Web scraping

Data Science in a Box

datasciencebox.org

Scraping the web

Scraping the web: what? why?

- Increasing amount of data is available on the web
- These data are provided in an unstructured format: you can always copy&paste, but it's time-consuming and prone to errors
- Web scraping is the process of extracting this information automatically and transform it into a structured dataset
- Two different scenarios:
  - Screen scraping: extract data from source code of website, with html parser (easy) or regular expression matching (less easy).
  - Web APIs (application programming interface): website offers a set of structured http requests that return JSON or XML files.

Web Scraping with rvest

Hypertext Markup Language

- Most of the data on the web is still largely available as HTML
- It is structured (hierarchical / tree based), but it''s often not available in a form useful for analysis (flat / tidy).

```
<html>
  <head>
    <title>This is a title</title>
  </head>
  <body>
    <p align="center">Hello world!</p>
  </body>
</html>
```

rvest

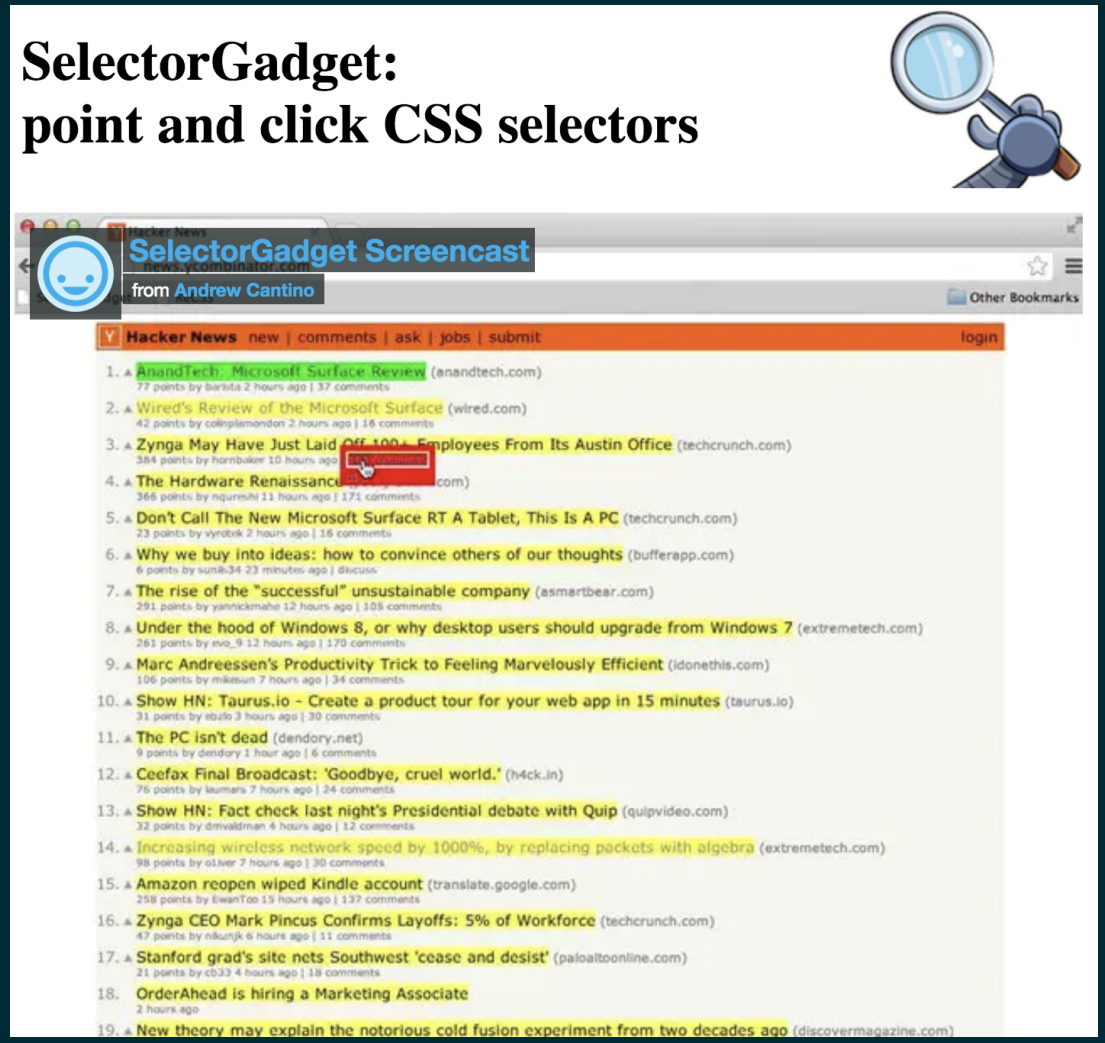
- The **rvest** package makes basic processing and manipulation of HTML data straight forward
- It's designed to work with pipelines built with %>%

Core rvest functions

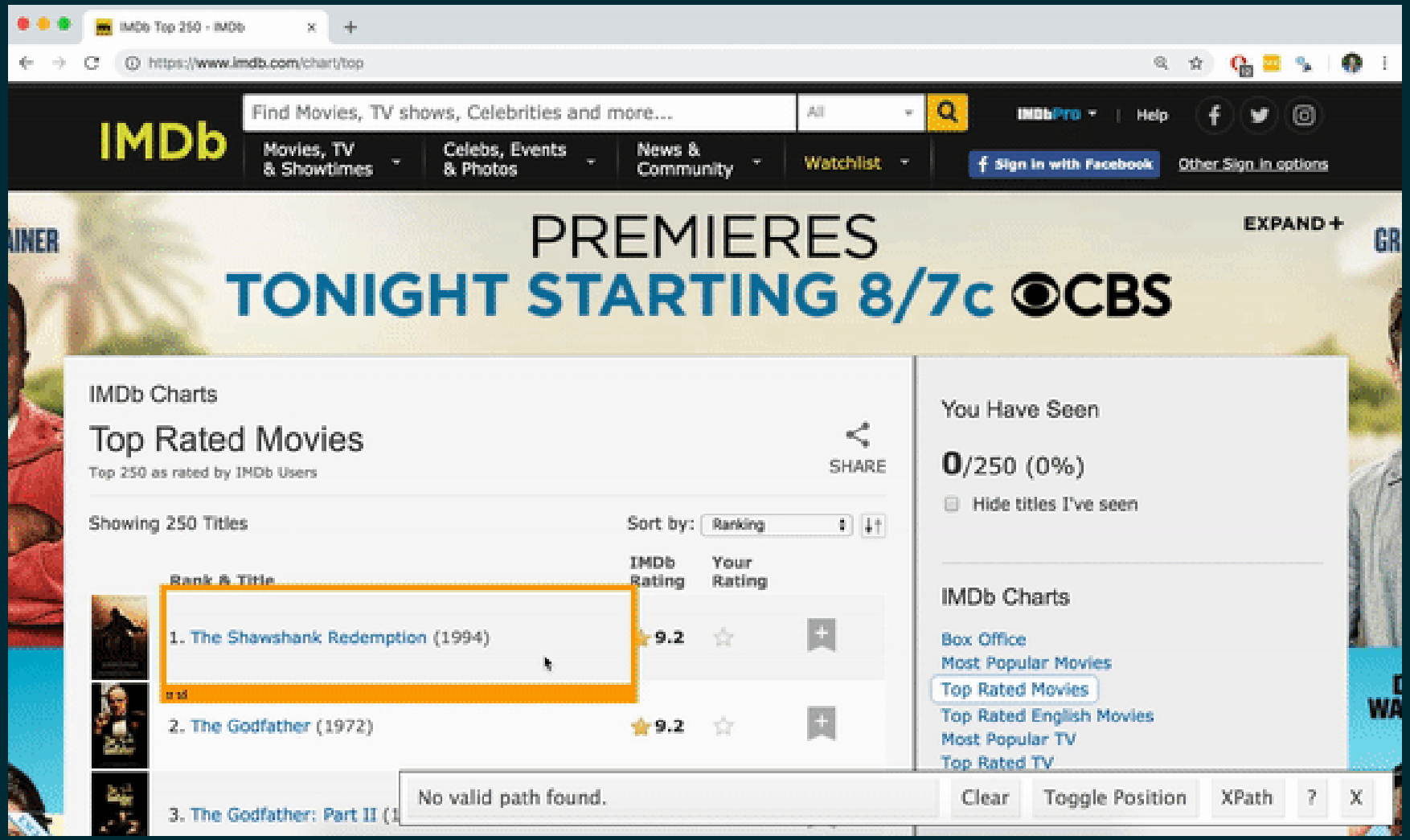
- `read_html` - Read HTML data from a url or character string
- `html_node` - Select a specified node from HTML document
- `html_nodes` - Select specified nodes from HTML document
- `html_table` - Parse an HTML table into a data frame
- `html_text` - Extract tag pairs' content
- `html_name` - Extract tags' names
- `html_attrs` - Extract all of each tag's attributes
- `html_attr` - Extract tags' attribute value by name

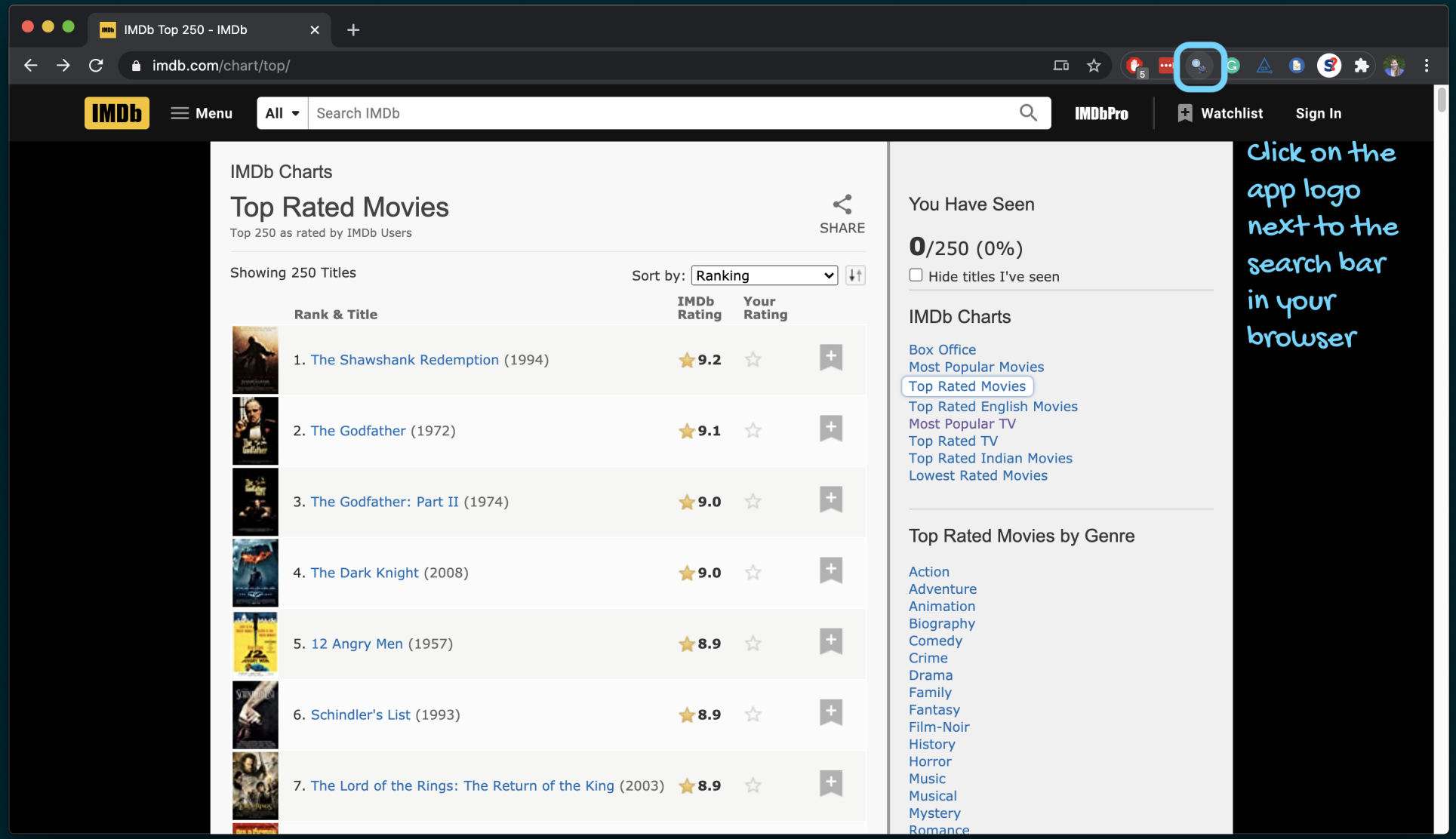
SelectorGadget

- Open source tool that eases CSS selector generation and discovery
- Easiest to use with the Chrome Extension
- Find out more on the SelectorGadget vignette



Using the SelectorGadget

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5. 12 Angry Men (1957) 8.9
6. Schindler's List (1993) 8.9
7. The Lord of the Rings: The Return of the King (2003) 8.9
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Drama
Family
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Film-Noir
History
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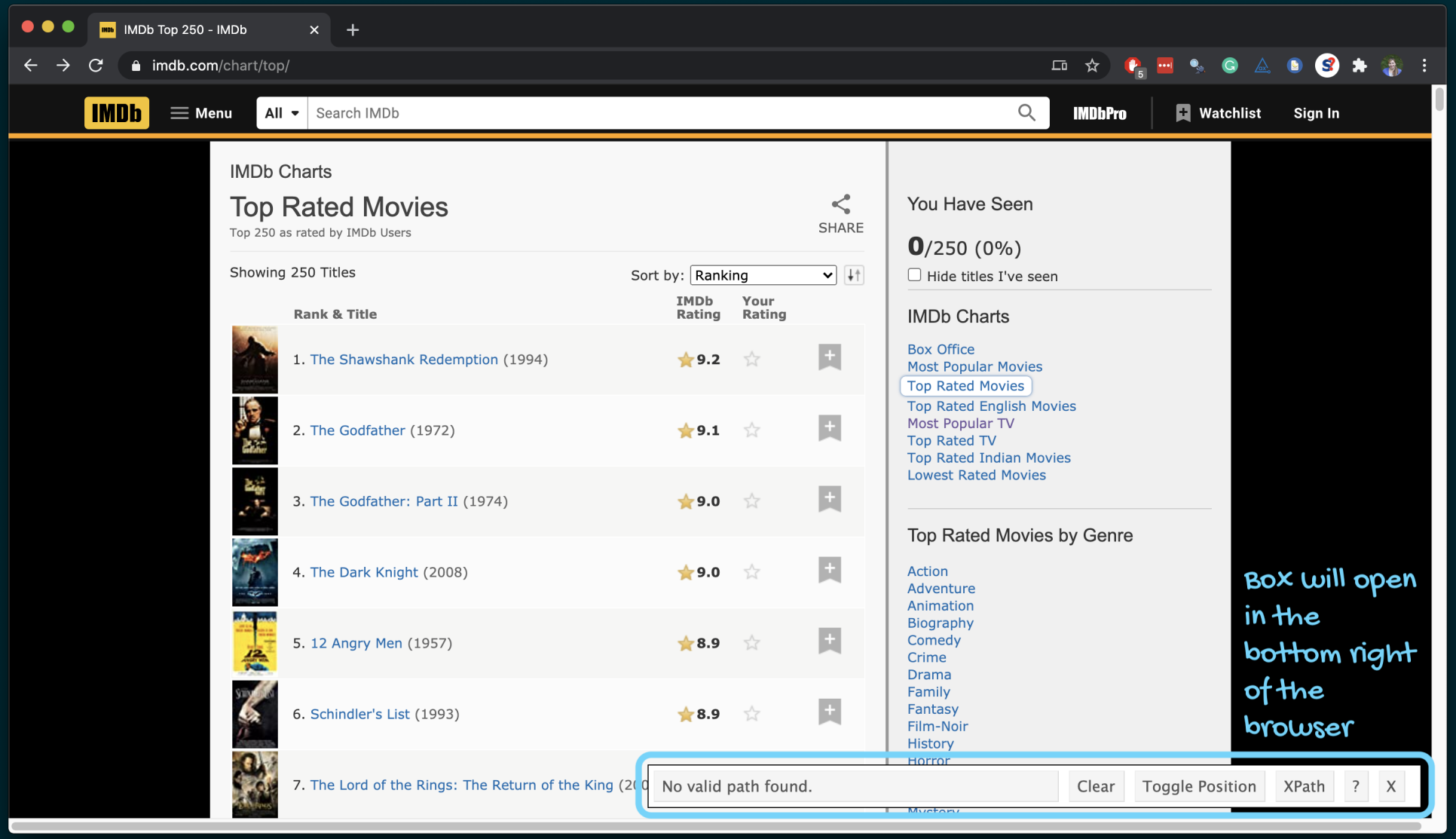
Click on the app logo next to the search bar in your browser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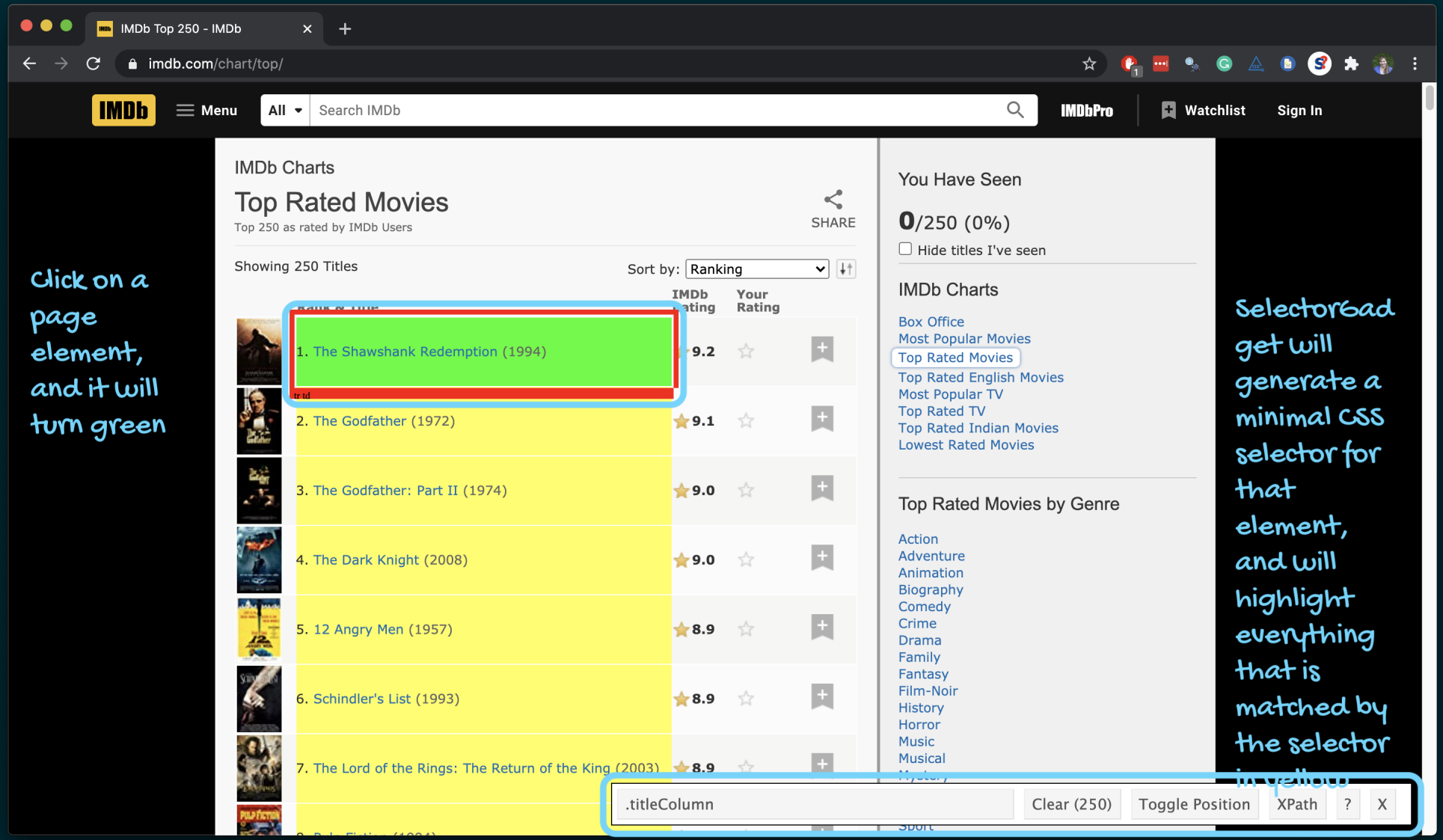
Family
Fantasy
Film-Noir
History
Horror
Box will open in the bottom right of the browser
No valid path found.
Clear
Toggle Position
XPath
?
X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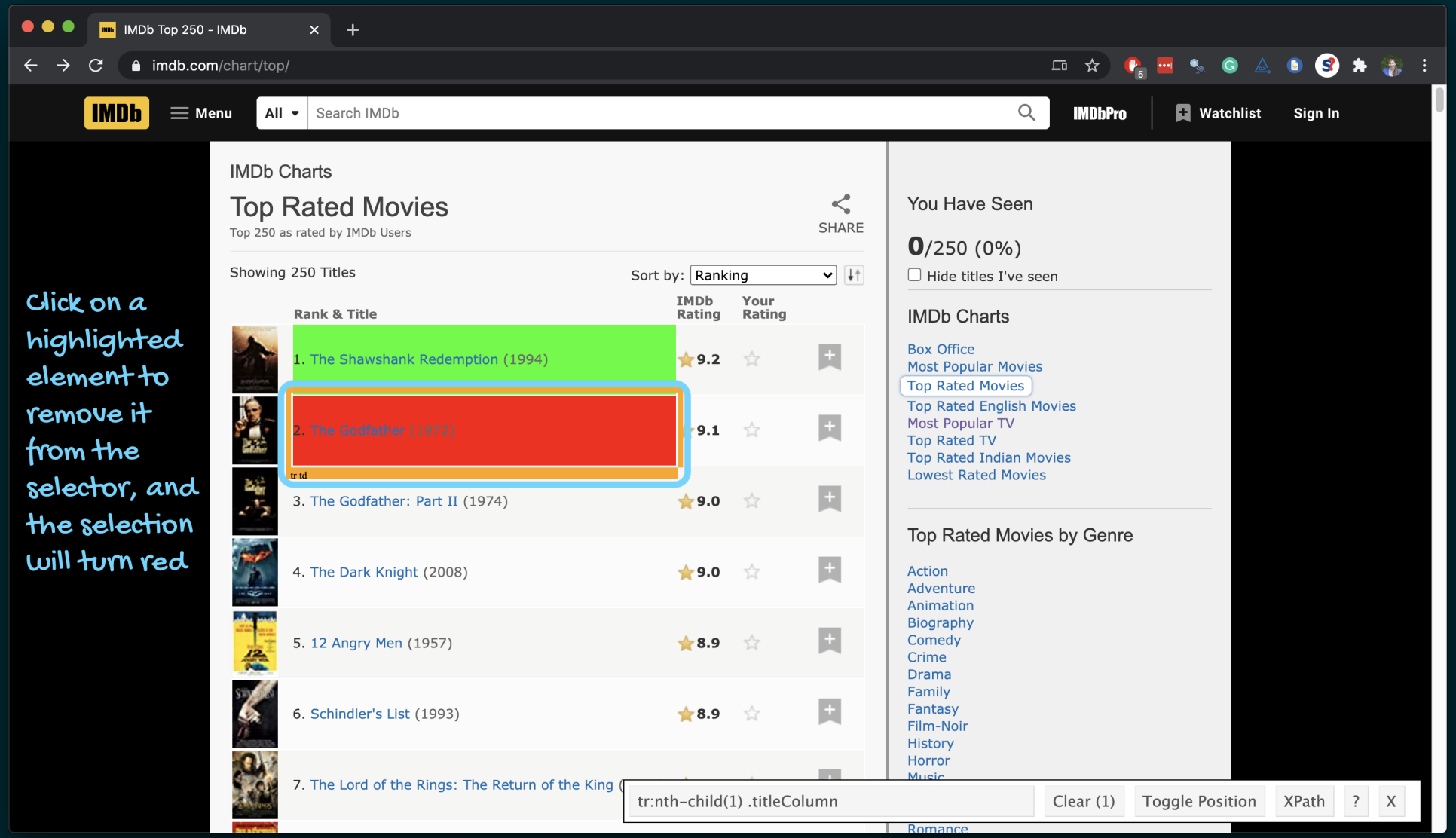
Animation
Biography
Comedy
Crime
Drama
Family
Fantasy
Film-Noir
History
Horror
Music
Musical
.titleColumn
Clear (250)
Toggle Position
XPath
?
X
Click on a page element, and it will turn green
Selectorgad get will generate a minimal CSS selector for that element, and will highlight everything that is matched by the selector in yellow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Click on a highlighted element to remove it from the selector, and the selection will turn red
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Biography
Comedy
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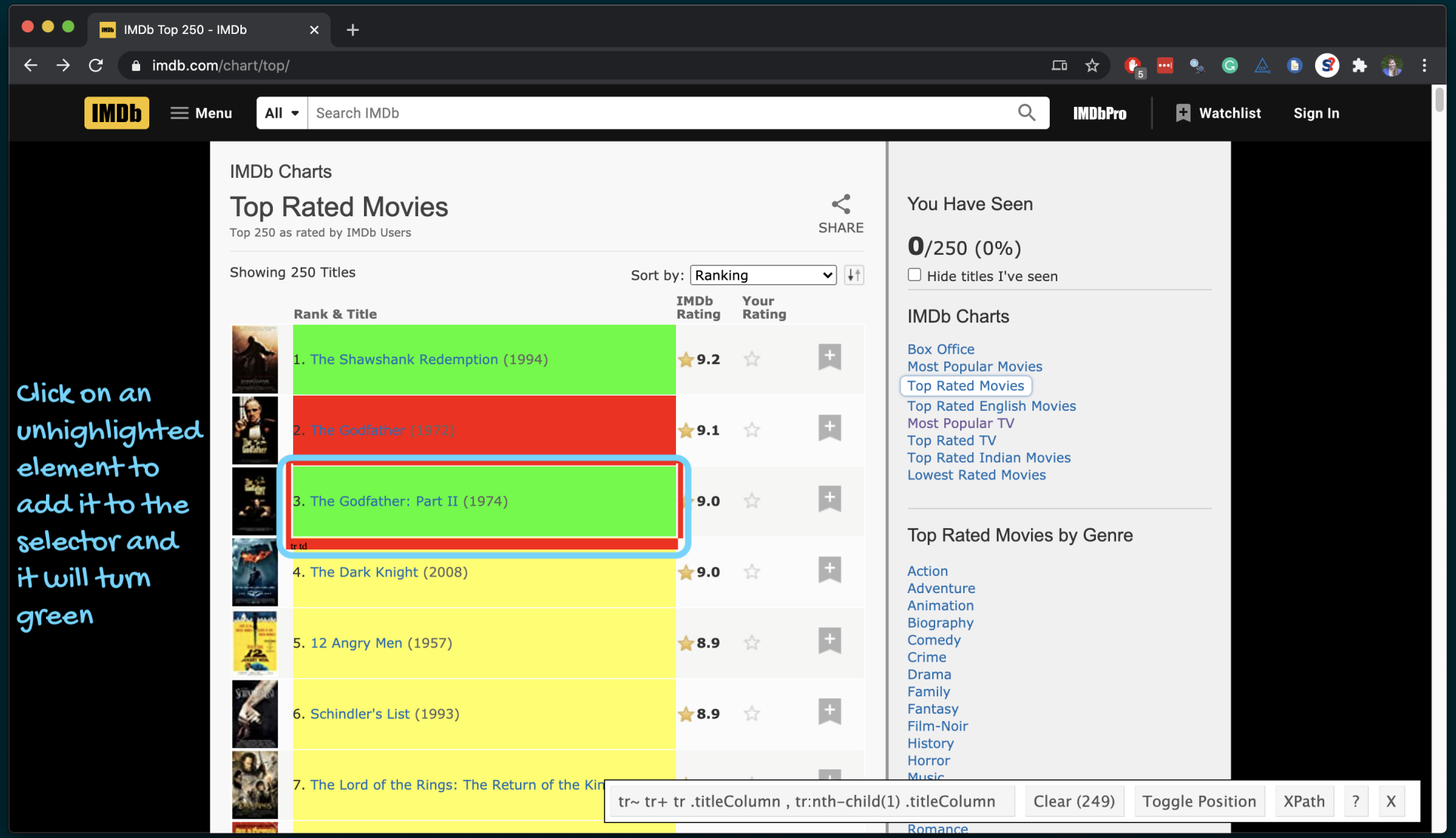
Romance
tr:nth-child(1) .titleColumn
Clear (1)
Toggle Position
XPath
?
X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Fantasy
Film-Noir
History
Horror
Romance
Click on an unhighlighted element to add it to the selector and it will turn green
tr~ tr+ tr .titleColumn , tr:nth-child(1) .titleColumn
Clear (249)
Toggle Position
XPath
?
X

Using the SelectorGadget

Through this process of selection and rejection, SelectorGadget helps you come up with the appropriate CSS selector for your needs