

Background

Blood pressure and heart rate variability can be used to assess cardiovascular health, and are useful research tools.

Problem Statement

You are a biomedical engineer developing a program to analyze short segments of blood pressure data. The blood pressure sensor collecting the data sends text files after every 100 data points, containing the time of heart beats and the blood pressure value after each heart beat (systolic pressure). You will create a program to read the data from the text file, analyze it, and report the results to an output file.

Instructions*Represent*

- Consider creating a flowchart, algorithm, or pseudocode for solving the problem.

Plan

- Create a file named **APP_C27_1.cpp**
- Add comment statements to help organize your script file.

Implement

- Write a complete C/C++ program **APP_C27_1.cpp** to perform the following tasks:
 - Open an existing data file, **APP_C27_1_bp_hr.dat** verifying the file opened successfully.
 - This file is located in
/share/EED/class/engr1281/students/c/Class_27/Application/
 - Read all 100 lines of the file. Each line consists of the time for the heart beat and the corresponding pressure.
 - Since the time values represent the time of each beat (the amount of time between beats in minutes, or minutes per beat), the heart rate (beats per minute, or bpm) can be determined by calculating the reciprocal of each time value. Perform this calculation for all of the time values to yield the heart rate signal.
 - Determine the average, minimum, and maximum values for both the blood pressure (mm Hg) and the heart rate (beats per minute) data. Print these values to the screen.
 - Close **APP_C27_1_bp_hr.dat**.
- Compile, link, and run your program.
- Once working modify the program to perform the following tasks:
 - Create and open an output file named **APP_C27_1_result.txt**.
 - Write the same values to this output file that are also printed to the screen.
 - Close **APP_C27_1_result.txt**.
- Compile, link, and run your program.

Evaluate

- Verify your results using Excel.

Document

- Create a single PDF that includes your code, output to the terminal and file, verification, and any additional documentation.
- Submit the PDF to Carmen according to the DAL.

Include the standard comment, **printf()**, and **fprintf()** statements indicating name, etc.