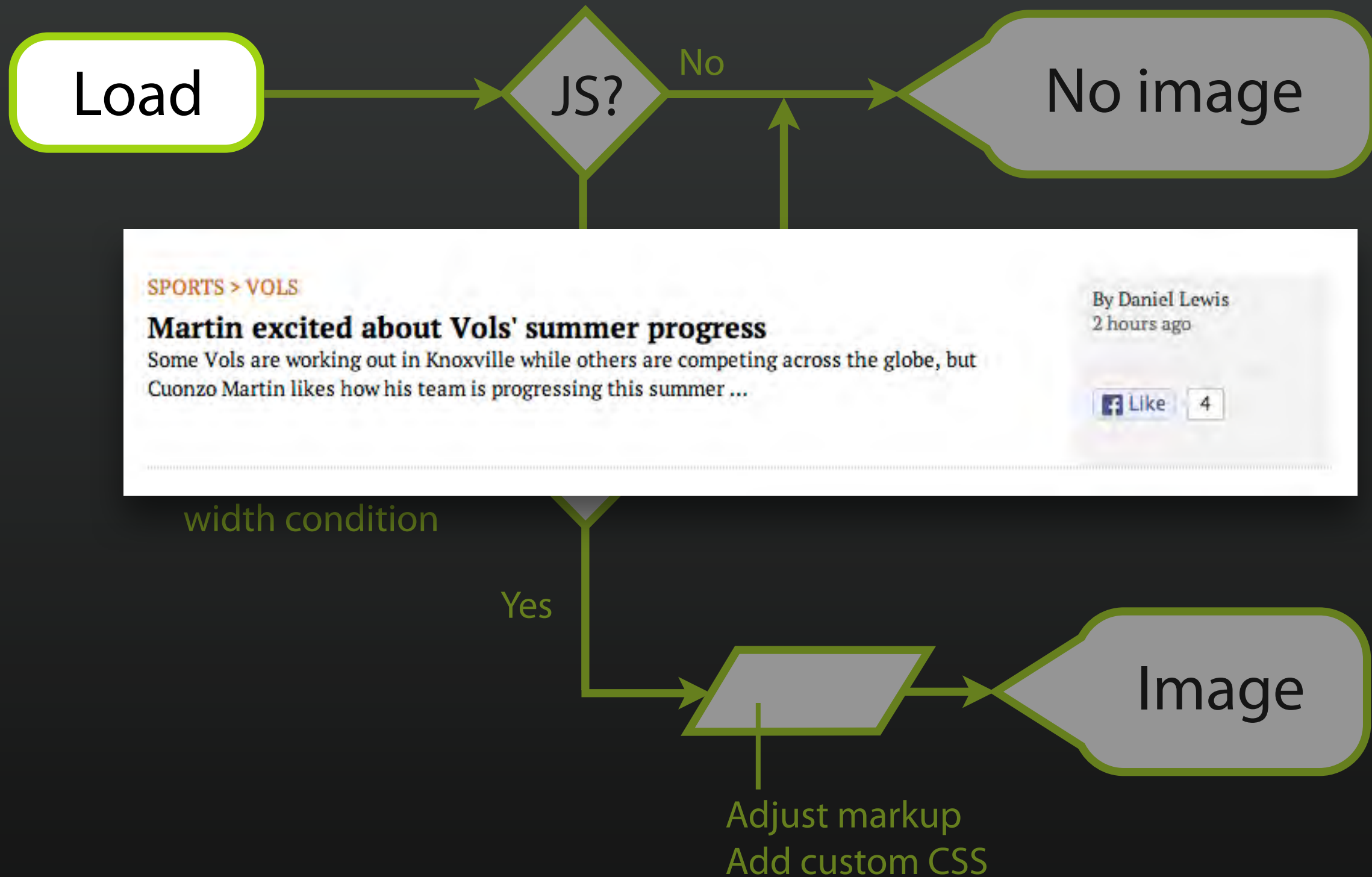
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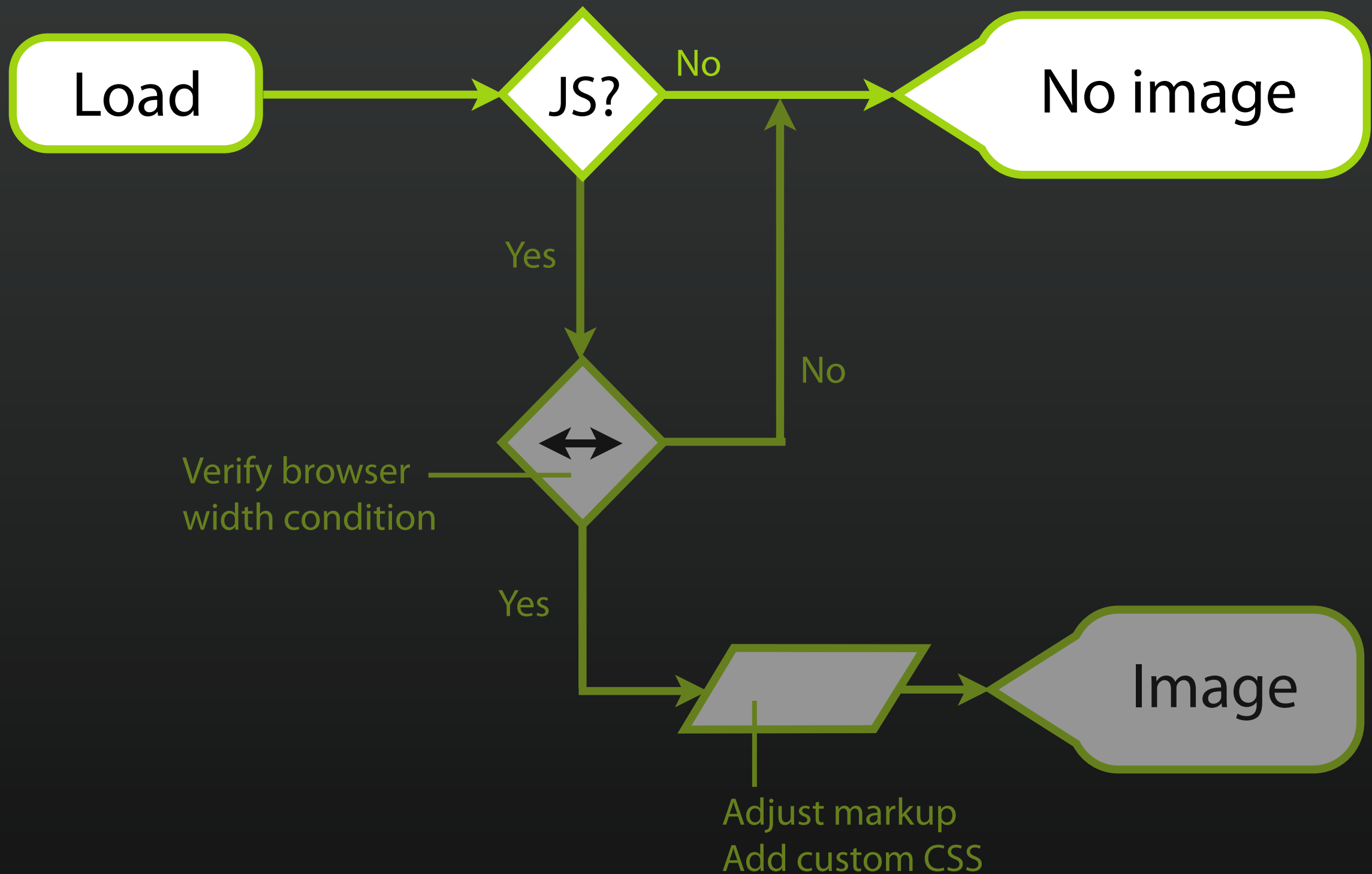
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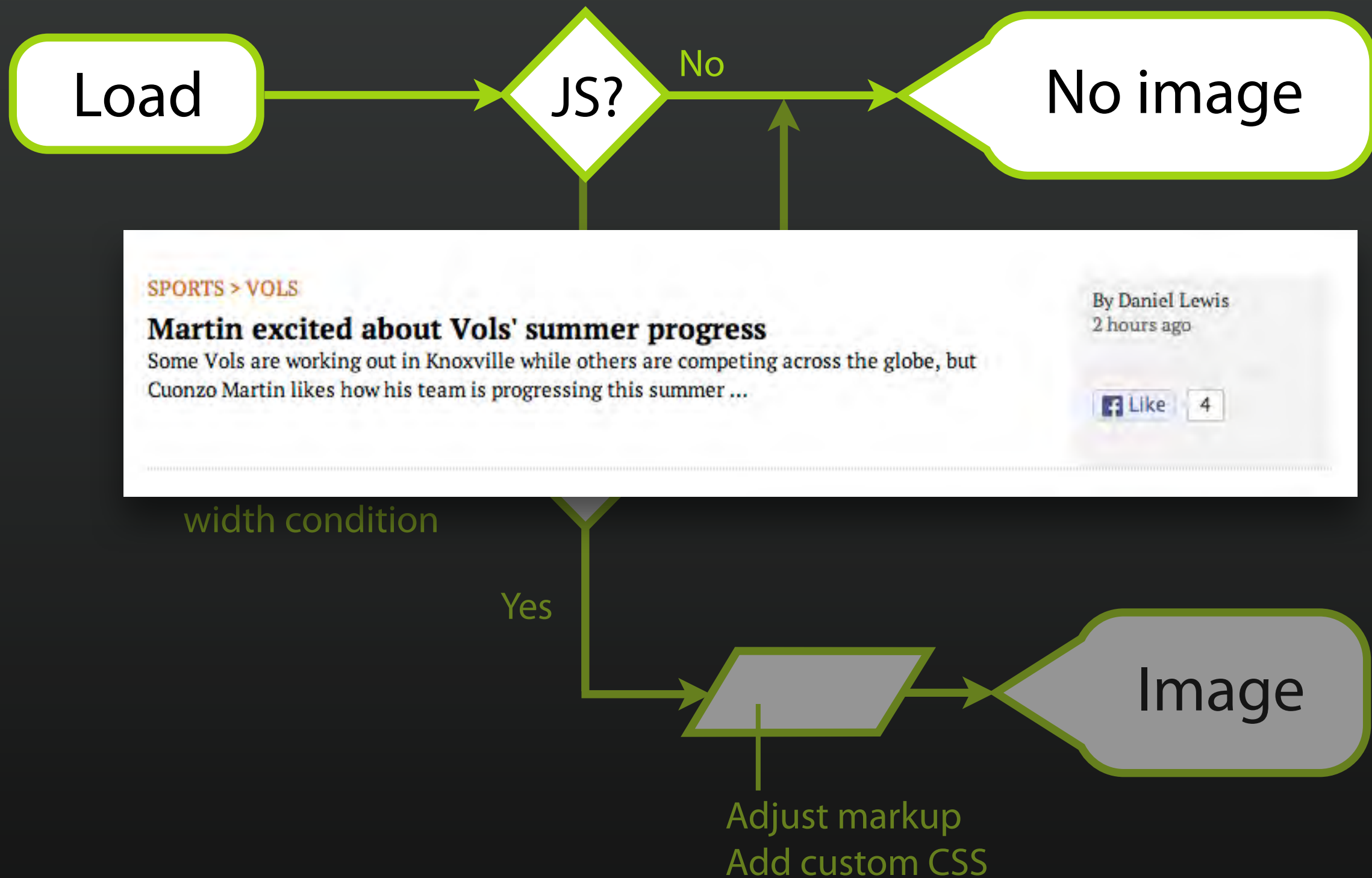
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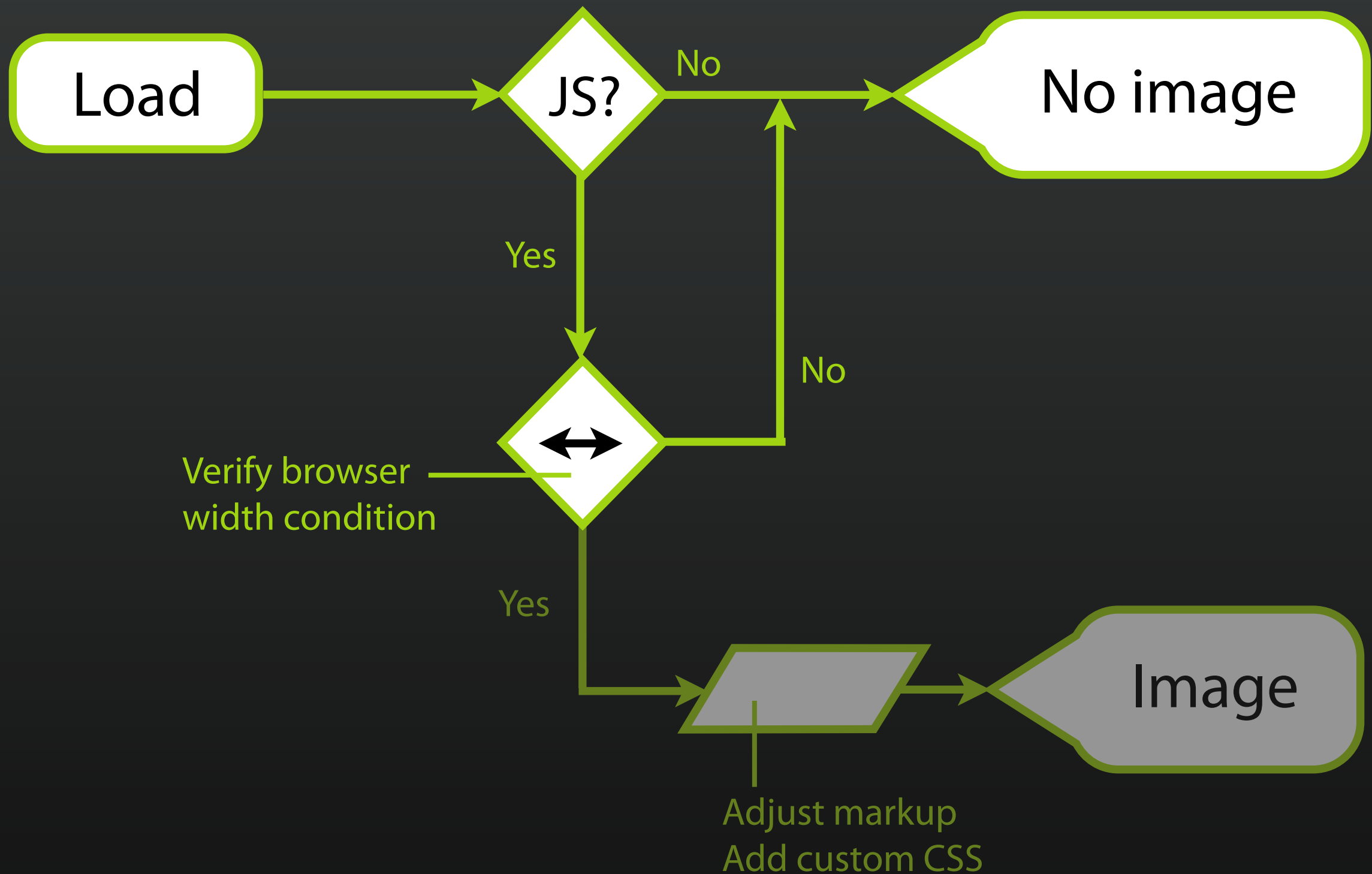
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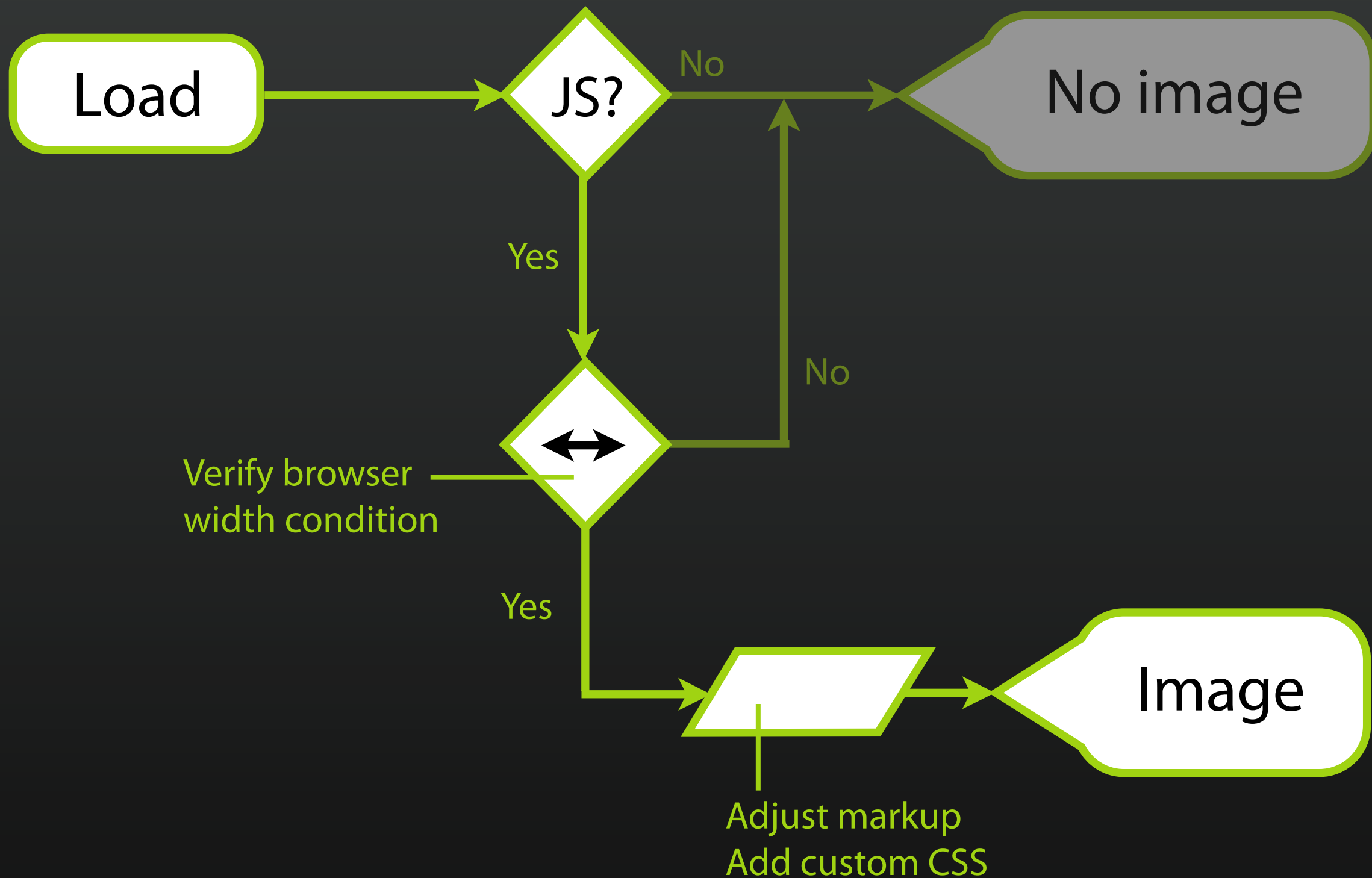
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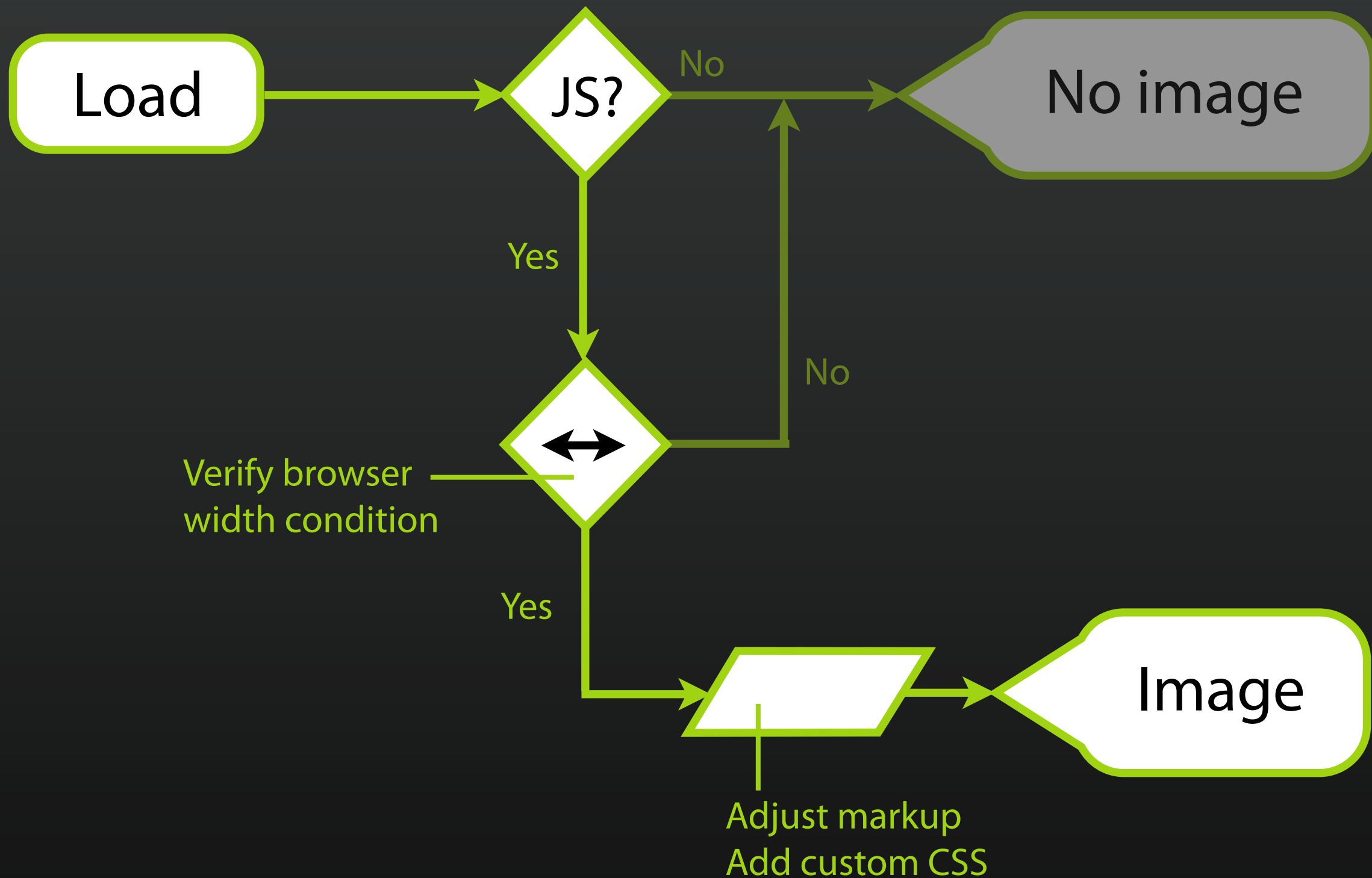
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By Richard Simms
5 hours ago

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Riverwalk Bird of the Week: Canada goose

The folks in the Riverwalk Bird Club don't just watch birds. The group includes some excellent photographers. ...

By Staff Report
5 hours ago

f Like 0

There is no image...

```
<p class="entry-image"  
  data-image-src="/i/sample.jpg"></p>
```

Until there is

```
<p class="entry-image"  
  data-image-src="/i/sample.jpg"></p>
```



```
<p class="entry-image"  
  data-image-src="/i/sample.jpg"  
  data-has-image="true">  
    
</p>
```

CSS at rest

```
[data-image-src] {  
  display: none;  
}
```

CSS at play

```
[data-image-src][data-image-loaded] {  
  display: block;  
}
```


JS Watcher

```
window.watchResize = function(callback)
{
    var resizing;
    function done() {
        clearTimeout( resizing );
        resizing = null;
        callback();
    }
    window.onresize = function(){
        if ( resizing ) {
            clearTimeout( resizing );
            resizing = null;
        }
        resizing = setTimeout( done, 50 );
    };
    callback();
};
```

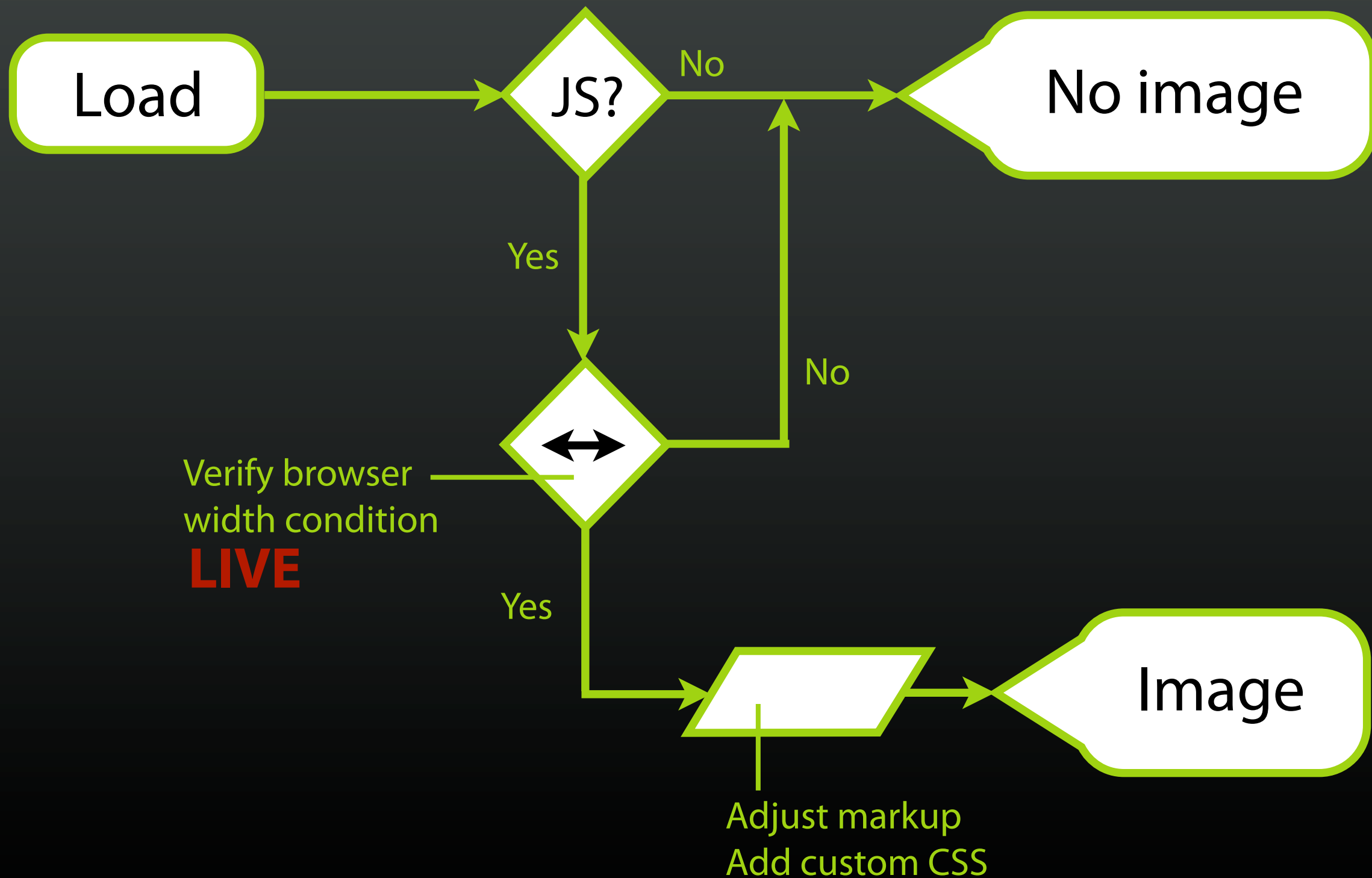
JS Watcher

```
var browser_width = 0;
window.watchResize(function(){
    browser_width = window.innerWidth ||
                    document.body.offsetWidth;
});
```

JS Watcher

```
window.watchResize(function(){
  var threshold = 400,
      image = document.createElement('img'),
      paragraphs = document.getElementsByTagName('p'),
      i = paragraphs.length,
      p, loaded, src, img;
  if ( browser_width >= threshold ) {
    image.setAttribute('alt','');
    while ( i-- ) {
      p = paragraphs[i];
      src = p.getAttribute('data-image-src');
      loaded = p.getAttribute('data-image-loaded');
      if ( src != null && loaded == null ) {
        img = image.cloneNode(true);
        img.setAttribute('src',src);
        p.appendChild( img );
        p.setAttribute('data-image-loaded','');
      }
    }
    image = paragraphs = p = img = null;
  }
});
```

UI Construction Flow



Smart CSS

```
[data-image-src][data-image-loaded] {  
  display: block;  
}
```

Smart CSS

```
[data-image-src][data-image-loaded] {  
  display: block;  
}
```



```
@media only screen and (min-width:400px) {  
  [data-img-src][data-image-loaded] {  
    display: block;  
  }  
}
```

Thumbnails



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By Daniel Lewis
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Behold, your new favorite shirt! This built-to-last tee adapts to your size and capabilities, starting off XS then stretches and scales to keep you comfortable as you grow taller and wider. The future is here, so look sharp.

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ADD TO CART

SHARE   

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Annotations:
OFF

8 Reviews ★★★★★



★★★★★

Awesome shirt!

11/12/2011 By Bruce Bosco

This shirt looks awesome and is really comfortable to wear. It did shrink quite a lot when washed, but that could have just been how I ran it. All in all, it's my favourite shirt, and I love wearing it.



★★★★★

Nice shirt

11/12/2011 By Nick McKinsey

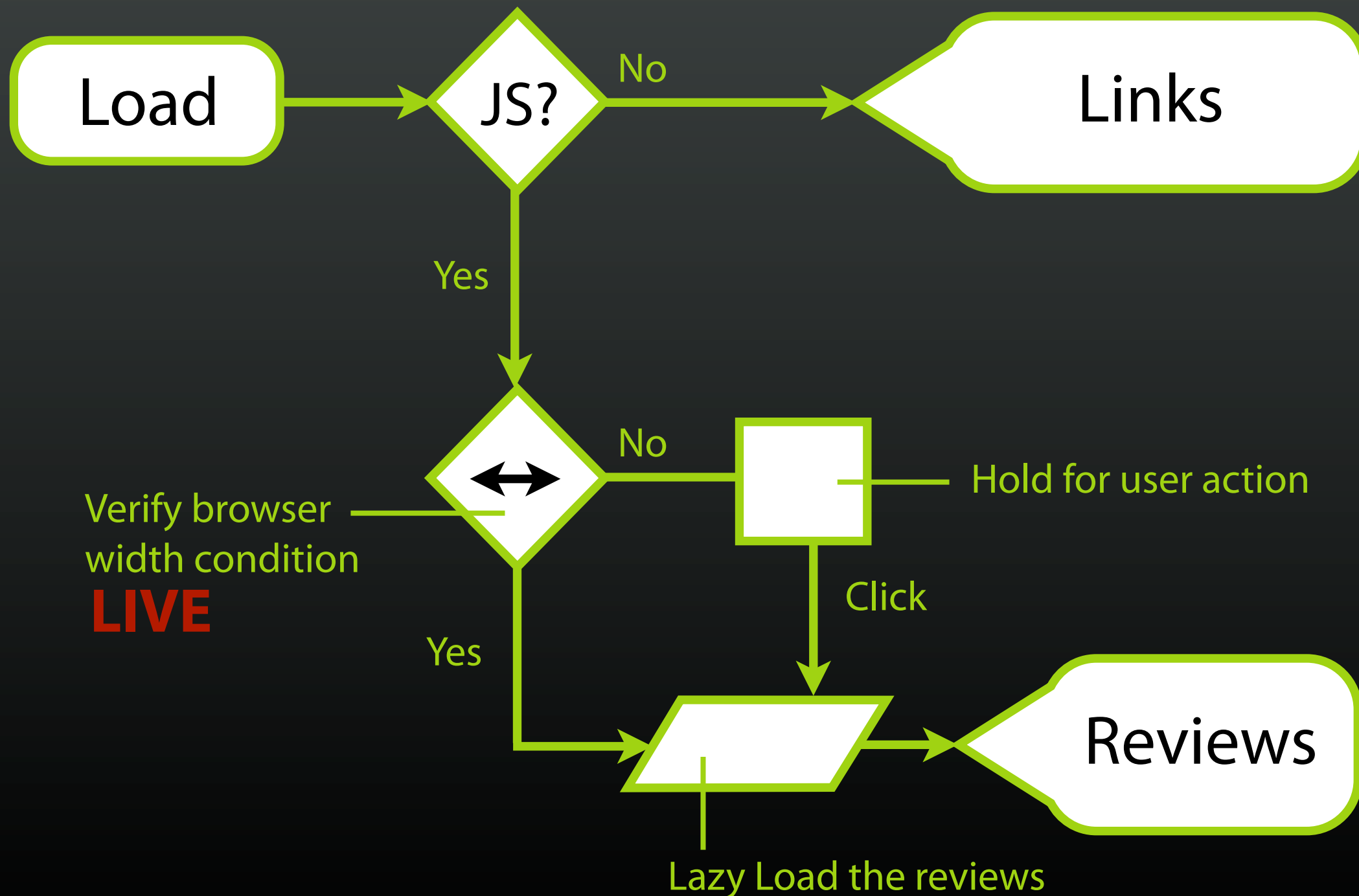
This shirt is a great addition to any simple wardrobe. Can be worn by itself or complimented with accessories. Nice and soft to the touch!

http://is.gd/lazyloading_demo

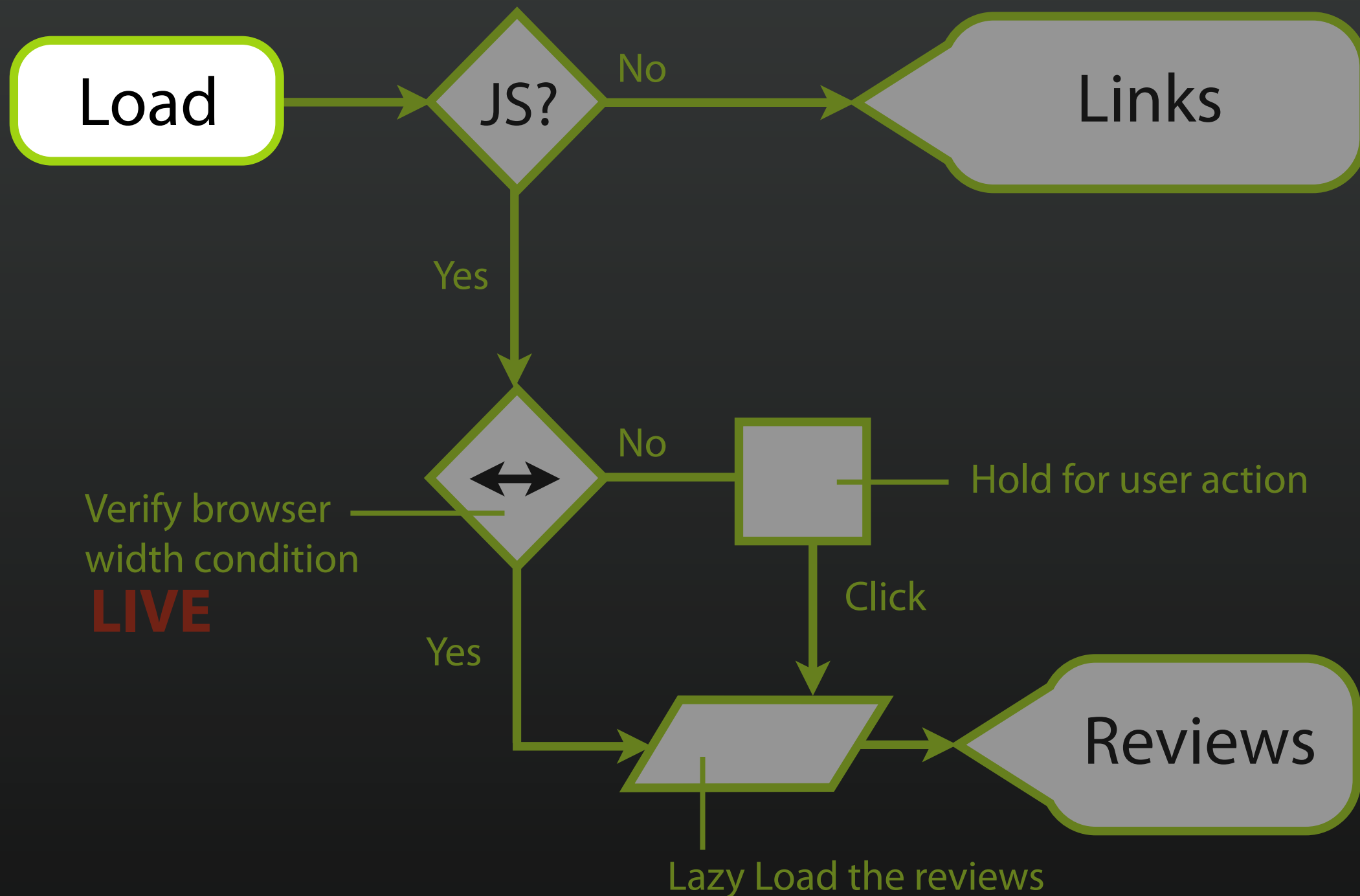
NO!!!!

```
#reviews {  
  display: none;  
}  
  
@media only screen and (min-width:50em) {  
  #reviews {  
    display: block;  
  }  
}
```


UI Construction Flow



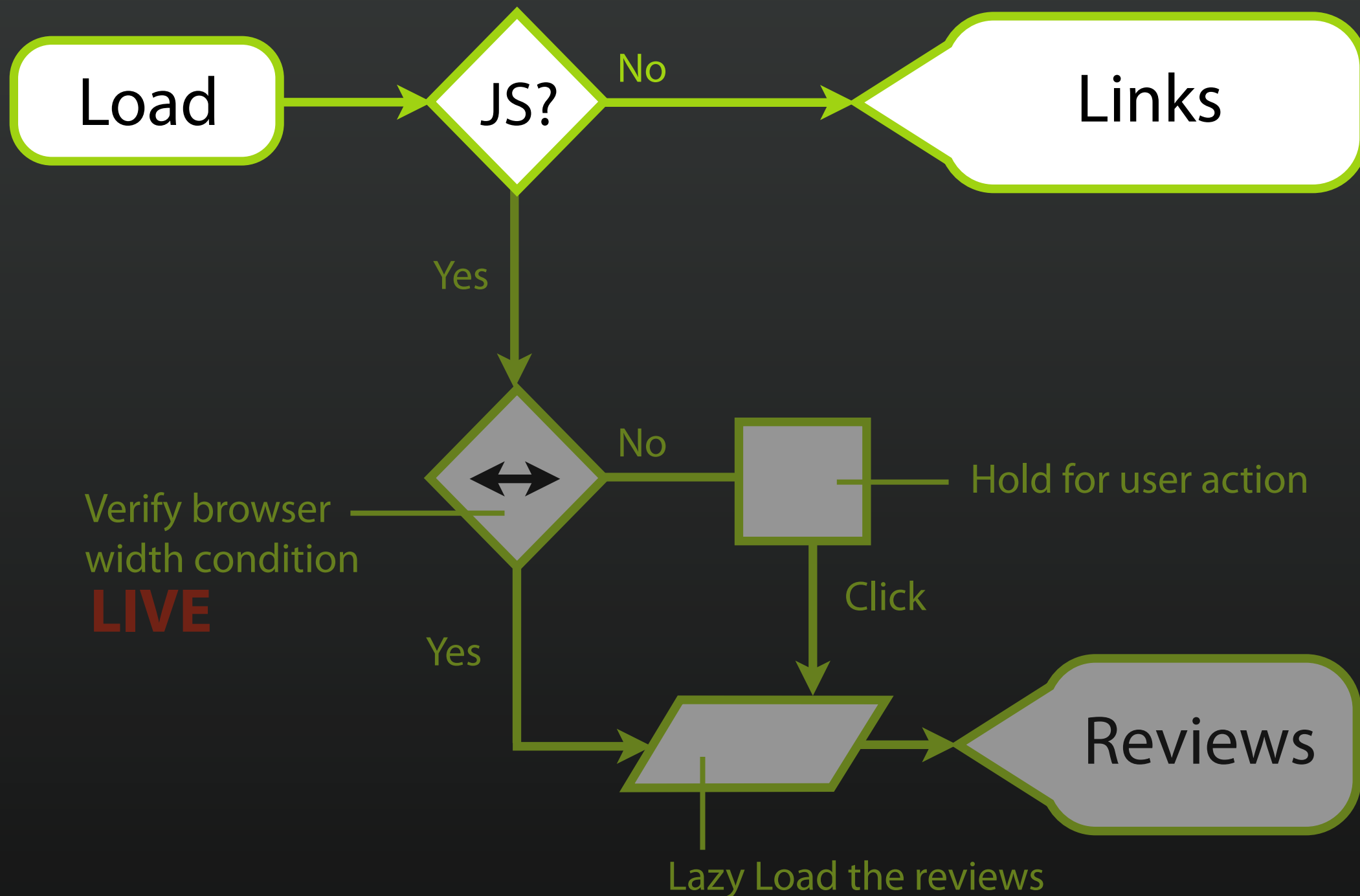
UI Construction Flow



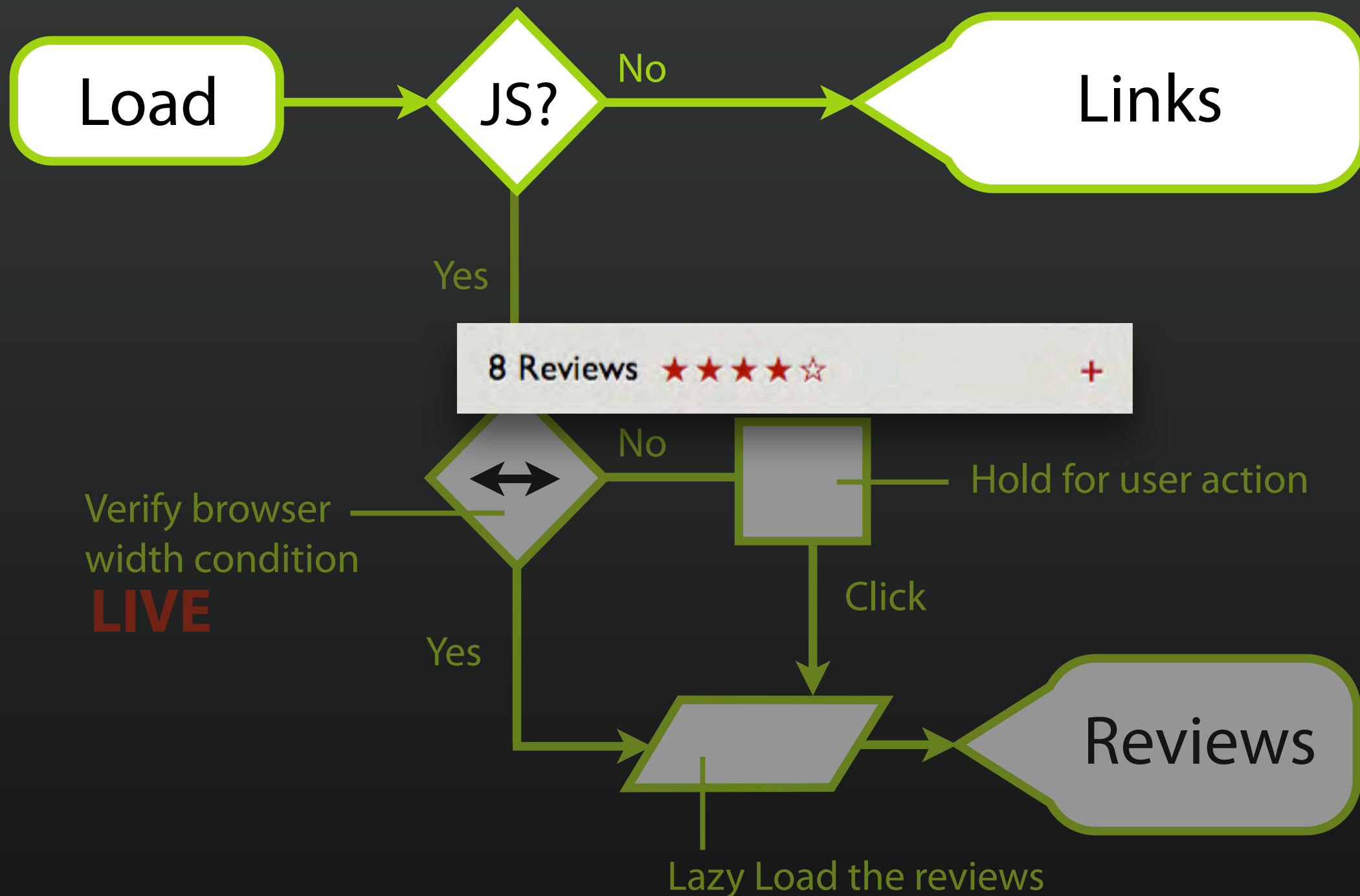
UI Construction Flow



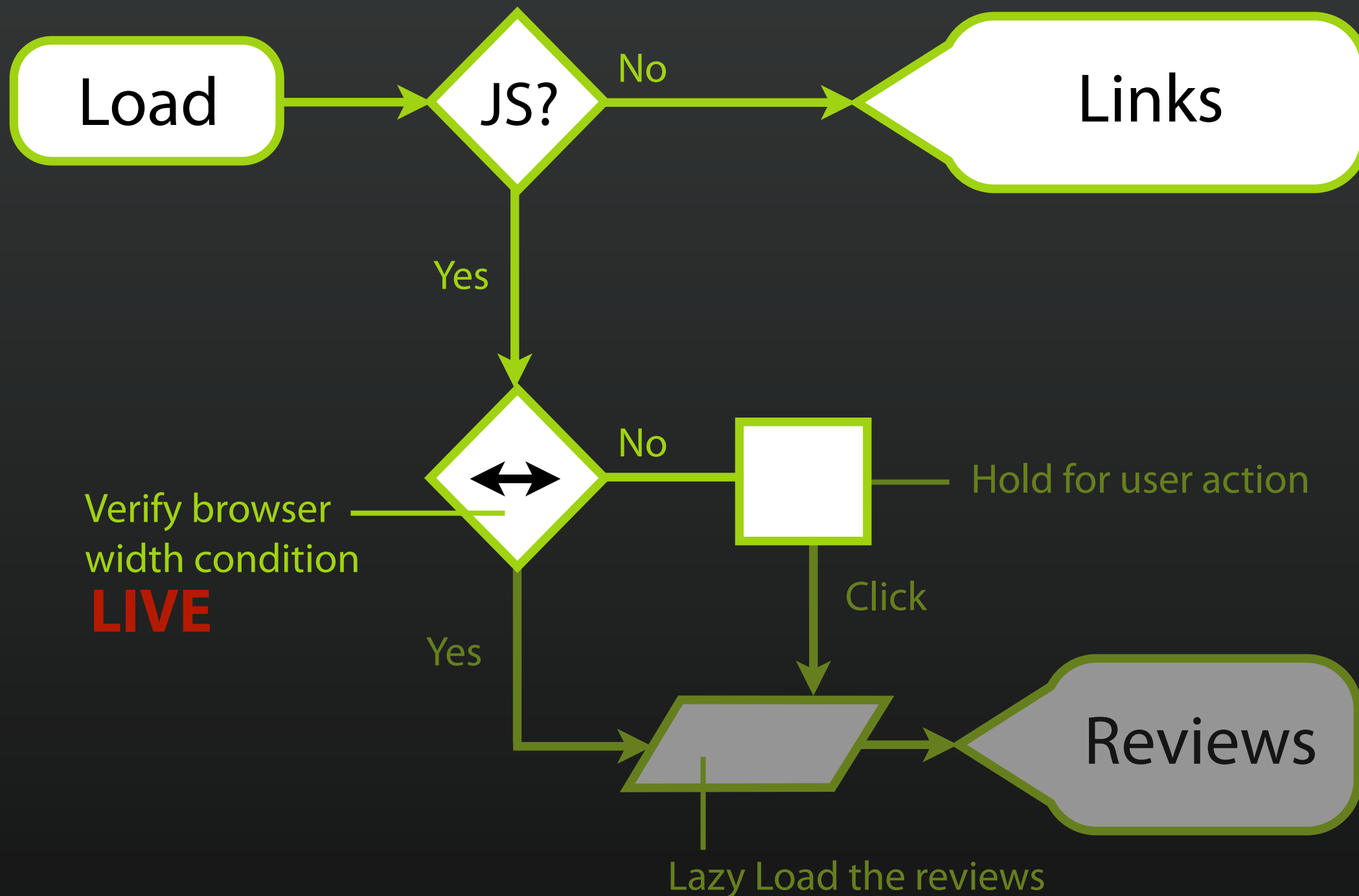
UI Construction Flow



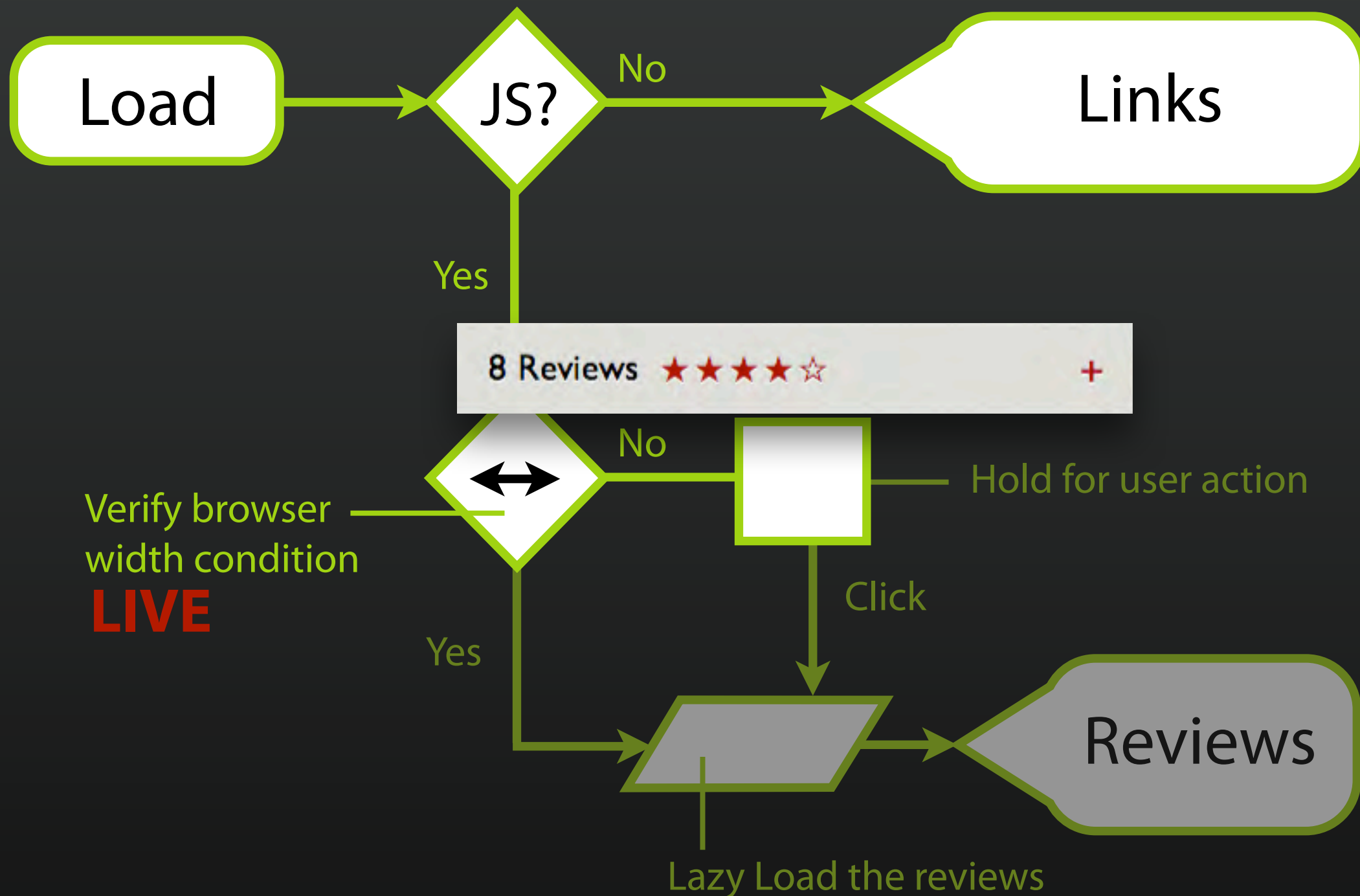
UI Construction Flow



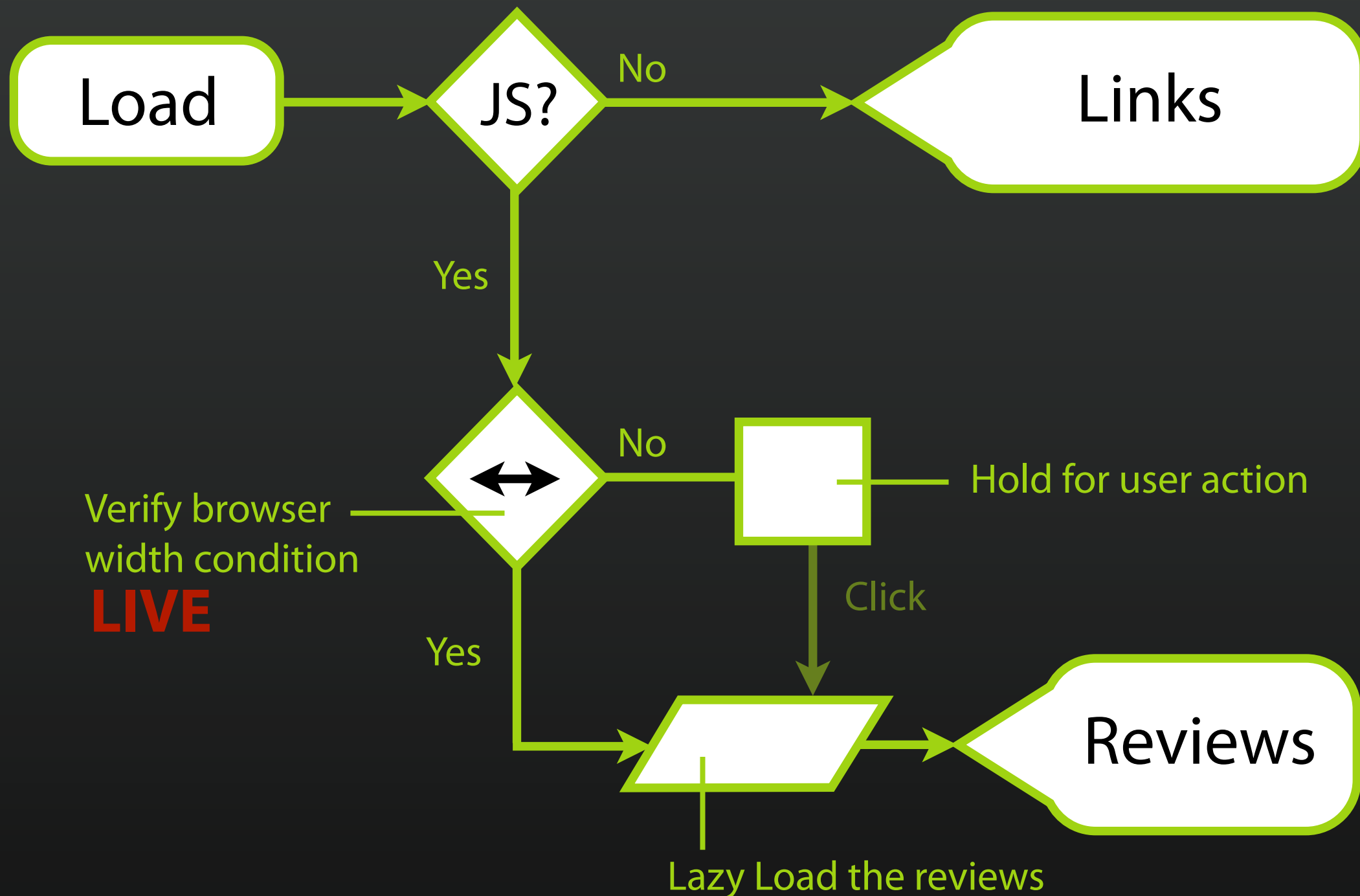
UI Construction Flow



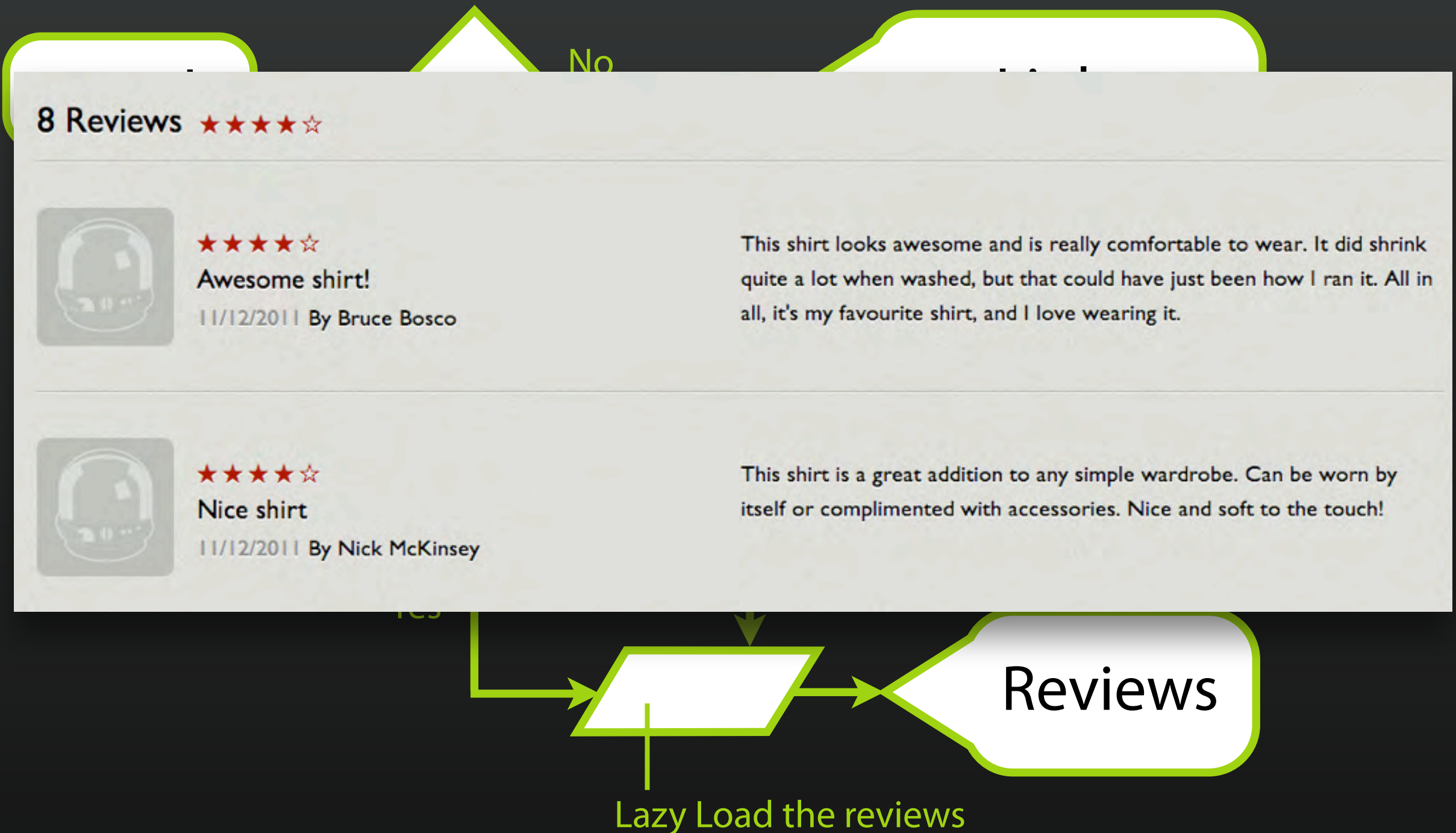
UI Construction Flow



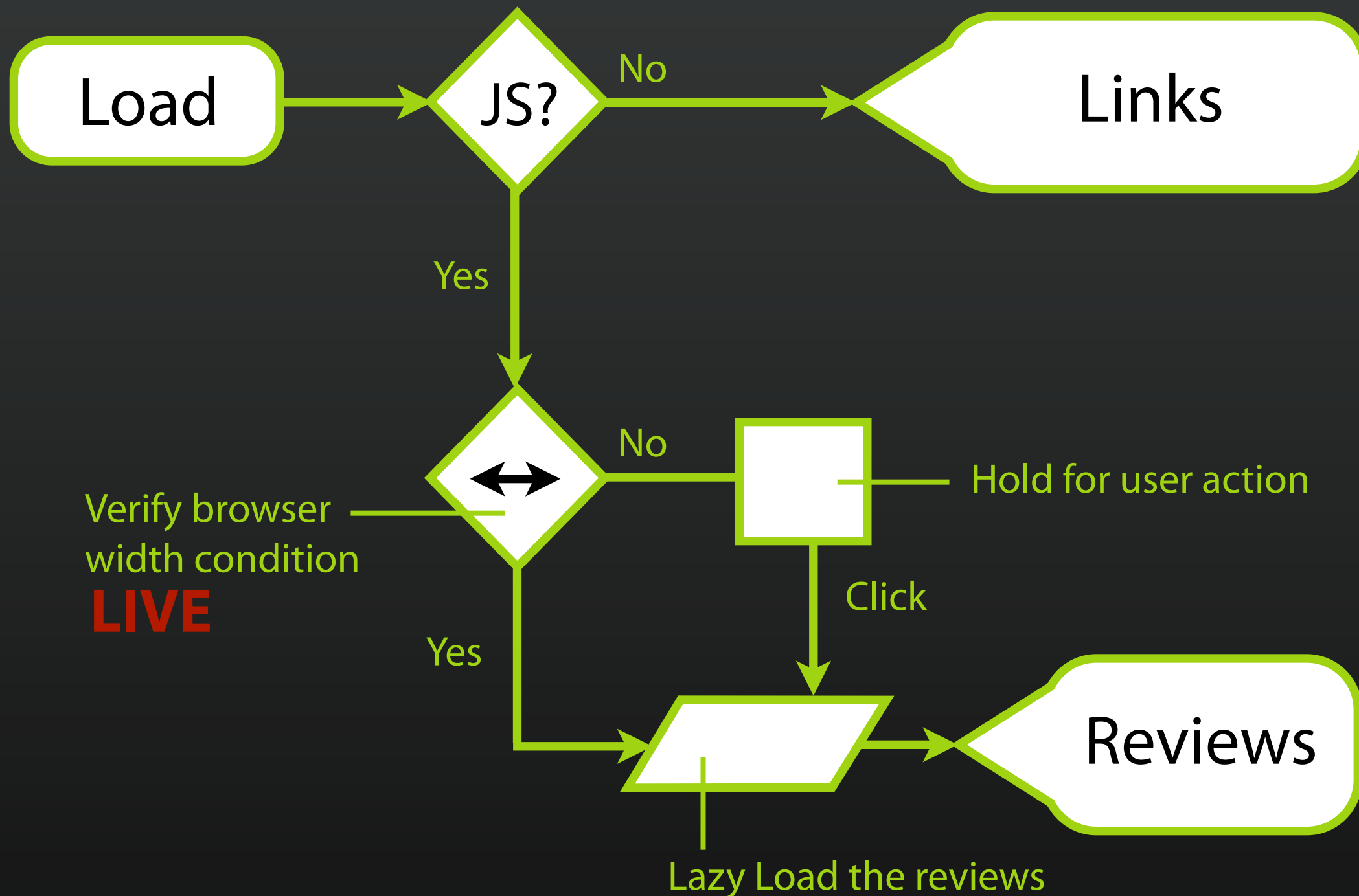
UI Construction Flow



UI Construction Flow



UI Construction Flow



UI Constr

Load

Verify browser
width condition
LIVE

8 Reviews ★★★★★



★★★★★

Awesome shirt!

11/12/2011 By Bruce Bosco

This shirt looks awesome and is really comfortable to wear. It did shrink quite a lot when washed, but that could have just been how I ran it. All in all, it's my favourite shirt, and I love wearing it.



★★★★★

Nice shirt

11/12/2011 By Nick McKinsey

This shirt is a great addition to any simple wardrobe. Can be worn by itself or complimented with accessories. Nice and soft to the touch!

nks

user action

reviews

Lazy Loading

```
<section class="aux reviews" id="reviews">
  <header id="tab-reviews">
    <a href="reviews.html" class="disabled">...</a>
  </header>
</section>
```


Lazy Loading

```
<section class="aux reviews loaded" id="reviews">
  <header id="tab-reviews">
    <a href="reviews.html" class="disabled open">...</a>
  </header>
  <div role="tabpanel">
    <div id="p-reviews" aria-labeledby="tab-reviews">
      <ol class="reviews-list">
        <li>
          
          <div class="review-meta">
            <h3>Awesome shirt!</h3>
            <a href="#"><time datetime="2010-01-20" pubdate="">11/12/2011</time></a>
            By Bruce Bosco
          </div>
          <div class="review-content">
            <p>This shirt looks awesome and is really comfortable to wear. It did shrink quite a lot when washed, but that could have just been how I ran it. All in all, it's my favourite shirt, and I love wearing it.</p>
          </div>
        </li>
        <!-- ... -->
      </ol>
    </div>
  </div>
</section>
```

Tabbed Interface

Pumpkin Pie

OVERVIEW

INGREDIENTS

DIRECTIONS

NUTRITION

Whether you're hosting a festive party or a casual get-together with friends, our Pumpkin Pie will make entertaining easy!

Original recipe yield: 1 × 9-inch deep dish pie

Prep Time: 10min

Cook Time: 1hr

Ready In: 1hr 10min



Traditional approach

```
<h1>Pumpkin Pie</h1>
<div class="container">
  <ul class="tabs">
    <li><a href="#">Overview</a></li>
    <li><a href="#">Ingredients</a></li>
    <li><a href="#">Directions</a></li>
    <li><a href="#">Nutrition</a></li>
  </ul>
  <div class="section">
    <h2>Overview</h2>
    
    <p>Whether you're hosting a festive party or a casual
    get-together with friends, our Pumpkin Pie will make
    entertaining easy!</p>
    <!-- ... -->
  </div>
  <!-- ... -->
</div>
```

Cleaner approach

```
<h1>Pumpkin Pie</h1>
<div class="tabbed-interface">
  <h2>Overview</h2>
  
  <p>Whether you're hosting a festive party or a casual
  get-together with friends, our Pumpkin Pie will make
  entertaining easy!</p>
  <!-- ... -->
  <h2>Ingredients</h2>
  <ul>
    <li>1 (9<abbr title="inch">in</abbr>) unbaked deep
      dish pie crust</li>
    <li>½ cup white sugar</li>
    <!-- ... -->
  </ul>
  <h2>Directions</h2>
  <!-- ... -->
</div>
```


Cleaner approach

```
<h1>Pumpkin Pie</h1>
<div class="tabbed-interface">
  <h2>Overview</h2>
  
  <p>Whether you're hosting a festive party or a casual
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    <!-- ... -->
  </ul>
  <h2>Directions</h2>
  <!-- ... -->
</div>
```

No JS, basic CSS

Pumpkin Pie

OVERVIEW

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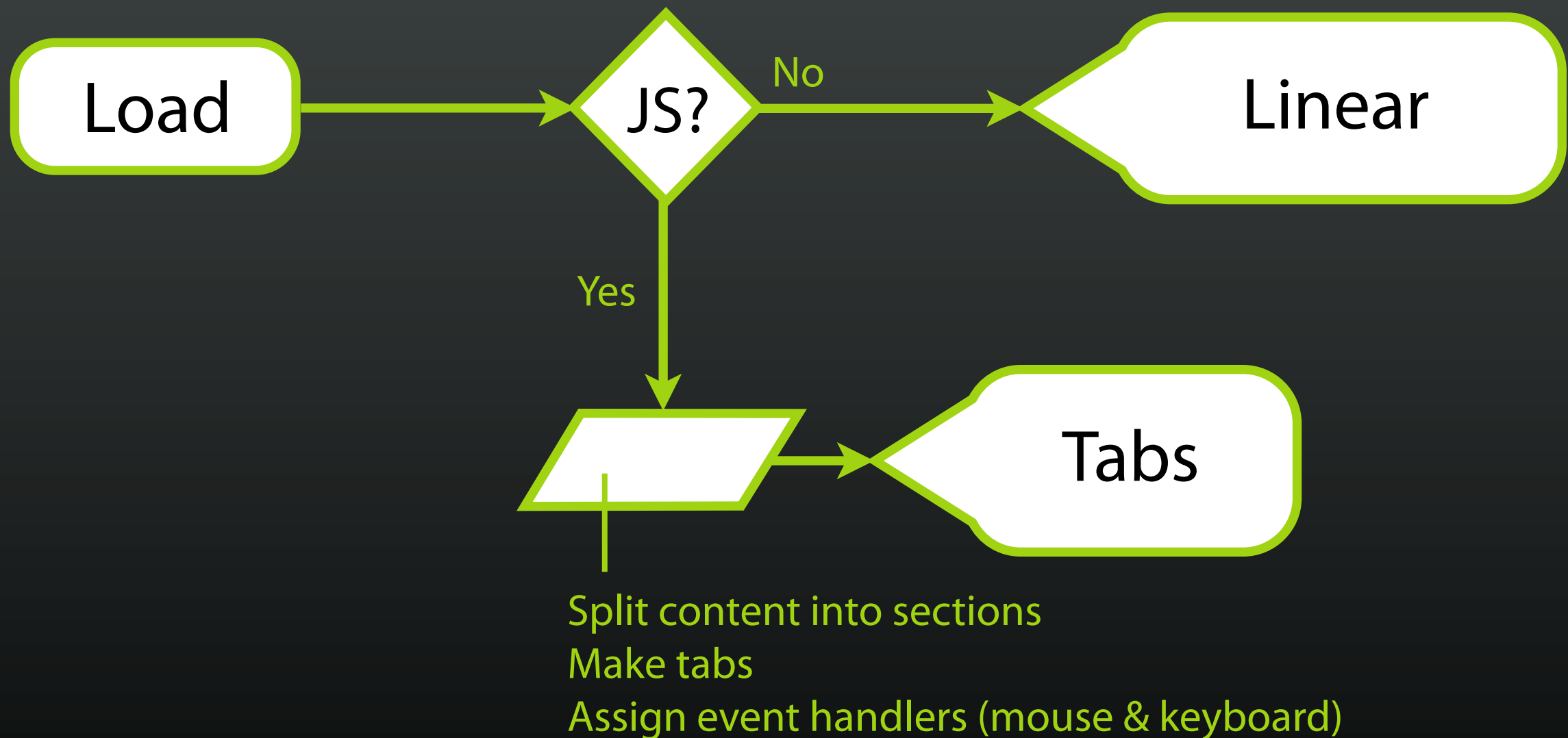
INGREDIENTS

1 (9in) unbaked deep dish pie crust
½ cup white sugar
1 tsp ground cinnamon
½ tsp salt
½ tsp ground ginger
¼ tsp ground cloves
2 eggs
1 can (15oz) pumpkin puree
1 can (12fl oz) evaporated milk

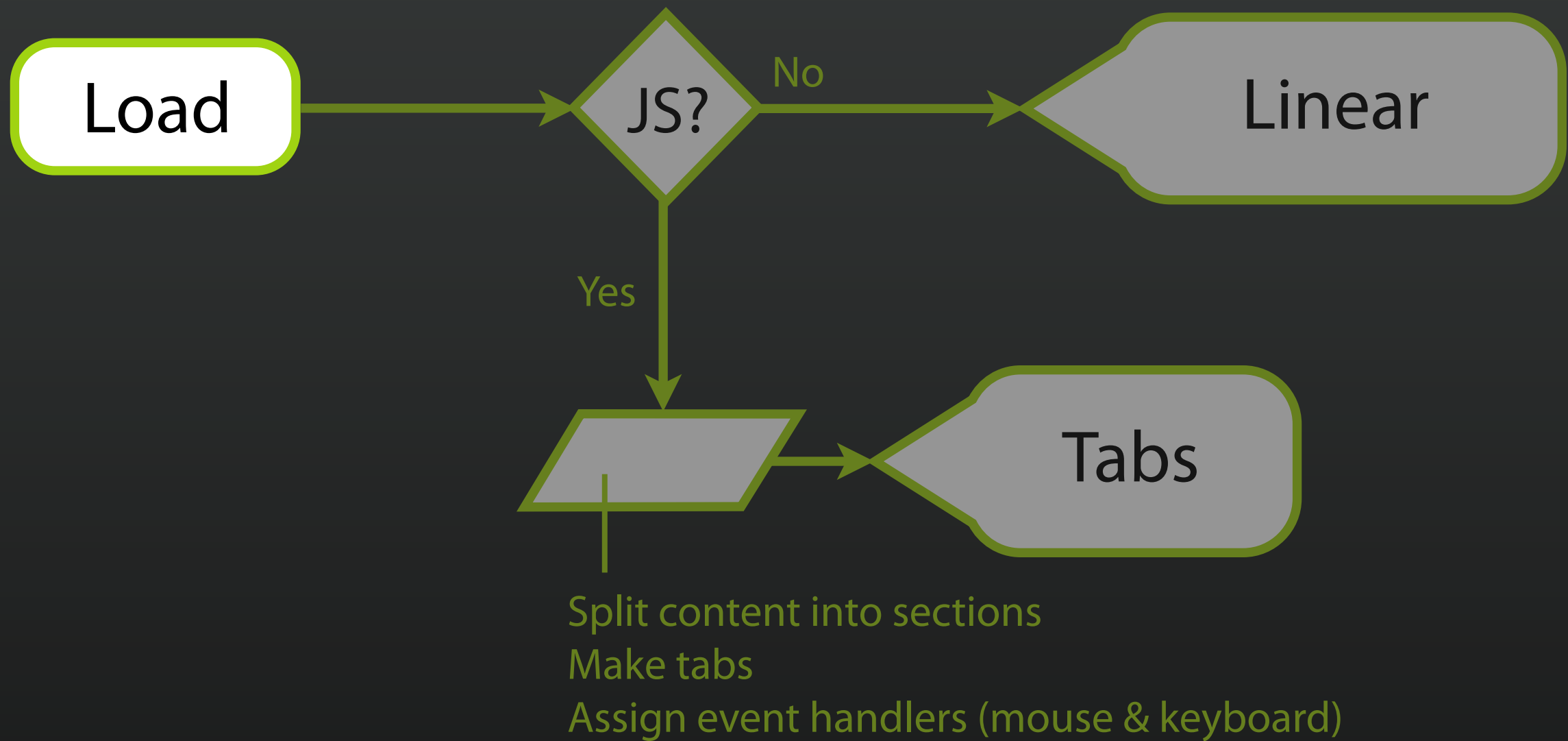
DIRECTIONS

1. Preheat oven to 425°F
2. Combine sugar, salt, cinnamon, ginger and cloves in small bowl.
3. Beat eggs lightly in large bowl.
4. Stir in pumpkin and sugar-spice mixture.

UI Construction Flow



UI Construction Flow



UI Constraints

Load

Pumpkin Pie

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DIRECTIONS

1. Preheat oven to 425°F
2. Combine sugar, salt, cinnamon, ginger and cloves in small bowl.
3. Beat eggs lightly in large bowl.
4. Stir in pumpkin and sugar-spice mixture.
5. Gradually stir in evaporated milk.
6. Pour into pie shell.
7. Bake for 15 minutes.
8. Reduce temperature to 350°F; bake for 40 to 50 minutes or until knife inserted near center comes out clean.
9. Cool on wire rack for 2 hours.
10. Serve immediately or refrigerate.

NUTRITION

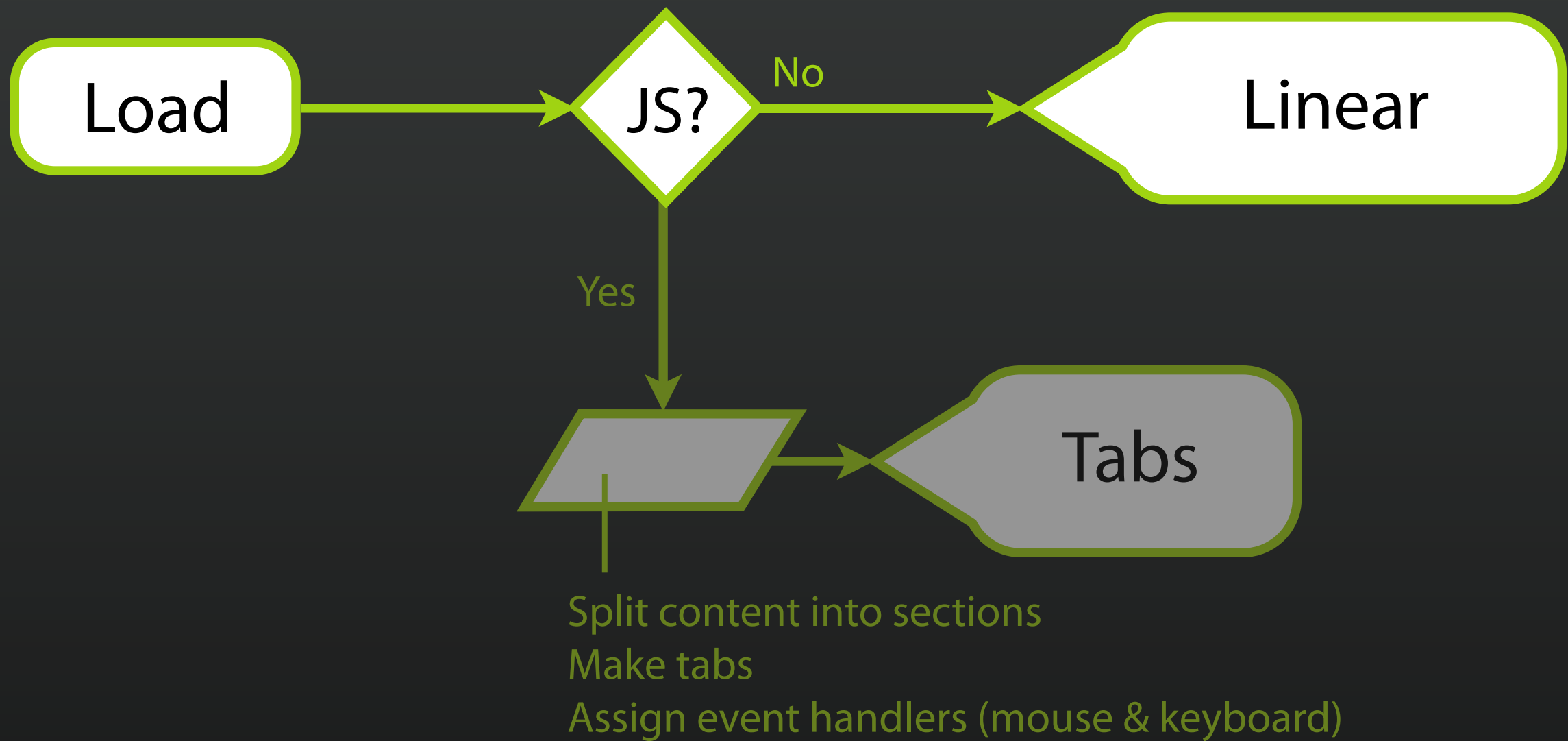
Servings Per Recipe: 8

Amount Per Serving

linear

board)

UI Construction Flow



UI Constraints

Load

Pumpkin Pie

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NUTRITION

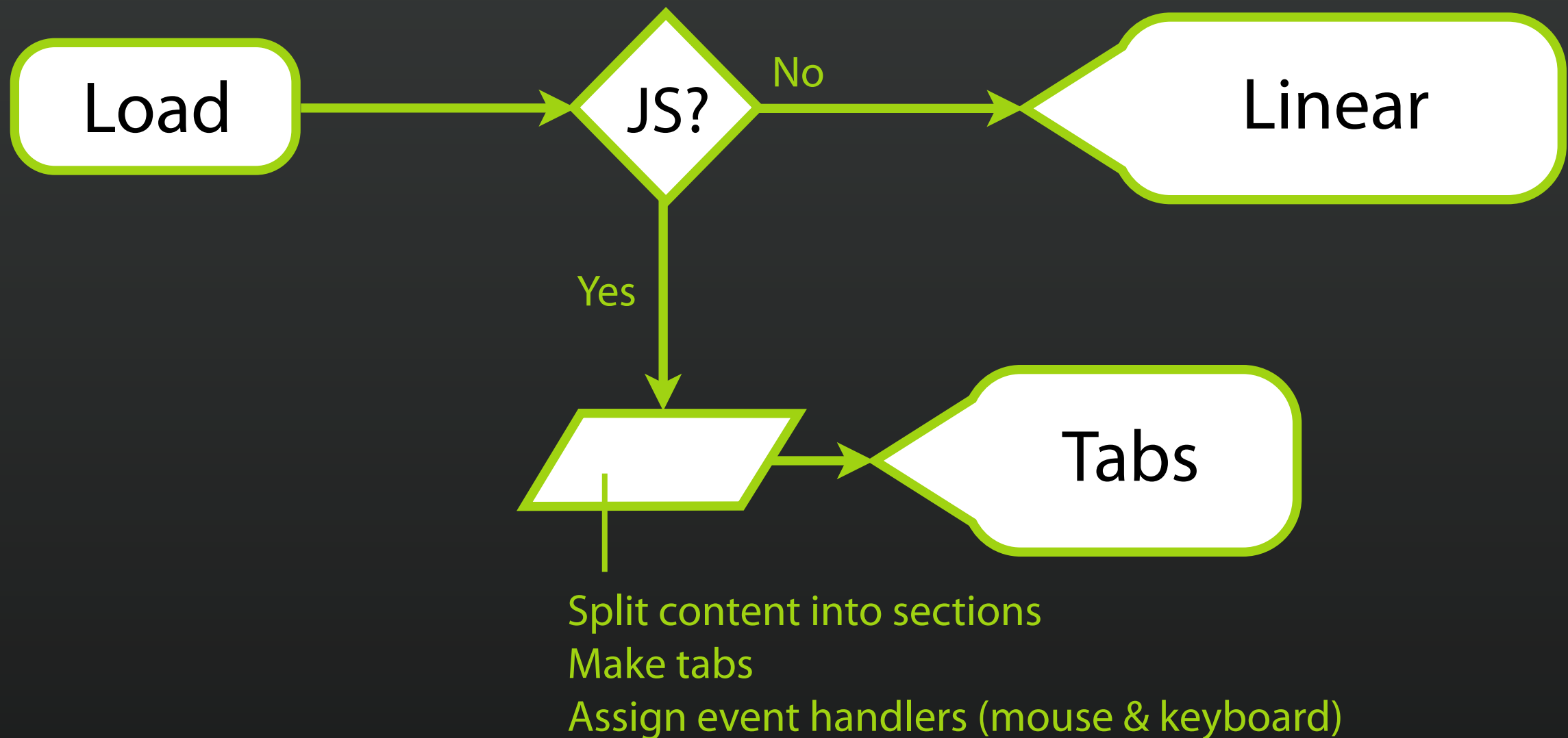
Servings Per Recipe: 8

Amount Per Serving

Linear

board)

UI Construction Flow



UI Construction Flow

Load

Pumpkin Pie

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ear

Linear HTML

```
<h1>Pumpkin Pie</h1>
<div class="tabbed-interface">
  <h2>Overview</h2>
  
  <p>Whether you're hosting a festive party or a casual
  get-together with friends, our Pumpkin Pie will make
  entertaining easy!</p>
  <!-- ... -->
  <h2>Ingredients</h2>
  <ul>
    <li>1 (9<abbr title="inch">in</abbr>) unbaked deep
      dish pie crust</li>
    <li>½ cup white sugar</li>
    <!-- ... -->
  </ul>
  <h2>Directions</h2>
  <!-- ... -->
</div>
```


Tabbed

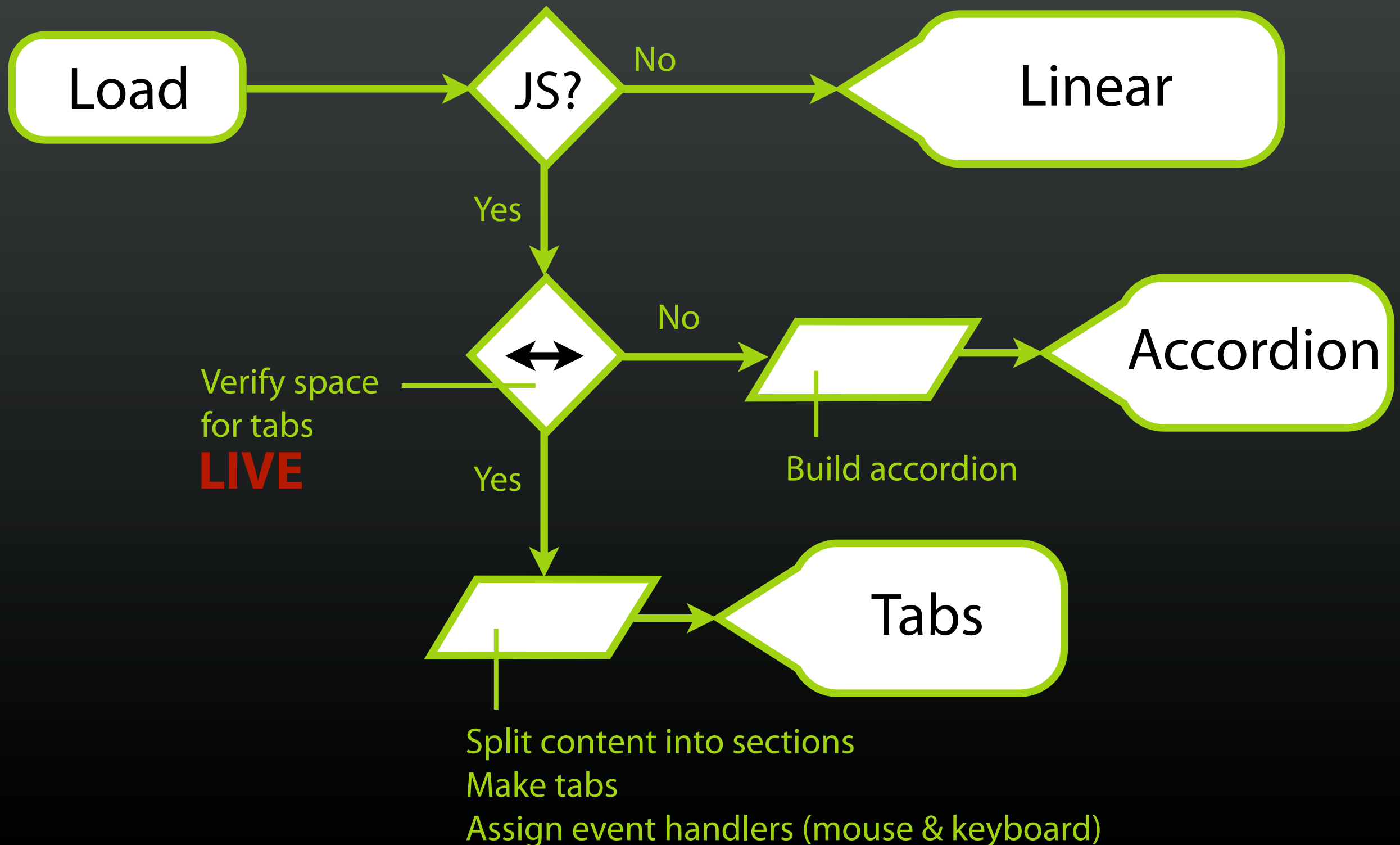
```
<h1>Pumpkin Pie</h1>
<div class="tabbed-interface TabInterface-enabled">
  <ul class="tabs">
    <li><a href="#folder-1">Overview</a></li>
    <li><a href="#folder-2">Ingredients</a></li>
    <li><a href="#folder-3">Directions</a></li>
    <li><a href="#folder-4">Nutrition</a></li>
  </ul>
  <section id="folder-1">
    <h2>Overview</h2>
    
    <p>Whether you're hosting a festive party or a casual
    get-together with friends, our Pumpkin Pie will make
    entertaining easy!</p>
    <!-- ... -->
  </section>
  <!-- ... -->
</div>
```

Tabbed

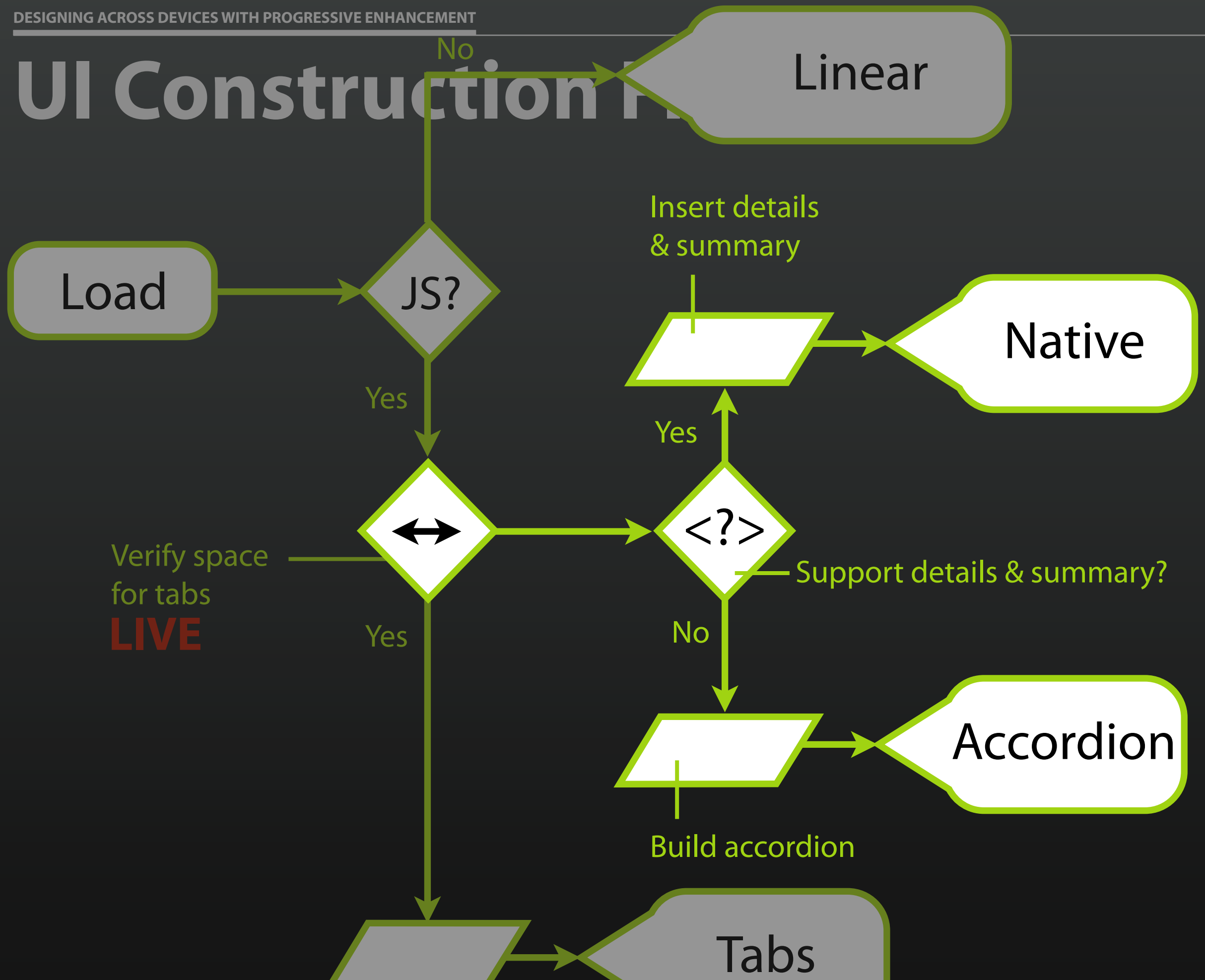


```
<h1>Pumpkin Pie</h1>
<div class="tabbed-interface TabInterface-enabled">
  <ul class="tabs">
    <li><a href="#folder-1">Overview</a></li>
    <li><a href="#folder-2">Ingredients</a></li>
    <li><a href="#folder-3">Directions</a></li>
    <li><a href="#folder-4">Nutrition</a></li>
  </ul>
  <section id="folder-1">
    <h2>Overview</h2>
    
    <p>Whether you're hosting a festive party or a casual
    get-together with friends, our Pumpkin Pie will make
    entertaining easy!</p>
    <!-- ... -->
  </section>
  <!-- ... -->
</div>
```

UI Construction Flow



UI Construction Flow



Adding ARIA

role="tablist"

Pumpkin Pie

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Adding ARIA



role="tab"
aria-selected="true"
aria-controls="folder-1"

Adding ARIA

`role="tab"`
`aria-selected="false"`
`aria-controls="folder-4"`



Adding ARIA

Pumpkin Pie

OVERVIEWINGREDIENTSDIRECTIONSNUTRITION

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`role="tabpanel"`
`aria-hidden="false"`
`aria-labelledby="folder-1-tab"`

Adding ARIA

Pumpkin Pie

OVERVIEWINGREDIENTSDIRECTIONSNUTRITION

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`role="application"`
`aria-activedescendant="folder-1"`

Result!

Pumpkin Pie

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Pumpkin pie Mozilla Firefox

Photo by [Paul Coyette](#), licensed under [Creative Commons](#).

Tabbed Interface

Pumpkin Pie

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Thank you!!!

Slides

http://is.gd/uie_pe_seminar

Password: [uie2013](#)

Further Reading

http://is.gd/readlist_awd