



The **HTML DOM** is an **Object Model** for **HTML**. It defines:

- HTML elements as **objects**
- **Properties** for all HTML elements
- **Methods** for all HTML elements
- **Events** for all HTML elements



The **HTML DOM** is an **API** (Programming Interface) for **JavaScript**:

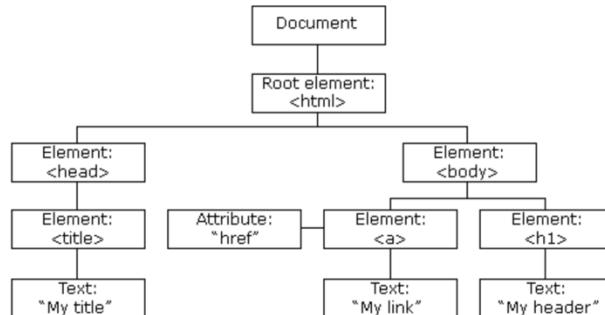
- JavaScript can add/change/remove HTML elements
- JavaScript can add/change/remove HTML attributes
- JavaScript can add/change/remove CSS styles
- JavaScript can react to HTML events
- JavaScript can add/change/remove HTML events

The HTML DOM (Document Object Model)

When a web page is loaded, the browser creates a **Document Object Model** of the page.

The **HTML DOM** model is constructed as a tree of **Objects**:

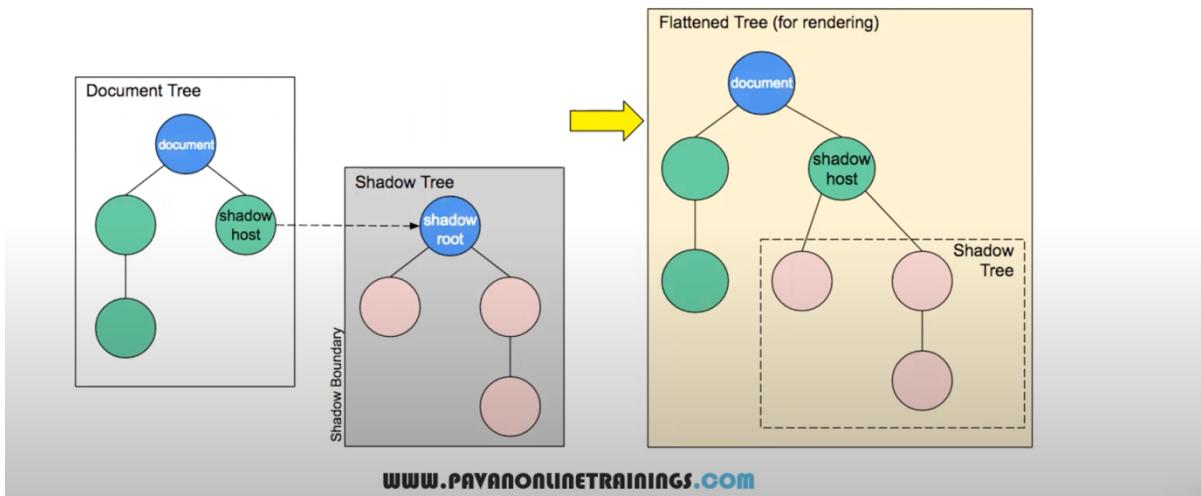
The HTML DOM Tree of Objects



Locating Elements in Shadow DOM

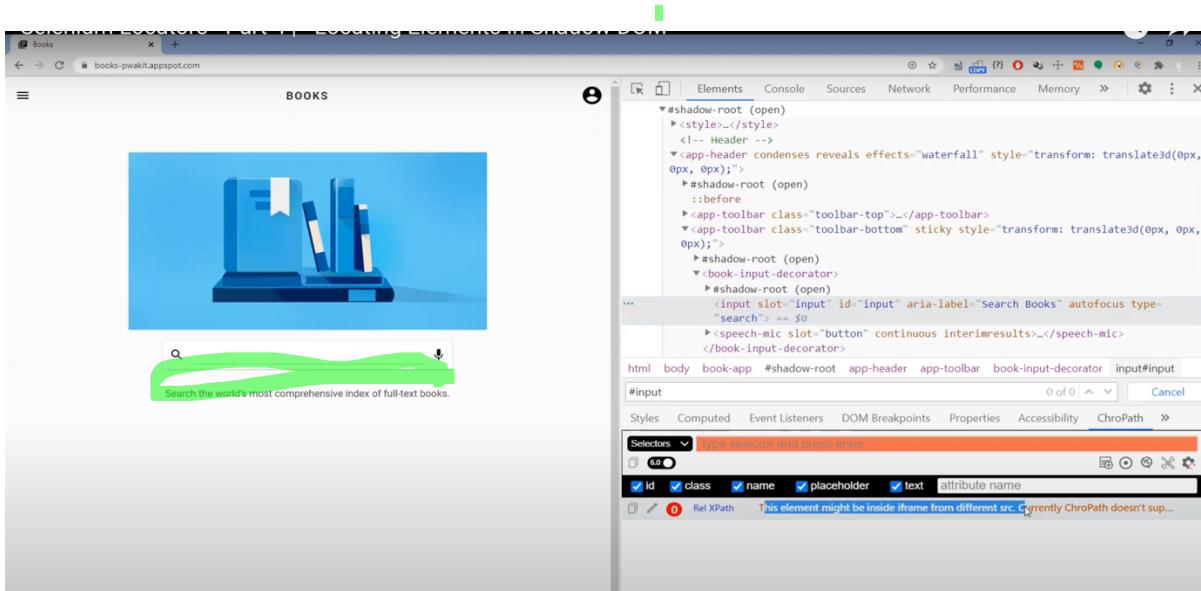
What is DOM & Shadow DOM ?

- **DOM (Document Object Model)** is Tree representation of HTML nodes.
- **Shadow DOM** subset of **DOM**.
- **Shadow host** is the regular node that the **Shadow DOM** is attached.



Bu websitesinde css `#input` yazıyor ama locator bulunamıyor
Chropath ile de herhangi bir sonuc çıkmıyor

We cannot use any locator to locate this element because this element is a part of shadow dom



Elementin shadow dom a ait oldugu belli

Locaterlari kullanamiyoruz , xpath de calismaz

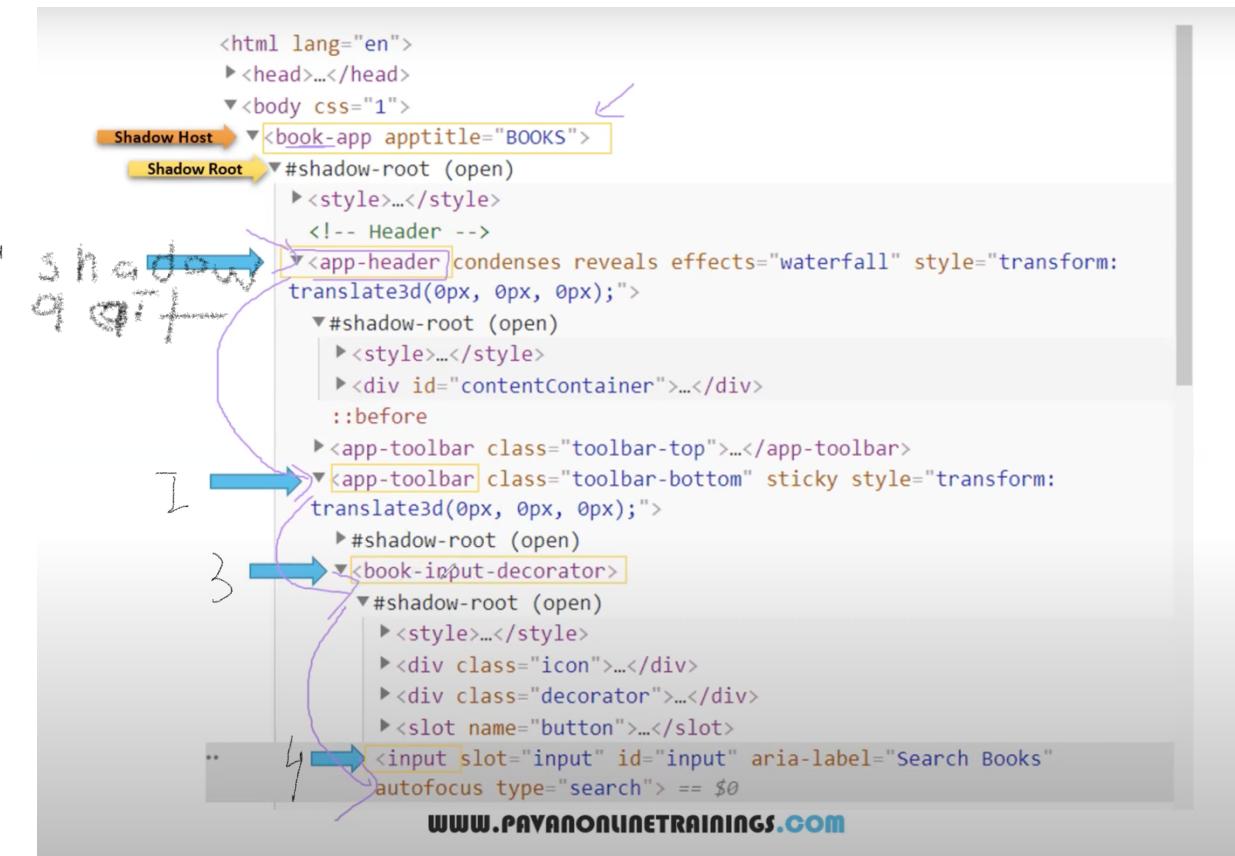
Sadece css kullanabiliriz fakat direct olarak onuda kullanamyz



```
<book-input-decorator>
  #shadow-root (open)
    <input slot="input" id="input" aria-label="Search Books" autofocus type="search"> == $0
    <speech-mic slot="button" continuous interimresults>...</speech-mic>
  </book-input-decorator>
<h4 class="subtitle" hidden>...</h4>
</app-toolbar>
</app-header>
```

First we should capture all the elements present in shadow dom and then we can interact with them with css selector that is only selector can support our dom elements

1 numara shadow a ait , 2,3,ve 4 numarali nod lar shadow a ait degil



```

System.setProperty("webdriver.chrome.driver", "C://Drivers//chromedriver_win32//chromedriver.exe");
WebDriver driver=new ChromeDriver();
driver.manage().timeouts().implicitlyWait(10, TimeUnit.SECONDS);
driver.get("https://books-pwakit.appspot.com/");
driver.manage().window().maximize();

//driver.findElement(By.xpath("//input[@id='input']")).sendKeys("testing"); //NoSuchElementException
//driver.findElement(By.cssSelector("input#input")).sendKeys("testing"); //NoSuchElementException

WebElement root=driver.findElement(By.tagName("book-app")); //Shadow Host / root Ele

JavascriptExecutor js=(JavascriptExecutor)driver;
WebElement shadowDom1=(WebElement) js.executeScript("return arguments[0].shadowRoot", root); I

WebElement appheader=shadowDom1.findElement(By.tagName("app-header"));
WebElement apptoolbar=appheader.findElement(By.cssSelector("app-toolbar.toolbar-bottom"));
WebElement bookinputdecorator= apptoolbar.findElement(By.tagName("book-input-decorator"));

bookinputdecorator.findElement(By.cssSelector("input#input")).sendKeys("Testing");
}
    
```

ANOTHER EXAMPLE

Screencast Locators Part 1: Locating Elements in Shadow DOM

shop.polymer-project.org

SHOP

Men's Outerwear Ladies Outerwear Men's T-Shirts Ladies T-Shirts

Men's Outerwear

SHOP NOW

https://shop.polymer-project.org/list/mens_outerwear

```
<body>
  <shadow-root open>
    <shop-app page="home">
      <#shadow-root (open) == $0>
        <style>...</style>
        <shop-analytics key="UA-39334307-16"></shop-analytics>
        <!--
          app-location and app-route elements provide the state of the URL for the app.
        -->
        <app-location>...</app-location>
        <app-route pattern="/:page"></app-route>
        <iron-media-query query="max-width: 767px" style="display: none;"></iron-media-query>
        <!--
          shop-category-data provides the list of categories.
        -->
        <shop-category-data></shop-category-data>
        <!--
          shop-cart-data maintains the state of the user's shopping cart (in localstorage) and
          calculates the total amount.
        -->
        <shop-cart-data id="cart"></shop-cart-data>
        <app-header role="navigation" id="header" effects="waterfall" condenses reveals style="transform:
translate3d(0px, 0px, 0px); transition-duration: 0ms;"></app-header>
        <!-- Lazy-create the drawer for small screen sizes. -->
        <!-- Two-way bind `drawerOpened` since app-drawer can update `opened` itself. -->
        <app-drawer swipe-open tabindex="0" position="left" style="transition-duration: 200ms; touch-
action: pan-y;"></app-drawer>
        <dom-if style="display: none;"></dom-if>
        <iron-pages role="main" attr-for-selected="name" selected-attribute="visible" fallback-selection=
"404">
          <#shadow-root (open)
            <!-- home view -->
            <shop-home name="home" class="iron-selected" visible>
              <#shadow-root (open)
                <style>...</style>
                <div class="item">
                  <a class="image-link" href="/list/mens_outerwear">...</a>
                  <h2>Men's Outerwear</h2>
                </div>
                <shop-button>
                  <a href="/list/mens_outerwear" aria-label="Men's Outerwear Shop Now">Shop Now</a>
                </shop-button>
              </#shadow-root (open)
            </shop-home>
          </iron-pages>
        </#shadow-root (open)
      </shop-app>
    </#shadow-root (open) == $0>
  </shadow-root>

```

Shadow Host
Shadow Root

BIRDEN FAZLA SHADOW OLDUGUNDA BIR TAME METHOD UYGULADI

```
public static void main(String[] args) {  
    System.setProperty("webdriver.chrome.driver", "C://Drivers//chromedriver_win32//chromedriver.exe");  
  
    WebDriver driver=new ChromeDriver();  
    driver.manage().timeouts().implicitlyWait(10, TimeUnit.SECONDS);  
  
    driver.get("https://shop.polymer-project.org/");  
    driver.manage().window().maximize();  
  
    WebElement root=driver.findElement(By.tagName("shop-app")); //root node/shadow host  
    WebElement shadowDom1=getShadowDOM(root,driver);  
    WebElement ironpages=shadowDom1.findElement(By.tagName("iron-pages"));  
    WebElement shophome=ironpages.findElement(By.name("home"));  
  
    WebElement shadowDom2=getShadowDOM(shophome,driver); I  
    shadowDom2.findElement(By.cssSelector("div:nth-child(2) > shop-button >a")).click();  
}  
  
static WebElement getShadowDOM(WebElement element, WebDriver driver)  
{  
    JavascriptExecutor js=(JavascriptExecutor)driver;  
    WebElement shadowDom1=(WebElement) js.executeScript("return arguments[0].shadowRoot", element);  
    return shadowDom1;  
}
```