# SIT220/731 2022.T3: Task 1P

Introduction to Python and Jupyter Notebooks

Last updated: 2022-10-30

## Contents



## 1 Task

Create a single Jupyter/IPython notebook (see the *Artefacts* section below for all the requirements), where you perform what follows.

1. Input three Python lists of identical lengths (at least five items each) giving basic data on your friends/family, for example:

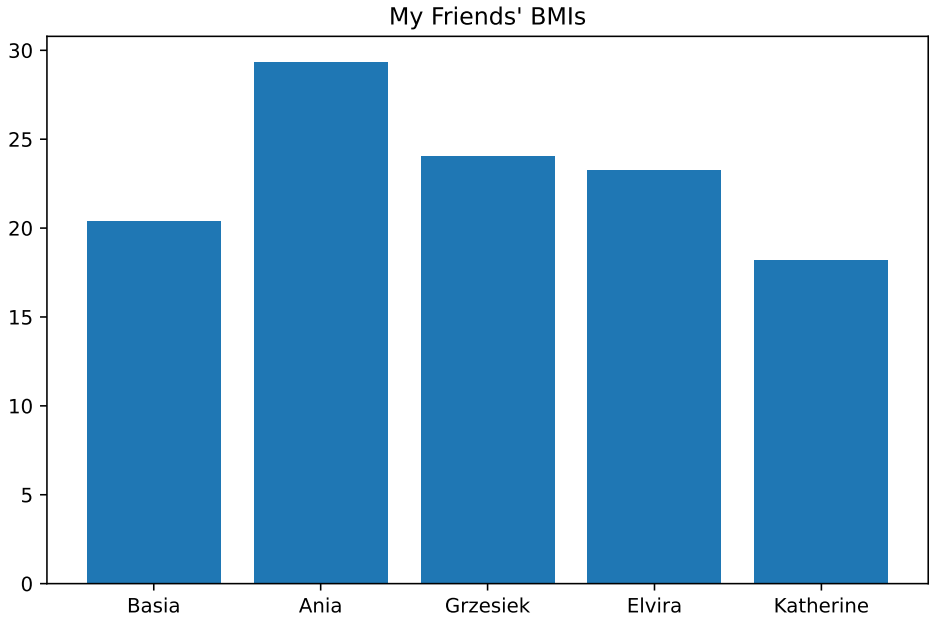
```
names   = ["Basia", "Ania", "Grzesiek", "Elvira", "Katherine"]
heights = [1.73,    1.61,   1.80,       1.58,     1.77]  # in metres
weights = [61,      76,     78,         58,       57  ]  # in kilograms
```

   It is assumed that `names[i]` gives the name of the `i`-th person whose height in metres is `heights[i]` and weight in kilograms is `weights[i]`.

   You should enter different data, not exactly the values above.

2. Create a Python list `bmis` such that `bmis[i]` gives the body mass index of the `i`-th person.

3. Draw a barplot like:




Hint: you can find the relevant code in *Module 1* on our unit site.

4. Based on the BMI categories as defined by the WHO (underweight if below 18.5, normal range up to 25.0, etc.), write some code that outputs a series of strings like `"{name} has BMI of {bmi} which is {bmi_category}."`:

```
## Basia       has BMI of 20.38 which is normal.
## Ania        has BMI of 29.32 which is overweight.
## Grzesiek    has BMI of 24.07 which is normal.
## Elvira      has BMI of 23.23 which is normal.
## Katherine   has BMI of 18.19 which is underweight.
```

   Make sure the formatting is neat and tidy.

5. The Wikipedia article on BMI correctly identifies this index as a very simple measure. In your own words, discuss what are the benefits and limitations of BMI from both the medical and societal perspective, including its possible misuses (write at least 3 text paragraphs).

Note that your code must work correctly if someone decides to modify the `names`, `heights`, and `weights` lists at the beginning of the notebook, for example, add another person to the database.

## 2 Additional Tasks for Postgraduate (SIT731) Students (*)

Postgraduate students, apart from the above tasks, are additionally **required** to solve/address/discuss what follows.

1. For each person, calculate also the *BMI prime* measure as defined in https://en.wikipedia.org/wiki/Body_mass_index.
2. Draw a separate barplot of the BMI prime indices of the persons in our database.
3. Modify the textual reporting scheme so that the output strings are like `"{name} has BMI of {bmi} which is {bmi_category}. The BMI prime index is {bmi_prime}."`:
4. In your own words, discuss the possible advantages and limitations of this measure.

## 3 Optional Features (**)

The following suggestions are not part of the requirements for a pass grade, therefore you can skip them. Nevertheless, you might still want to tackle them, as only practice makes perfect.

You are encouraged to define auxiliary functions like `get_bmi` and `get_bmi_category`, etc., to make your code more readable.

Also, you might wish to check if all the heights are between 1 and 250 cm. If this is not the case, call `raise Exception("incorrect data")`.

Similarly, check if all weights are between 1 and 1000 kg.

## 4 Artefacts

The solution to the task must be included in a single Jupyter/IPython notebook (an .ipynb file) running against a Python 3 kernel.

At the start of the notebook, you need to provide: the **title** of the report (e.g., *Task 42: How Much I Love This Unit*), your **name**, **student number**, **email address**, and whether you are an **undergraduate (SIT220) or postgraduate (SIT731)** student.

Make sure that your notebook has a **readable structure**; in particular, that it is divided into sections. Use rich Markdown formatting.

Imagine it is a report that you would like to show to your manager or clients — you certainly want to make a good impression. Check your spelling and grammar. Also, use formal language.

Before each code chunk, briefly **explain** what its purpose is. After each code chunk, **summarise and discuss the obtained results** (in a few sentences).

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Submit one file via OnTrack:

1. the version of the Jupyter/IPython notebook converted to a PDF file (e.g., via *File → Export Notebook As → PDF* or convert to HTML and from that to PDF with your web browser; any method will do).

You do not need to submit the .ipynb file via OnTrack, but you must store it for further reference – a marking tutor might ask for it later, e.g., at the end of the trimester.

## 5 Intended Learning Outcomes

| ULO | Is Related? |
|---|---|
| ULO1 (Data Processing/Wrangling) | YES |
| ULO2 (Data Discovery/Extraction) | |
| ULO3 (Requirement Analysis/Data Sources) | |
| ULO4 (Exploratory Data Analysis) | |
| ULO5 (Data Privacy and Ethics) | YES |