Javascript

Basic Concept of DOM

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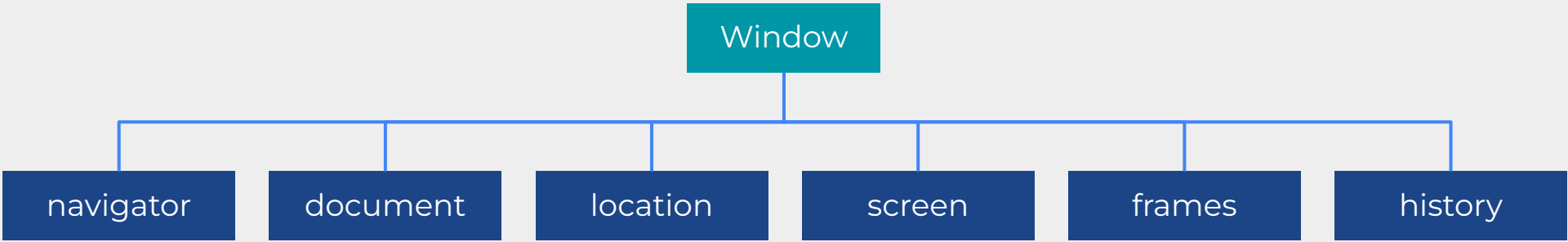
The Browser Object Model (BOM)

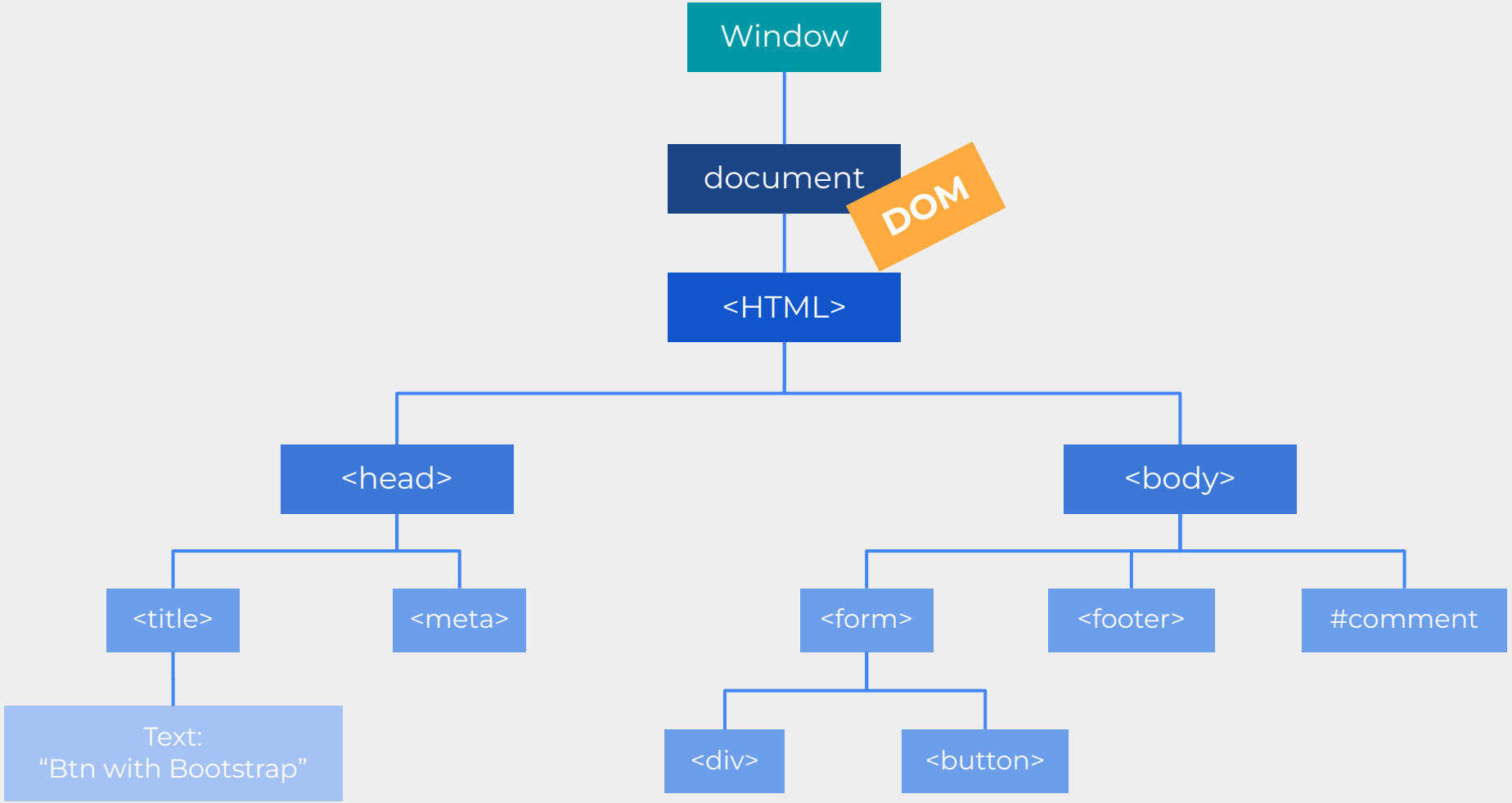
- The browser object model (BOM) is a hierarchy of browser objects that are used to manipulate methods and properties associated with the Web browser.
- All the things inside the BOM are objects which have their own properties and methods.
- The highest level is the window object, which is created once your browser is opened.
- All other browser objects are under window object.



```
> window
< ▼ Window {window: Window, self: Window, document:
  document, name: '', location: Location, …} i
    ▶ $: ƒ (e,t)
    ▶ alert: ƒ alert()
    ▶ atob: ƒ atob()
    ▶ blur: ƒ blur()
    ▶ bootstrap: {Alert: ƒ, Button: ƒ, Carousel: ƒ, Col
    ▶ btoa: ƒ btoa()
    ▶ caches: CacheStorage {}
    ▶ cancelAnimationFrame: ƒ cancelAnimationFrame()
    ▶ cancelIdleCallback: ƒ cancelIdleCallback()
    ▶ captureEvents: ƒ captureEvents()
```

The Document Object Model (DOM)

- consists of objects of the document or Web page loaded in the browser window.
- Those objects are formed in a tree structure called **DOM tree.**
- Any type of **object** in the DOM is called a **node.**
- There are 12 node types in total, but only 4 of them are commonly used in practice:
- document – the “entry point” into DOM.
- element nodes – HTML-tags, the tree building blocks.
- text nodes – contain text.
- comments – sometimes we can put information there, it won’t be shown, but JS can read it from the DOM.
- **Everything in HTML becomes part of the DOM tree**, even those are invisible on the screen.



Why is it important to understand the DOM

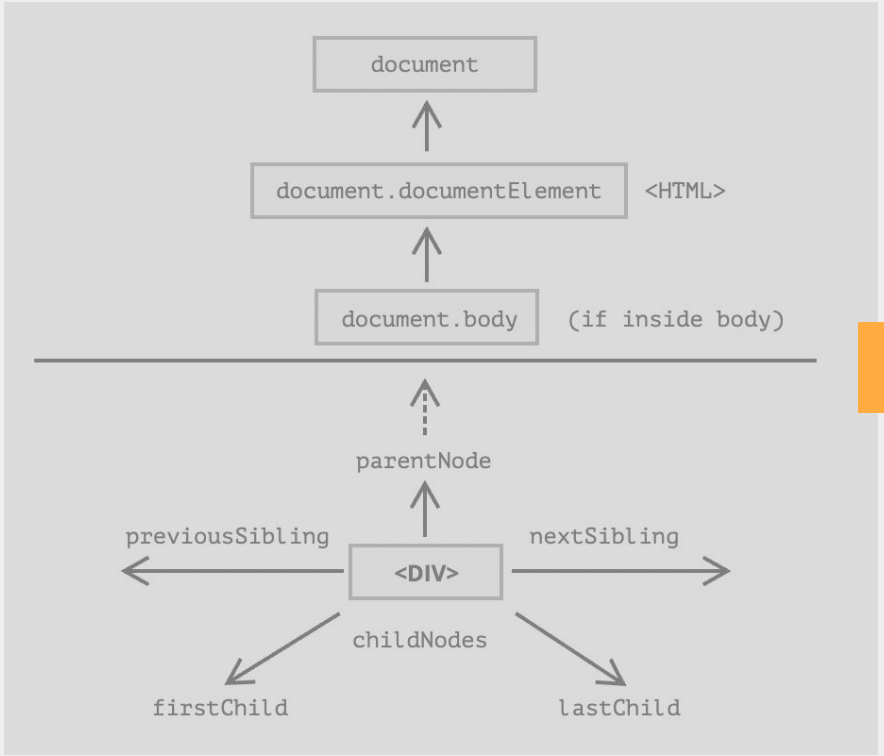
- The browser engine is written by **JavaScript**.
- A dynamic page can **ONLY** made through applying JavaScript processing to the DOM Tree.
- Onec the HTML document is loaded into the browser engine, you are able to interact with the HTML tag (the element node) through modifying their properties and methods.
- **properties** - refer to structural, visual, or content characteristics of the element
- **methods** - refer to actions the object can perform

- The next question would be how can we reach to a specific DOM object?

The relationship of the DOM tree

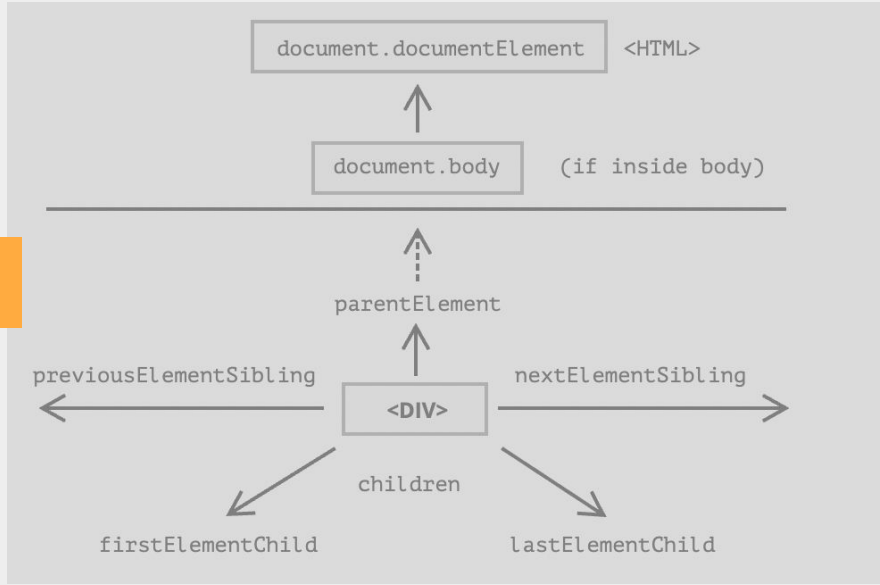
- All operations on the DOM start with the **document object**. That's the main "entry point" to DOM. From it we can access any node.
- You can access to both nodes and elements inside the DOM tree.
- But note that the result of accessing the nodes in the DOM is **differ** from the result of accessing the elements in the DOM
- Although they look similar.

DOM Nodes



V.S

Element Only



DOM Nodes ❖ Try in the console: let children = document. body.childNodes;

```
> let children = document.body.childNodes;
<· undefined
> children
<· ▼NodeList(11) [text, form.p-5, text, footer, text, script, text, script,
   text, script, text] i
    ▶0: text
    ▶1: form.p-5
    ▶2: text
    ▶3: footer
    ▶4: text
    ▶5: script
    ▶6: text
    ▶7: script
    ▶8: text
    ▶9: script
    ▶10: text
      length: 11
    ▶[[Prototype]]: NodeList
```

Element Only ❖ Try in the console: let children = document.body.children;

```
> let children = document.body.children;
<- undefined
> children
<- HTMLCollection(5) [form.p-5, footer, script, script, script] i
    0: form.p-5
    1: footer
    2: script
    3: script
    4: script
    length: 5
    [[Prototype]]: HTMLCollection
```

Iteration of DOM collections

- Although **childNodes** and **children** looks like array, they are actually **NOT** an array.
- They are **collection** – a special array-like iterable object.
- So Array methods are not able to use for iteration of the collection.
- for..of can be used for the iteration:

```
for (let node of document.body.childNodes) {
    console.log(node);
}
```

- The same method can be used for the element iteration too.

```
for (let elem of document.body.children) {
    console.log(elem);
}
```

Node Navigation

- parentNode - show the parent node of the current node
- childNodes - show all the direct child in a Node list
- firstChild / lastChild - fast access to the first or the last children
- previousSibling / nextSibling: show the pervidou or next node of the same parent

Element Navigation

- parentElement - show the parent element of the current node
- children - show only the children that are element node
- firstElementChild / lastElementChild - fast access to the first or the last element children
- previousElementSibling / nextElementSibling - show the neighbor elements

Searching inside DOM

QuerySelector Methods:

- querySelector() Method
- querySelectorAll() Method

GetElement Methods:

- getElementById() Method
- getElementsByTagName() Method
- getElementsByClassName() Method

document.getElementById

- If an element has the id attribute, we can get the element using the method **document.getElementById(id)**, no matter where it is.
- The method **getElementById** can be called **ONLY** on document object. It looks for the given id in the whole document.

  →Only **document.getElementById**, **NOT** **anyElem.getElementById**
- The id must be **unique,** with only **one** element in the document with the given id.

  →Otherwise, the behavior of methods that use it is unpredictable

  →may return any elements at random

querySelectorAll(css)

- A **NodeList** object with the elements that matches the CSS selector(s).
- Since it returns a NodeList, the following assignment is not execuable:

  →document.querySelectorAll("p").style.backgroundColor = "red";
- Instead, you need to run:

  →document.querySelectorAll("p")[0].style.backgroundColor = "red";

querySelector(css)

- returns the **first element** for the given CSS selector.

getElementsByClassName() / getElementsByTagName()

- They return a **collection**, not an element! So the following is not working:

  →document.getElementsByTagName('input').value = 5;

- should either **iterate** over the collection or get an element by its **index** like:

  →document.getElementsByTagName('input')[0].value = 5;

- Do not forget the letter **“s”** in the name of the method.