CS50's Introduction to Programming with Python

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Bitcoin Price Index

Bitcoin (https://en.wikipedia.org/wiki/Bitcoin) is a form of digitial currency, otherwise known as cryptocurrency (https://en.wikipedia.org/wiki/Cryptocurrency). Rather than rely on a central authority like a bank, Bitcoin instead relies on a distributed network, otherwise known as a blockchain (https://en.wikipedia.org/wiki/Blockchain), to record transactions.

Because there's demand for Bitcoin (i.e., users want it), users are willing to buy it, as by exchanging one currency (e.g., USD) for Bitcoin.

In a file called `bitcoin.py`, implement a program that:

- Expects the user to specify as a command-line argument the number of Bitcoins, n, that they would like to buy. If that argument cannot be converted to a `float`, the program should exit via `sys.exit` with an error message.
- Queries the API for the CoinDesk Bitcoin Price Index at https://api.coindesk.com/v1/bpi/currentprice.json (https://api.coindesk.com/v1/bpi/currentprice.json), which returns a JSON (https://en.wikipedia.org/wiki/JSON) object, among whose nested keys is the current price of Bitcoin as a `float`. Be sure to catch any exceptions (https://requests.readthedocs.io/en/latest/api/#exceptions), as with code like:

```
import requests

try:
    ...
```

```
except requests.RequestException:
    ...
```

- Outputs the current cost of n Bitcoins in USD to four decimal places, using `,` as a thousands separator.

▼ Hints

- Recall that the `sys` module comes with `argv`, per docs.python.org/3/library/sys.html#sys.argv (https://docs.python.org/3/library/sys.html#sys.argv).
- Note that the `requests` module comes with quite a few methods, per requests.readthedocs.io/en/latest (https://requests.readthedocs.io/en/latest/), among which are `get`, per requests.readthedocs.io/en/latest/user/quickstart.html#make-a-request (https://requests.readthedocs.io/en/latest/user/quickstart.html#make-a-request), and `json`, per requests.readthedocs.io/en/latest/user/quickstart.html#json-response-content (https://requests.readthedocs.io/en/latest/user/quickstart.html#json-response-content). You can install it with:

```
pip install requests
```

- Note that CoinDesk's API returns a JSON response like:


```
{
   "time":{
      "updated":"May 2, 2022 15:27:00 UTC",
      "updatedISO":"2022-05-02T15:27:00+00:00",
      "updateduk":"May 2, 2022 at 16:27 BST"
   },
   "disclaimer":"This data was produced from the CoinDesk Bitcoin Price Index
   "chartName":"Bitcoin",
   "bpi":{
      "USD":{
         "code":"USD",
         "symbol":"&#36;",
         "rate":"38,761.0833",
         "description":"United States Dollar",
         "rate_float":38761.0833
      },
      "GBP":{
         "code":"GBP",
         "symbol":"&pound;",
         "rate":"30,827.6198",
         "description":"British Pound Sterling",
         "rate_float":30827.6198
      },
      "EUR":{
         "code":"EUR",
         "symbol":"&euro;",
         "rate":"36,800.2764",
         "description":"Euro",
         "rate_float":36800.2764
      }
```

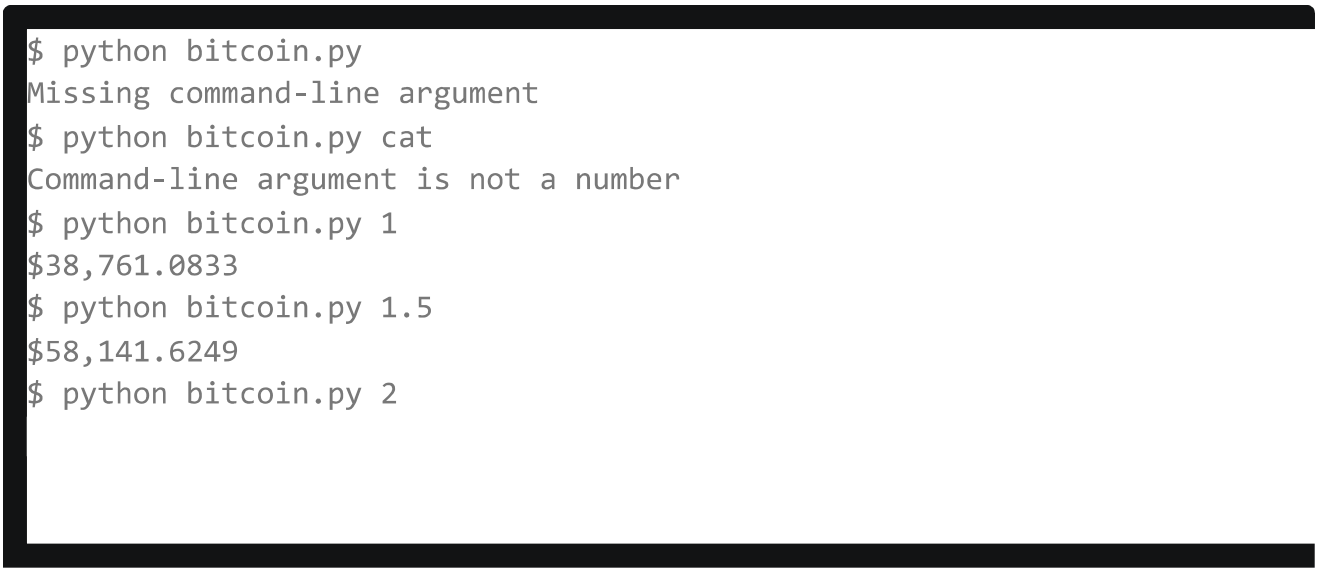
```
    }
}
```

- Recall that you can format USD to four decimal places with a thousands separator (https://docs.python.org/3/library/string.html#formatspec) with code like:

```
print(f"${amount:,.4f}")
```

Demo

This demo was recorded when the price of Bitcoin was $38,761.0833. Your own output may vary.



Recorded with asciinema

Before You Begin

Log into cs50.dev (https://cs50.dev/), click on your terminal window, and execute `cd` by itself. You should find that your terminal window's prompt resembles the below:

```
$
```

Next execute

```
mkdir bitcoin
```

to make a folder called `bitcoin` in your codespace.

Then execute

```
cd bitcoin
```

to change directories into that folder. You should now see your terminal prompt as `bitcoin/ $`. You can now execute

```
code bitcoin.py
```

to make a file called `bitcoin.py` where you'll write your program.

How to Test

Here's how to test your code manually:

- Run your program with `python bitcoin.py`. Your program should use `sys.exit` to exit with an error message:

  ```
  Missing command-line argument
  ```

- Run your program with `python bitcoin.py cat`. Your program should use `sys.exit` to exit with an error message:

  ```
  Command-line argument is not a number
  ```

- Run your program with `python bitcoin.py 1`. Your program should output the price of a single Bitcoin to four decimal places, using `,` as a thousands separator (https://docs.python.org/3/library/string.html#formatspec).
- Run your program with `python bitcoin.py 2`. Your program should output the price of two Bitcoin to four decimal places, using `,` as a thousands separator (https://docs.python.org/3/library/string.html#formatspec).
- Run your program with `python bitcoin.py 2.5`. Your program should output the price of 2.5 Bitcoin to four decimal places, using `,` as a thousands separator (https://docs.python.org/3/library/string.html#formatspec).

You can execute the below to check your code using `check50`, a program that CS50 will use to test your code when you submit. But be sure to test it yourself as well!

```
check50 cs50/problems/2022/python/bitcoin
```

Green smilies mean your program has passed a test! Red frownies will indicate your program output something unexpected. Visit the URL that `check50` outputs to see the input `check50` handed to your program, what output it expected, and what output your program actually gave.

How to Submit

In your terminal, execute the below to submit your work.

```
submit50 cs50/problems/2022/python/bitcoin
```