

GNB: CANDIDATE PREREQUISITES

SEPTEMBER 13TH 2023

PREREQUISITE TO FACE THE CHALLENGE FOR GNB IN ANALYSIS OF GLYCEMIC VARIABILITY AND CONTROL IN EXERCISE

SKILLS	DESCRIPTION
Programming	<ul style="list-style-type: none">• Basic knowledge of any programming language that allows data manipulation:<ul style="list-style-type: none">◦ For ease of use and the presence of dedicated software packages, it is recommended to use R
R packages	Iglu (https://github.com/irinagain/iglu)
Data Management	<ul style="list-style-type: none">• Ability to import data• Data pre-processing (to select the relevant data segment)• Ability to discern relevant and non-relevant information
Data Visualization	<ul style="list-style-type: none">• Familiarity in the use of dedicated libraries to the representation of the processed data• Effective and creative visualizations
Communication	Ability to communicate results in a clear and precise manner with the aim of highlighting the results produced.

CHALLENGE PROPOSALS - TASKS

Preamble

The assignment consists of the analysis of CGM recordings in a population of young individuals with Type 1 diabetes performing a standardized exercise session.

The group will be provided with 5 CGM recordings (one for each individual), each of which contains glycemia values for the pre-, during and post-exercise period. For each individual, the information related to the exercise start time is provided. Exercise period lasts 75 minutes. The group will use these data to perform the required tasks, which include preliminary analysis of the CGM recording and the extraction of proper CGM metrics.

The total score is 10.

Google form to fill out:

https://docs.google.com/forms/d/e/1FAIpQLSdUw2zaSpLBHASOdBxkthpt-nligSzIpeL7LGd-H1NpZngyCA/viewform?usp=sf_link

TASKS	DESCRIPTION	TIME	SCORE
Preliminary analysis of data characteristics	Defined: <ul style="list-style-type: none">- Folder containing CGM recordings in csv format. Use the R packages to manage and import csv files. Expected outcome: number of recordings with missing data points.	~10'	2
Athletes who experienced hypoglycemia during and post exercise	Selected the exercise and post-exercise interval: <ul style="list-style-type: none">- Identify all subjects who experienced hypoglycemia (values lower than 70 mg/dl). Expected outcome: <ul style="list-style-type: none">- List of Subject IDs;- lowest (among all the subjects) glycemia value reached (expressed in mg/dl).	~15'	3

Metrics of control and variability in athletes who did not experience hypoglycemia	<p>On the whole CGM recording:</p> <ul style="list-style-type: none"> - Assess relevant CGM metrics for control and variability in subjects who did not experience hypoglycemia. <p>Expected outcome:</p> <ul style="list-style-type: none"> - List of percentage of glucose values in the target range between 70 and 180 mg/dl; - list of percentage of glucose values above 180 mg/dl; - list of percentage of glucose values above 250 mg/dl; - list of percentage of glucose values below 70 mg/dl; - list of percentage of glucose values below 54 mg/dl. - list of percentage coefficients of variation. <p>Note: round to the nearest integer</p>	~15'	3
Athlete with the most favorable glycemic condition for competition	<p>On the whole CGM recording:</p> <ul style="list-style-type: none"> - Identify the subjects with the most favorable glycemic condition and visualize relevant information. <p>Expected outcome:</p> <ul style="list-style-type: none"> - Subject ID - Image (.png) representing bar plot with percentage of time in glucose ranges - Brief explanation of the reason for choosing 	~20'	2
TOTAL		~1h	10