

# This is CS50

## CS50's Introduction to Computer Science

OpenCourseWare

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## Cash

Implement a program that calculates the minimum number of coins required to give a user change.

```
$ python cash.py
Change owed: 0.41
4
```

## Getting Started

Log into [cs50.dev](https://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

```
wget https://cdn.cs50.net/2022/fall/psets/6/sentimental-cash.zip
```

in order to download a ZIP called `sentimental-cash.zip` into your codespace.

Then execute

```
unzip sentimental-cash.zip
```

to create a folder called `sentimental-cash`. You no longer need the ZIP file, so you can execute

```
rm sentimental-cash.zip
```

and respond with “y” followed by Enter at the prompt to remove the ZIP file you downloaded.

Now type

```
cd sentimental-cash
```

followed by Enter to move yourself into (i.e., open) that directory. Your prompt should now resemble the below.

```
sentimental-cash/ $
```

Execute `ls` by itself, and you should see `cash.py`. If you run into any trouble, follow these same steps again and see if you can determine where you went wrong!

## Specification

- Write, in a file called `cash.py`, a program that first asks the user how much change is owed and then spits out the minimum number of coins with which said change can be made. You can do this exactly as you did in [Problem Set 1](#), except that your program this time should be written in Python, and you should assume that the user will input their change in dollars (e.g., 0.50 dollars instead of 50 cents).
- Use `get_float` from the CS50 Library to get the user's input and `print` to output your answer. Assume that the only coins available are quarters (25¢), dimes (10¢), nickels (5¢), and pennies (1¢).
  - We ask that you use `get_float` so that you can handle dollars and cents, albeit sans dollar sign. In other words, if some customer is owed \$9.75 (as in the case where a newspaper costs 25¢ but the customer pays with a \$10 bill), assume that your program's input will be `9.75` and not `$9.75` or `975`. However, if some customer is owed \$9 exactly, assume that your program's input will be `9.00` or just `9` but, again, not `$9` or `900`. Of course, by nature of floating-point values, your program will likely work with inputs like `9.0` and `9.000` as well; you need not worry about checking whether the user's input is “formatted” like money should be.
- If the user fails to provide a non-negative value, your program should re-prompt the user for a valid amount again and again until the user complies.
- Incidentally, so that we can automate some tests of your code, we ask that your program's last line of output be only the minimum number of coins possible: an integer followed by a newline.

## Usage

Your program should behave per the example below.

```
$ python cash.py
Change owed: 0.41
4
```

## Testing

While `check50` is available for this problem, you're encouraged to first test your code on your own for each of the following.

- Run your program as `python cash.py`, and wait for a prompt for input. Type in `0.41` and press enter. Your program should output `4`.
- Run your program as `python cash.py`, and wait for a prompt for input. Type in `0.01` and press enter. Your program should output `1`.
- Run your program as `python cash.py`, and wait for a prompt for input. Type in `0.15` and press enter. Your program should output `2`.
- Run your program as `python cash.py`, and wait for a prompt for input. Type in `1.60` and press enter. Your program should output `7`.
- Run your program as `python cash.py`, and wait for a prompt for input. Type in `23` and press enter. Your program should output `92`.
- Run your program as `python cash.py`, and wait for a prompt for input. Type in `4.2` and press enter. Your program should output `18`.
- Run your program as `python cash.py`, and wait for a prompt for input. Type in `-1` and press enter. Your program should reject this input as invalid, as by re-prompting the user to type in another number.
- Run your program as `python cash.py`, and wait for a prompt for input. Type in `foo` and press enter. Your program should reject this input as invalid, as by re-prompting the user to type in another number.
- Run your program as `python cash.py`, and wait for a prompt for input. Do not type anything, and press enter. Your program should reject this input as invalid, as by re-prompting the user to type in another number.

Execute the below to evaluate the correctness of your code using `check50`. But be sure to compile and test it yourself as well!

```
check50 cs50/problems/2023/x/sentimental/cash
```

Execute the below to evaluate the style of your code using `style50`.

```
style50 cash.py
```

## How to Submit

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

```
submit50 cs50/problems/2023/x/sentimental/cash
```

