Python Data Products

Course 1: Basics

Lecture: Reading CSV and JSON into Python

Learning objectives

In this lecture we will…

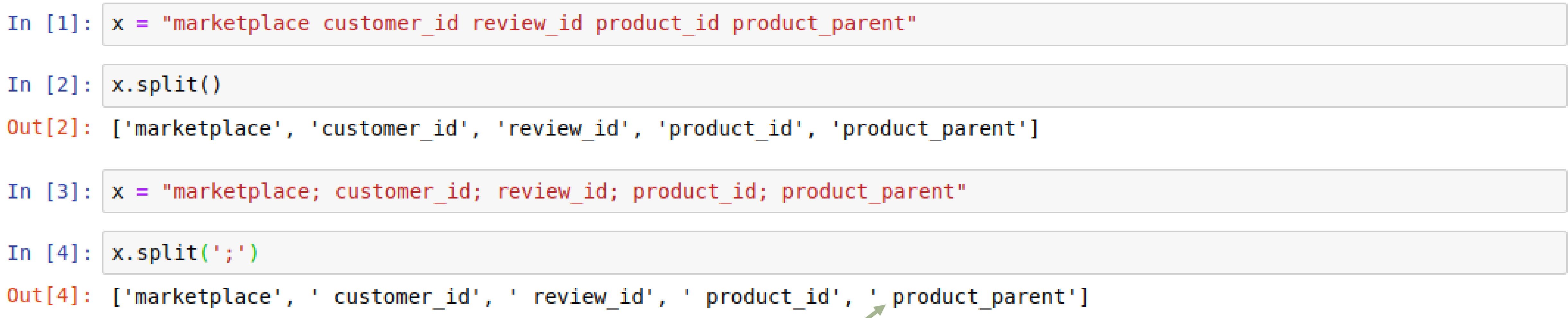
- Demonstrate the main **methods** to read CSV/TSV and JSON files in Python
- **Understand** some of the edge cases that make reading these formats difficult

CSV/TSV in Python

In this lecture we'll look through a few functions to read CSV/TSV and JSON data in Python:

- string.split()
- csv.reader (library)
- eval() and ast.eval()
- json.loads (library)

Code: String.split()



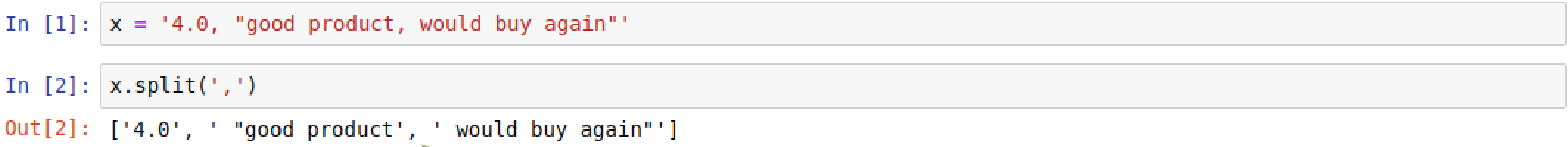
```
In [1]: x = "marketplace customer_id review_id product_id product_parent"

In [2]: x.split()

Out[2]: ['marketplace', 'customer_id', 'review_id', 'product_id', 'product_parent']

In [3]: x = "marketplace; customer_id; review_id; product_id; product_parent"

In [4]: x.split(';')

Out[4]: ['marketplace', ' customer_id', ' review_id', ' product_id', ' product_parent']
```

Note: preserves
whitespace!

- Converts a **string** to a **list**, given a **separator**
- By default, any whitespace separator is used (tab, space, newline)
- But different separators can be provided via an optional argument

Code: String.split()

What happens when the delimiter appears in the column?



```
In [1]: x = '4.0, "good product, would buy again"'
```

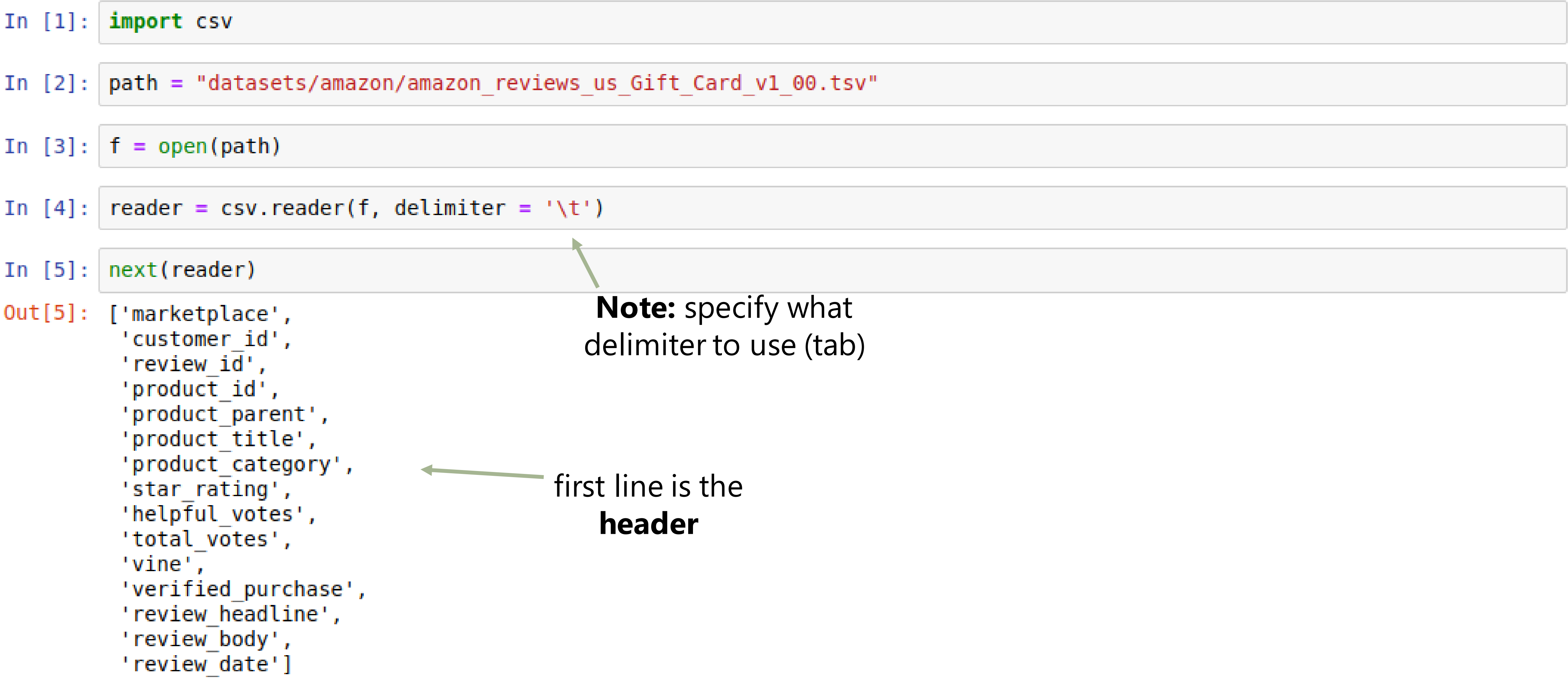
```
In [2]: x.split(',')
```

```
Out[2]: ['4.0', ' "good product', ' would buy again"']
```

Note: splits into three columns rather than two!

- This could be addressed by using a different delimiter (e.g. ';'), though this doesn't generalize for fields containing arbitrary text
- Normally, the field will be escaped by quotes

Code: CSV.reader

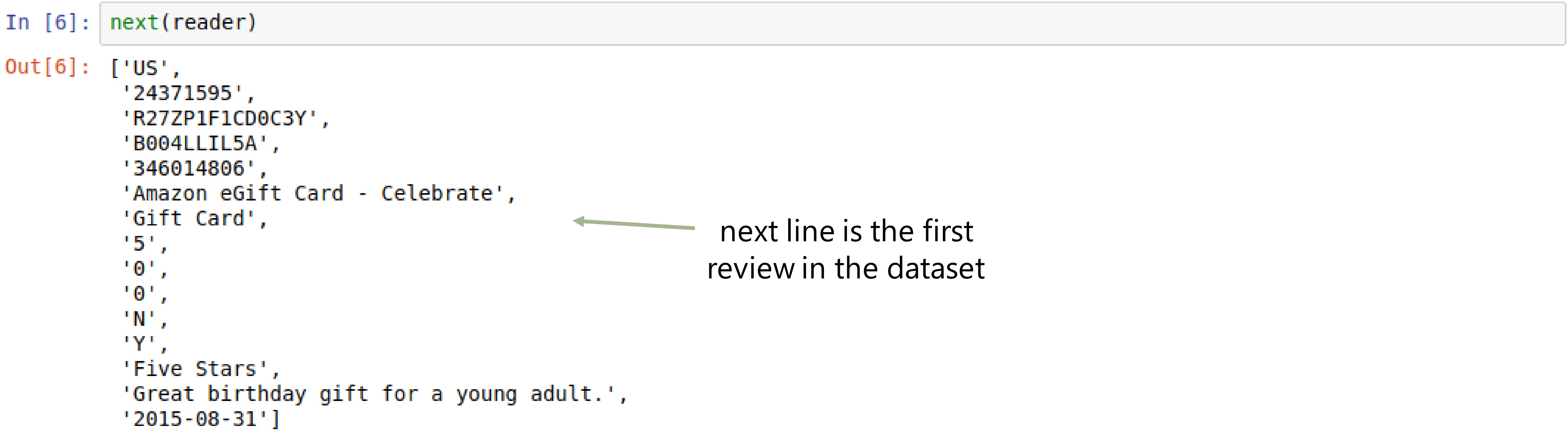


```
In [1]: import csv

In [2]: path = "datasets/amazon/amazon_reviews_us_Gift_Card_v1_00.tsv"

In [3]: f = open(path)

In [4]: reader = csv.reader(f, delimiter = '\t')

In [5]: next(reader)

Out[5]: ['marketplace',
         'customer_id',
         'review_id',
         'product_id',
         'product_parent',
         'product_title',
         'product_category',
         'star_rating',
         'helpful_votes',
         'total_votes',
         'vine',
         'verified_purchase',
         'review_headline',
         'review_body',
         'review_date']
```

Note: specify what delimiter to use (tab)

first line is the **header**

Code: CSV.reader

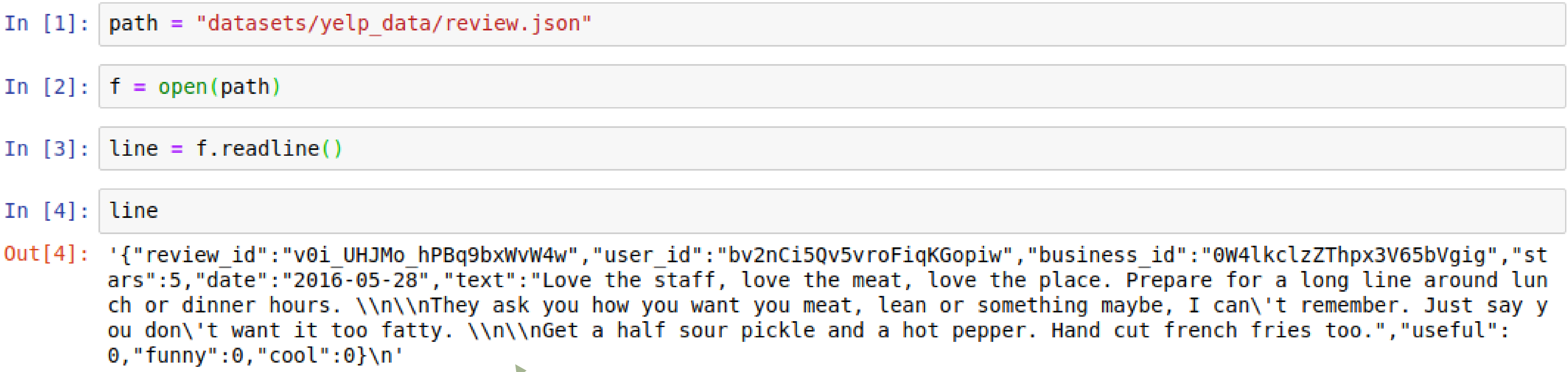


```
In [6]: next(reader)

Out[6]: ['US',
         '24371595',
         'R27ZP1F1CD0C3Y',
         'B004LLIL5A',
         '346014806',
         'Amazon eGift Card - Celebrate',
         'Gift Card',
         '5',
         '0',
         '0',
         'N',
         'Y',
         'Five Stars',
         'Great birthday gift for a young adult.',
         '2015-08-31']
```

next line is the first review in the dataset

Code: eval()

Reading json files is even easier as they're very similar to Python's built-in dictionaries:

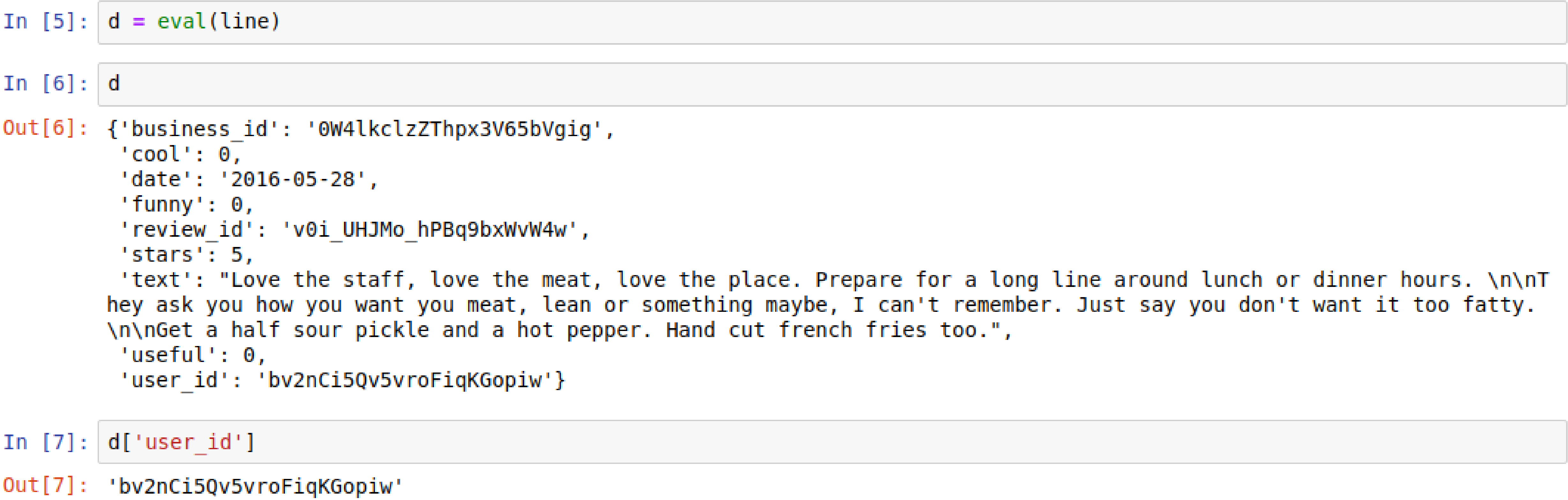


```
In [1]: path = "datasets/yelp_data/review.json"

In [2]: f = open(path)

In [3]: line = f.readline()

In [4]: line

Out[4]: '{"review_id":"v0i_UHJMo_hPBq9bxWvW4w","user_id":"bv2nCi5Qv5vroFiqKGopiw","business_id":"0W4lkclzZThpx3V65bVgig","st
        ars":5,"date":"2016-05-28","text":"Love the staff, love the meat, love the place. Prepare for a long line around lun
        ch or dinner hours. \\n\\nThey ask you how you want you meat, lean or something maybe, I can\'t remember. Just say y
        ou don\'t want it too fatty. \\n\\nGet a half sour pickle and a hot pepper. Hand cut french fries too.","useful":
        0,"funny":0,"cool":0}\n'
```

Note: first line of
Yelp's review data

Code: eval()

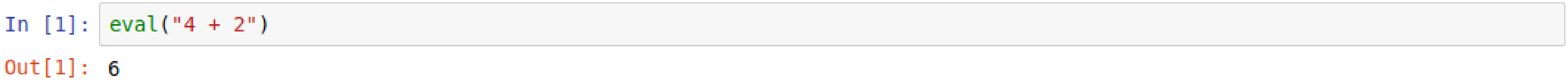
Reading json files is even easier as they're very similar to Python's built-in dictionaries:



```
In [5]: d = eval(line)

In [6]: d

Out[6]: {'business_id': '0W4lkclzZThpx3V65bVgig',
         'cool': 0,
         'date': '2016-05-28',
         'funny': 0,
         'review_id': 'v0i_UHJMo_hPBq9bxWvW4w',
         'stars': 5,
         'text': "Love the staff, love the meat, love the place. Prepare for a long line around lunch or dinner hours. \n\nT
        hey ask you how you want you meat, lean or something maybe, I can't remember. Just say you don't want it too fatty.
        \n\nGet a half sour pickle and a hot pepper. Hand cut french fries too.",
         'useful': 0,
         'user_id': 'bv2nCi5Qv5vroFiqKGopiw'}

In [7]: d['user_id']

Out[7]: 'bv2nCi5Qv5vroFiqKGopiw'
```

Code: eval()

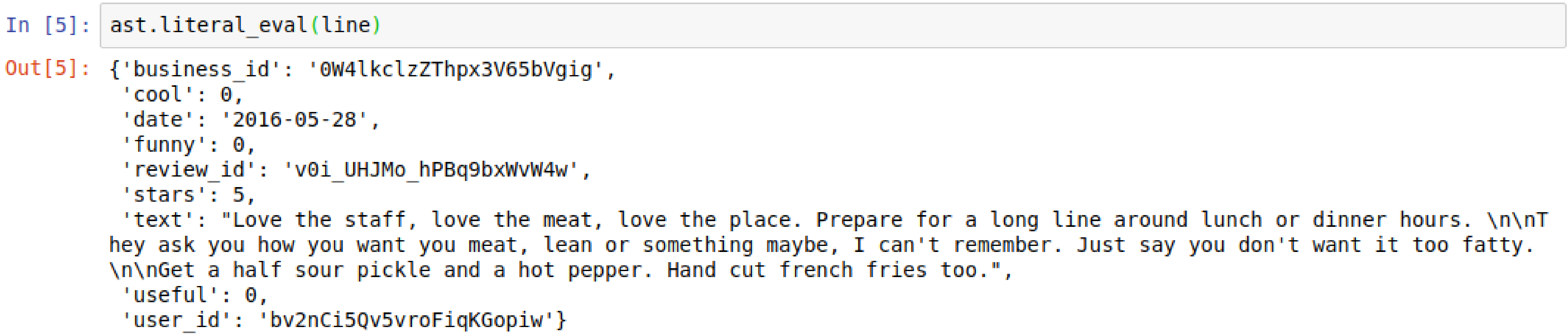
Note that the "eval" function just treats an arbitrary string as if it were python code:



```
In [1]: eval("4 + 2")
Out[1]: 6
```

- While convenient, this could be **dangerous** to run on untrusted datasets since it could execute arbitrary code
- We can use some library functions to make sure that only valid json data gets executed
- We'll look at the **ast** (abstract syntax tree) and **json** libraries

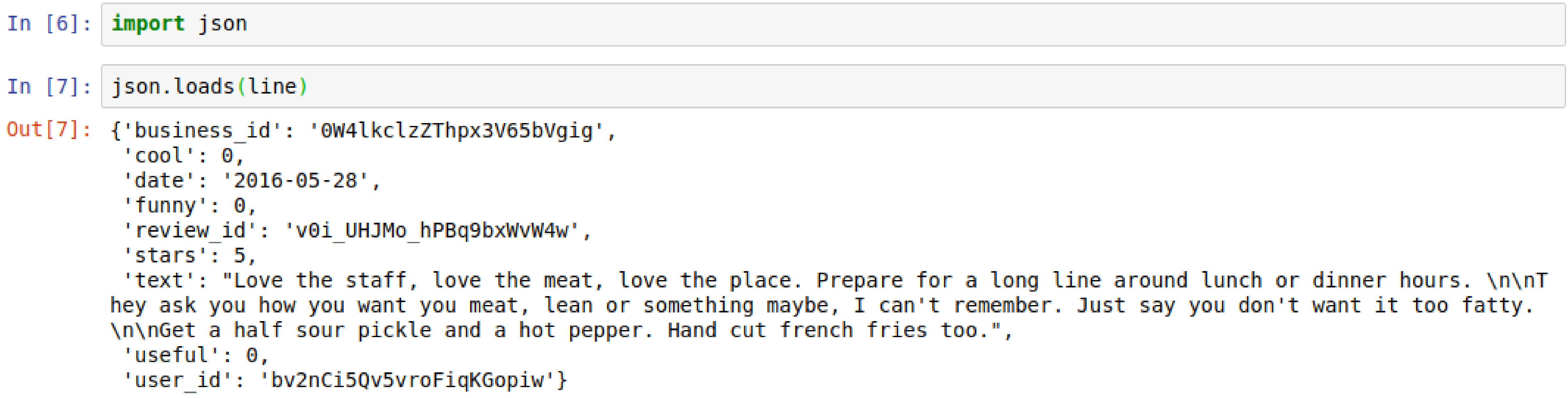
Code: ast and json libraries



```
In [5]: ast.literal_eval(line)

Out[5]: {'business_id': '0W4lkclzZThpx3V65bVgig',
         'cool': 0,
         'date': '2016-05-28',
         'funny': 0,
         'review_id': 'v0i_UHJMo_hPBq9bxWvW4w',
         'stars': 5,
         'text': "Love the staff, love the meat, love the place. Prepare for a long line around lunch or dinner hours. \n\nT
        hey ask you how you want you meat, lean or something maybe, I can't remember. Just say you don't want it too fatty.
        \n\nGet a half sour pickle and a hot pepper. Hand cut french fries too.",
         'useful': 0,
         'user_id': 'bv2nCi5Qv5vroFiqKGopiw'}
```

- Note that the outputs are identical, the code is merely "safer" to execute

Code: ast and json libraries



```
In [6]: import json

In [7]: json.loads(line)

Out[7]: {'business_id': '0W4lkclzZThpx3V65bVgig',
         'cool': 0,
         'date': '2016-05-28',
         'funny': 0,
         'review_id': 'v0i_UHJMo_hPBq9bxWvW4w',
         'stars': 5,
         'text': "Love the staff, love the meat, love the place. Prepare for a long line around lunch or dinner hours. \n\nT
        hey ask you how you want you meat, lean or something maybe, I can't remember. Just say you don't want it too fatty.
        \n\nGet a half sour pickle and a hot pepper. Hand cut french fries too.",
         'useful': 0,
         'user_id': 'bv2nCi5Qv5vroFiqKGopiw'}
```

- Note that the outputs are identical, the code is merely "safer" to execute

Summary of concepts

- Understand the **methods** .split() and eval()
- Understand the **libraries** ast and json
- Be able to read JSON and CSV data in Python

On your own…

- Try reading the Amazon dataset (or the first few lines) using csv.reader
- Try reading the Yelp dataset using json.loads()