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# Pandas Brain Teasers

Exercise Your Mind

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Exercise Your Mind



Miki Tebeka

*edited by Margaret Eldridge*



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CEO: Dave Rankin

COO: Janet Furlow

Managing Editor: Tammy Coron

Development Editor: Margaret Eldridge

Copy Editor: Jennifer Whipple

Indexing: Potomac Indexing, LLC

Layout: Gilson Graphics

Founders: Andy Hunt and Dave Thomas

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*To all the data nerds out there, you rock!*



# Preface

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Pandas is a great library. I have used it in many projects, and it always delivers. Like any big project, the Pandas developers had to make some design decisions that at times seem surprising. This book uses these quirks as a teaching opportunity. By understanding the gaps in your knowledge, you'll become better at what you do.

There's a lot of research showing that people who make mistakes during the learning process learn better than people who don't. If you use this approach when fixing bugs, you'll find you enjoy bug hunting more and become a better developer after each bug you fix.

These teasers will help you avoid mistakes. Some of the teasers are from my own experience shipping bugs to production and some are from others doing the same.

Teasers are fun! We geeks love to solve puzzles. You can also use these teasers to impress your coworkers, have knowledge competitions, and become better together.

Many of these brain teasers are from quizzes I gave at conferences and meetups. I've found that people highly enjoy them, and they tend to liven up the room.

At the beginning of each chapter, I'll show you a short Python program with Pandas code in it and ask you to guess the output. These are the possible answers:

- Syntax error
- Exception
- Some output (e.g., [1 2 3])



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### Versions

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I'm using Python version 3.8.3 and Pandas version 1.0.5. The output *might* change in future versions.

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Before moving on to the answer and the explanation, go ahead and guess the output. After guessing, I encourage you to run the code and see the output yourself; only then proceed to read the solution and the explanation. I've been teaching programming for many years and found this course of action to be highly effective.

## About the Author

Miki Tebeka has a B.Sc. in computer science from Ben Gurion University. He also studied there toward an M.Sc. in computational linguistics.

Miki has a passion for teaching and mentoring. He teaches many workshops on various technical subjects all over the world and has mentored many young developers on their way to success. Miki is involved in open source, has several projects of his own, and has contributed to several more, including the Python project. He has been using Python for more than twenty-three years now.

Miki wrote *Python Brain Teasers*, *Go Brain Teasers*, and *Forging Python* and is a LinkedIn Learning author and an organizer of Go Israel Meetup, GopherCon Israel, and PyData Israel Conference.

## About the Code

You can find the brain teasers code at <https://pragprog.com/titles/d-pandas/pandas-brain-teasers/>.

I've tried to keep the code as short as possible and remove anything that is not related to the teaser. This is *not* how you'll normally write code.

Some code examples are shown in the IPython interactive prompt. You should write the following two imports in your IPython session to follow the examples:

```
In [1]: import pandas as pd
In [2]: import numpy as np
```

When referring to a brain teaser, I assume you ran the code with the `%run` magic. For example

```
In [3]: %run sanchez.py
```

This will load all the variables defined in the file into your IPython, even if there was an exception.

## About You

I assume you know Pandas at some level and have experience programming with it. This book is not for learning how to work with Pandas. If you don't know Pandas, I recommend learning it first (it's fun). There are many resources online. I recommend the official documentation and the book *Python for Data Analysis* by Pandas initial developer Wes McKinney.

## One More Thing

As you work through the puzzles in this book, it might help to picture yourself as Nancy Drew, Sherlock Holmes, or any other of your favorite detectives trying to solve a murder mystery in which *you* are the murderer. Think of it like this:

Debugging is like being a detective in a crime movie where you're also the murderer.

— Filipe Fortes

With this mindset, I have found that things are easier to understand, and the work is more enjoyable. So, with that in mind, have fun guessing the brain teasers in this book—perhaps you might even learn a new trick or two.

If you'd like to learn more, please send an email to [info@353solutions.com](mailto:info@353solutions.com), and we'll tailor a hands-on workshop to meet your needs. There's also a comprehensive offering of hands-on workshops at <https://www.353solutions.com>.

Stay curious, and keep hacking!

Miki Tebeka, March 2020