



# Scrapy

## Python Library

# Què és Scrapy?

- Framework de web scraping (rastreig de pàgines web)
- Escrit en Python
- Orientat a la simplicitat i la facilitat d'ús
- Escalable i flexible
- Utilitza Spiders per definir com rastrejar un lloc web
- Pot utilitzar XPath o CSS per seleccionar elements de la pàgina

# Casos d'ús

- Recopilació de dades per a anàlisi
- Monitoratge de pàgines web
- Recerca de dades
- Creació de bots
- ...



# Instal·lació

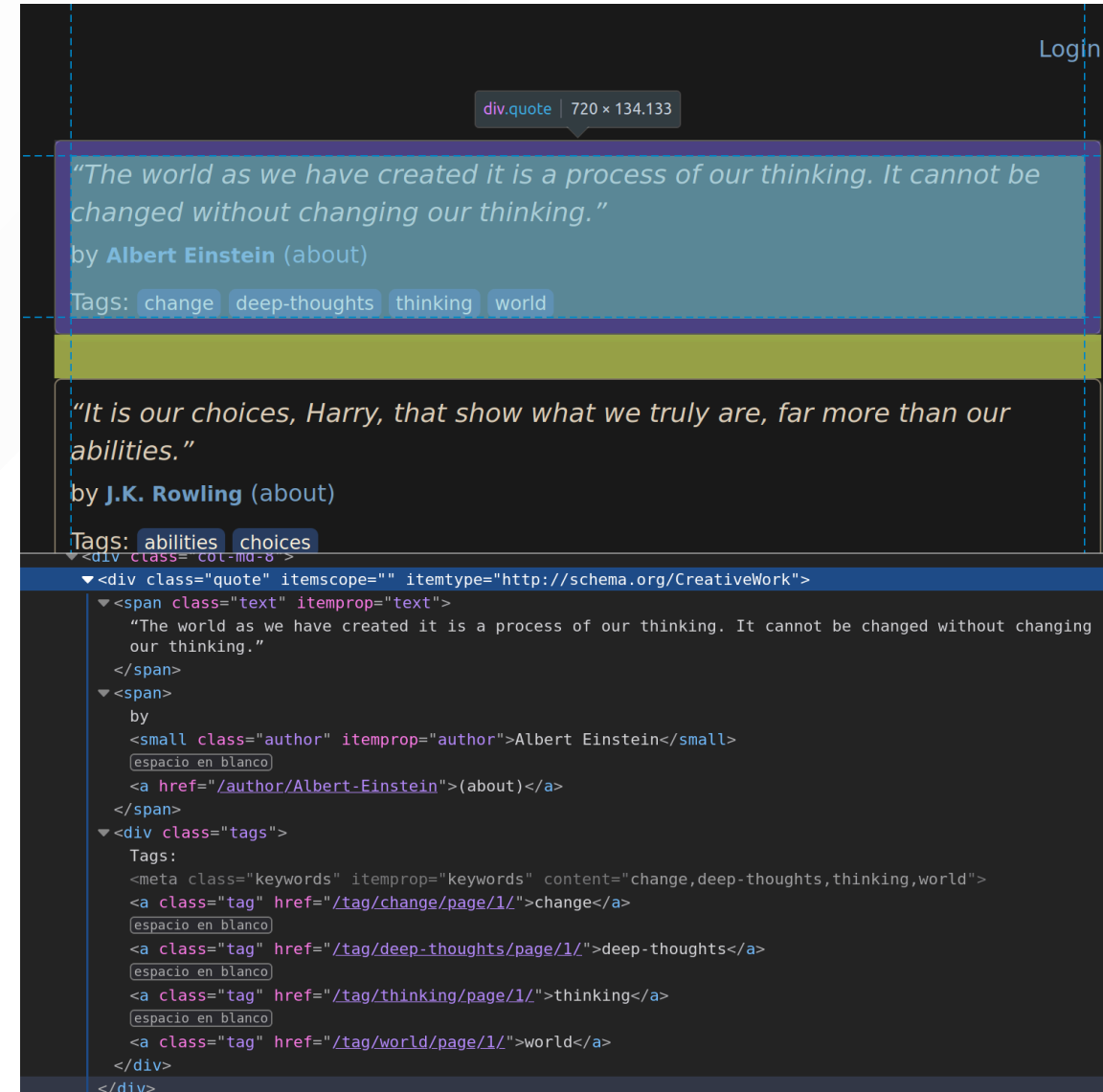
```
pip install scrapy
```

- Requereix Python 3.6 o superior
- Per evitar problemes deuriem instal·lar-lo en un entorn virtual

```
python -m venv scrapy_env  
source scrapy_env/bin/activate  
pip install scrapy
```

# Example: Quotes to Scrape

- Pàgina web amb frases de llibres
- Pensades per ser extretes
- <https://quotes.toscrape.com/>
- Volem extreure les frases, els autors i les etiquetes



# Creació d'un projecte

```
scrapy startproject project_name
```

```
project_name/  
  scrapy.cfg  
  project_name/  
    __init__.py  
    items.py  
    middlewares.py  
    pipelines.py  
    settings.py  
    spiders/  
      __init__.py
```

# Components d'un projecte Scrapy

- **Items:** defineixen els elements que volem extreure de la pàgina
- **Spiders:** defineixen com rastrejar la pàgina
- **Pipelines:** processen les dades extretes
- **Middlewares:** processen les peticions i respostes HTTP
- **Settings:** configuració del projecte

# Creació d'un Spider (I)

```
scrapy genspider quotes quotes.toscrape.com
```

```
import scrapy

class QuotesSpider(scrapy.Spider):
    name = "quotes"
    allowed_domains = ["quotes.toscrape.com"]
    start_urls = ["https://quotes.toscrape.com"]

    def parse(self, response):
        pass
```



# Creació d'un Spider (II)

- Modifiquem parse per extreure dades

```
def parse(self, response):  
    for quote in response.css('div.quote'):  
        text = quote.css('span.text::text').get() # extreu el text de l'span amb classe text  
        author = quote.css('small.author::text').get() # extreu l'autor  
        tags = quote.css('div.tags a.tag::text').getall() # extreu les etiquetes  
  
        yield {  
            'text': text,  
            'author': author,  
            'tags': tags  
        }
```

# Execució del Spider (I)

Per defecte, el resultat es mostra per pantalla

```
scrapy crawl quotes
```

```
2024-06-04 22:33:17 [scrapy.utils.log] INFO: Scrapy 2.11.2 started (bot: quotes_scrap)
...
{'text': '"The world as we have created it is a process of our thinking. It cannot be changed without changing our thinking."', 'author': 'Albert Einstein', 'tags': ['change', 'deep-thoughts', 'thinking', 'world']}
2024-06-04 22:33:20 [scrapy.core.scraper] DEBUG: Scraped from <200 https://quotes.toscrape.com>
{'text': '"It is our choices, Harry, that show what we truly are, far more than our abilities."', 'author': 'J.K. Rowling', 'tags': ['abilities', 'choices']}
2024-06-04 22:33:20 [scrapy.core.scraper] DEBUG: Scraped from <200 https://quotes.toscrape.com>
{'text': '"There are only two ways to live your life. One is as though nothing is a miracle. The other is as though everything is a miracle."', 'author': 'Albert Einstein', 'tags': ['inspirational', 'life', 'live', 'miracle', 'miracles']}
2024-06-04 22:33:20 [scrapy.core.scraper] DEBUG: Scraped from <200 https://quotes.toscrape.com>
{'text': '"The person, be it gentleman or lady, who has not pleasure in a good novel, must be intolerably stupid."', 'author': 'Jane Austen', 'tags': ['aliteracy', 'books', 'classic', 'humor']}
2024-06-04 22:33:20 [scrapy.core.scraper] DEBUG: Scraped from <200 https://quotes.toscrape.com>
{'text': '"Imperfection is beauty, madness is genius and it's better to be absolutely ridiculous than absolutely boring."', 'author': 'Marilyn Monroe', 'tags': ['be-yourself', 'inspirational']}
2024-06-04 22:33:20 [scrapy.core.scraper] DEBUG: Scraped from <200 https://quotes.toscrape.com>
{'text': '"Try not to become a man of success. Rather become a man of value."', 'author': 'Albert Einstein', 'tags': ['adulthood', 'success', 'value']}
2024-06-04 22:33:20 [scrapy.core.scraper] DEBUG: Scraped from <200 https://quotes.toscrape.com>
{'text': '"It is better to be hated for what you are than to be loved for what you are not."', 'author': 'André Gide', 'tags': ['life', 'love']}
2024-06-04 22:33:20 [scrapy.core.scraper] DEBUG: Scraped from <200 https://quotes.toscrape.com>
{'text': '"I have not failed. I've just found 10,000 ways that won't work."', 'author': 'Thomas A. Edison', 'tags': ['edison', 'failure', 'inspirational', 'paraphrased']}
2024-06-04 22:33:20 [scrapy.core.scraper] DEBUG: Scraped from <200 https://quotes.toscrape.com>
{'text': '"A woman is like a tea bag; you never know how strong it is until it's in hot water."', 'author': 'Eleanor Roosevelt', 'tags': ['misattributed-eleanor-roosevelt']}
2024-06-04 22:33:20 [scrapy.core.scraper] DEBUG: Scraped from <200 https://quotes.toscrape.com>
{'text': '"A day without sunshine is like, you know, night."', 'author': 'Steve Martin', 'tags': ['humor', 'obvious', 'simile']}
2024-06-04 22:33:20 [scrapy.core.engine] INFO: Closing spider (finished)
2024-06-04 22:33:20 [scrapy.statscollectors] INFO: Dumping Scrapy stats:
...
2024-06-04 22:33:20 [scrapy.core.engine] INFO: Spider closed (finished)
```

# Execució del Spider (II)

Podem guardar-lo en un fitxer

```
scrapy crawl quotes -o quotes.json
```

```
[{"text": "\"The world as we have created it is a process of our thinking. It cannot be changed without changing our thinking.\"\"", "author": "Albert Einstein", "tags": ["change", "deep-thoughts", "thinking", "world"]}, {"text": "\"It is our choices, Harry, that show what we truly are, far more than our abilities.\"\"", "author": "J.K. Rowling", "tags": ["abilities", "choices"]}, {"text": "\"There are only two ways to live your life. One is as though nothing is a miracle. The other is as though everything is a miracle.\"\"", "author": "Albert Einstein", "tags": ["inspirational", "life", "live", "miracle", "miracles"]}, {"text": "\"The person, be it gentleman or lady, who has not pleasure in a good novel, must be intolerably stupid.\"\"", "author": "Jane Austen", "tags": ["aliteracy", "books", "classic", "humor"]}, {"text": "\"Imperfection is beauty, madness is genius and it's better to be absolutely ridiculous than absolutely boring.\"\"", "author": "Marilyn Monroe", "tags": ["be-yourself", "inspirational"]}, {"text": "\"Try not to become a man of success. Rather become a man of value.\"\"", "author": "Albert Einstein", "tags": ["adulthood", "success", "value"]}, {"text": "\"It is better to be hated for what you are than to be loved for what you are not.\"\"", "author": "André Gide", "tags": ["life", "love"]}, {"text": "\"I have not failed. I've just found 10,000 ways that won't work.\"\"", "author": "Thomas A. Edison", "tags": ["edison", "failure", "inspirational", "paraphrased"]}, {"text": "\"A woman is like a tea bag; you never know how strong it is until it's in hot water.\"\"", "author": "Eleanor Roosevelt", "tags": ["misattributed-eleanor-roosevelt"]}, {"text": "\"A day without sunshine is like, you know, night.\"\"", "author": "Steve Martin", "tags": ["humor", "obvious", "simile"]}]
```

Altres formats: csv, xml, jsonlines, jl, marshal, pickle, yaml

```
scrapy crawl quotes -o quotes.csv  
scrapy crawl quotes -o quotes.xml
```

# Múltiples pàgines (I)

- Si volem extreure dades de més d'una pàgina podem utilitzar dos mètodes:
  - Si sabem totes les pàgines, podem generar les URLs i afegir-les a `start_urls`
    - Exemple:

```
start_urls = [f'https://quotes.toscrape.com/page/{ i }' for i in range(1, 11)]
```
  - Si no sabem el nombre de pàgines, podem utilitzar el mètode `parse` per extreure la URL de la següent pàgina i la seguim amb `response.follow`. Veurem com fer-ho a continuació.

# Múltiples pàgines (II)

```
def parse(self, response):
    for quote in response.css('div.quote'):
        text = quote.css('span.text::text').get()
        author = quote.css('small.author::text').get()
        tags = quote.css('div.tags a.tag::text').getall()

        yield {
            'text': text,
            'author': author,
            'tags': tags
        }

    next_page = response.css('li.next a::attr(href)').get()
    if next_page is not None:
        yield response.follow(next_page, self.parse)
```

# Múltiples pàgines (III)

- `response.css('li.next a::attr(href)').get()` extreu l'atribut `href` de l'element `a` dins de l'element `li` amb classe `next`
- `response.follow(next_page, self.parse)` segueix la URL `next_page` i crida `parse` amb la resposta
  - Podriem definir un mètode diferent per processar la següent pàgina, segons el tipus de contingut
- Per evitar extreure la mateixa pàgina dues vegades, podem utilitzar `response.urljoin(next_page)`. Les urls visitades es guarden a `response.meta['visited']` i podem comprovar si ja hem visitat la pàgina. De totes maneres, Scrapy ja ho fa per nosaltres.

# Postprocessament amb pipelines (I)

- Les dades extretes poden ser processades abans de ser guardades
- Per exemple, podem netejar les dades, eliminar duplicats, guardar-les en una base de dades, etc.
- Per activar una pipeline, cal afegir-la a `ITEM_PIPELINES` a `settings.py`

```
ITEM_PIPELINES = {  
    'project_name.pipelines.QuotesPipeline': 300,  
}  
  
# 300 és la prioritat de la pipeline, de 0 a 1000,  
# on 0 és la prioritat més alta
```

# Postprocessament amb pipelines (II)

- Creem una pipeline a `pipelines.py` que processi les dades netejant-les i eliminant espais en blanc, per després retornar-les.

```
class QuotesPipeline:
    def process_item(self, item, spider):
        item['text'] = item['text'].strip()
        item['author'] = item['author'].strip()
        item['tags'] = [tag.strip() for tag in item['tags']]

        return item
```



# Postprocessament amb pipelines (III)

- Podem afegir tantes pipelines com vulguem, i s'executaran en l'ordre definit a `ITEM_PIPELINES`
- Per exemple, podem guardar les dades en una base de dades

```
class QuotesPipeline:
    def open_spider(self, spider):
        self.conn = sqlite3.connect('quotes.db')
        self.cur = self.conn.cursor()
        self.cur.execute('CREATE TABLE IF NOT EXISTS quotes (text TEXT, author TEXT, tags TEXT)')

    def process_item(self, item, spider):
        self.cur.execute('INSERT INTO quotes VALUES (?, ?, ?)', (item['text'], item['author'], ', '.join(item['tags'])))
        return item

    def close_spider(self, spider):
        self.conn.commit()
        self.conn.close()
```

# Postprocessament amb pipelines (IV)

- Podem afegir més funcionalitats a la pipeline, com ara comprovar si les dades ja existeixen a la base de dades abans de guardar-les

```
class QuotesPipeline:
    def open_spider(self, spider):
        self.conn = sqlite3.connect('quotes.db')
        self.cur = self.conn.cursor()
        self.cur.execute('CREATE TABLE IF NOT EXISTS quotes (text TEXT, author TEXT, tags TEXT)')

    def process_item(self, item, spider):
        self.cur.execute('SELECT * FROM quotes WHERE text = ? AND author = ?', (item['text'], item['author']))
        if not self.cur.fetchone():
            self.cur.execute('INSERT INTO quotes VALUES (?, ?, ?)', (item['text'], item['author'], ', '.join(item['tags'])))
        return item

    def close_spider(self, spider):
        self.conn.commit()
        self.conn.close()
```

# Errors i logs (I)

- Scrapy té un sistema de logs que ens permet veure els errors i la informació de depuració
- Podem configurar el nivell de logs a `settings.py`

```
LOG_LEVEL = 'INFO'
```

- Nivells de logs: `CRITICAL`, `ERROR`, `WARNING`, `INFO`, `DEBUG`
- Amb `logging` podem afegir logs personalitzats

# Errors i logs (II)

```
import logging

# ...

def parse(self, response):
    logging.info('Processant la pàgina %s', response.url)

# ...
```

# Errors i logs (III)

Podem capturar errors i processar-los

```
def parse(self, response):  
    if response.status == 404:  
        logging.error('Pàgina no trobada: %s', response.url)  
    elif response.status == 500:  
        logging.error('Error del servidor: %s', response.url)  
    else:  
        for quote in response.css('div.quote'):  
            text = quote.css('span.text::text').get()  
            author = quote.css('small.author::text').get()  
            tags = quote.css('div.tags a.tag::text').getall()  
  
            yield {  
                'text': text,  
                'author': author,  
                'tags': tags
```

# Exercici

- Crea un projecte Scrapy per extreure les dades de totes les notícies penjades a <https://portal.edu.gva.es/iesbenigaslo/entrades/>
- Extreu el títol, la data, l'autor i el contingut de cada notícia
  - Hauràs de seguir les pàgines per extreure totes les dades sol·licitades.
- Guarda les dades en un fitxer JSON.
- Utilitza pipelines per processar les dades abans de guardar-les
- Utilitza logs per mostrar informació de depuració i errors
- Extra: guarda les dades en una base de dades SQLite