Al Gore's Revenge

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Problem.

Write a program exploring how the Earth's climate has changed over the past century and projecting what future temperatures might be like. You are going to explore the change in sea levels and the change in air temperature. The world's oceans have risen 1.8 mm over the past century. Forecasts indicate the rate will increase to 3.1 mm/year for the foreseeable future. In addition, the mean July air temperature was measured for the following cities for last year: New York City: 85 ◦ F, Denver: 88 ◦ F, Phoenix: 106 ◦ F, Sacramento: 92 ◦ F. Reports suggest these temperatures will increase by 2 ◦ F over the next 15 years and will continue to increase at that rate into the future. Note: my sample data shown in this assignment may differ from this.

Requirements.

- Store the results of all computations.
- Include your specification comments above the main portion of your code where you implement the specification. No credit if this is missing!
- Use white-space and comments to make your code more readable.
- Put a Source File Header at the top of your source file.
- Include a ProgramGreeting() function.
- Use function prototypes for all functions.
- Do not use c (.h) style libraries. Use C++ libraries instead.
- Your program must compile in C++ on Ubuntu.
- Your program must generate logically correct output.
- Program activities are split into logical 'chunks' or paragraphs. I'm expecting paragraphs for input, processing (if any), and output operations.
- If there is non integer output, force the computer to always display 3 places to the right of the decimal.

Specifications.

// Specification C1 - ProgramGreeting
Create a void ProgramGreeting() function which runs immediately upon program start (then initialization code, then your menu). You are free to put anything you want in this function many students put ASCII art here (but that will drive up your plagiarism score). Do not use cin to pause output, we want this function to run and done. Remember you will use this in every homework assignment in this class. You can make this a void function and not send it any arguments if you wish.

// Specification C2 - 5 year rise
Compute how much the oceans will rise each year over the next 5 years. Display each year's results.

// Specification C3 - 5 year temp
Compute how much the mean July temperatures will increase over the next 5 years each year. Display your results.

// Specification C4 - coutAll function
Create a void function called coutAll 3 and pass it 2 arguments: a year 1 rise value and a year 1 temperature value. The function will display the 2 values in 1 line. Build another output table with this by passing the values for years 2-5 as well.

// Specification B1 - Mixed length output
Display your output in both inches and mm. 1 mm = 0.1 cm = 0.03937 inches. Note: This conflicts with the output in the picture, follow this. Store your conversion factor in a constant variable MM2IN. Use the appropriate style for constants.

// Specification B2 - Mixed temperature output
Display your temperatures in both ◦ C as well as ◦ F. Store the conversion factor in the constant variable F2C and make sure the style is appropriate.

// Specification B3 - Auto Heading Function
Create a function called autoHeader. This void function takes a string and displays it in all caps as a title. It then, emits a newline and displays "=" underliniing each letter in the title. Do not send an all caps string, find the library function which will convert to uppercase for you. You may be wondering how to automatically underline the title. The string function has an option where you can have it generate a string with a specified number of characters, string(size, 'char'). String variables also have a function called size() which returns an integer of the size of the string.

// Specification B4 – coutMax function
Create a void function called coutMax. This function is similar to the function in C4 except it will take 4 values to display in one line: rise in mm and inches, temp in ◦ F and ◦ C. It will display all 4 values on one line. Display all 5 years with this function.

// Specification A - Reflection
Using the following prompts, generate feedback on your assignment using ChatGPT. Often shift-return will generate a blank line without submitting the prompt.

Analyze this student's code in relationship to commonly accepted C++ programming practices and standards. This is an assignment from an Introductory C++ programming course. Indicate if this code is likely to compile or run correctly in addition to your other feedback.

<Copy and Paste your source code here>

Review and reflect on the feedback the system gives you. Write this up in 250 words or more. Include your write up as a block comment at the bottom of your assignment. **Also indicate the number of words in your write up, as well**. You may wish to:

Comment on the overall quality of the assessment. Was it accurate? Did it make sense? Did you find it useful? Does it align with what you coded? You may wish to discuss one or two main themes the AI identified in relationship to your coding.

Memorialize your reaction to the feedback. Do you find it easier to get feedback from a computer or a human? Was there any advice in particular which was helpful to you? Can you think of a better prompt to generate the information you need?

I am NOT interested in the feedback from the generative AI. Do NOT copy and paste that in your program. I am interested in your thoughts about it however. You are free to use multiple prompts as well. I do not use this tool to grade your assignments - it's not accurate enough for my purposes. I will not grade the quality of your content. I want this to be useful to you and not worry about saying something "grade worthy". I suggest this is the last step you perform before you turn in your assignment. You can do it earlier if you wish, but the feedback will not be as useful. You are free to revise your code in light of the feedback you get, but remember, the assignment is what I grade to, not ChatGPT. Make sure you confirm your code runs before you turn it in.