CS50's Introduction to Programming with Python

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David J. Malan (https://cs.harvard.edu/malan/)
malan@harvard.edu
(https://www.facebook.com/dmalan) (https://github.com/dmalan) (https://www.instagram.com/davidjmalan/) (https://www.linkedin.com/in/malan/) (https://orcid.org/0000-0001-5338-2522) (https://www.quora.com/profile/David-J-Malan) (https://www.reddit.com/user/davidjmalan) (https://www.tiktok.com/@davidjmalan) (https://twitter.com/davidjmalan)

Vanity Plates

In Massachusetts, home to Harvard University, it's possible to request a vanity license plate (https://www.mass.gov/how-to/request-a-vanity-license-plate) for your car, with your choice of letters and numbers instead of random ones. Among the requirements, though, are:

- "All vanity plates must start with at least two letters."
- "… vanity plates may contain a maximum of 6 characters (letters or numbers) and a minimum of 2 characters."
- "Numbers cannot be used in the middle of a plate; they must come at the end. For example, AAA222 would be an acceptable … vanity plate; AAA22A would not be acceptable. The first number used cannot be a '0'."
- "No periods, spaces, or punctuation marks are allowed."

In `plates.py`, implement a program that prompts the user for a vanity plate and then output `Valid` if meets all of the requirements or `Invalid` if it does not. Assume that any letters in the usr's input will be uppercase. Structure your program per the below, wherein `is_valid` returns `True` if `s` meets all requirements and `False` if it does not. Assume that `s` will be a `str`. You're welcome to implement additional functions for `is_valid` to call (e.g., one function per requirement).

```
def main():
    plate = input("Plate: ")
    if is_valid(plate):
        print("Valid")
```

```
    else:
        print("Invalid")


def is_valid(s):
    ...


main()
```

▼ **Hints**

- Recall that a `str` comes with quite a few methods, per docs.python.org/3/library/stdtypes.html#string-methods (https://docs.python.org/3/library/stdtypes.html#string-methods).
- Much like a `list`, a `str` is a "sequence" (of characters), which means it can be "sliced (https://docs.python.org/3/library/stdtypes.html#common-sequence-operations)" into shorter strings with syntax like `s[i:j]`. For instance, if `s` is `"CS50"`, then `s[0:2]` would be `"CS"`.

Demo

```
Plate: GOODBYE
Invalid
$ python plates.py
Plate: CS50
Valid
$ python plates.py
Plate: CS05
Invalid
$ python plates.py
Plate: 50
Invalid
$
```

Recorded with asciinema

Before You Begin

Log into code.cs50.io (https://code.cs50.io/), 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 plates
```

to make a folder called `plates` into your codespace.

Then execute

```
cd plates
```

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

```
code plates.py
```

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

How to Test

Here's how to test your code manually:

- Run your program with `python plates.py`. Type `CS50` and press Enter. Your program should output:

  ```
  Valid
  ```

- Run your program with `python plates.py`. Type `51HHMD` and press Enter. Your program should output:

  ```
  Invalid
  ```

- Run your program with `python plates.py`. Type `A-113` and press Enter. Your program should output

  ```
  Invalid
  ```

- Run your program with `python plates.py`. Type `OUTATIME` and press Enter. Your program should output

  ```
  Invalid
  ```

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/plates
```

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/plates
```