MET 3601 Syntax Problem #8

Please do your work in the syntax-problems folder on the JupyterHub <u>and</u> DON'T forget to also upload both the figure and the .ipynb file to Canvas!

https://fit24f-1.ees220002.projects.jetstream-cloud.org/

Objectives

1. Practice writing and running Python code
2. Use File I/O for input into program

Due by 11:00 a.m. 10/2/2024

Problem

1. Write a Python program that will read the input file KMLB_precip.txt and perform a few tasks. (File is available in the syntax folder in the JupyterHub and on Canvas)

a) For the hours 2100-2200 UTC only, plot a bar graph of the cumulative precipitation (that is what is in the text file!).

b) Add a line graph of the cumulative precipitation to the figure you started in part a.

c) Use the cumulative precipitation to calculate the individual amounts (i.e., the amount that has fallen in each time interval). Add this to the figure as a second bar graph (same scale).

d) Call the figure kmlb_precip.png.

Notes:

- Be careful dealing with the "missing" (blank) data for times when there is no precipitation. *See np.nan_to_num(array) in the syntax8.ipynb file*.
- You must limit the x axis time interval to one hour (2100-2200 UTC) only. *See ax.set_xlim() in the syntax8.ipynb file*.
- You will need to format the x-axis to plot only the hours and minutes of the date-time string (the day is not needed – it just clutters up the x-axis!). See

      fmt = mdates.DateFormatter('%H:%M')
      ax.xaxis.set_major_formatter(fmt)

  in the syntax8.ipynb file.

- For part c), you will need to calculate the difference between consecutive (n=1) numpy array elements using:

new_array = np.diff(original_array, n=1)

- You will need to add a single element (zero here) to the end of the numpy array you created in part c) above. If you don't do this, you will not be able to add it to the figure.

See the previous syntax problem #7 for instructions on how to read the file.