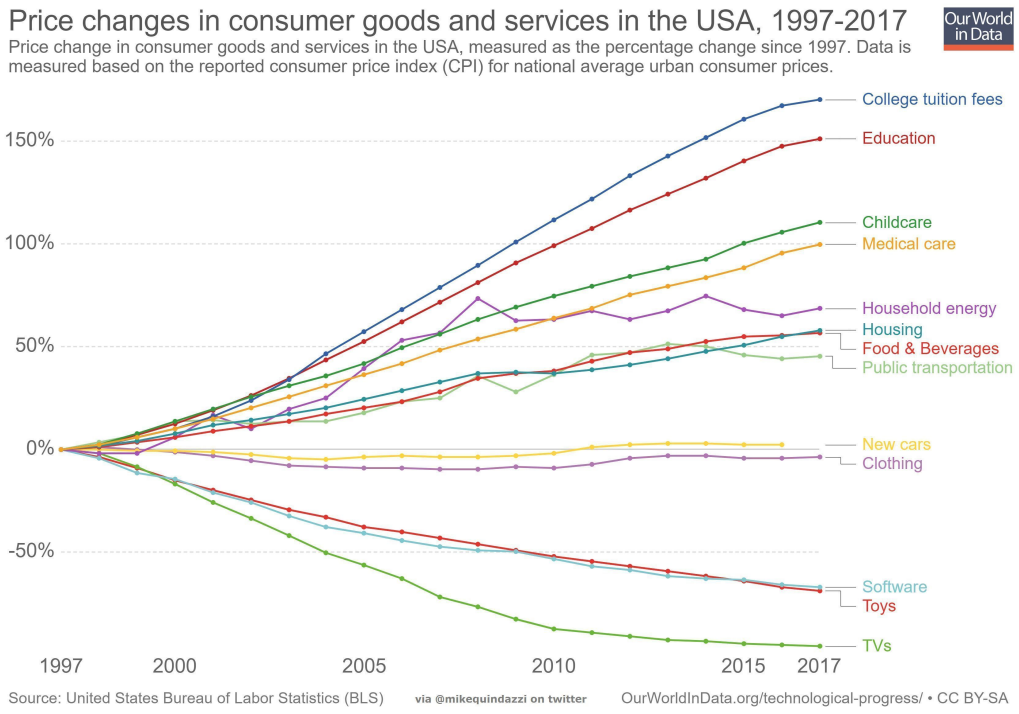
Take-home test for Unit 6

Intro



Task

In this task, we are going to write a program `test6.py` that reports **Consumer Price Index** and its **maximum** and **average** values for any year selected by the user. Additionally, the user will be able to choose the months of the year they want to display. The program will have to use **list comprehension** for transforming the list of months into the list of corresponding CPI values.

Enter query: **1948**
[23.7, 23.5, 23.4, 23.8, 23.9, 24.1, 24.4, 24.5, 24.5, 24.4, 24.2, 24.1]
max = 24.5
avg = 24.041666666666668

Enter query: **1948 10 11 12** *(October, November, and December of 1948)*
Enter query: 1948 10 11 12
[24.4, 24.2, 24.1]
max = 24.4
avg = 24.23333333333333

Enter query: **1948 3 5 7 9 11** *(March, May, July, September, and November of 1948)*
[23.4, 23.9, 24.4, 24.5, 24.2]
max = 24.5
avg = 24.08

...

Step-by-step implementation:

1. Use `urllib.request` to download CPI data from `http://nancymcohen.com/csci133/cpiai.txt`.
2. Provide a user interface to look up the CPI values for any year. The program should read a year number from the keyboard and print out the list of CPI values for that year. After that, it should compute and print out the maximum and average CPI for that year (by computing the maximum and the average value in the reported list).

```
Enter query: 1950
[23.5, 23.5, 23.6, 23.6, 23.7, 23.8, 24.1, 24.3, 24.4, 24.6, 24.7, 25.0]
max = 25.0
avg = 24.066666666666666

Enter query: 2001
[175.1, 175.8, 176.2, 176.9, 177.7, 178.0, 177.5, 177.5, 178.3, 177.7, 177.4, 176.7]
max = 178.3
avg = 177.06666666666663

...
```

3. Enhance the program by allowing the user to specify the list of months they want to see. A valid query may *in addition* to the year number contain a list of month numbers separated by spaces.

   For example, `1948 10 11 12` requests the data for October, November, and December of 1948. If the months are not specified, report full year. The maximum and the average should be computed only for the reported months.

```
Enter query: 1948 10 11 12
[24.4, 24.2, 24.1]
max = 24.4
avg = 24.23333333333333

Enter query: 1948 1 3 5 7 9
[23.7, 23.4, 23.9, 24.4, 24.5]
max = 24.5
avg = 23.98

Enter query: 1948
[23.7, 23.5, 23.4, 23.8, 23.9, 24.1, 24.4, 24.5, 24.5, 24.4, 24.2, 24.1]
max = 24.5
avg = 24.041666666666668

...
```

To find the list of months requested by the user, you will have to split the user input into a list of strings. If the length of the list is equal to 1, it contains only a year number and you have to report full year. Otherwise, the remaining elements of the list are the month numbers, use slicing to extract these numbers.

4. Finally, edit your program to use **list comprehension** when transforming the list of month numbers into the list of corresponding CPI values.

Don't worry what happens if the user enters invalid year or invalid month numbers.

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