

CS 2450 – Advanced Programming

Final Assignment

Instructor: Patrik Boloz

Date: 11-29-2023

Maximum points: 150

Deadline: 12-8-2023 by midnight. Any submissions after the deadline will NOT be accepted.

Finish these two following exercises and submit a compressed folder where each exercise will have its own subfolder, with the Python code and image files for each exercise.

Exercise 1 (75 points):

Write a Python program that generates a scatter plot showing the square root of every 10th value between numbers 200 and 100, in descending order.

Details:

- Use matplotlib.pyplot and math libraries (sqrt) as initial imports
- Generate x_values and y_values. The x_values are generated with the use of a range function, where you start with value 200, stop at 100, and the step is -10. The y_values will be generated with the use of a for loop and a square root function, that will compute the square root of each of the x_values.
- Create a scatter plot, where you use the Blues colormap and set the size of the points to 25.
- Create a custom title, an x-label, and a y-label.
- Use the set_xticks and set_yticks methods to show all x and y-values on the plot.
- Invert the points to be shown in descending order.
- Save the generated plot (manually or introduce a line in the script) as a JPG, JPEG, or PNG.

Exercise 2 (75 points):

Write a Python program that generates a Plotly Express bar plot showing the frequency of values resulting by rolling one D6, one D12, and one D20 die 1500 times.

Details:

- Use the provided Die class as a starting point.
- Import plotly.express and the Die class from the module.
- Create one D6, one D12, and one D20 die with the use of a Die class.
- Make 1500 rolls and store the results in a results list.
- Create a frequency list, where based on the possible results, you will append the frequency of the result found in the results list.
- Create a bar plot with the use of Plotly Express with a custom title and labels.

- Update the layout so that each x-value is shown under each bar.
- Save the generated plot/Take a screenshot of the generated plot and save it as a JPG, JPEG, or PNG file.

Submissions Requirements:

- Each exercise should have its own folder, where the Python code and the screenshots/images can be found.
- You will submit only ONE Zipped/Compressed folder, which will contain the exercise subfolders. This compressed folder should be named as LastNameFirstInitial_final_assignment.zip, for example “bolozp_final_assignment.zip”.
- Submit the compressed folder to Brightspace by the Deadline. Any submissions after the deadline will NOT be accepted.

Grading Criteria:

- Points will be assigned based on each task that is completed/not completed.
- Partial points will be assigned; therefore, submission of partial code is encouraged.
- If no file is submitted for that exercise, automatic 0 points will be awarded to that exercise in question.