1. watch & summary 5 points -<https://www.youtube.com/watch?v=SmE4OwHztCc&ab_channel=JSConf>

Key elements in Browser

* Binding
* Rendering: Parsing layout painting
* Platform
* JavaScript VM

Let see how the browser loads the webpage:

Rendering: Parsing layout painting:

Parse HTMl

Render Tree

Paint

Layout

Parse CSS

**1) Parsing HTML:**

* HTML is forgiving by Nature
* Parsing isn’t straightforward
* Can be halted
* Will do speculative parsing
* Its re-entered

HTML tags autocompleted themselves while Html parsing and it uses tokenizer start tag and end tag for tree construction and inputs to DOM

**<script>,<link>,<Style>:**

* These tags will halt the parser as a script can alter the document
* Cause Network Latency
* Link and Style could halt the JS execution

**Speculative Parsing:**

It will look ahead and halt the page to load the external image or scripts

**Why we use the script at bottom of Html:**

* Parsing uninterrupted
* Faster to render
* Refer and async attributes
* Trade-off

**2) Parsing CSS:**

**DOM + CSSOM**

* Combines two objects models and style resolution
* Not a 1 to 1 mapping
* JS can affect both HTML and CSS parsing

**3) Rendering:**

Render tree is a multiple trees.

* Render Objects
* Render Styles
* Render layers
* Live border

Things that won’t be rendered on the web page:

1. Non-visual elements (Head/title)
2. Nodes that are hidden via display: none

**DOM Nodes to render objects:**

* Visual Output
* Geometric info
* Can layout and paint
* Hold style and computed metrics

**Calculating Visual Properties:**

* Combines all styles
* Defaults, the external, style element, inline
* Complexity around and matching rules for each element
* Style computation

**4) Layout**

**It’s Recursive Process:**

* Traverse Render tree
* Nodes position and size
* Layout its children

**Will Batch Layouts:**

* Incremental layouts
* The browser will intelligently batch changes
* Render tree items will flag themselves

**Immediate Layouts**

* Accessing certain properties via JS
* Same with Browser resize
* Doing the font resize change will relayout the entire document

**5) Paint**

* Will take layered out render tree
* Creates layers
* Incremental Process
* Build up over 12 Phases

**Painting:**

* Produces bitmap from each layer
* A bitmap is uploaded to GPU as texture
* Compounds the textures into final image to render

