By submitting this assignment, I agree to the following:
"Aggies do not lie, cheat, or steal, or tolerate those who do."
"I have not given or received any unauthorized aid on this assignment."

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Section: 213
Team: 11
Assignment: Lab8_Act1
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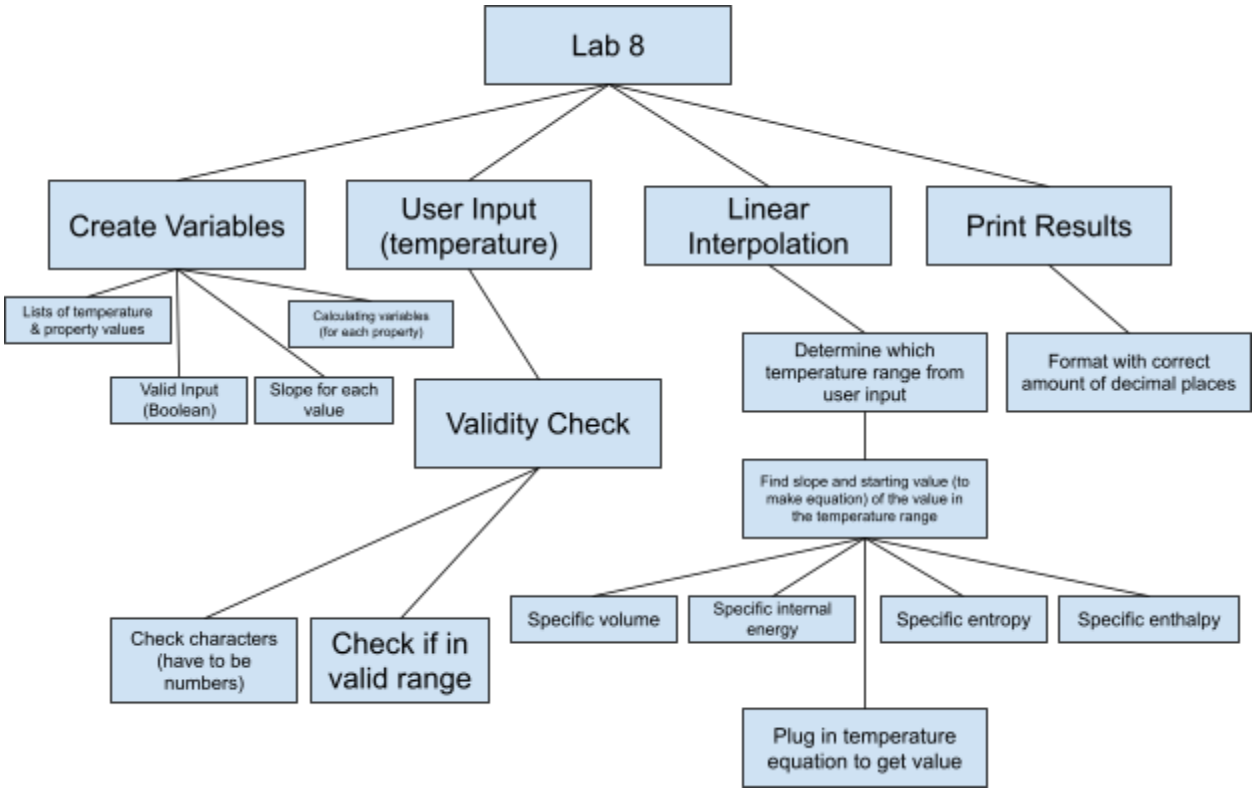
Hierarchy:



Variables:

- temp_list
  - This is a list of all the temperature values (in degrees Celsius) in the data sheet.
- specific_volume
  - This is a float that the calculated value of specific volume (in meters cubed/kilograms (m3/kg)) will be stored in.
- specific_volume_list
  - This is a list of all the specific volume values in the data sheet.
- slope_specific_volume
  - This is a float that will store the calculated value of the slope of the specific volume in the inputted temperature range.
- specific_internal_energy_list
  - This is a list of all the specific internal energy values in the data sheet.
- specific_internal_energy
  - This is a float that the calculated value of specific internal energy (kilojoules/kilograms (kJ/kg))will be stored in.
- slope_specific_internal_energy
  - This is a float that will store the calculated value of the slope of the specific internal energy in the inputted temperature range.
- specific_entropy
  - This is a float that the calculated value of specific entropy (kilojoules/kilograms per Kelvin (kJ/kgK)) will be stored in.
- specific_entropy_list
  - This is a list of all the specific entropy values in the data sheet.
- slope_specific_entropy
  - This is a float that will store the calculated value of the slope of the specific entropy in the inputted temperature range.
- specific_enthalpy
  - This is a float that the calculated value of specific enthalpy (kilojoules/kilograms (kJ/kg)) will be stored in.
- specific_enthalpy_list
  - This is a list of all the specific enthalpy values in the data sheet.
- slope_specific_enthalpy
  - This is a float that will store the calculated value of the slope of the specific enthalpy in the inputted temperature range.
- valid_characters
  - This is a string of the allowable characters, numbers and periods as a decimal point.
- temperature
  - This is a float that will be input by the user (as a string and converted to float).
- temp_index
  - This is an integer that will store the index of the temperature range it is in, for use in calculations.
- delta_y

    - This is a float that stores the change in y value, for each of the property values, to be used in slope calculations.
- delta_x
    - This is a float that stores the change in x value, for each of the property values, to be used in slope calculations.

Test Cases:

1.) Input Temperature: 200
    a.) Results:
        i.) Specific Volume: 0.0011531
        ii.) Specific Internal Energy: 847.92
        iii.) Specific Enthalpy: 853.68
        iv.) Specific Entropy: 2.3251
    b.) Type: Edge
2.) Input Temperature: 100
    a.) Results:
        i.) Specific Volume: 0.0010410
        ii.) Specific Internal Energy: 417.65
        iii.) Specific Enthalpy: 422.85
        iv.) Specific Entropy: 1.3034
    b.) Type: Edge
3.) Input Temperature: 20
    a.) Results:
        i.) Specific Volume: 0.0009996
        ii.) Specific Internal Energy: 83.61
        iii.) Specific Enthalpy: 88.61
        iv.) Specific Entropy: 0.2954
    b.) Type: Edge
4.) Input Temperature: 260
    a.) Results:
        i.) Specific Volume: 0.0012755
        ii.) Specific Internal Energy: 1128.50
        iii.) Specific Enthalpy: 1134.90
        iv.) Specific Entropy: 2.8841
    b.) Type: Edge
5.) Input Temperature: 140
    a.) Results:
        i.) Specific Volume: 0.0010769
        ii.) Specific Internal Energy: 586.80
        iii.) Specific Enthalpy: 592.18
        iv.) Specific Entropy: 1.7344
    b.) Type: Edge
6.) Input Temperature: 70

a.) Results:
    i.) Specific Volume: 0.0010208
    ii.) Specific Internal Energy: 292.06
    iii.) Specific Enthalpy: 297.16
    iv.) Specific Entropy: 0.9505
b.) Type: Typical

7.) Input Temperature: 130
    a.) Results:
        i.) Specific Volume: 0.0010673
        ii.) Specific Internal Energy: 544.36
        iii.) Specific Enthalpy: 549.69
        iv.) Specific Entropy: 1.6290
    b.) Type: Typical
8.) Input Temperature: 170
    a.) Results:
        i.) Specific Volume: 0.0011114
        ii.) Specific Internal Energy: 716.01
        iii.) Specific Enthalpy: 721.57
        iv.) Specific Entropy: 2.0356
    b.) Type: Typical
9.) Input Temperature: 10
    a.) Results:
        i.) Specific Volume: 0.0009987
        ii.) Specific Internal Energy: 41.83
        iii.) Specific Enthalpy: 46.82
        iv.) Specific Entropy: 0.1478
    b.) Type: Typical
10.) Input Temperature: 250
    a.) Results:
        i.) Specific Volume: 0.0012512
        ii.) Specific Internal Energy: 1080.05
        iii.) Specific Enthalpy: 1086.30
        iv.) Specific Entropy: 2.7912
    b.) Type: Typical

Summary:

Describe the difficulty with which your team was able to combine the code at the end. Did this provide your team any insight into how the design itself might have been specified more clearly?

Usually, our team has a fair amount of difficulty debugging our final code, but thanks to the top-down method, our team was able to combine our code with a significantly lower amount of

time dedicated to debugging. There were only a few issues with our code that we were able to locate and fix with relative ease. This exercise did show us that, even though our process design was very efficient, there was room for improvement. We would probably have been able to streamline the process even further if we had added separate nodes for subcategories, instead of just placing them under existing nodes. However, it can't be understated that our existing design process was still an improvement on our team's efficiency and effectiveness.

Describe any benefits and drawbacks you saw into dividing the coding like this. Can you see reasons why this might be a good idea? Can you see reasons why this might be a bad idea?

We saw many benefits to dividing the coding according to the top-down method. For example, each person was able to dedicate time to writing a short amount of code and making sure it ran perfectly before combining all of our separate files of code together. Because of this, we were able to eliminate a large percentage of errors that we may have made if we did not utilize the top-down method. The only drawback that our team noticed was the lack of communication we had while coding our individual sections of code. However, it is something we are willing to overlook for the efficiency we were afforded. The method we used to divide the work was clearly a good idea because we were able to solve the problem in a much shorter amount of time with less time dedicated to debugging the code. Despite our success with this method, we can still see why this could be a bad idea for some. We were able to achieve such success because of how detailed and thorough our initial plan was, but other teams who don't plan in such detail beforehand might experience a great amount of difficulty. Depending on the team, the top-down approach to coding could prove to be either extremely constructive or extremely destructive.