Deakin University

Data Wrangling

OnTrack Submission

Task 1P

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Outcome	Weight
ULO1	♦♦♦♦♦
ULO2	♦◇◇◇◇
ULO3	♦◇◇◇◇
ULO4	♦◇◇◇◇
ULO5	♦♦♦♦♦

The task is a prime example of Data Processing.

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TASK 1
 NAME: Adithya Krishnamurthy
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* *STUDENT*TYPE: Postgraduate (SIT731)

1. Creation of the list of names, their heights and weights:

CELL 03

```
names = ["Alex", "Eric", "Jimi", "Gilmour", "Kiko"]
heights= [173, 175, 181, 183, 186]
weights=[50,69,75,88,125]
```

Creating 3 distinct list with the appropriate parameters.

2. Calculation of the BMIs:

CELL 06

```
bmis=[]
for height, weight in zip(heights, weights):
    bmi= (weight / (height / 100) ** 2)
    bmis.append(bmi)
    #New BMI calculation
new_bmis = [1.3 * (weight / (height / 100) ** 2.5) for weight, height in zip(weights, heights)]
```

The list above displays the calcuated values of each person's BMI.

3. Creation of categories based on BMI values:

CELL 09

```
bmi_categories=[]
for name, bmi, new_bmi in zip(names, bmis, new_bmis):
    if bmi < 18.5:
        bmi_category = "underweight"
    elif 18.5 and bmi < 25:
        bmi_category = "normal"
    elif 25 and bmi< 30:
        bmi_category = "overweight"
    else:
        bmi_category = "obese"
    bmi_categories.append(bmi_category)
    print(f"{name} has BMI of {bmi:.2f} which is {bmi_category}. The new BMI index is
    ↪  {new_bmi:.2f}.")
```

```
Alex has BMI of 16.71 which is underweight. The new BMI index is 16.51.
Eric has BMI of 22.53 which is normal. The new BMI index is 22.14.
Jimi has BMI of 22.89 which is normal. The new BMI index is 22.12.
Gilmour has BMI of 26.28 which is overweight. The new BMI index is 25.25.
Kiko has BMI of 36.13 which is obese. The new BMI index is 34.44.
```

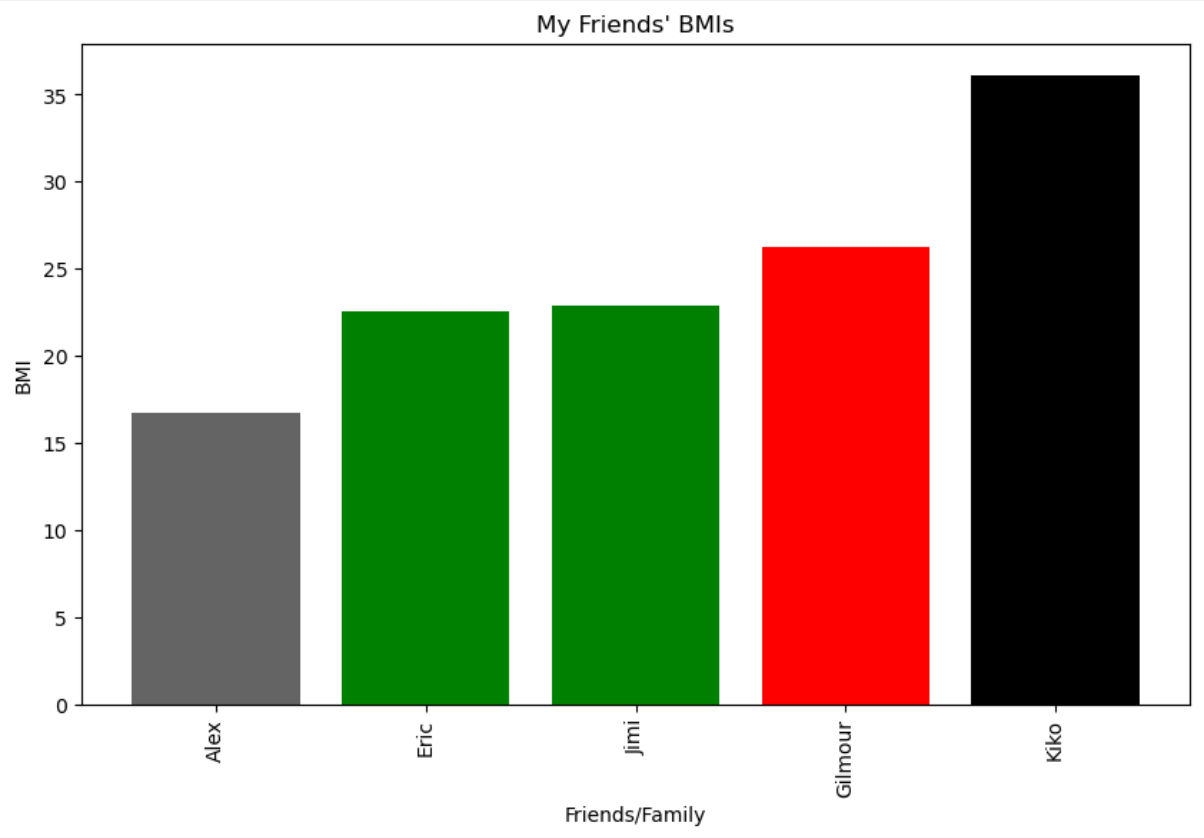
The output shows the category that each person belongs to based on their BMI.

4. Creation of a bar graph from the calculated BMIs and usage of colors based on BMI:

CELL 12

```
import matplotlib.pyplot as plt
category_colors = {
```

```
    "underweight": "#646464",
    "normal": "#008000",
    "overweight": "#FF0000",
    "obese": "#000000"
}
plt.figure(figsize=(10, 6))
plt.bar(names, bmis, color=[category_colors[category] for category in bmi_categories])
plt.xlabel("Friends/Family")
plt.ylabel("BMI")
plt.title("My Friends' BMIs")
plt.xticks(rotation=90)
plt.show()
```



A bar graph representation of each person's BMI with color coding.

5. The *body mass index* (BMI) is a value derived from an individual's height and weight. It is calculated as the weight in kilograms divided by 5. the square of the height in meters. It is worthy to note that Adolphe Quetelet (the inventor of the index) himself never intended for the index, then called the Quetelet Index, to be used as a means of medical assessment.
 Benefits: 1. The traditional BMI calculation, which is dividing a person's weight in kilograms by the square of their height in meters, is simple to understand, making it a quick and accessible method for assessing body weight. 2. Despite its latest criticism BMI values have shown correlation to certain health risks. Individuals with a BMI outside the normal range have been shown to at a higher risk for certain health conditions, such as cardiovascular diseases and type 2 diabetes.

Limitations: 1. BMI does not differentiate between lean body mass (muscle, bone, organs) and fat mass. As a result, two people with the same BMIs can have different body compositions. 2. Athletes with high muscle mass and low body fat may have a higher BMI which is an inaccurate depiction of physique. Additionally, BMI may underestimate body fat in older adults, as it doesn't account for changes that occur in the bone and muscle density as we age.

2. *Categorization based on the newly calculated BMIs*:

The output shows the category that each person belongs to based on the new BMI calculation.

3 .Benefits and Limitations of the new method of BMI calculation: - *Benfits*: The exponent of 2.5 in the formula may potentially provide a different emphasis on body composition compared to the traditional BMI calculation, which uses an exponent of 2. - *Limitations*: The new formula is not widely adopted and standardized across healthcare and research communities and lacks clinical research. Standardization is crucial for any health-related measure to ensure uniformity in interpretation.

CONCLUSION: Through the completion of the task, I was able to understand various concepts such as for loops, nested if statements, numerical calculations and usage of the matplotlib library to plot graphs along with color coding. We also delved into benefits and limitations of two different ways of calculating BMI.