Physical Activity and Heart Rates

Introduction

According to the CDC Guidelines, your target heart rate should be between 64-76% of your maximum heart rate for moderate-intensity physical activity or between 77-93% of your maximum heart rate for vigorous-intensity physical activity. One can estimate maximum age-related heart rate by subtracting their age from 220. For example, a 50-year old person would have a maximum age-related heart rate of 170 beats per minute (bpm).
CDC Guidelines: https://www.cdc.gov/physicalactivity/basics/measuring/heartrate.htm

Instructions

Your task with this question is to write a MATLAB script to retrieve and display the heart rate zones for a list of study patients participating in an exercise-based study and whether or not target metrics were met during their exercise time at the clinical study facility. Your code should work for any files that are of the same format (imagine I give you two more files with x patients and one with y patients).

Your script should make use of two text files:

- *study_patients.txt*: This file contains a row of data for each unique patient. Each row contains three numbers: the patient ID, their age, and the type of exercise prescription they are targeting (either moderate-intensity=MI or vigorous-intensity=VI).
- *study_results.txt:* This file contains a row of data for each exercise visit. Each row contains two numbers: the patient ID and the average heart rate during the exercise in BPM. There may be multiple tests for each patient or none at all. No date is provided for the tests but they are included in the file in chronologic order.

Your completed program should:

- Read in the patient and result data from the two files.
- Utilize at least one user-defined function to either calculate the heart rate zone and/or category for the exercise visit result ("Within Target Zone", "Too Low", or "Too High"). Be sure to include "type functionname.mlx" in your code to print the file to your output.
- For a patient with results, your code should independently determine their heart rate range for prescribed physical activity intensity (moderate or vigorous) and whether the measured heart rate from the file was "Within Target Zone", "Too Low", or "Too High" (remember that normal range will depend upon the age of the patient).
    - This means that you do not hard code this in but rather your code would select display based on some test.
- Your code should create a summary list for each patient of their ID, target intensity (moderate or vigorous), target heart rate range for that intensity given their age, and the number of times each category (Within Zone, Too Low, Too High) were identified.
- Identify if a patient has no test results and display this information.
- Finally, at the end of your program, your code should include description of your algorithm and code design choices- this may be in "text" in your .mlx script