

QMB 3311: Python for Business Analytics

Department of Economics
College of Business
University of Central Florida
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Assignment 2

Due Sunday, January 30, 2021 at 11:59 PM
in your GitHub repository

Instructions:

Complete this assignment within the space on your GitHub repo in a folder called `assignment_02`. In this folder, save your answers to Questions 1 and 2 in a file called `my_functions.py`, following the sample script in the folder `assignment_02` in the course repository. When you are finished, submit it by uploading your files to your GitHub repo using any one of the approaches outlined in Question 3. You are free to discuss your approach to each question with your classmates but you must upload your own work.

Question 1:

Follow the function design recipe to define functions for all of the following Exercises. For each function, create three examples to test your functions. Record the definitions in the sample script `my_functions.py`

- Example 1 Write a python function `present_value()` that will calculate the present value of a future cash flow. It should have three arguments, the dollar amount of the cash flow, the discount rate, and the number of years that the cash flow is to be received in the future. A junior developer at your firm made an initial attempt in the sample script `my_functions.py` but left to join a start-up in California. You might have to make some adjustments to the function.
- Example 2 Write a python function `future_value()` that will calculate the *future* value of a *present* cash flow. It should have three arguments, the dollar amount of the cash flow, the interest rate, and the number of years that the cash flow is to be invested for the future. You can call your function `present_value()` within this function.
- Example 3 Write a python function `total_revenue()` that will calculate the revenue earned by a firm selling a product at a fixed price. The first argument should be the number of units sold. The second argument should be the price.
- Example 4 Write a python function `total_cost()` that will calculate the total cost incurred by a firm to produce a product. The first argument should be the number of units produced. The second argument should be the fixed cost. The third argument should be a constant that is multiplied by the square of the number of units sold. That is, the cost function can be written as $TC(q, a, b) = aq^2 + b$, where b is the fixed cost, q is the quantity sold, and b is the number multiplied by the square of the number of units.

Example 5 Write a python function `CESutility()` that will calculate the value of the Constant Elasticity of Substitution utility function $u(x, y; \alpha) = (x^r + y^r)^{\frac{1}{r}}$, which measures a theoretical degree of satisfaction that a consumer may get from buying two goods. The first two arguments are x and y , respectively, to denote the amounts of two goods consumed, and the third is r , which is a parameter that represent the degree to which the goods are substitutes or complements.

Question 2:

For all of the Exercises in Question 1, use your examples to test the functions you defined. Complete the code at the bottom of your `my_functions.py` script so that it will make the comparisons between your expected answers and the output from your functions. When you run the whole block of code at the bottom, it should print the results of all your comparisons.

Question 3:

Push your completed files to your GitHub repository following one of these three methods.

Method 1: In a Browser

Upload your code to your GitHub repo using the interface in a browser.

1. Browse to your `assignment_02` folder in your repository.
2. Click on the “Add file” button and select “Upload files” from the drop-down menu.
3. Revise the generic message “Added files via upload” to leave a more specific message. You can also add a description of what you are uploading in the field marked “Add an optional extended description...”
4. Press the button “Commit changes,” leaving the button set to “Commit directly to the `main` branch.”

Method 2: With GitHub Desktop

Upload your code to your GitHub repo using the interface in GitHub Desktop.

1. Save your file within the folder in your repository within the folder referenced in GitHub Desktop.
2. When you see the changes in GitHub Desktop, add a description of the changes you are making in the bottom left panel.
3. Press the button “Commit to main” to commit those changes.
4. Press the button “Push origin” to push the changes to the online repository. After this step, the changes should be visible on a browser, after refreshing the page.

Method 3: At the Command Line

Push your code directly to the repository from the command line in a terminal window, such as GitBash on a Windows machine or Terminal on a Mac.

1. Open GitBash or Terminal and navigate to the folder inside your local copy of your git repo containing your assignments. Any easy way to do this is to right-click and open GitBash within the folder in Explorer. A better way is to navigate with UNIX commands, such as `cd`.
2. Enter `git add .` to stage all of your files to commit to your repo. You can enter `git add my_filename.ext` to add files one at a time, such as `my_functions.py` in this Assignment.
3. Enter `git commit -m "Describe your changes here"`, with an appropriate description, to commit the changes. This packages all the added changes into a single unit and stages them to **push** to your online repo.
4. Enter `git push origin main` to push the changes to the online repository. After this step, the changes should be visible on a browser, after refreshing the page.