



GROUP EXERCISE: Sensor Data Analysis

[New Attempt](#)

Due Sep 10 by 11:59pm **Points** 100 **Submitting** a file upload **File Types** pdf and zip

The instructions for this exercise are available on this [Google Doc](#)  <https://docs.google.com/document/d/1XctD7ZflJeL1YwEOUlevJ2rbYSZAYfRbTBI9nPTthOI/edit?usp=sharing>. This is a group activity, and you should be able to find your teammates on Canvas by the group name "Assignment 1 Sensor Data".

The activity will require downloading an app, [Phyphox](#)  <https://phyphox.org/download/>, and a working Python3 environment. The exact instructions and requirements are listed in the Google Doc, so please take a moment to make sure you're set up for tomorrow.

Data for the extra credit component is available under Canvas -> Files -> Sensor Data Analysis.

Sensor Data Analysis Exercise

Criteria	Ratings				Pts
Task 1: Part A	3 pts Full Marks Reports sampling rate in Hertz (Hz) OR samples per second, and the rate is reasonable (between 10Hz and 200Hz)	2 pts Partial Credit - wrong unit Another unit beside Hz/samples per second	1 pts Partial Credit - unreasonable rate Rate is unreasonable (less than 10Hz or over 200Hz)	0 pts No Marks Rate is unreasonable AND another unit is used, or answer is missing	3 pts
Task 1: Part B	3 pts Full Marks Variation is measured by some number (the method doesn't matter: variance, stdev, etc.) & at least one reasonable explanation of variation. Reasonable explanations include: multi-processing, power, incorrectly reporting system time, etc.	1.5 pts Partial Credit - incomplete explanation Explanation provided does not make sense	1.5 pts Partial Credit - no variation Variation is not reported ("no variation", "negligible", or other non-quantitative response)	0 pts No Marks Variation is not reported and explanation not provided	3 pts
Task 1: Part C	3 pts Full Marks Answer provided		0 pts No Marks No answer		3 pts
Task 1: Part D	3 pts Full Marks Two possible answers: "downsampling" or re-sampling to correct the time windows.		0 pts No Marks Sampling technique doesn't make sense		3 pts
Task 1: Part E	3 pts Full Marks "Yes", followed by some short explanation	1.5 pts Partial Credit - incomplete explanation Explanation provided doesn't make sense	1.5 pts Partial Credit - wrong answer Answer provided is "no", but logic in explanation is sound	0 pts No Marks	3 pts
Task 2: Part A Plot X,Y,Z for walking_steps_1.csv and walking_steps_1_clean.csv.	5 pts Full Marks Both plots are provided, and XYZ for each plot are all plotted correctly	2.5 pts Partial Credit - missing plot If either plot (walking_steps_1.csv, walking_steps_clean_1.csv) is plotted incorrectly or missing		0 pts No Marks Both plots are incorrect or missing	5 pts
Task 2: Part B Plot X, Y, Z for walking_steps_2.csv and	5 pts Full Marks	2.5 pts Partial Credit - missing plot		0 pts No Marks	5 pts

Criteria	Ratings					Pts
walking_steps_2_clean.csv	Both plots are provided, and XYZ for each plot are all plotted correctly	If either plot (walking_steps_2.csv, walking_steps_clean_2.csv) is plotted incorrectly or missing			Both plots are incorrect or missing	
Task 2: Part C Reflection	5 pts Full Marks Thoughtful reflection (at least two important concepts listed) Examples of important concepts: Side to side, low amplitude, Acceleration due to G, Front to back, more amplitude		2.5 pts Partial Credit - incomplete explanation Only one important concept listed		0 pts No Marks Reflection does not make sense or is missing	5 pts
Task 3: Part A (Plot only)	4 pts Full Marks Both plots are provided, the magnitude of walking_steps_clean_1(2).csv is plotted correctly.		2 pts Partial Credit - missing plot One plot is correct, the other is missing or incorrect		0 pts No Marks	4 pts
Task 3: Part A (Reflection)	2 pts Full Marks Reflection is about discarding orientation	1 pts Partial Credit - incomplete explanation Reflection doesn't mention "orientation"		0 pts No Marks Missing explanation or outright incorrect		2 pts
Task 3: Part B (Plot only)	4 pts Full Marks Plots provided. Moving average of walking_steps_clean_1(2).csv is plotted correctly.		2 pts Partial Credit - missing plot One plot for moving average is incorrect or missing		0 pts No Marks Both plots either missing or incorrect	4 pts
Task 3: Part B (Explanation only)	2 pts Full Marks Reflection provided. Explains why orientation is different from magnitude. Mentions "window size" as a dependent feature		1 pts Partial Credit - incomplete explanation Missing why orientation is different from magnitude	1 pts Partial Credit - incomplete explanation Doesn't mention "window_size" as a dependent feature	0 pts No Marks	2 pts
Task 3: Part C	8 pts Full Marks Explanation matches result: use the	4 pts Partial Credit - incomplete explanation	4 pts Partial Credit - unreasonable method	4 pts Partial Credit - unreasonable method	0 pts No Marks General mismatch of explanation/results,	8 pts

Criteria	Ratings					Pts
	magnitude of walking steps, uses moving_average, explains how peaks are counted, general match between code, results, and explanation	Explanation doesn't explain how they count peaks	Explanation doesn't use the magnitude of walking steps	Explanation doesn't use moving_average	or two or more of the requirements listed are not met (magnitude, moving_average, counting peaks).	
Task 3: Part D (results only)	6 pts Full Marks Counted steps are provided and between 95 and 105.	4 pts Partial Credit - steps close Counted steps inside bounds [90, 94] or [106, 110]	2 pts Partial Credit - steps provided, not close Counted steps are not in bounds [90, 110]	0 pts No Marks		6 pts
Task 3: Part D (Plot only)	4 pts Full Marks Plots are provided and are correct, with each detected step marked. Plots match results	2 pts Partial Credit - missing plot One of the plots is missing or incorrect, or do not correlate with results	0 pts No Marks Plots are incorrect or missing			4 pts
Task 3: Part E	10 pts Full Marks Explains why the calculation is different than ground truth	5 pts Partial Credit - incomplete explanation Explanation is partially incorrect	0 pts No Marks Explanation is completely incorrect or missing			10 pts
Task 4: Part A	10 pts Full Marks Explains how they measure elevation (e.g. barometer)	5 pts Half Credit Solution seems "hacky" or won't always work (e.g. only using the accelerometer data)	0 pts No Marks			10 pts
Task 4: Part B	5 pts Full Marks Both plots are correct, and plot for segmented data distinguishes between climbing and walking.	3 pts Partial Credit - poor segmentation Plot of segmented data does not distinguish between climbing and walking	1 pts Partial Credit - missing plot One of the plots are missing	0 pts No Marks no plots submitted		5 pts
Task 4: Part C	5 to >4.99 pts Full Marks	4.99 to >0.0 pts	0 pts			5 pts

Criteria	Ratings			Pts
	Method mentions you need to measure elevation or barometer and distinguishes between climbing and walking	Partial Credit - incomplete explanation Method does not distinguish between climbing and walking	No Marks	
Task 4: Part D	5 pts Full Marks Stair count and plot are both present	2.5 pts Partial Credit Either stair count or plot is missing	0 pts No Marks Both stair count and plot is missing	5 pts
Task 4: Part E	5 to >4.99 pts Full Marks Thoughtful explanation provided, mentions Bulling's chain	4.99 to >0.0 pts Partial Credit Either does not mention Bulling's chain or the explanation is low-effort or does not make sense	0 pts No Marks	5 pts
[BONUS] Task 5: Part A	5 pts Full Marks	0 pts No Marks		5 pts
[BONUS] Task 5: Part B	5 to >4.99 pts Full Marks	4.99 to >0.0 pts Partial Credit	0 pts No Marks	5 pts
Total Points: 110				