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CS 499 Capstone

Artifact 2 Narrative

1. Briefly describe the artifact. What is it? When was it created?
    1. This artifact is an android application that I made in CS 360. It is a weight tracking application that allows the user to login and keep track of their weight while also displaying this data in graphical form.
2. Justify the inclusion of the artifact in your ePortfolio. Why did you select this item? What specific components of the artifact showcase your skills and abilities in algorithms and data structure? How was the artifact improved?
    1. I selected this item because it is the first application that I developed from ground up. From the design phase to the implementation of the UI and functionality.
    2. With this enhancement I learned how to formulate mathematical formulas from the mathematical form to a code form. To do this I needed to translate which data would be needed to fill in for the formula. After deciding on a formula model I then had to translate to the types of data and structures I would need to use to hold and call this data.
    3. The components that are shown for algorithms and data structures that was developed for this enhancement was an algorithm to predict future weights and then display those onto the graph. This gives the user the ability to see how their progress is going and the implications of their choices.

3. Did you meet the course outcomes you planned to meet with this enhancement in Module One? Do you have any updates to your outcome-coverage plans?
    1. With this enhancement I am able to check off the remaining outcomes that I feel I needed to achieve. These would be:
        1. Design and evaluate computing solutions that solve a given problem using algorithmic principles and computer science practices and standards appropriate to its solution, while managing the trade-offs involved in design choices (data structures and algorithms) – done by creating algorithm based on the collected data that would be available to me, and structuring that data in forms that can be used to preform functions.
        2. Develop a security mindset that anticipates adversarial exploits in software architecture and designs to expose potential vulnerabilities, mitigate design flaws, and ensure privacy and enhanced security of data and resources – required exact formatting of data so user input validation was crucial for formatting the date in this instance.
    2. As far as outcome-coverage plans with this artifact It should cover all five outcomes that are needed. I feel like if this does not sufficiently cover them then my next artifact should be able to cover the rest.
4. Reflect on the process of enhancing and modifying the artifact. What did you learn as you were creating it and improving it? What challenges did you face?
    1. Creating this prediction algorithm has helped me to think outside the box and how to get all the data that is needed for any type of formula. This algorithm is

constant or O(1) since it always just references the first and last data points in the list. There are never any loops that needs referencing the other data points. Creating this made me think how I wanted to store this data because it could constantly change so when I read my data from the DB it is safe to store them in a list. This also allows for other enhancements to be done if we need further data from those list. Because the dates were stored in the DB as a string I had to find a way to convert them from the pattern that they were saved in. Luckily Java provides away to do this using the DateTimeFormatter. This is something I learned to do while developing this enhancement and feel like it could be beneficial for future projects.

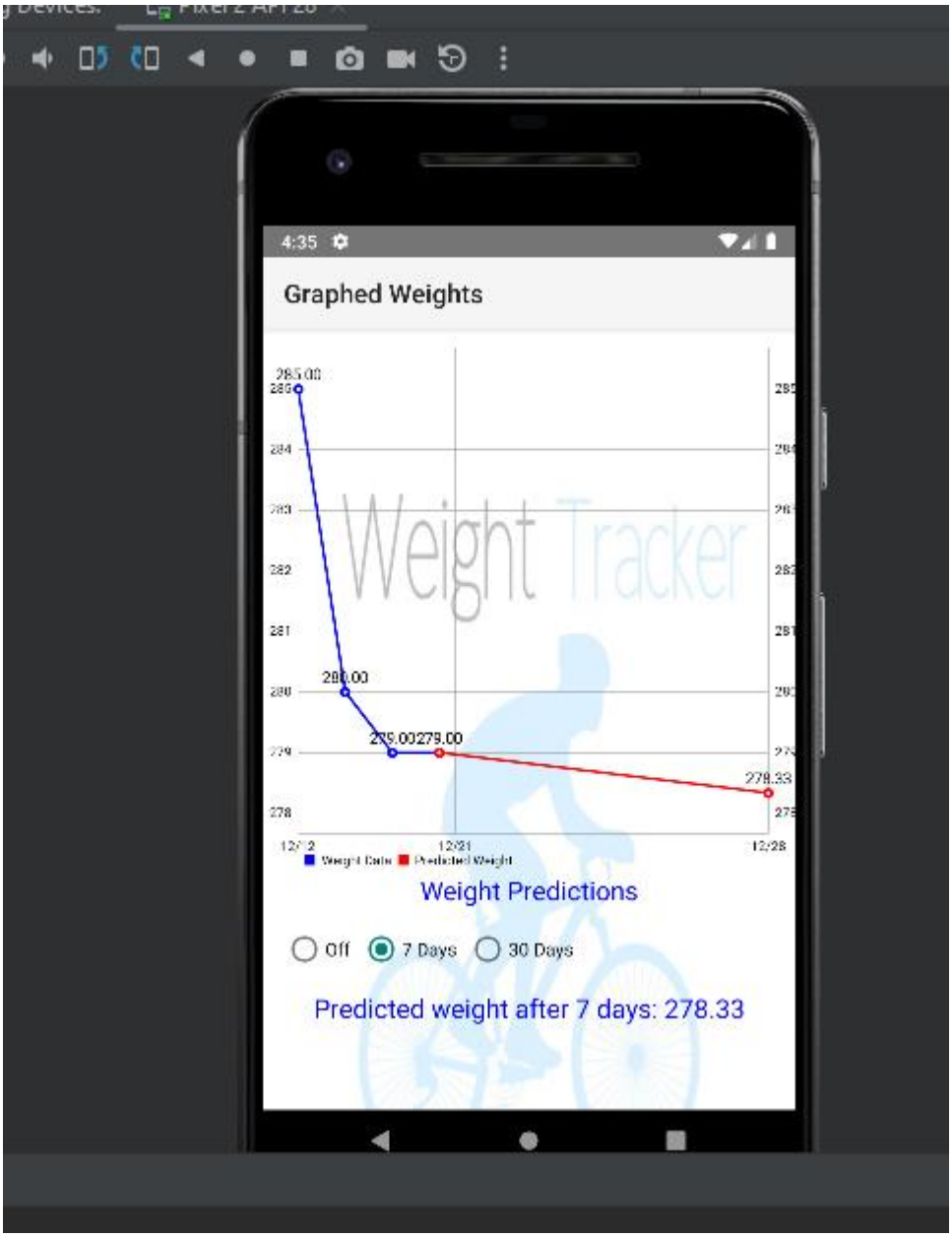
2. The main challenges I faced while creating this were figuring out which data I needed to use to get the best results. I knew that I wanted to incorporate the days in this. I was able to decide on using the very first weight and the last weight and the days between when those weights were taken.

Screenshots of algorithm in use: The algorithm takes the first data point (first weight) and the last data point (last weight) and then uses the days between each to predict the future weight of the selected days (linear regression formula).

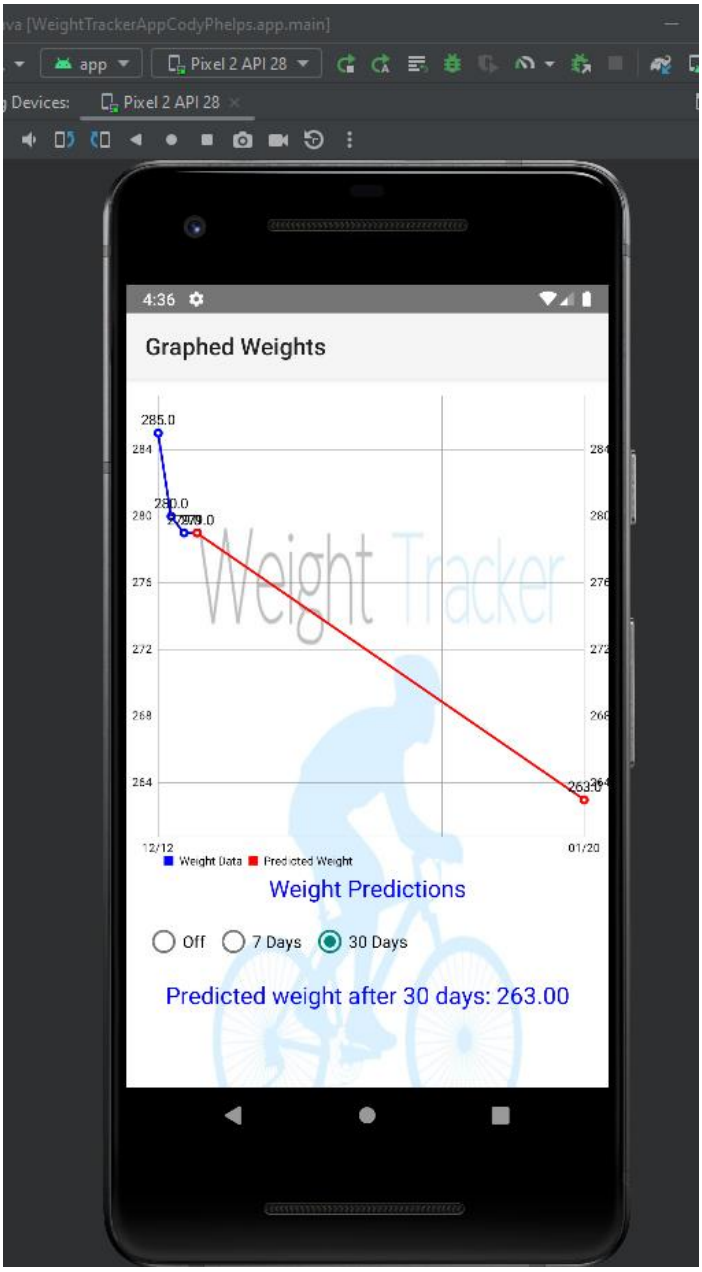
Before weight predictions selected:


4:34
Graphed Weights
285.00
284
283
282
281
280
279
280.00
279.00
279.00
12/12
12/19
2/20
Weight Predictions
Off
7 Days
30 Days

7 days:


4:35
Graphed Weights
285.00
280.00
279.00279.00
278.33
12/28
Weight Predictions
Off
7 Days
30 Days
Predicted weight after 7 days: 278.33

30 days:


app
Pixel 2 API 28
Devices:
Pixel 2 API 28
4:36
Graphed Weights
285.0
280.0
284
280
276
272
268
264
12/12
01/20
Weight Data
Predicted Weight
Weight Predictions
Off
7 Days
30 Days
Predicted weight after 30 days: 263.00