Introduction to HTML

WEB SCRAPING IN R

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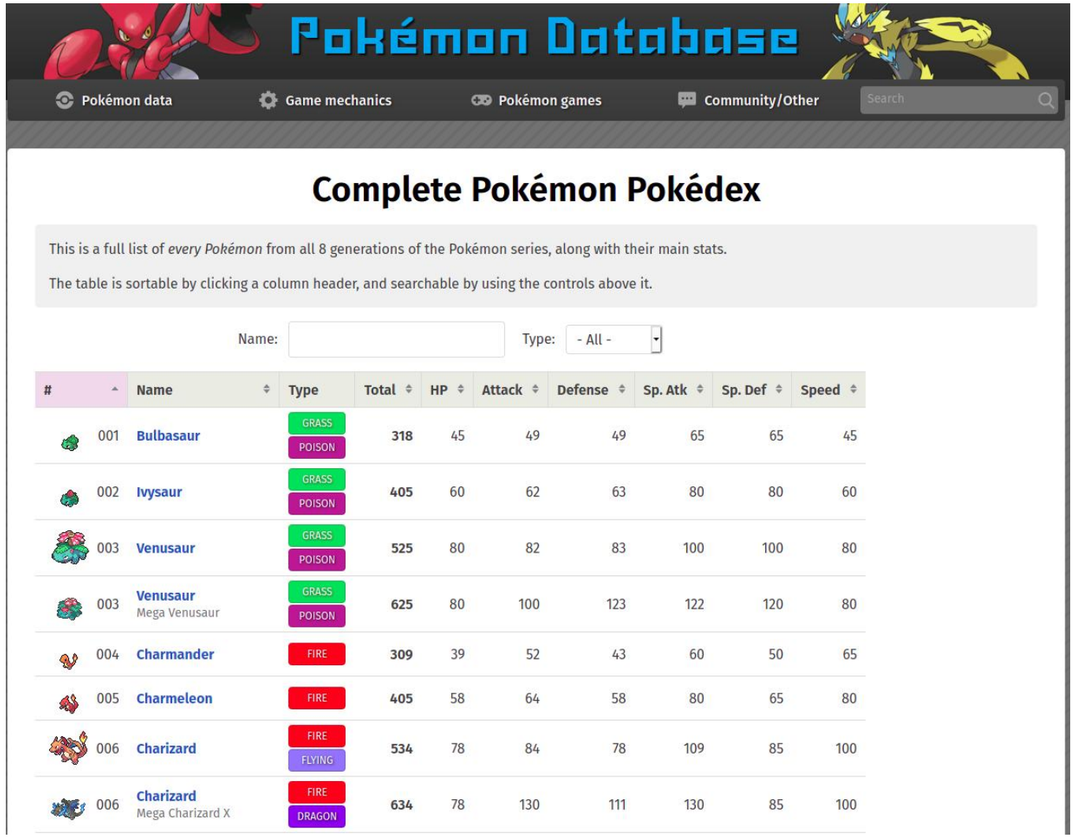
datacamp

If you see something, it can be scraped

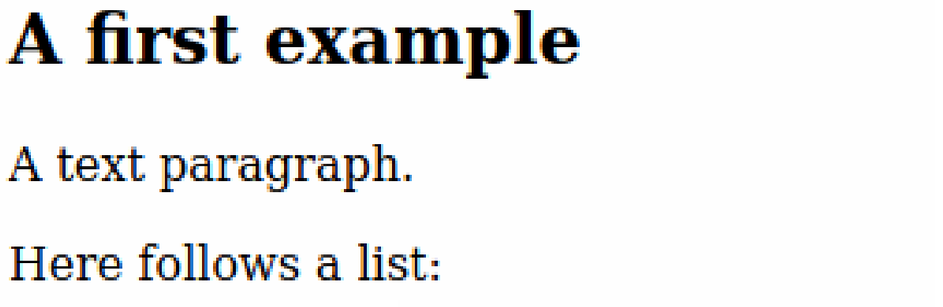


#	Name	Type	Total	HP	Attack	Defense	Sp. Atk	Sp. Def	Speed
001	Bulbasaur	GRASS POISON	318	45	49	49	65	65	45
002	Ivysaur	GRASS POISON	405	60	62	63	80	80	60
003	Venusaur	GRASS POISON	525	80	82	83	100	100	80
003	Venusaur Mega Venusaur	GRASS POISON	625	80	100	123	122	120	80
004	Charmander	FIRE	309	39	52	43	60	50	65
005	Charmeleon	FIRE	405	58	64	58	80	65	80
006	Charizard	FIRE FLYING	534	78	84	78	109	85	100
006	Charizard Mega Charizard X	FIRE DRAGON	634	78	130	111	130	85	100

https://pokemondb.net

Hypertext Markup Language (HTML)

```
<html>
  <body>
    <h2>A first example</h2>
    <p>A text paragraph.</p>
    <p>
      Here follows a list:
    </p>
  </body>
</html>
```



HTML is organized hierarchically

A first example

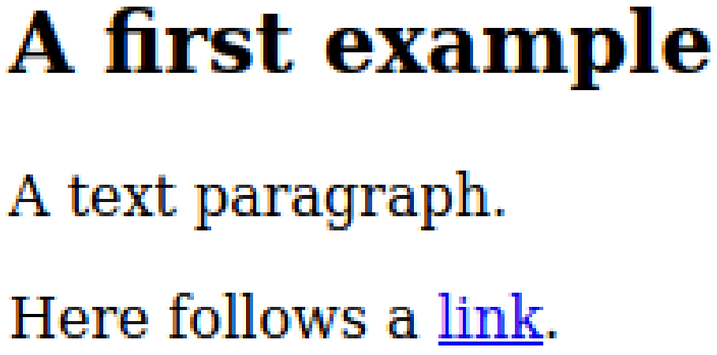
A text paragraph.

Here follows a list:

- Bullet 1
- Bullet 2
- Bullet 3

```
...
    <div>
      Here follows a list:
      <ul>
        <li>Bullet 1</li>
        <li>Bullet 2</li>
        <li>Bullet 3</li>
      </ul>
    </div>
...
```

HTML tags can have attributes




```
...
    <p>
      Here follows a
      <a href="https://google.com">link</a>.
    </p>
...
```

Reading HTML with R

```
library(rvest)
```

```
html <- read_html(html_document)
html
```

```
{html_document}
<html>
[1] <body> \n    <h2>A first example</h2>\n    <p>A text paragraph.</p>\n   ...
```

```
class(html)
```

```
"xml_document" "xml_node"
```

```
xml_structure(html)
```

```
<html>
  <body>
    {text}
    <h2>
      {text}
    {text}
    <p>
      {text}
    {text}
    <p>
      {text}
      <a [href]>
        {text}
      {text}
    {text}
```

Let's parse HTML!

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Navigating HTML

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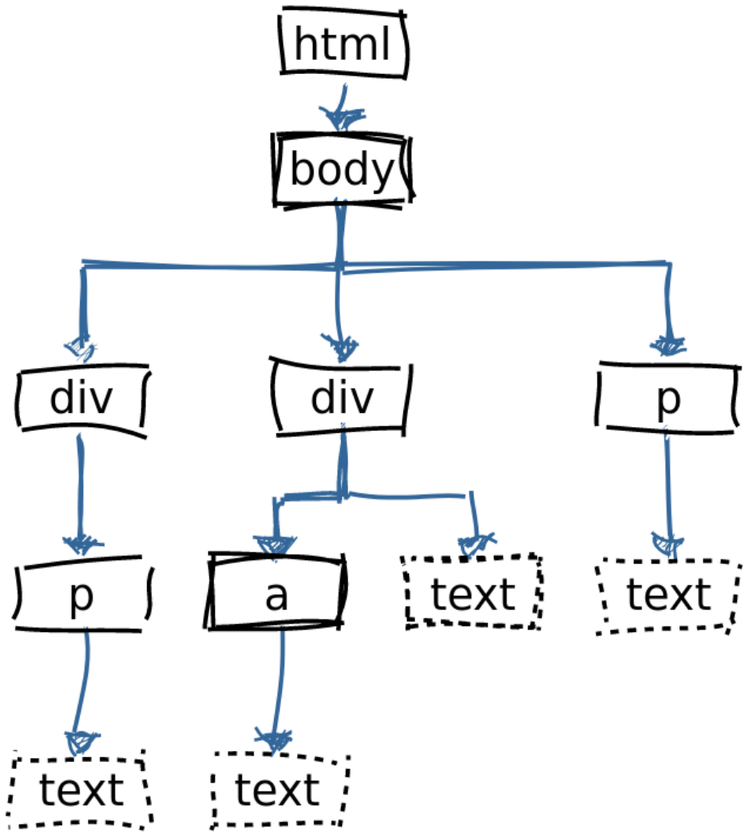
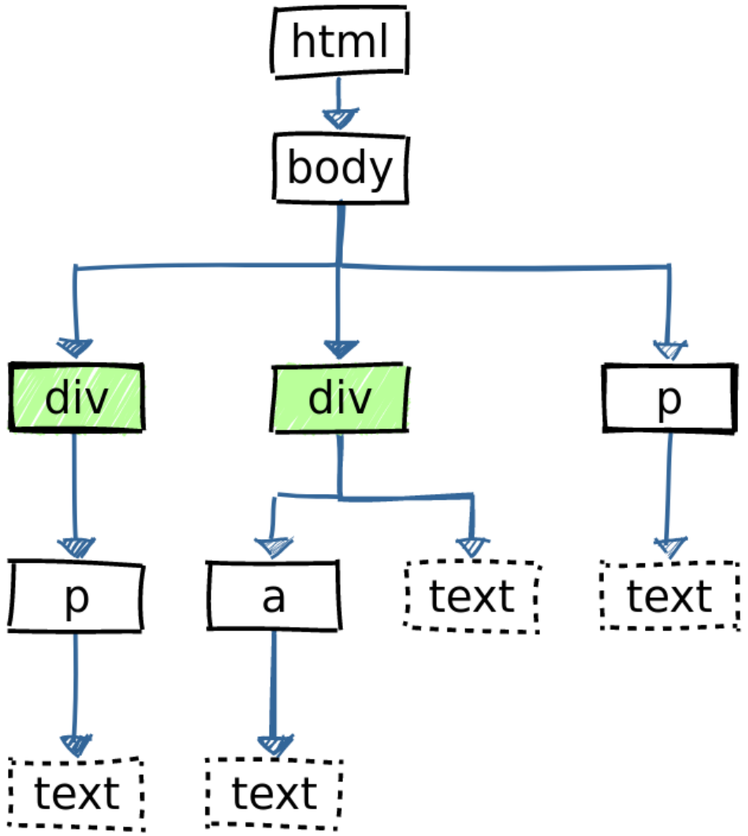
HTML is like a tree

```
<html>
  <body>
    <div>
      <p>The first paragraph.</p>
    </div>
    <div>
      Not an actual paragraph,
      but with a <a href="#">link</a>.
    </div>
    <p>A paragraph without an
      enclosing div.</p>
  </body>
</html>
```



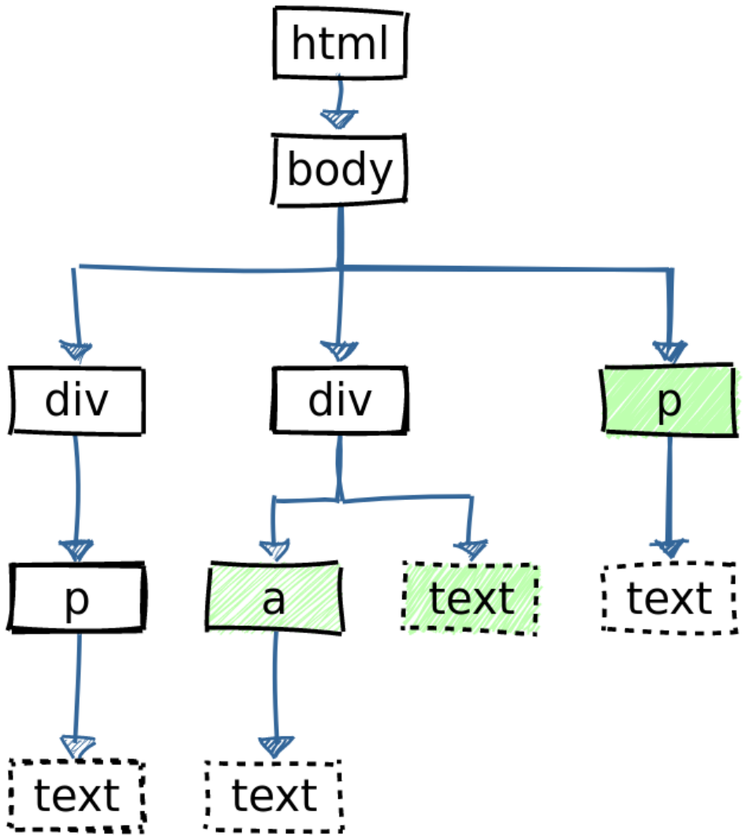
HTML is like a tree

```
<html>
  <body>
    <div>
      <p>The first paragraph.</p>
    </div>
    <div>
      Not an actual paragraph,
      but with a <a href="#">link</a>.
    </div>
    <p>A paragraph without an
      enclosing div.</p>
  </body>
</html>
```



HTML is like a tree

```
<html>
  <body>
    <div>
      <p>The first paragraph.</p>
    </div>
    <div>
      Not an actual paragraph,
      but with a <a href="#">link</a>.
    </div>
    <p>A paragraph without an
      enclosing div.</p>
  </body>
</html>
```



Navigating the tree with rvest

```
<html>
  <body>
    <div>
      <p>The first paragraph.</p>
    </div>
    <div>
      Not an actual paragraph,
      but with a <a href="#">link</a>.
    </div>
    <p>A paragraph without an
      enclosing div.</p>
  </body>
</html>
```

```
html <- read_html(html_document)
html_children(html)
```

```
{xml_nodeset (1)}
[1] <body>\n    <div>\n  < ...
```

```
html %>% html_children()
```

```
html %>% html_children() %>% html_text()
```

```
[1] "\n    \n      The first paragraph.\n
\n    \n      Not an actual paragraph, \n
but with a link.\n    \n    A paragraph ...
```

Navigating to nodes with selectors

```
<html>
  <body>
    <div>
      <p>The first paragraph.</p>
    </div>
    <div>
      Not an actual paragraph,
      but with a <a href="#">link</a>.
    </div>
    <p>A paragraph without an
      enclosing div.</p>
  </body>
</html>
```

```
html <- read_html(html_document)
html %>% html_node('body')
```

```
{xml_nodeset (1)}
[1] <body>\n    <div>\n  < ...
```

```
html %>% html_nodes('div p')
```

```
{xml_nodeset (1)}
[1] <p>The first paragraph.</p>
```

Navigating to nodes with selectors

```
<html>
  <body>
    <div>
      <p>The first paragraph.</p>
    </div>
    <div>
      Not an actual paragraph,
      but with a <a href="#">link</a>.
    </div>
    <p>A paragraph without an
      enclosing div.</p>
  </body>
</html>
```

```
html %>% html_nodes('p')
```

```
{xml_nodeset (2)}
[1] <p>The first paragraph.</p>
[2] <p>A paragraph without an enclosi...
```

```
html %>% html_nodes('div') %>%
    html_nodes('p')
```

```
{xml_nodeset (1)}
[1] <p>The first paragraph.</p>
```

Extracting attributes

```
html %>%
    html_node('a') %>%
    html_attr('href')
```

```
[1] #
```

```
html %>%
    html_node('a') %>%
    html_attrs()
```

```
href
 "#"
```

Let's do this!

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Scrape your first table

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Name	Profession	Age	Country
Dillon Arroyo	Carpenter	54	UK
Rebecca Douglas	Developer	32	USA

```
<table>
    <tr>
      <td>Name</td><td>Profession</td><td>Age</td><td>Country</td>
    </tr>
    <tr>
      <td>Dillon Arroyo</td><td>Carpenter</td><td>54</td><td>UK</td>
    </tr>
    <tr>
      <td>Rebecca Douglas</td><td>Developer</td><td>32</td><td>USA</td>
    </tr>
</table>
```

Name	Profession	Age	Country
Dillon Arroyo	Carpenter	54	UK
Rebecca Douglas	Developer	32	USA

```
<table>
    <tr>
      <th>Name</th><th>Profession</th><th>Age</th><th>Country</th>
    </tr>
    <tr>
      <td>Dillon Arroyo</td><td>Carpenter</td><td>54</td><td>UK</td>
    </tr>
    <tr>
      <td>Rebecca Douglas</td><td>Developer</td><td>32</td><td>USA</td>
    </tr>
</table>
```

Scraping a table with rvest

```
html <- read_html(table_html) # table with <th> header cells
html %>%
    html_table()
```

```
[[1]]
             Name Profession Age Country
1   Dillon Arroyo  Carpenter  54      UK
2 Rebecca Douglas  Developer  32     USA
```

Scraping a table with rvest

```
html <- read_html(table_html) # table without <th> header cells
html %>%
    html_table(header = TRUE)
```

```
[[1]]
             Name Profession Age Country
1   Dillon Arroyo  Carpenter  54      UK
2 Rebecca Douglas  Developer  32     USA
```

Scraping a table with rvest

```
html <- read_html(table_html)
html %>%
    html_table(header = TRUE, fill = TRUE)
```

```
[[1]]
             Name Profession Age Country
1   Dillon Arroyo  Carpenter  54      UK
2 Rebecca Douglas  Developer  32    <NA>
```

Scraping "tables" in reality

```
<div class="rTable">
     <div class="rTableRow">
       <div class="rTableHead"><strong>Name</strong></div>
       <div class="rTableHead"><span style="font-weight: bold;">Telephone</span></div>
       <div class="rTableHead"> </div>
     </div>
     <div class="rTableRow">
       <div class="rTableCell">John</div>
       <div class="rTableCell"><a href="tel:0123456785">0123 456 785</a></div>
       <div class="rTableCell"><img src="images/check.gif" alt="checked" /></div>
     </div>
     <div class="rTableRow">
         ...
     </div>
</div>
```

[1] Example taken from https://html-cleaner.com/features/replace-html-table-tags-with-divs/

Let's practice!

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