

TESTIRANJE SOFTVERA - VEŽBE 06

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# LOCIRANJE WEB ELEMENATA

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# PROBLEM LOCIRANJA

- ▶ Web elementi mogu biti bilo šta na stranici – dugmad, labele, padajući menii i još mnogo toga
- ▶ Kao ljudski korisnici, ne razmišljamo često o strukturi web stranice. Intuitivno samo gledamo i kliknemo na stvari koje želimo. Međutim, automatsko testiranje ne može vršiti interakciju na taj način
- ▶ Kodu su potrebni pokazivači na željene elemente, koje nazivamo lokatorima ili selektorima. Postoji mnogo tipova lokatora, neki jednostavni, a drugi složeni

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# WEB STRANICE

- ▶ Web stranica je dokument na worldwide web mreži koja se može prikazati u pretraživaču na računaru ili uređaju. Popularne stranice kao što su Google, Facebook i Wikipedia imaju više stranica sa različitim sadržajem
- ▶ Korisnici mogu da pronađu web stranice koristeći URL adrese ili pretraživače
- ▶ Korisnici komuniciraju sa web stranicama vizuelno, što predstavlja važan aspekt ovih stranica
- ▶ Korisnici ne moraju da znaju nikakve posebne komande, a UI/UX odlike čine interakcije intuitivnim i besprekornim za korisnike
- ▶ Gradivne komponente web stranica su:
  - A. HTML
  - B. CSS
  - C. JavaScript

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# HTML

- ▶ HTML je skraćenica od Hipertext Markup Language i predstavlja kostur stranice i ima za cilj da obezbedi strukturu za sav sadržaj
- ▶ HTML sam po sebi nije programski jezik, već jezik za označavanje. Jednostavno deklariše šta bi trebalo da se pojavi na stranici
- ▶ HTML stranice imaju standardne sekcije i svaka pojava na stranici je napisana elementom, koji se pišu u obliku:

```
<!-- HTML Element Format -->
<tagName attribute="value">content</tagName>
```

- ▶ Svaki element ima jedinstveno ime oznake ili tag. Deklaracija elementa počinje i završava se nazivom taga okruženim uglastim zagradama <>, s tim da završno ime ima prefiks kosom crtom / kako bi se označilo da je to kraj elementa
- ▶ Početna oznaka može takođe da sadrži atribute za prilagođavanje elementa
- ▶ Sadržaj se može postaviti između oznaka kao što je neobrađeni tekst ili drugih ugnezđenih elementa

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# CSS

- ▶ Ako je HTML kostur stranice, onda je CSS može posmatrati kao kožu. On kontroliše stil i formatiranje za izgled stranice. CSS može da kontroliše stvari kao što su:
  - ▶ Boje
  - ▶ Veličina
  - ▶ Font
  - ▶ Položaj
  - ▶ Layout
- ▶ Iako se CSS može dodati direktno u bilo koji HTML element pomoću atributa style, najbolja je praksa da se CSS stavi u odvojene .css datoteke radi ponovne upotrebe
- ▶ Takođe je uobičajeno da se kreiraju CSS „klase“ za primenu istih stilova na određene elemente

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# JAVA SCRIPT

- ▶ Dinamički sadržaj uglavnom dolazi iz JavaScript-a, programskog jezika koji deluje kao mišići stranice
- ▶ Programeri mogu da koriste JavaScript da menjaju elemente i stilove, upravljaju unosom korisnika, upućuju pozive usluga pozadinskim sistemima i još mnogo toga. Praktično sve moderne veb aplikacije koriste JavaScript za pružanje dinamičkog korisničkog iskustva na klijentskom delu aplikacija, jer ga podržavaju svi glavni veb pretraživači
- ▶ Danas se u cilju bržeg razvoja aplikacija koriste razni radni okviri kao što su React, Angular, Vue itd.
- ▶ JavaScript kod se može napisati direktno u HTML datoteke, ili kao bolja praksa, u zasebnim .js datotekama

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# DOM

- ▶ HTML, CSS i JavaScript su dokumenti koje web pretraživač zajedno prikazuje u cilju dobijanja vizuelnih web stranica. Kada browser prikaže stranicu i izvrši naknadno izvršenje pratećeg koda, potreban mu je interfejs za rukovanje web stranicom - DOM
- ▶ Model Object Document ili skraćeno DOM je programski interfejs za HTML i XML dokumente koji omogućava programerima da manipulišu stranicom na različite načine kao što su:
  - ▶ Traženje elemenata
  - ▶ Promena sadržaja elementa
  - ▶ Promena HTML strukture stranice
  - ▶ Promena CSS stila stranice
- ▶ DOM se naziva „model objekta“ jer predstavlja stranicu kao objekat. Taj objekat dokumenta sadrži objekat koji predstavlja svaki element unutar njega. Objekti elementa su ugnezđeni iz osnovnog elementa da bi odražavali HTML strukturu te stranice
- ▶ Ono što je zaista lepo u vezi sa DOM-om je to što ne zavisi ni od jednog programskega jezika. JavaScript ga najčešće koristi za manipulisanje web stranicama u pregledaču, ali ga može koristiti bilo koji drugi jezik

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# DOM

- ▶ Prilikom rada sa DOM-om treba biti svestan razlike između elementa i njegovog lokatora
- ▶ Web element je objekat koji predstavlja renderovani HTML element na stranici. S druge strane, lokator web elemenata (koji se ponekad naziva i „selektor“) je upit koji pronađe i vraća određene elemente iz DOM-a. Ukratko, lokatori pronađe elemente.
- ▶ Zašto je ova razlika važna? Dva glavna razloga:
  - ▶ Prvo, direktni putevi od korena do deteta bili bi veoma dugi i komplikovani. Nije neuobičajeno da podređeni elementi budu ugnezđeni ispod desetina slojeva. Zamislite da programirate reference objekata od roditelja do deteta za ceo lanac. To bi bilo ludo dugo. Mnogo je smislenije pisati manje, smislenije upite za lokator da biste pronašli željene elemente
  - ▶ Drugo, ne postoji garancija da će se određeni elementi zaista pojaviti na stranici. Dinamički sadržaj znači sadržaj koji se stalno menja, a elementi se mogu dodavati, uklanjati ili menjati po volji. Štaviše, greške u HTML-u, CSS-u ili JavaScript-u mogu dovesti do toga da se web elementi uopšte ne pojavljuju na stranici
- ▶ Iz ovih razloga moramo odvojiti brige o samim objektima elementa i lokatorima koji se koriste za njihovo pronađenje

# DOM

- ▶ Postoji više tipova lokatora, a to su:

- ▶ ID-ovi
- ▶ imena
- ▶ nazivi klase
- ▶ CSS selektori
- ▶ XPath selektori

```
// JavaScript Code

// Clicks the element with the "ok-button" ID
document.getElementById("ok-button").click();

// Gets the text from the element with the "main-para" class
var text = document.getElementByClassName("main-para").textContent

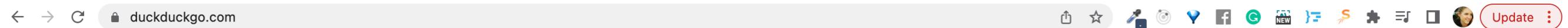
// Sets the "class" attribute of the first "div" element
document.getElementsByName("div")[0].setAttribute("class", "big-text");
```

- ▶ Lokator takođe može da vrati više elemenata, a ne samo jedan. U tom slučaju vratiće sve pronađene elemente koji odgovaraju zadatom upitu
- ▶ Jednom kada se dobiju objekti elemenata, postoji mnogo načina za interakciju sa njima
- ▶ JavaScript posebno pruža metode, ne samo za promenu stanja elemenata, već i za slanje akcija sličnih korisniku

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# LOCIRANJE WEB ELEMENATA

- Ručno pronalaženje elemenata je važan korak kada se automatizuju testovi web korisničkog interfejsa. Programeri neće uvek davati lokatore svakom elementu – stoga je jedan od zadataka testera da ih sami pronađu
- Za potrebe manuelnog lociranja koristi se Google Chrome DevTools sekcija koja omogućava programerima i testerima da pregledaju izvorni kod, konzolu, mrežnu aktivnost i još mnogo toga; u suštini, bilo šta što se dešava na web stranici



Privacy, simplified. Help Spread DuckDuckGo!

Selektovanje  
elementa iz  
renderovane  
stranice



Elements Memory Recorder Performance insights Console Sources Network Performance Application Security Lighthouse Redux EditThisCookie

```
<div id="content_homepage" class="content--home" style="visibility: visible;">

</div>

</div><div class="search_autocomplete" style="display: none;"></div></form></div><!-- en_US All Settings --><noscript>...</noscript>


```

Styles Computed Layout Event Listeners DOM Breakpoints Properties Accessibility

Filter :hov .cls +

element.style {

.search\_input, .search\_input--adv {

  -webkit\_appearance: none; rgba(0,0,0,0);

  -moz\_appearance: none;

  -ms\_appearance: none;

  -o\_appearance: none;

  appearance: none;

  -webkit-tap-highlight-color: rgba(0,0,0,0);

  font-size: 1.1em;

  font-weight: normal;

  display: block;

  width: 100%;

  background: none;

  outline: none;

Console What's New Issues

top Filter Default levels 4 Issues: 1 3

No messages

No user me...

No errors

No warnings

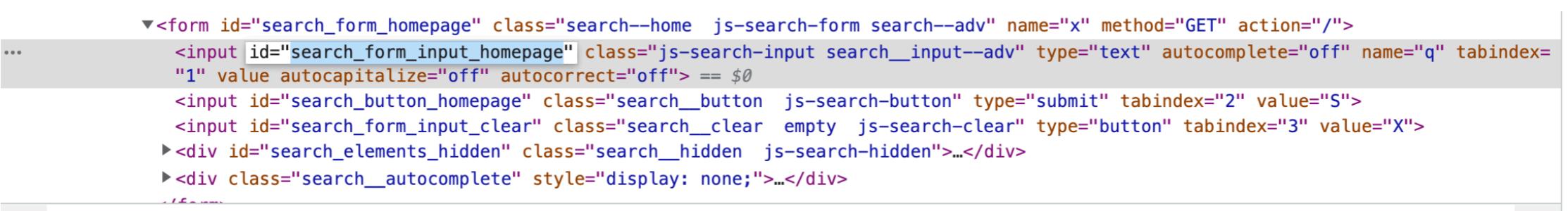
No info

```
> $('#search_form_input_homepage')
< [input#search_form_input_homepage.js-search-input.search_input--adv]
```

```
document.getElementById("search_form_input_homepage")
```

# ID LOKATOR

- ▶ ID lokator je najbolji tip lokatora
- ▶ Po HTML standardima, atribut `id` mora imati jedinstvenu vrednost na datoj stranici. Dakle, lokator koji koristi ID će jedinstveno identifikovati jedan ciljni element
- ▶ Preporuka za pisanje lokatora jeste da se uvek potraži `id` atribut. Ako element ima jedan, onda je lokator super jednostavan
- ▶ **NAPOMENA:** Za svaki slučaj se uverite da se ID zapravo koristi jedinstveno na stranici. Jednostavna pretraga izvora DevTools-a može to potvrditi



```
<form id="search_form_homepage" class="search--home js-search-form search--adv" name="x" method="GET" action="/">
  <input id="search_form_input_homepage" class="js-search-input search__input--adv" type="text" autocomplete="off" name="q" tabindex="1" value autocapitalize="off" autocorrect="off"> == $0
  <input id="search_button_homepage" class="search__button js-search-button" type="submit" tabindex="2" value="S">
  <input id="search_form_input_clear" class="search__clear empty js-search-clear" type="button" tabindex="3" value="X">
  ><div id="search_elements_hidden" class="search__hidden js-search-hidden">...</div>
  ><div class="search__autocomplete" style="display: none;">...</div>
</form>
```

... ly--onboarding div.site-wrapper.site-wrapper--home.js-site-wrapper div.content-wrap--home div#content\_homepage.content--home div.cw--c div.search-wrap--ho ...

⋮ Console What's New Issues

Console | top ▾ | Filter

No messages > \$\$("#search\_form\_input\_homepage")  
No user me... <- ▾ [input#search\_form\_input\_homepage.js-search-input.search\_\_input--adv] ⓘ  
No errors > 0: input#search\_form\_input\_homepage.js-search-input.search\_\_input--adv  
No warnings < length: 1  
[[Prototype]]: Array(0)

```
document.getElementById("q")
```

# NAME LOKATOR

- ▶ Još jedan dobar lokator je atribut name
- ▶ Name atributi se koriste za elemente koji su povezani sa unosima kao što su input, select, button i textarea. Svaki ulazni element unutar obrasca treba da ima jedinstveno ime, a često su imena jedinstvena i za celu stranicu

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## CLASS NAME LOKATOR

- ▶ Klasama se dodaju CSS stilovi HTML elementima. Element može imati jedno ime klase, više imena klasa ili nijedno
- ▶ Štaviše, imena klasa ne moraju biti jedinstvena po elementu. Jedno ime klase može da deli više elemenata. Ovo je korisno kada se locira skup elemenata, kao što je lista rezultata pretrage

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# PROBLEMI LOCIRANJA WEB ELEMENATA

- ▶ Pisanje dobrih lokatora može biti izazov. Zapamtite, lokator će vratiti sve elemente koji odgovaraju njegovom upitu
  - ▶ Ako je lokator preširok, može da vrati lažne pozitivne rezultate
  - ▶ Međutim, ako je lokator previše specifičan, onda bi mogao da se pokvari kad god se DOM promeni i može biti težak za čitanje
- ▶ Najbolja filozofija je napisati najjednostavniji upit lokatora koji jedinstveno identificuje ciljani element ili elemente
- ▶ ID-ovi, imena i nazivi klasa su najlakši lokatori za upotrebu - brzo se nalaze na stranici, ako postoje, i ne zahtevaju dodatno razmišljanje za pisanje
- ▶ Međutim, u situacijama kada oni definisani za sve ciljane elemente, a ne postoji mogućnost da se dodaju, potrebno je koristiti naprednije vidove lociranja kao što su CSS i XPath selektori

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# CSS SELEKTORI

- ▶ CSS selektori su izrazi koji koriste podudaranje šablonu za pronalaženje elemenata na veb stranici
- ▶ CSS dokumenti koriste ove selektore za primenu stila na elemente
- ▶ Selektori pronalaze HTML elemente na osnovu:
  - ▶ Tipa elementa
  - ▶ Identifikatora
  - ▶ Klasa
  - ▶ Atributa
  - ▶ Vrednosti atributa itd

# CSS SELEKTORI PO TIPU ELEMENTA

- ▶ Najjednostavniji tip CSS selektora jeste selektor po tagu
- ▶ Element selektori pronalaze sve elemente čiji naziv taga odgovara onom koji je naveden u selektoru
- ▶ Međutim, često ovaj vid selektora je suviše širok i retko kad će biti od koristi

The screenshot shows a search for "giant panda" on duckduckgo.com. The results page includes links to Wikipedia, Smithsonian's National Zoo, and WWF. The developer tools' Elements tab is open, displaying a list of selected CSS selectors. The list includes:

- > \$("body")
- < > [body.body--serp]
- > \$\$("img")
- < (33) [img,header\_clickable--icon, img.social\_icon.js-lazysvg, img.social\_icon.js-lazysvg, img.social\_icon.js-lazysvg, img, img, img, img.js-carousel-item-image.module--carousel\_image, img.zci\_more-at\_\_icon, img.js-carousel-item-image.module--carousel\_image, img.zci\_more-at\_\_icon, img.js-carousel-item-image.module--carousel\_image, img.zci\_more-at\_\_icon, img.zci\_more-at\_\_icon, img.js-carousel-item-image.module--carousel\_image, img.zci\_more-at\_\_icon, img, img, img, img, img, img, img.module--about\_\_img, img.zci\_more-at\_\_icon, img.footer\_card\_\_icon.js-footer-lazysvg, img.footer\_card\_\_icon.js-footer-lazysvg, img.footer\_card\_\_icon.js-footer-lazysvg, img.footer\_social\_\_icon.js-footer-lazysvg, img.footer\_social\_\_icon.js-footer-lazysvg, img.footer\_social\_\_icon.js-footer-lazysvg, img.footer\_social\_\_icon.js-footer-lazysvg)
- > \$\$("textare")
- < > []
- > \$\$("div")
- < (179) [div#spacing\_hidden\_wrapper, div#spacing\_hidden, div.site-wrapper.js-site-wrapper, div.welcome-wrap.js>Welcome-wrap, div#header\_wrapper.header-wrap.js-header-wrap, div#header.header.cw, div.header\_shrink-beyond-min-size, div.header\_search-wrap, div.header\_content.header\_search,

# CSS SELEKTORI PO KLASI

- ▶ Selekciju je moguće specificirati dodavajući elementu ime klase, što se postiže specijalnim karakterom .(tačka)
- ▶ Ovaj selektor radi contains, a ne equals nad class atributom datog elementa. Selektor se zatim definiše u obliku tag-name.class-name
- ▶ Po potrebi je moguće i olabaviti CSS selektor, tako što umesto da specificiramo da određeni tip elementa imaju klasu, možemo tražiti jednostavno sve elemente koji imaju klasu rezultata
- ▶ U tom slučaju, ubacite tačku, a zatim ime klase: .class-name

The screenshot shows a web browser window with the URL `duckduckgo.com/?q=giant+panda&hps=1&ia=web`. The search term "giant panda" is entered in the search bar. Below the search bar, there are filters for "All", "Images", "Videos", "News", and "Maps". The "All" filter is selected. A dropdown menu shows the element `div.nrn-react-div` with dimensions `672x154.77`. The search results include:

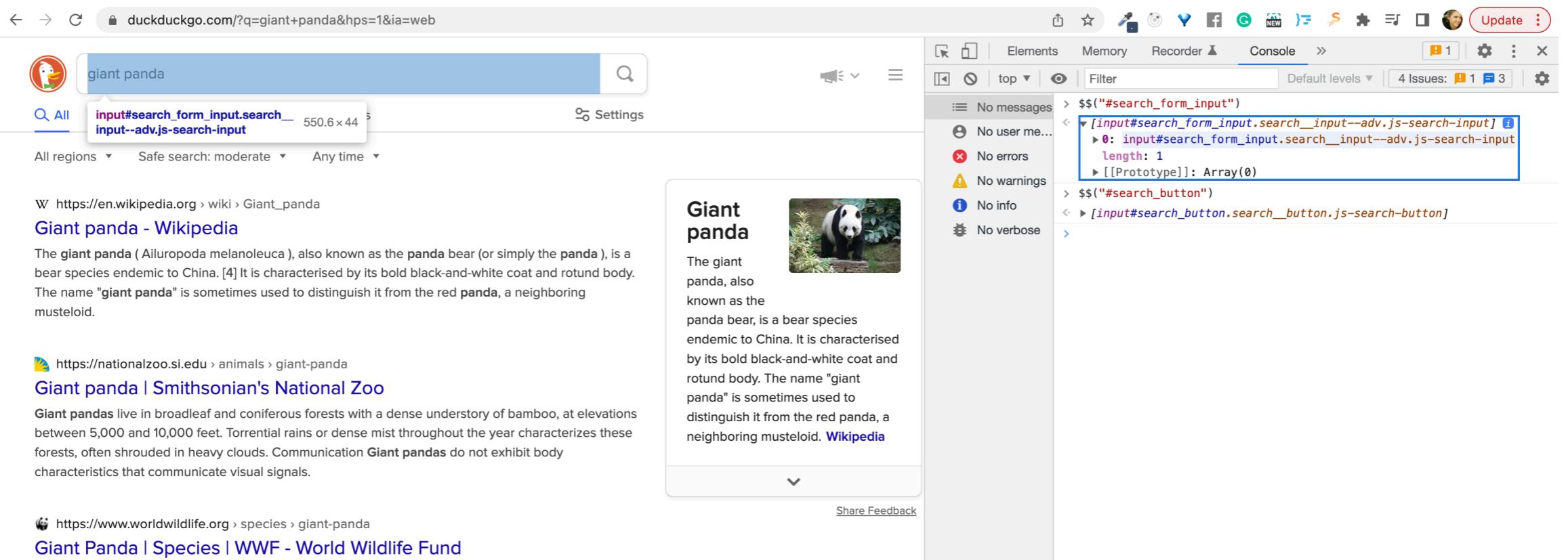
- Giant panda - Wikipedia**  
The giant panda (*Ailuropoda melanoleuca*), also known as the panda bear (or simply the panda), is a bear species endemic to China. [4] It is characterised by its bold black-and-white coat and rotund body. The name "giant panda" is sometimes used to distinguish it from the red panda, a neighboring musteloid.
- Giant panda | Smithsonian's National Zoo**  
Giant pandas live in broadleaf and coniferous forests with a dense understory of bamboo, at elevations between 5,000 and 10,000 feet. Torrential rains or dense mist throughout the year characterizes these forests, often shrouded in heavy clouds. Communication Giant pandas do not exhibit body characteristics that communicate visual signals.
- Giant Panda | Species | WWF - World Wildlife Fund**

On the right side of the screen, the developer tools are open, specifically the Console tab. The console output shows the following JavaScript code and its execution results:

```
$$(".div.nrn-react-div")
< (10) [div.nrn-react-div, div.nrn-react-div, div.nrn-react-div,
div.nrn-react-div, div.nrn-react-div, div.nrn-react-div,
div.nrn-react-div, div.nrn-react-div, div.nrn-react-div,
div.nrn-react-div]
$($(".nrn-react-div")
< (10) [div.nrn-react-div, div.nrn-react-div, div.nrn-react-div,
div.nrn-react-div, div.nrn-react-div, div.nrn-react-div,
div.nrn-react-div, div.nrn-react-div, div.nrn-react-div,
div.nrn-react-div]
0: div.nrn-react-div
1: div.nrn-react-div
2: div.nrn-react-div
3: div.nrn-react-div
4: div.nrn-react-div
5: div.nrn-react-div
6: div.nrn-react-div
7: div.nrn-react-div
8: div.nrn-react-div
9: div.nrn-react-div
length: 10
[[Prototype]]: Array(0)
$($("#search__input--adv js-search-input")
< []
$($("#search__input--adv.js-search-input")
< [input#search_form_input.search__input--adv.js-search-input]
> |
```

# CSS SELEKTORI PO IDENTIFIKATORU

- ▶ Za pisanje selektora za element sa datim ID-om koristi se specijalni karakter # (taraba, hashtag)
- ▶ Selektor se zatim definiše u obliku `#identificator`



# CSS SELEKTORI PO POTOMCIMA

- ▶ Sada se ovi rezultati mogu pojaviti bilo gde na stranici. Ako bismo želeli da ih ograničimo na kontejner, potrebno je koristiti selektor potomaka
- ▶ Na ovaj način se osiguravamo od false positive rezultata u slučaju da postoje elementi u drugim kontejnerima koje ne želimo da selektujemo. Selektor se zatim definiše u obliku `ancestor_element descendant_element`
- ▶ Ukoliko je potrebno, moguće je selektovati i direktnе odnose roditelj-dete, umesto pomenutih odnosa predaka i potomaka. Selektor se u tom slučaju definiše u obliku `parent_element > child_element`

The screenshot shows a search results page for "giant panda" on duckduckgo.com. The results include links to Wikipedia, Smithsonian's National Zoo, and WWF. On the right, the Chrome DevTools Console tab shows the CSS selector `$("#links h2")` being evaluated, returning a list of 10 matching elements.

```
$($("#links h2"))
< (10) [h2,LnpumSThxEWMIIsDdAT17.CXMyPcQ6nDv47DKFeywM,
h2,LnpumSThxEWMIIsDdAT17.CXMyPcQ6nDv47DKFeywM,
h2,LnpumSThxEWMIIsDdAT17.CXMyPcQ6nDv47DKFeywM,
h2,LnpumSThxEWMIIsDdAT17.CXMyPcQ6nDv47DKFeywM,
h2,LnpumSThxEWMIIsDdAT17.CXMyPcQ6nDv47DKFeywM,
h2,LnpumSThxEWMIIsDdAT17.CXMyPcQ6nDv47DKFeywM,
h2,LnpumSThxEWMIIsDdAT17.CXMyPcQ6nDv47DKFeywM,
h2,LnpumSThxEWMIIsDdAT17.CXMyPcQ6nDv47DKFeywM,
h2,LnpumSThxEWMIIsDdAT17.CXMyPcQ6nDv47DKFeywM,
h2,LnpumSThxEWMIIsDdAT17.CXMyPcQ6nDv47DKFeywM]
```

```
> $$("#links h2>a")
< (10) [a.eVNpHGjtxRBq_gL0fGDr.LQNqh2U1kzYxReS65IJu,
a.eVNpHGjtxRBq_gL0fGDr.LQNqh2U1kzYxReS65IJu,
a.eVNpHGjtxRBq_gL0fGDr.LQNqh2U1kzYxReS65IJu,
a.eVNpHGjtxRBq_gL0fGDr.LQNqh2U1kzYxReS65IJu,
a.eVNpHGjtxRBq_gL0fGDr.LQNqh2U1kzYxReS65IJu,
a.eVNpHGjtxRBq_gL0fGDr.LQNqh2U1kzYxReS65IJu,
a.eVNpHGjtxRBq_gL0fGDr.LQNqh2U1kzYxReS65IJu,
a.eVNpHGjtxRBq_gL0fGDr.LQNqh2U1kzYxReS65IJu,
a.eVNpHGjtxRBq_gL0fGDr.LQNqh2U1kzYxReS65IJu,
a.eVNpHGjtxRBq_gL0fGDr.LQNqh2U1kzYxReS65IJu]
```

```
> $$("#links a")
< (47) [a,a.Rn_JXVtoPVAfyGkcaXyK,
a.eVNpHGjtxRBq_gL0fGDr.LQNqh2U1kzYxReS65IJu, a,
a.Rn_JXVtoPVAfyGkcaXyK,
a.eVNpHGjtxRBq_gL0fGDr.LQNqh2U1kzYxReS65IJu, a,
a.Rn_JXVtoPVAfyGkcaXyK,
a.eVNpHGjtxRBq_gL0fGDr.LQNqh2U1kzYxReS65IJu,
a.module--carousel__body__title.js-carousel-item-title,
a.module--carousel__body__title.js-carousel-item-title,
a.module--carousel__body__title.js-carousel-item-title,
```

# CSS SELEKTORI PO ATRIBUTIMA

- ▶ Još jedan veoma moćan aspekt sintakse CSS selektora je mogućnost odabira elemenata na osnovu njihovih atributa
- ▶ Selektor koji pronađe elemente na osnovu postojanja atributa definiše se u obliku `element [attribute_name]`
- ▶ Pored postojanja, moguće je proveriti i sadržaj atributa i to na nekoliko načina:
  - ▶ Equality `element [attribute_name = 'value']`
  - ▶ Contains `element [attribute_name *= 'value']`

The screenshot shows a web browser window with the URL `duckduckgo.com/?q=giant+panda&hps=1&ia=web`. The search term "giant panda" is entered in the search bar. Below the search bar, there are filters for All, Images, Videos, News, and Maps. The results section displays three main entries:

- Giant panda - Wikipedia**  
The result is from `https://en.wikipedia.org/wiki/Giant_panda`. It includes a brief description of the giant panda as a bear species endemic to China, mentioning its black-and-white coat and rotund body. It also notes that the name "giant panda" distinguishes it from the red panda.
- Giant panda | Smithsonian's National Zoo**  
The result is from `https://nationalzoo.si.edu/animals/giant-panda`. It provides information about giant pandas living in broadleaf and coniferous forests, their diet, and communication.
- Giant Panda | Species | WWF - World Wildlife Fund**  
The result is from `https://www.worldwildlife.org/species/giant-panda`. It discusses the habitat of giant pandas and their conservation status.

On the right side of the browser, the developer tools console is open. It shows a list of selected elements using attribute selectors, such as `a[data-zci-link]` and `div[class='result']`.

```
$($(".a[data-zci-link]")
< (5) [a.zcm_link.js-zci-link.js-zci-link--web.is-active,
a.zcm_link.js-zci-link.js-zci-link--images,
a.zcm_link.js-zci-link.js-zci-link--videos,
a.zcm_link.js-zci-link.js-zci-link--news,
a.zcm_link.js-zci-link.js-zci-link--maps_expanded]
> $(".a[data-zci-link = 'images']")
< [a.zcm_link.js-zci-link.js-zci-link--images]
> $(".div[class='result']")
< []
> $(".div[class*='result']")
< (8) [div#links_wrapper.serp_results.js-serp-results,
div.results--main, div#message.results--message,
div#ads.results--ads.results--ads--main.js-results-ads,
div#links_results.js-results, div#rld-1.result.result--more,
div#rrd-1.js-result-hidden-el,
div.results--sidebar.js-results-sidebar]
> 0: div#links_wrapper.serp_results.js-serp-results
> 1: div.results--main
> 2: div#message.results--message
> 3: div#ads.results--ads.results--ads--main.js-results-ads
> 4: div#links_results.js-results
> 5: div#rld-1.result.result--more
> 6: div#rrd-1.js-result-hidden-el
> 7: div.results--sidebar.js-results-sidebar
length: 8
> [[Prototype]]: Array(0)
```

# CSS SELEKTORI PO PSEUDO KLASAMA

- Selekcija po pseudo klasama pozdravljena je selektovanje elemenata web stranice koji se nalaze ili zadovoljavaju posebna stanja
- Selektor se definiše se u obliku element:pseudo-class

The screenshot shows a web browser window with the following details:

- Search Bar:** giant panda
- Search Results:**
  - All regions ▾ Safe search: moderate ▾ Any time ▾
  - W [https://en.wikipedia.org/wiki/Giant\\_panda](https://en.wikipedia.org/wiki/Giant_panda)  
**Giant panda - Wikipedia**

The giant panda (*Ailuropoda melanoleuca*), also known as the **panda** bear (or simply the **panda**), is a bear species endemic to China. [4] It is characterised by its bold black-and-white coat and rotund body. The name "giant panda" is sometimes used to distinguish it from the red **panda**, a neighboring musteloid.
  - <https://nationalzoo.si.edu/animals/giant-panda>  
**Giant panda | Smithsonian's National Zoo**

Giant pandas live in broadleaf and coniferous forests with a dense understory of bamboo, at elevations between 5,000 and 10,000 feet. Torrential rains or dense mist throughout the year characterizes these forests, often shrouded in heavy clouds. Communication **Giant pandas** do not exhibit body characteristics that communicate visual signals.
  - <https://www.worldwildlife.org/species/giant-panda>  
**Giant Panda | Species | WWF - World Wildlife Fund**
- Developer Tools Console:** Shows the following log:

```
$$(".div.nrn-react-div:nth-child(3)")[0: div.nrn-react-div
length: 1
[[Prototype]]: Array(0)
$.zcm ul:first-child>li:last-child")
```

# CSS CHEATSHEET

SELECTOR	MEANING	EXAMPLE
UNIVERSAL SELECTOR	Applies to all elements in the document	* {} Targets all elements on the page
TYPE SELECTOR	Matches element names	h1, h2, h3 {} Targets the <h1>, <h2> and <h3> elements
CLASS SELECTOR	Matches an element whose class attribute has a value that matches the one specified after the period (or full stop) symbol	.note {} Targets any element whose class attribute has a value of note p.note {} Targets only <p> elements whose class attribute has a value of note
ID SELECTOR	Matches an element whose id attribute has a value that matches the one specified after the pound or hash symbol	#introduction {} Targets the element whose id attribute has a value of introduction
CHILD SELECTOR	Matches an element that is a direct child of another	li>a {} Targets any <a> elements that are children of an <li> element (but not other <a> elements in the page)
DESCENDANT SELECTOR	Matches an element that is a descendent of another specified element (not just a direct child of that element)	p a {} Targets any <a> elements that sit inside a <p> element, even if there are other elements nested between them

# CSS CHEATSHEET

SELECTOR	MEANING	EXAMPLE
EXISTENCE	[ ]	p[class] Targets any <p> element with an attribute called class
EQUALITY	[=]	p[class="dog"] Targets any <p> element with an attribute called class whose value is dog
SPACE	[~=]	p[class~="dog"] Targets any <p> element with an attribute called class whose value is a list of space-separated words, one of which is dog
PREFIX	[^=]	p[attr^"d"] Targets any <p> element with an attribute whose value begins with the letter "d"
SUBSTRING	[*=]	p[attr* "do"] Targets any <p> element with an attribute whose value contains the letters "do"
SUFFIX	[ \$= ]	p[attr\$ "g"] Targets any <p> element with an attribute whose value ends with the letter "g"

# CSS TEST

```
<html>
<body>
  <div class="article opinion" id="main-article">
    <div class="section">
      <h2 class="topic-header">Main Argument</h2>
      <p>...</p>
    </div>
    <div class="section">
      <h2 class="topic-header">Rebuttal</h2>
      <p>...</p>
    </div>
    <div class="section">
      <button class="response-button" name="agree">Agree with Argument</button>
      <button class="response-button" name="disagree">Agree with Rebuttal</button>
    </div>
  </div>
</body>
</html>
```

**1. Which of the following CSS selectors would select only "div" elements with the class name "parent"?**

- .parent
- div parent
- div.parent
- div[parent]

**2. Which of the following CSS selectors would select only <div> elements that do not have the class name "parent"?**

- :not(.parent)
- :not(div.parent)
- div:not(parent)
- div:not(.parent)

**3. Review the HTML document above. Which of the following CSS selectors would uniquely identify the main article div?**

- div.main-article
- main-article
- #main-article
- div['main-article']

**4. Review the HTML document above. Which of the following CSS selectors would NOT uniquely identify the "Agree with Argument" button?**

- div.article div.section button[1]
- [name='agree']
- #main-article button[name='agree']
- .section button:nth-child(1)

# XPATH SELEKTORI PO TIPU ELEMENTA

- Selekcija po tipu elementa se u xPathu može definisati na dva načina:
    1. Počevši od korena stranice, potrebno je definisati putanju definisanjem / karaktera (kose crte), a zatim pisanjem lanac elemenata koji se spušta do mesta elementa koji nam je potreban, pri čemu je html osnovni element, a zatim body
    2. Međutim, nije baš zgodno pisati svaki xPath od osnovnog elementa. Umesto toga, moguće je koristiti dvostruku kosu crtlu // u cilju pronalaženja elementa po tagu bilo gde na stranici

# XPATH SELEKTORI PO ATRIBUTIMA

- XPath takođe može da selektuje elemente na osnovu njihovih atributa
- Selektor koji pronalazi elemente na osnovu postojanja atributa definiše se u obliku `element[@attribute_name]`
- Pored postojanja, moguće je proveriti i vrednost sadržaja atributa `element[@attribute_name = 'value']`

The screenshot shows a web browser window with the URL `duckduckgo.com/?q=giant+panda&hps=1&ia=web`. The search term "giant panda" is entered in the search bar. Below the search bar, there are filters for All, Images, Videos, News, and Maps. The results section displays three main entries:

- Giant panda - Wikipedia**: A link to `https://en.wikipedia.org/wiki/Giant_panda`. The page description states: "The giant panda (*Ailuropoda melanoleuca*), also known as the **panda** bear (or simply the **panda**), is a bear species endemic to China. [4] It is characterised by its bold black-and-white coat and rotund body. The name "giant panda" is sometimes used to distinguish it from the red **panda**, a neighboring musteloid."
- Giant panda | Smithsonian's National Zoo**: A link to `https://nationalzoo.si.edu/animals/giant-panda`. The page description states: "Giant pandas live in broadleaf and coniferous forests with a dense understory of bamboo, at elevations between 5,000 and 10,000 feet. Torrential rains or dense mist throughout the year characterizes these forests, often shrouded in heavy clouds. Communication **Giant pandas** do not exhibit body characteristics that communicate visual signals."
- Giant Panda | Species | WWF - World Wildlife Fund**: A link to `https://www.worldwildlife.org/species/giant-panda`. The page description states: "Giant pandas live in broadleaf and coniferous forests with a dense understory of bamboo, at elevations between 5,000 and 10,000 feet. Torrential rains or dense mist throughout the year characterizes these forests, often shrouded in heavy clouds. Communication **Giant pandas** do not exhibit body characteristics that communicate visual signals."

On the right side of the browser window, the developer tools console is open. It shows two expanded XPath queries:

```
$x("//a[@data-zci-link]")
< (5) [a.zcm_link.js-zci-link.js-zci-link--web.is-active,
a.zcm_link.js-zci-link.js-zci-link--images,
a.zcm_link.js-zci-link.js-zci-link--videos,
a.zcm_link.js-zci-link.js-zci-link--news,
a.zcm_link.js-zci-link.js-zci-link--maps_expanded]

$x("//li[@class='zcm_item']")
< (6) [li.zcm_item, li.zcm_item, li.zcm_item, li.zcm_item,
li.zcm_item, li.zcm_item]
```

# XPATH SELEKTORI INDEXI

- CSS selektori imaju neke mogućnosti za indeksiranje sa pseudo klasama kao što je nth-child ili last-child, ali to ne funkcioniše u svim slučajevima. XPath može staviti indekse na bilo koji element
- **NAPOMENA:** XPath indeksi počinju od 1, a ne sa 0 (to znači da je treća pozicija indeks 3, a ne indeks 2 kao što bi to bio slučaj u većini programskih jezika). Zgrade oko XPath izraza osiguravaju da se index pravilno primjenjuje.
- **NAPOMENA 2:** Indexi nisu dobra opcija za lociranje elemenata, u potpunosti su zasnovani na broju i redosledu elemenata, koji programeri lako mogu da promene. Indeksni brojevi takođe ne prenose uvek mnogo značenja i mogu da dodaju zabunu, dok su drugi atributi često opisniji i intuitivniji

The screenshot shows a web browser window with the URL `duckduckgo.com/?q=giant+panda&hps=1&ia=web`. The search term "giant panda" is entered in the search bar. Below the search bar, there are filters for All, Images, Videos, News, and Maps. The results section displays three items:

- Giant panda - Wikipedia**  
The giant panda (*Ailuropoda melanoleuca*), also known as the **panda bear** (or simply the **panda**), is a bear species endemic to China. [4] It is characterised by its bold black-and-white coat and rotund body. The name "giant panda" is sometimes used to distinguish it from the red panda, a neighboring musteloid.
- Giant panda | Smithsonian's National Zoo**  
Giant pandas live in broadleaf and coniferous forests with a dense understory of bamboo, at elevations between 5,000 and 10,000 feet. Torrential rains or dense mist throughout the year characterizes these forests, often shrouded in heavy clouds. Communication Giant pandas do not exhibit body characteristics that communicate visual signals.
- Giant Panda | Species | WWF - World Wildlife Fund**  
Giant Pandas are found in the Qinling Mountains of China, where they live in bamboo forests at elevations between 1,800 and 3,500 meters above sea level. They are primarily nocturnal and spend most of their day eating bamboo.

On the right side of the screen, the browser's developer tools are open, specifically the Console tab. The console shows the following expanded XPath expression:

```
$x("//ul")
<- (10) [ul, ul#duckbar_static.zcm_menu.zcm_constant.has-zci,
ul#duckbar_new.zcm_menu.zcm_dynamic,
ul#duckbar_dropdowns.zcm_menu.zcm_dropdowns.js-duckbar-dropdowns,
ul.nav-menu_list, ul.nav-menu--theme, ul, ul, ul, ul]
> $x("//ul/li[2]")
<- (7) [li.fix.showcase_dropdown_list, li.zcm_item,
li.nav-menu_item.clear, li.nav-menu_item, li.nav-menu_item,
li.nav-menu_item, li.nav-menu_item]
> $x("//div[@class = 'nrn-react-div'][2]")
<- ▾ [div.nrn-react-div]
  ▷ 0: div.nrn-react-div
    length: 1
    [[Prototype]]: Array(0)
> $x("//div[@class = 'nrn-react-div'][position() < 3]")
<- ▷ (2) [div.nrn-react-div, div.nrn-react-div]
> $x("//div[@class = 'nrn-react-div'][last() - 3]")
<- ▷ [div.nrn-react-div]
```

The line `0: div.nrn-react-div` is highlighted with a blue box, indicating the use of an index (0) to select the first element matching the XPath selector.

# XPATH SELEKTORI UGRAĐENE FUNKCIJE

- ▶ Još jedan veoma moćan deo XPath sintakse je skup funkcija koje zaista pomažu da se naprave bolji uslovi atributa
- ▶ Neke od često korišćenih funkcija su contains, not, text()
- ▶ **NAPOMENA:** Selektori po tekstu nisu dobra sigurna opcija za lociranje. Neće funkcionisati kada se web stranica prevede na druge jezike radi internacionalizacije i lokalizacije, a takođe su i deo stranica koji su podložni čestim promenama

The screenshot shows a web browser window with the URL [duckduckgo.com/?q=giant+panda&hps=1&ia=web](https://duckduckgo.com/?q=giant+panda&hps=1&ia=web). The search term "giant panda" is entered in the search bar. Below the search bar, there are filters for All, Images, Videos, News, and Maps. The results section displays three main entries:

- Giant panda - Wikipedia**: A link to the Wikipedia page for the giant panda. The page description states: "The giant panda (*Ailuropoda melanoleuca*), also known as the **panda bear** (or simply the **panda**), is a bear species endemic to China. [4] It is characterised by its bold black-and-white coat and rotund body. The name "giant panda" is sometimes used to distinguish it from the red **panda**, a neighboring musteloid."
- Giant panda | Smithsonian's National Zoo**: A link to the Smithsonian's National Zoo page. The description states: "Giant pandas live in broadleaf and coniferous forests with a dense understory of bamboo, at elevations between 5,000 and 10,000 feet. Torrential rains or dense mist throughout the year characterizes these forests, often shrouded in heavy clouds. Communication Giant pandas do not exhibit body characteristics that communicate visual signals."
- Giant Panda | Species | WWF - World Wildlife Fund**: A link to the WWF page for the giant panda. The description states: "Giant pandas live in broadleaf and coniferous forests with a dense understory of bamboo, at elevations between 5,000 and 10,000 feet. Torrential rains or dense mist throughout the year characterizes these forests, often shrouded in heavy clouds. Communication Giant pandas do not exhibit body characteristics that communicate visual signals."

On the right side of the browser window, the developer tools console is open. It shows several XPath queries and their results. The results pane lists the following items:

- \$x("//h2//span[text() = 'Giant panda'])"
- \$x("//h2//span[contains(text(),'Giant panda'))]"
- (3) [span.EKtkFWMYpwzMKOYr0GYm.LQVY1Jpkk8nyJ6HBWKAK, span.EKtkFWMYpwzMKOYr0GYm.LQVY1Jpkk8nyJ6HBWKAK, span.EKtkFWMYpwzMKOYr0GYm.LQVY1Jpkk8nyJ6HBWKAK]
- \$x("//h2//span[not(contains(text(),'Giant panda'))]"
- (7) [span.EKtkFWMYpwzMKOYr0GYm.LQVY1Jpkk8nyJ6HBWKAK, span.EKtkFWMYpwzMKOYr0GYm.LQVY1Jpkk8nyJ6HBWKAK, span.EKtkFWMYpwzMKOYr0GYm.LQVY1Jpkk8nyJ6HBWKAK, span.EKtkFWMYpwzMKOYr0GYm.LQVY1Jpkk8nyJ6HBWKAK, span.EKtkFWMYpwzMKOYr0GYm.LQVY1Jpkk8nyJ6HBWKAK, span.EKtkFWMYpwzMKOYr0GYm.LQVY1Jpkk8nyJ6HBWKAK, span.EKtkFWMYpwzMKOYr0GYm.LQVY1Jpkk8nyJ6HBWKAK]
- \$x("//div[contains(@class, 'nrn-react-div')][contains(., 'bamboo'))]"
- (5) [div.nrn-react-div, div.nrn-react-div, div.nrn-react-div, div.nrn-react-div, div.nrn-react-div]
- 0: div.nrn-react-div
- 1: div.nrn-react-div
- 2: div.nrn-react-div
- 3: div.nrn-react-div
- 4: div.nrn-react-div
- length: 5
- [[Prototype]]: Array(0)

---

# XPATH TEST

**1. Any element on a Web page can be uniquely located using XPath.**

- True
- False

**2. Which of the following XPaths would locate all image <img> elements that are within hyperlink <a> elements?**

- /div/a/img
- /a//img
- //a//img

**3. What is the best way to get a <div> element by class name using an XPath (assuming you have made sure there are no false positives)?**

- //div[@class='classname']
- //div[contains(@class, 'classname')]
- Don't ever use XPath for class names

**4. Which of the following XPaths would locate all paragraphs that do not contain the class "main-content"?**

- //p[not(@class='main-content')]
- //p[not(contains(@class, 'main-content'))]
- //p[not(@class, 'main-content')]
- //p[contains(@class, not('main-content'))]

---

# XPATH TEST 2

**1. XPaths are always slower than CSS selectors.**

- 
- True
  - False

**2. Which of the following XPaths would locate a <p> paragraph that contains the word "elephant"?**

- 
- `//*[contains(text(), 'elephant')]`
  - `//p[contains('elephant')]`
  - `//p[contains(., 'elephant')]`
  - `//p[@elephant]`

**3. What are abilities XPath has that CSS selectors do not have?**

- 
- Locating elements by text contents
  - Locating any element by index
  - Locating elements using conditional positions and axes
  - All the above

# ZADACI

- ▶ Zadatak 1
  - ▶ <https://remarkablegames.org/button-clicker/>
  - ▶ Selektovati poslednji red tabele
  - ▶ Selektovati sve elemente prve kolone
  - ▶ Selektovati text iz kolone Next Output 6. reda
- ▶ Zadatak 2
  - ▶ <https://ministryoftesting.github.io/the-button/>
  - ▶ Selektovati Click me! dugme

# PLAY & LEARN

- ▶ Korisni sajтови за веžbanje selektora
  - ▶ CSS dinner <https://flukeout.github.io/#>
  - ▶ XPath dinner <https://topswagcode.com/xpath/>

CSS Diner

Share [✉](#) [✉](#) [✉](#) [✉](#)

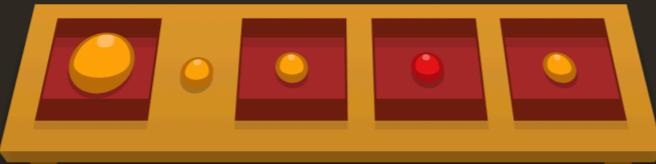
Level 8 of 32 ✓ < > ⌂

You can do it...

Put your back into it!

Combine what you learned in the last few levels to solve this one!

Select the small oranges in the bentos



**CSS Editor**

```
1 Type in a CSS selector
2 {
3 /* Styles would go here. */
4 }
5 /*
6 Type a number to skip to a level.
7 Ex → "5" for level 5
8 */
9
10
11
12
13
14
15
16
17
18
19
20
```

**style.css**

```
1 <div class="table">
2   <bento>
3     <orange />
4   </bento>
5   <orange class="small" />
6   <bento>
7     <orange class="small" />
8   </bento>
9   <bento>
10    <apple class="small" />
11  </bento>
12  <bento>
13    <orange class="small" />
14  </bento>
15 </div>
```

**HTML Viewer**

```
1 <div class="table">
2   <bento>
3     <orange />
4   </bento>
5   <orange class="small" />
6   <bento>
7     <orange class="small" />
8   </bento>
9   <bento>
10    <apple class="small" />
11  </bento>
12  <bento>
13    <orange class="small" />
14  </bento>
15 </div>
```

**table.html**