**Names: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Group Project#05**

**Computer Applications in Meteorology Due: Fri. Feb. 21, 2020**

**Python**

1. Driver Initials:\_\_\_\_\_\_\_\_ Passenger Initials:\_\_\_\_\_\_\_\_
* Launch Xming
* Login to “blizzard.atms.unca.edu” via PuTTY
* [uname@blizzard]# csh
* [uname@blizzard]# verify that this is already in your environment by typing “setenv”, otherwise type=> setenv LD\_LIBRARY\_PATH /data/local/hdf5/lib:/usr/share/VTK/bin:/usr/share/netcdf/lib:/data/local/epd-7.2-2-rh5-x86\_64/lib/vtk-5.6
* [uname@blizzard]# verify that this is already in your environment by typing “setenv”, otherwise type => setenv PYTHONPATH /usr/share/VTK/Wrapping/Python:/usr/share/VTK/bin:/usr/local/epd-7.2-2-rh5-x86\_64/bin
* [uname@blizzard]# python
* At the command prompt type: *print “Hello World!”* <Enter>
	+ What happened?
* Now type: *#print “Hello World!”* <Enter>
	+ What happened?
* Type: *1 + 1* <Enter>
	+ What happened?
* Quit python and create subdirectory “python” in your “/home/atms261/GroupNN” directory
* Copy ‘python\_files.tar’ from “/home/atms261/programs” into your “python” subdirectory
* Untar the contents of ‘python\_files.tar’, type: tar –xvf ./python\_files.tar <Enter> which should allow you to see the following files and directories within subdirectory “python”…

 -rw-r--r--. 1 dmiller facstaff 102400 Feb 26 13:35 python\_files.tar

 drwxr-xr-x. 2 dmiller facstaff 4096 Feb 26 13:32 skewt

 -rwxr--r--. 1 dmiller facstaff 3602 Feb 25 16:23 MyPython.py

 -rw-r--r--. 1 dmiller facstaff 1802 Feb 25 16:12 Asheville2009.txt

 -rwxr-xr-x. 1 dmiller facstaff 191 Feb 24 09:18 script.py

 -rw-r--r--. 1 dmiller facstaff 6683 Feb 24 09:18 bna\_day1.txt

 -rw-r--r--. 1 dmiller facstaff 6137 Feb 24 09:18 bna\_day2.txt

 -rw-r--r--. 1 dmiller facstaff 2768 Feb 24 09:18 CHANGES.txt

 -rw-r--r--. 1 dmiller facstaff 8868 Feb 24 09:18 GSO\_1200utc19feb2020.txt

 -rw-r--r--. 1 dmiller facstaff 2906 Feb 24 09:18 LICENSE.txt

 -rw-r--r--. 1 dmiller facstaff 6513 Feb 24 09:18 README.txt

 -rw-r--r--. 1 dmiller facstaff 8559 Feb 23 17:57 PKG-INFO

 -rw-r--r--. 1 dmiller facstaff 467 Feb 23 17:54 setup.py

* Edit file ‘MyPython.py’ so that you can convert monthly AVL climatological observations from 2009 (Asheville2009.txt) to a more user-friendly output
* Test your program🡪[uname@blizzard]# python MyPython.py
* If your file has errors, it will ***not*** report “finished.” Return to edit the file.
* Once your program reports “finished,” open your output file “AVL\_Temps.out”. Check your results!
	+ If the results are correct, you are finished with Part (a)!
1. Driver Initials:\_\_\_\_\_\_\_\_ Passenger Initials:\_\_\_\_\_\_\_\_

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**Computer Applications in Meteorology Due: Fri. Feb. 21, 2020**

**Python (continued)**

where *TPW* = total precipitable water [kg m-2 {= mm}], *w* = mixing ratio [kg kg-1], *ρ* = air density [kg m-3], and *Z* = altitude [m]

* Within the “python” subdirectory, drop down to the “skewt” subdirectory and open an Emacs window for inspecting contents of the python file “SkewT.py”. Locate the routine ‘precipitable\_water’ and write down (a) from where the following routines are imported…
1. (b)

 SatVap:

 MixRatio:

 DensityHumid:

 trapz:

and (b) their purpose or function

* Run the python script for plotting a sounding on a Skew-T log P thermodynamic diagram by typing “./script.py” within the “python” subdirectory. Describe what happens…
* Fix the appropriate python code (look carefully at the code comments to know where to find the missing values needing to be added to the saturation vapor pressure routine) and re-run the Skew-T python script. Describe what happens…
* Note below the text files (\*.txt) located in your “python” subdirectory
* Link the text file containing the rawinsonde data from GSO (Greensboro, NC) at 1200 UTC 19 February 2020 to the default rawinsonde data filename by typing the command…

[uname@blizzard]# ln –s GSO\_1200utc19feb2020.txt soundingdata.txt

* Note below the **NEW** text file(s ) located in your “python” subdirectory
* Re-run the Skew-T python script. What file is created (list its name) and what type of file is it?
* Rename the output file to a name more descriptive of the “when” and “where” origins of the sounding data
* Verify that your python code is running correctly by comparing your Skew-T plot and total precipitable water calculation to what is displayed for the Greensboro sounding on the University of Wyoming upper-air web site located at

 <http://weather.uwyo.edu/upperair/sounding.html>

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**Computer Applications in Meteorology Due: Fri. Feb. 21, 2020**

**Python (continued)**

1. Driver Initials:\_\_\_\_\_\_\_\_ Passenger Initials:\_\_\_\_\_\_\_\_
* Create Skew-T log P thermodynamic diagram plots for rawinsonde observations from Nashville, TN on Day 1 (bna\_day1.txt) and Day 2 (bna\_day2.txt)
* List below the total precipitable water amounts from each day (don’t forget to include proper units)

Day 1: Day 2:

* Describe briefly how the temperature profile changed at Nashville, TN (BNA) from Day 1 to Day 2
* Describe briefly how the dewpoint temperature profile changed at Nashville, TN (BNA) from Day 1 to Day 2
* Describe briefly how the wind profile changed at Nashville, TN (BNA) from Day 1 to Day 2
* On which day (Day 1 or Day 2) was severe weather more likely to occur? How did you reach this conclusion?
* Go to your favorite weather map archive site (e.g., <http://www.wpc.ncep.noaa.gov/archives/web_pages/sfc/sfc_archive.php> ) to determine what happened at BNA between the launch of the rawinsonde on Day 1 and Day 2. Give a brief description of what happened below…

# Deliverables for Group Project#05 are:

* “AVL\_Temps.out” output file and answers to prompts on this answer sheet
* Plot of 1200 UTC 19 February 2020 GSO sounding and answers to prompts on this answer sheet
* Plots of Nashville, TN soundings from Day 1 and 2, along with answers to prompts on this answer sheet

Next meeting: **Moving data**