Lecture 18: Intro to web scraping

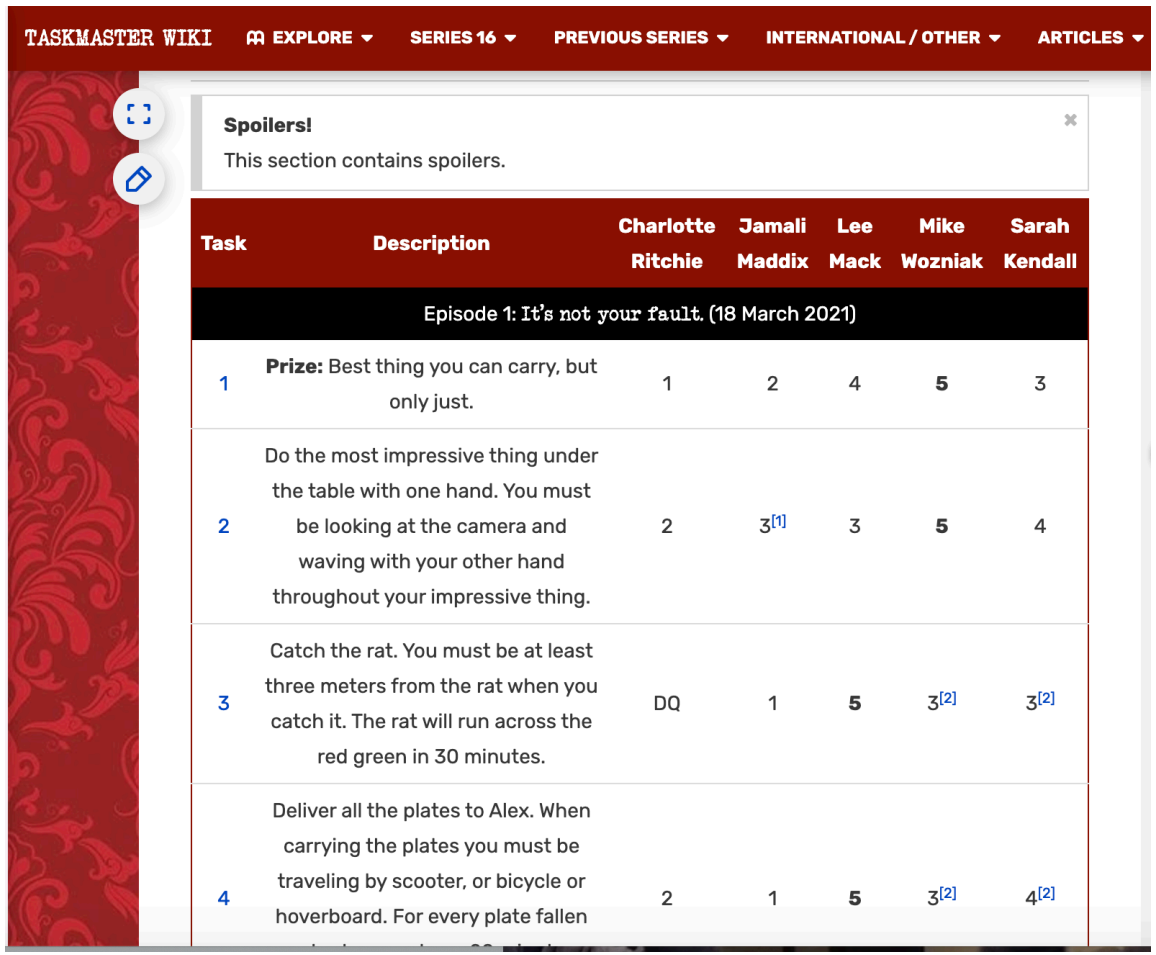
Motivation: Taskmaster

Show information

- 16 full series
- Each series involves 5 contestants, competing over 5-10 episodes
- Each episode involves approximately 5 tasks
- Contestants are scored from 1-5 (roughly) on each task

Taskmaster data

```
https://taskmaster.fandom.com/wiki/Series_11
```



Task	Description	Charlotte Ritchie	Jamali Maddix	Lee Mack	Mike Wozniak	Sarah Kendall
Episode 1: It's not your fault. (18 March 2021)						
1	**Prize:** Best thing you can carry, but only just.	1	2	4	**5**	3
2	Do the most impressive thing under the table with one hand. You must be looking at the camera and waving with your other hand throughout your impressive thing.	2	3[1]	3	**5**	4
3	Catch the rat. You must be at least three meters from the rat when you catch it. The rat will run across the red green in 30 minutes.	DQ	1	**5**	3[2]	3[2]
4	Deliver all the plates to Alex. When carrying the plates you must be traveling by scooter, or bicycle or hoverboard. For every plate fallen	2	1	**5**	3[2]	4[2]

Goal and required steps

Goal: Explore the Taskmaster data across all completed series. Which contestants did worst? Which contestants did best? Did the scoring change over the series?

- Scrape data from each series from the website
- Combine, clean, and transform
- Do statistics!

Scraping the data

```r
library(rvest)
library(tidyverse)

tm <- read_html("https://taskmaster.fandom.com/wiki/Series_11")
tm
```

```
{html_document}
<html class="client-nojs" lang="en" dir="ltr">
[1] <head>\n<meta http-equiv="Content-Type" content="text/html;
charset=UTF-8 ...
[2] <body class="mediawiki ltr sitedir-ltr mw-hide-empty-elt ns-0 ns-
subject  ...
```

HTML basics

Here is a basic HTML page:

```
<html>
<head>
  <title>Page title</title>
</head>
<body>
  <h1 id='first'>A heading</h1>
  <p>Some text &amp;amp; <b>some bold text.</b></p>
  <img src='myimg.png' width='100' height='100'>
</body>
```

Some HTML elements

- `<html>`: start of the HTML page
- `<head>`: header information (metadata about the page)
- `<body>`: everything that is on the page
- `<p>`: paragraphs
- `<b>`: bold
- `<table>`: table

Extracting HTML elements

The Taskmaster data we want looks like it is stored in a table. How can we extract it?

```
1 tm |>
2   html_elements("table")
```

```
{xml_nodeset (4)}
[1] <table style="width: 100%; text-align: center; border: 1px solid
#891100; ...
[2] <table class="toccolours" align="center" style="background: #891100;
colo ...
[3] <table class="pi-horizontal-group">\n<caption class="pi-header pi-
seconda ...
[4] <table class="tmtable"><tbody>\n<tr
class="tmtableheader">\n<th>Task\n</t ...
```

`html_elements` returns all the elements matching the selector.

Extracting HTML elements

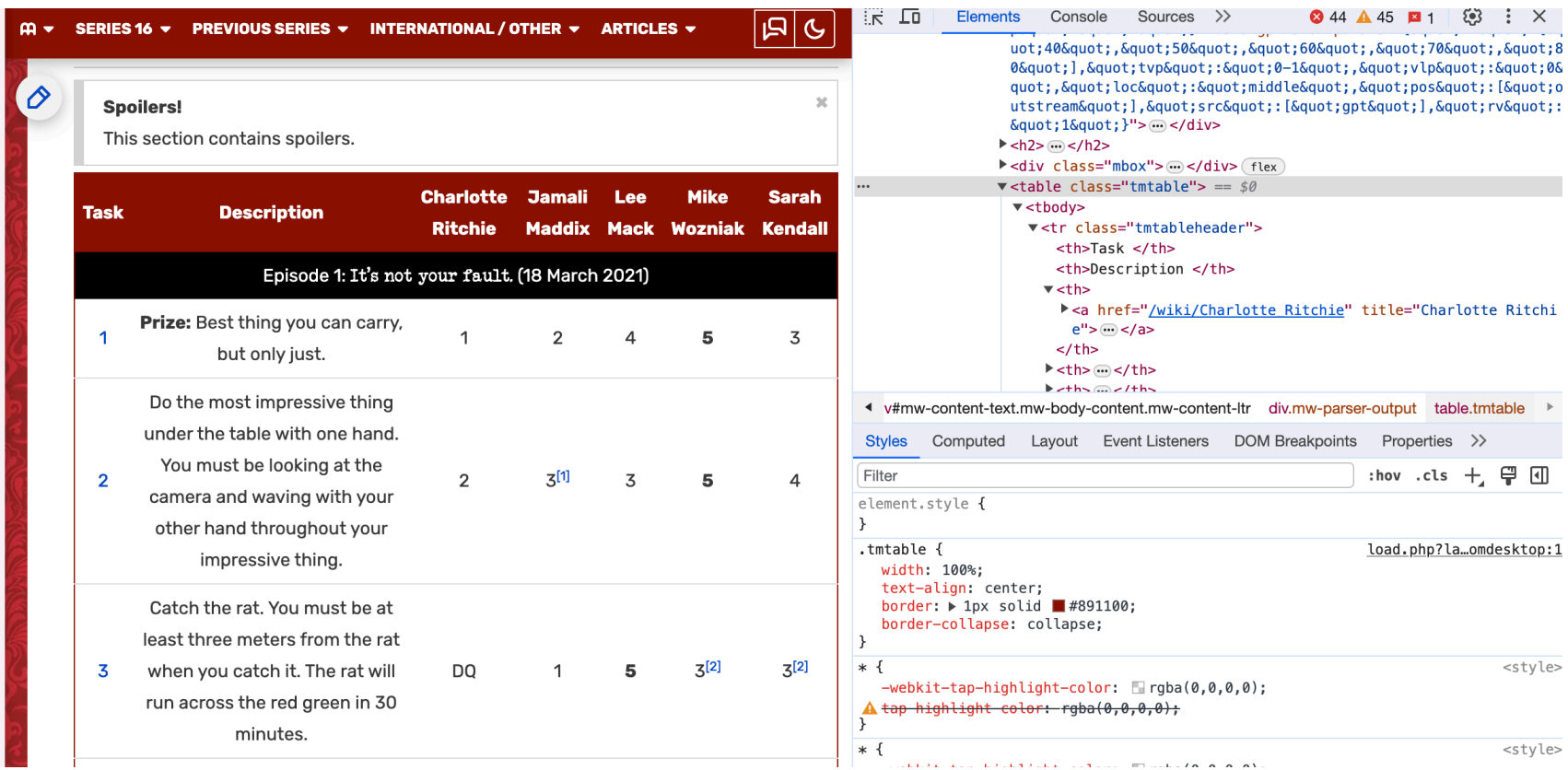
```
tm |>
  html_elements("table")
```

```
{xml_nodeset (4)}
[1] <table style="width: 100%; text-align: center; border: 1px solid
#891100; ...
[2] <table class="toccolours" align="center" style="background: #891100;
colo ...
[3] <table class="pi-horizontal-group">\n<caption class="pi-header pi-
seconda ...
[4] <table class="tmtable"><tbody>\n<tr
class="tmtableheader">\n<th>Task\n</t ...
```

How do we know which table we want?

Finding the right selectors

1. Open the webpage in Chrome
2. Right-click on the element you want, and click “Inspect”



Finding the right selector

```
tm |>
  html_element("[class='tmtable']") |>
  html_table()
```

```
# A tibble: 75 × 7
   Task                  Description `Charlotte Ritchie` `Jamali Maddix`
`Lee Mack`
   <chr>                 <chr>       <chr>               <chr>
<chr>
 1 Episode 1: It's n… Episode 1:… Episode 1: It's no… Episode 1: It'…
Episode 1…
 2 1                     Prize: Bes… 1                   2                 4
 3 2                     Do the mos… 2                   3[1]              3
 4 3                     Catch the … DQ                  1                 5
 5 4                     Deliver al… 2                   1                 5
 6 5                     Live: Stac… 0                   0                 0
 7 Total                 Total       5                   7                 17
 8 Episode 2: The Lu… Episode 2:… Episode 2: The Lur… Episode 2: The…
```

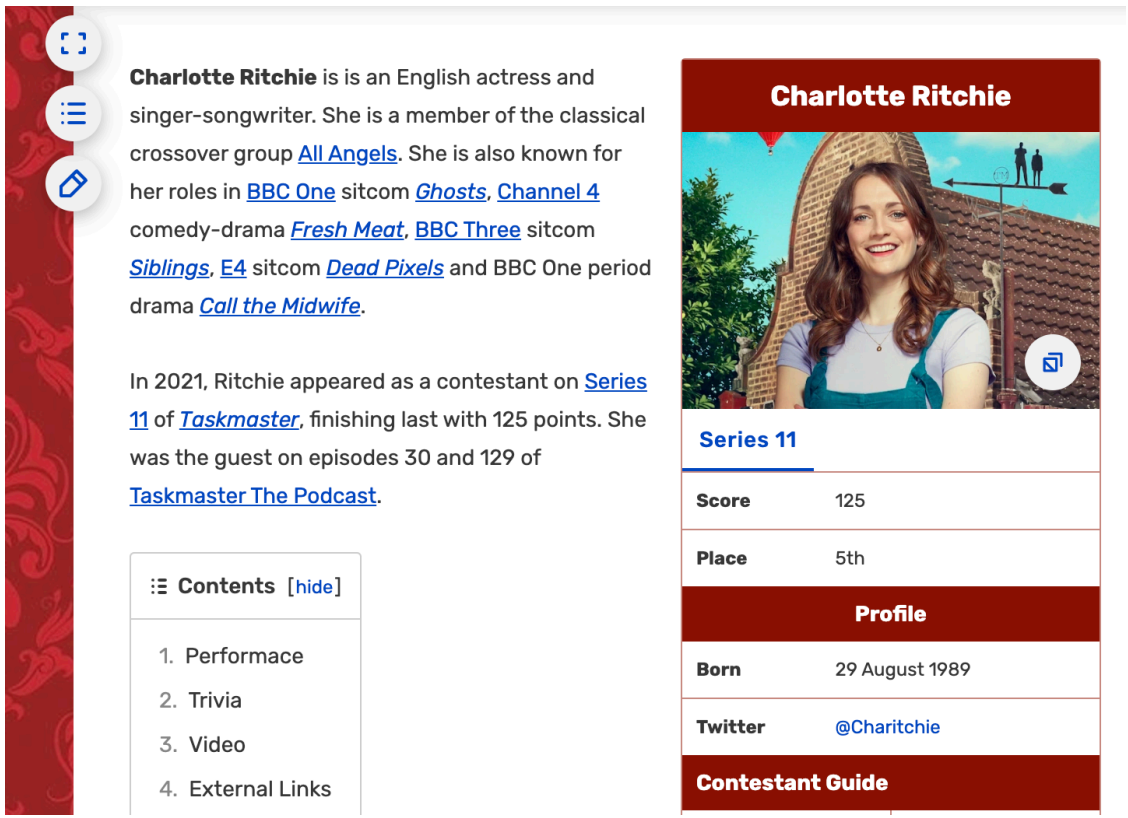
Finding the right selector

```
1 tm |>
2   html_element(".tmtable") |>
3   html_table()
```

```
# A tibble: 75 × 7
   Task                  Description `Charlotte Ritchie` `Jamali Maddix`
`Lee Mack`
   <chr>                 <chr>       <chr>               <chr>
<chr>
 1 Episode 1: It's n… Episode 1:… Episode 1: It's no… Episode 1: It'…
Episode 1…
 2 1                     Prize: Bes… 1                   2                 4
 3 2                     Do the mos… 2                   3[1]              3
 4 3                     Catch the … DQ                  1                 5
 5 4                     Deliver al… 2                   1                 5
 6 5                     Live: Stac… 0                   0                 0
 7 Total                 Total       5                   7                 17
 8 Episode 2: The Lu… Episode 2:… Episode 2: The Lur… Episode 2: The…
```

Extracting non-tabular data

```
1  https://taskmaster.fandom.com/wiki/Charlotte_Ritchie
```



Charlotte Ritchie is is an English actress and singer-songwriter. She is a member of the classical crossover group All Angels. She is also known for her roles in BBC One sitcom *Ghosts*, Channel 4 comedy-drama *Fresh Meat*, BBC Three sitcom *Siblings*, E4 sitcom *Dead Pixels* and BBC One period drama *Call the Midwife*.

In 2021, Ritchie appeared as a contestant on Series 11 of *Taskmaster*, finishing last with 125 points. She was the guest on episodes 30 and 129 of Taskmaster The Podcast.

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2. Trivia
3. Video
4. External Links

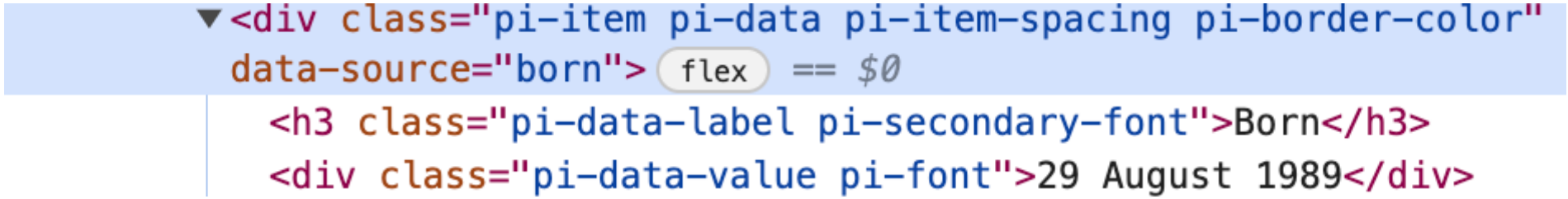
Charlotte Ritchie

Series 11

Score	125
Place	5th
Profile	
Born	29 August 1989
Twitter	@Charitchie
Contestant Guide	

How would we scrape Charlotte Ritchie's birthday?

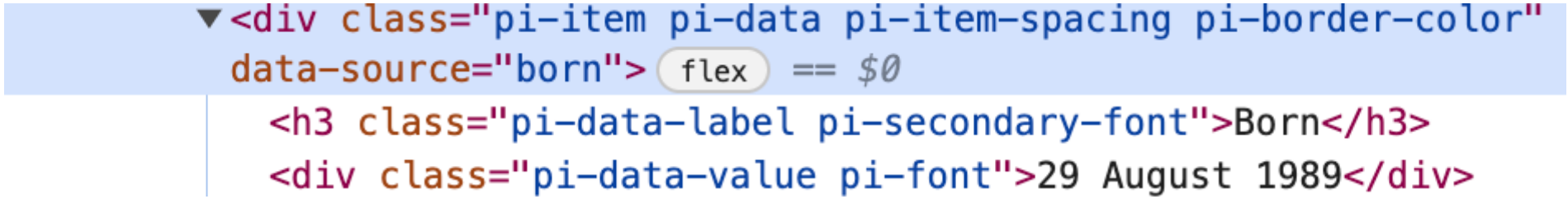
Identifying the right selector




```
1 read_html("https://taskmaster.fandom.com/wiki/Charlotte_Ritchie") |>
2   html_element("[data-source='born']")
```

```
{html_node}
<div class="pi-item pi-data pi-item-spacing pi-border-color" data-
source="born">
[1] <h3 class="pi-data-label pi-secondary-font">Born</h3>
[2] <div class="pi-data-value pi-font">29 August 1989</div>
```

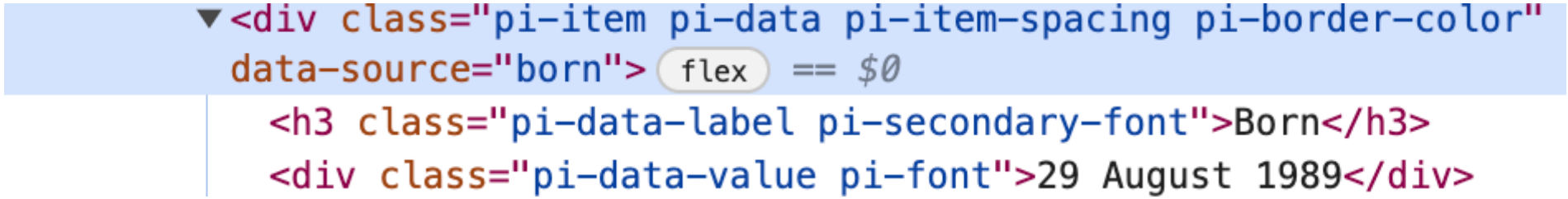
Identifying the right selector




```
1 read_html("https://taskmaster.fandom.com/wiki/Charlotte_Ritchie") |>
2   html_element("[data-source='born'] > .pi-font")
```

```
{html_node}
<div class="pi-data-value pi-font">
```

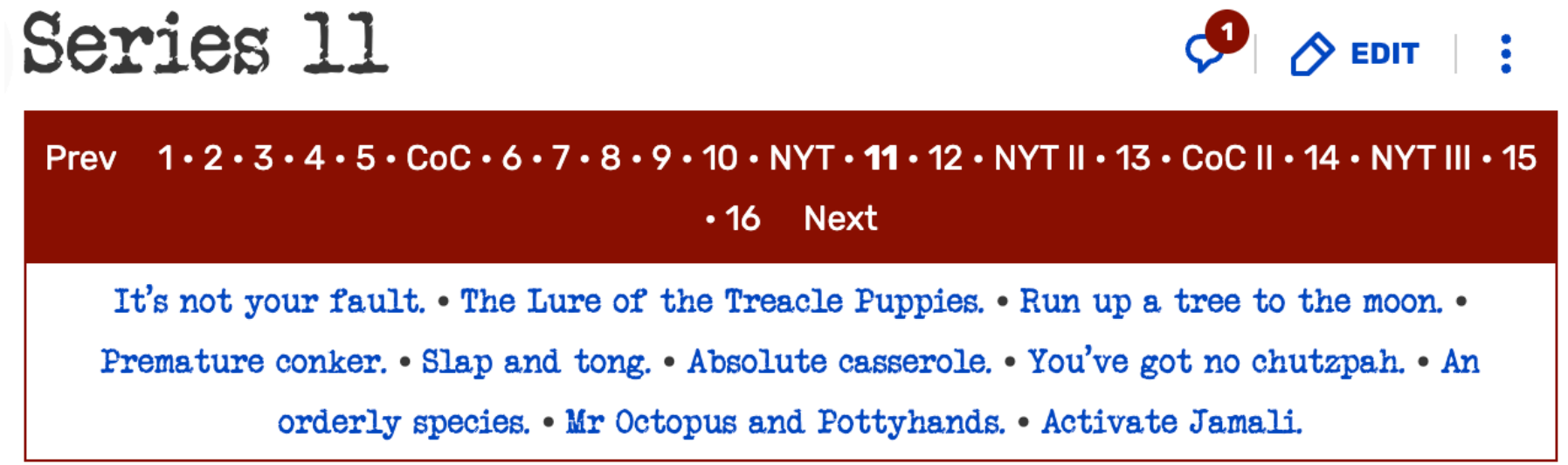
Identifying the right selector




```
1 read_html("https://taskmaster.fandom.com/wiki/Charlotte_Ritchie") |>
2   html_element("[data-source='born'] > .pi-font") |>
3   html_text2()
```

```
[1] "29 August 1989"
```

Accessing HTML attributes



```
▼<td align="center">
  ▼<span style="font-family: Veteran Typewriter;">
      <a href="/wiki/It%27s_not_your_fault." title="It's not y
      our fault.">It's not your fault.</a>
    </span>
    " • "
  ▼<span style="font-family: Veteran Typewriter;"> == $0
      <a href="/wiki/The_Lure_of_the_Treacle_Puppies." title=
      "The Lure of the Treacle Puppies.">The Lure of the
      Treacle Puppies.</a>
    </span>
    " • "
```

Accessing HTML attributes

```
read_html("https://taskmaster.fandom.com/wiki/Series_11") |>
  html_elements("td")
```

```
{xml_nodeset (436)}
 [1] <td>\n<table class="toccolours" align="center" style="background:
#89110 ...
 [2] <td>\n<a href="/wiki/Series_10" title="Series 10"><span
style="color: #F ...
 [3] <td align="center">\n<span style="font-family: Veteran
Typewriter;"><a h ...
 [4] <td class="pi-horizontal-group-item pi-data-value pi-font pi-
border-colo ...
 [5] <td class="pi-horizontal-group-item pi-data-value pi-font pi-
border-colo ...
 [6] <td colspan="7">Episode 1: <span style="font-family: Veteran
Typewriter; ...
 [7] <td>\n<a href="/wiki/Best_thing_you_can_carry,_but_only_just"
```

Accessing HTML attributes

Accessing HTML attributes

```
1 read_html("https://taskmaster.fandom.com/wiki/Series_11") |>
2   html_elements("td[align='center']")
```

```
{xml_nodeset (1)}
[1] <td align="center">\n<span style="font-family: Veteran Typewriter;">
<a hr ...
```

Accessing HTML attributes

Accessing HTML attributes

```
read_html("https://taskmaster.fandom.com/wiki/Series_11") |>
  html_elements("td[align='center'] > span")
```

```
{xml_nodeset (10)}
 [1] <span style="font-family: Veteran Typewriter;"><a
href="/wiki/It%27s_not ...
 [2] <span style="font-family: Veteran Typewriter;"><a
href="/wiki/The_Lure_o ...
 [3] <span style="font-family: Veteran Typewriter;"><a
href="/wiki/Run_up_a_t ...
 [4] <span style="font-family: Veteran Typewriter;"><a
href="/wiki/Premature_ ...
 [5] <span style="font-family: Veteran Typewriter;"><a
href="/wiki/Slap_and_t ...
 [6] <span style="font-family: Veteran Typewriter;"><a
href="/wiki/Absolute_c ...
 [7] <span style="font-family: Veteran Typewriter;"><a
```

Accessing HTML attributes

Accessing HTML attributes

```
read_html("https://taskmaster.fandom.com/wiki/Series_11") |>
  html_elements("td[align='center'] > span") |>
  html_element("a")
```

```
{xml_nodeset (10)}
 [1] <a href="/wiki/It%27s_not_your_fault." title="It's not your
fault.">It's ...
 [2] <a href="/wiki/The_Lure_of_the_Treacle_Puppies." title="The Lure of
the  ...
 [3] <a href="/wiki/Run_up_a_tree_to_the_moon." title="Run up a tree to
the m ...
 [4] <a href="/wiki/Premature_conker." title="Premature
conker.">Premature co ...
 [5] <a href="/wiki/Slap_and_tong." title="Slap and tong.">Slap and
tong.</a>
 [6] <a href="/wiki/Absolute_casserole." title="Absolute
casserole.">Absolute ...
 [7] <a href="/wiki/You%27ve_got_no_chutzpah." title="You've got no
```

Accessing HTML attributes

Accessing HTML attributes

```
read_html("https://taskmaster.fandom.com/wiki/Series_11") |>
  html_elements("td[align='center'] > span") |>
  html_element("a") |>
  html_attr("href")
```

```
 [1] "/wiki/It%27s_not_your_fault."
 [2] "/wiki/The_Lure_of_the_Treacle_Puppies."
 [3] "/wiki/Run_up_a_tree_to_the_moon."
 [4] "/wiki/Premature_conker."
 [5] "/wiki/Slap_and_tong."
 [6] "/wiki/Absolute_casserole."
 [7] "/wiki/You%27ve_got_no_chutzpah."
 [8] "/wiki/An_orderly_species."
 [9] "/wiki/Mr_Octopus_and_Pottyhands."
[10] "/wiki/Activate_Jamali."
```

Class activity

https://sta279-s24.github.io/class_activities/ca_lecture_18.html