Unit 6

Apply what you know (updated)

0. Study the programs in the *Learn something new* section until you can write them yourself from scratch without relying on this document or any other source of information. Here are the programs:

   0.1. Write a program to list lines in the *Huckleberry Finn* file that contain a string of three asterisks. The file URL is:

   ```
   https://www.gutenberg.org/files/76/76-0.txt
   ```

   0.2. Write a program that reads this same file from the web and creates a persistent list of the lines in it. Each line should be converted to a string and have the last two characters stripped off. Do *not* use a list comprehension.

   0.3. Modify the previous program so that it does use a list comprehension.

   0.4. Write a program that uses the shelved version of *Huckleberry Finn* to list lines from the novel containing the string 'cat'.

   0.5. Write a program that creates a persistent dictionary of Consumer Price Index values. If the dictionary is called `cpi`, then `cpi[year][month]` should be the CPI value for that year and month. CPI data is available on the web at the following URL:

   ```
   https://futureboy.us/frinkdata/cpiai.txt
   ```

   0.6. Write a program that uses the persistent CPI dictionary to list years in which prices fell between January and February.

1. Write and test a function called `lengths` that takes in a list of strings and returns a list of the lengths of the strings. If we pass it `['Ed', 'Ted', 'Fred', 'Jennifer']`, it will return `[2, 3, 4, 8]`. Your function should use a list comprehension.

2. Write a program to add *Pride and Prejudice* to the shelve object that holds *Huckleberry Finn*.

3. Use the shelved versions of *Pride and Prejudice* and *Huckleberry Finn* to see which of the two novels uses longer words on average.

4. Use the shelved version of the Consumer Price Index data to find the largest percentage increase in prices ever recorded over the summer months—that is, from May to September—and the year in which it occurred. Your program should use a function to compute the percentage increase. If a value increases from `begin` to `end`, the percentage increase is given by the formula: `100*(end/begin-1)`

5. Write a function `f` that takes in a number `x` and returns `17.7/(4x^2 -12x+13)`.
   Then write a program that asks the user for two floating point numbers, checks the value of f at 100 evenly spaced points between these two numbers and reports the highest value found. Use the builtin function `max`, which takes in a list of values and returns the highest.