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Functions

main: The main function starts by asking for the user's weight in pounds and height in feet and inches. It then converts the height to inches by multiplying the feet by 12 and adding the remaining inches. It then calculates the BMI using the `calculateBMI` function. Finally, it outputs the user's BMI range and waits for the user to exit the program. If the BMI is under 18.5, it outputs "Underweight". If the BMI is between 18.5 and 25, it outputs "Normal Weight". If the BMI is between 24 and 30, it outputs "Overweight". If the BMI is greater than or equal to 30, it outputs "Obese".

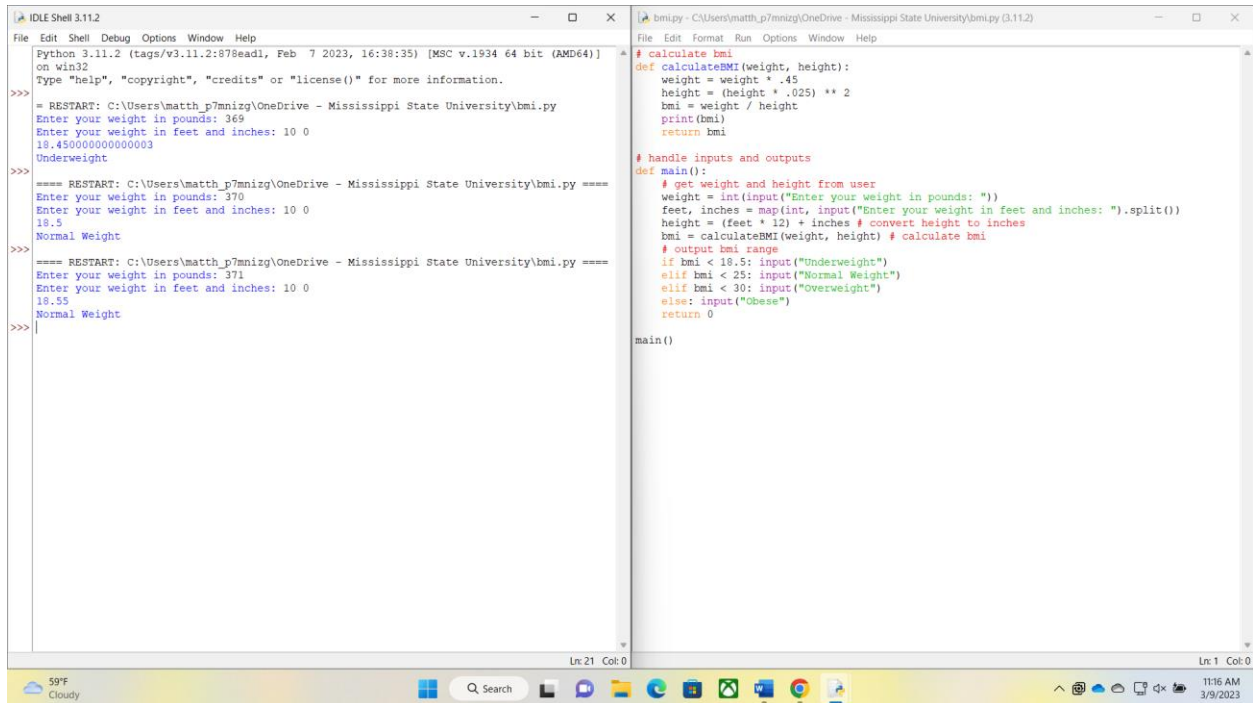
calculateBMI: The `calculateBMI` function receives the weight in pounds and the height in inches from the main function. It converts the weight to kilograms by multiplying by .45 and converts the height to meters by multiplying by .025. It then squares the resulting height. Finally, it finds the BMI by dividing the weight by the height, outputs it to the user, and returns it to the main function.

Test Cases

I used the same test cases for each function. I decided these test cases by using the extreme point combination technique. I used this technique because it allowed me to test each subdomain at each boundary. For simplicity, I used 10 feet as the height for each test case. I then found the weight that would result in a BMI at each boundary. For the under and over cases, I subtracted and added 1 to the weight respectively. In the end, all 9 test cases passed. I have recorded all these test cases in the table below and have provided screenshots of them running on the following pages.

Test Case	Weight (Height = 10 0)	Expected Outcome	Actual Outcome	Result
Under 18.5	369	18.45 Underweight	18.45 Underweight	Pass
Boundary 18.5	370	18.5 Normal Weight	18.5 Normal Weight	Pass
Over 18.5	371	18.55 Normal Weight	18.55 Normal Weight	Pass
Under 25	499	24.95 Normal Weight	24.95 Normal Weight	Pass
Boundary 25	500	25 Overweight	25 Overweight	Pass
Over 25	501	25.05 Overweight	25.05 Overweight	Pass
Under 30	599	29.95 Overweight	29.95 Overweight	Pass
Boundary 30	600	30 Obese	30 Obese	Pass
Over 30	601	30.05 Obese	30.05 Obese	Pass

Boundary 18.5



The image shows a screenshot of a Python IDE with two windows. The left window, titled 'IDLE Shell 3.11.2', displays the execution of a BMI calculator script. The right window, titled 'bmi.py - C:\Users\matth_p7mnizg\OneDrive - Mississippi State University\bmi.py (3.11.2)', shows the source code of the script.

Left Window (IDLE Shell 3.11.2) Output:

```
>>> Python 3.11.2 (tags/v3.11.2:878ead1, Feb 7 2023, 16:38:35) [MSC v.1934 64 bit (AMD64)]
>>> Type "help", "copyright", "credits" or "license()" for more information.
>>> == RESTART: C:\Users\matth_p7mnizg\OneDrive - Mississippi State University\bmi.py ==
>>> Enter your weight in pounds: 369
>>> Enter your weight in feet and inches: 10 0
>>> 18.450000000000003
>>> Underweight
>>>
>>> ==== RESTART: C:\Users\matth_p7mnizg\OneDrive - Mississippi State University\bmi.py ====
>>> Enter your weight in pounds: 370
>>> Enter your weight in feet and inches: 10 0
>>> 18.5
>>> Normal Weight
>>>
>>> ==== RESTART: C:\Users\matth_p7mnizg\OneDrive - Mississippi State University\bmi.py ====
>>> Enter your weight in pounds: 371
>>> Enter your weight in feet and inches: 10 0
>>> 18.55
>>> Normal Weight
>>>
```

Right Window (bmi.py) Source Code:

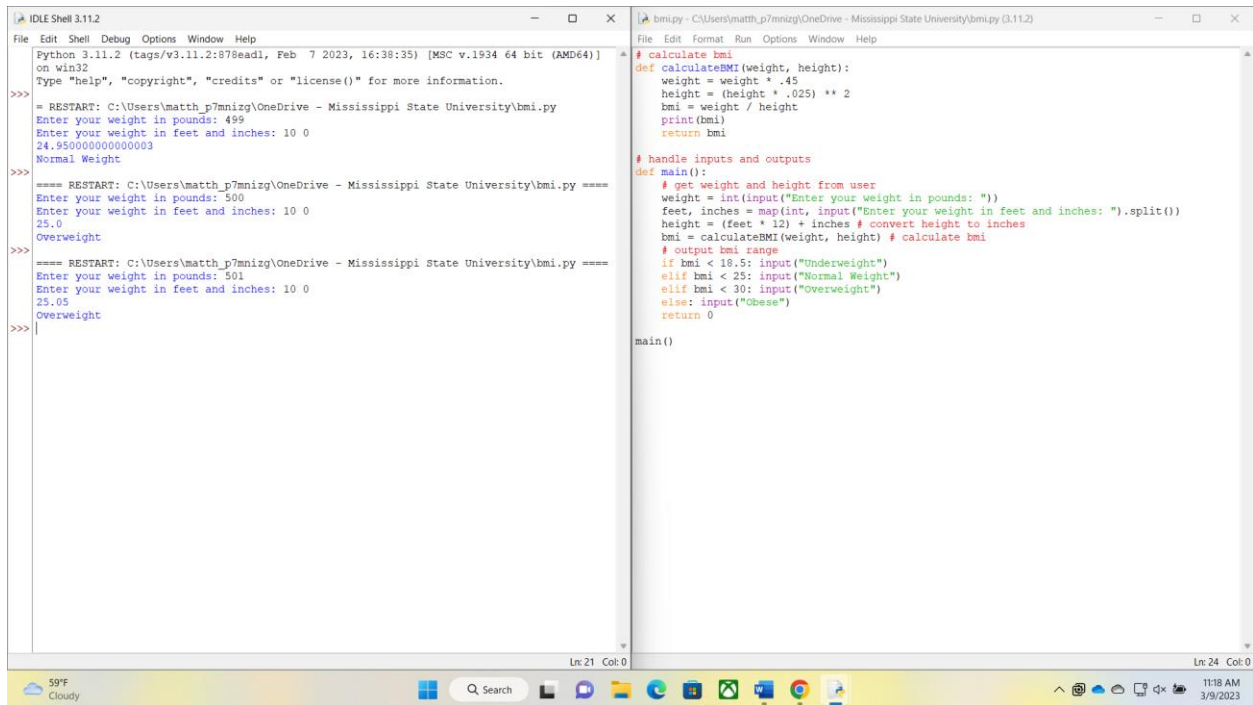
```
# calculate bmi
def calculateBMI(weight, height):
    weight = weight * .45
    height = (height * .025) ** 2
    bmi = weight / height
    print(bmi)
    return bmi

# handle inputs and outputs
def main():
    # get weight and height from user
    weight = int(input("Enter your weight in pounds: "))
    feet, inches = map(int, input("Enter your weight in feet and inches: ").split())
    height = (feet * 12) + inches # convert height to inches
    bmi = calculateBMI(weight, height) # calculate bmi
    # output bmi range
    if bmi < 18.5: input("Underweight")
    elif bmi < 25: input("Normal Weight")
    elif bmi < 30: input("Overweight")
    else: input("Obese")
    return 0

main()
```

The Windows taskbar at the bottom shows the date and time as 11:16 AM 3/9/2023, and the weather as 59°F Cloudy.

Boundary 25



The image shows a screenshot of an IDE with two windows. The left window, titled 'IDLE Shell 3.11.2', displays the execution output of a Python script. The right window, titled 'bmi.py - C:\Users\matth_p7mnizg\OneDrive - Mississippi State University\bmi.py (3.11.2)', shows the source code of the script.

Left Window (IDLE Shell 3.11.2) Output:

```
Python 3.11.2 (tags/v3.11.2:878ead1, Feb 7 2023, 16:38:35) [MSC v.1934 64 bit (AMD64)]
on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:\Users\matth_p7mnizg\OneDrive - Mississippi State University\bmi.py
Enter your weight in pounds: 499
Enter your weight in feet and inches: 10 0
24.950000000000003
Normal Weight
>>>
==== RESTART: C:\Users\matth_p7mnizg\OneDrive - Mississippi State University\bmi.py ====
Enter your weight in pounds: 500
Enter your weight in feet and inches: 10 0
25.0
Overweight
>>>
==== RESTART: C:\Users\matth_p7mnizg\OneDrive - Mississippi State University\bmi.py ====
Enter your weight in pounds: 501
Enter your weight in feet and inches: 10 0
25.05
Overweight
>>>
```

Right Window (bmi.py) Source Code:

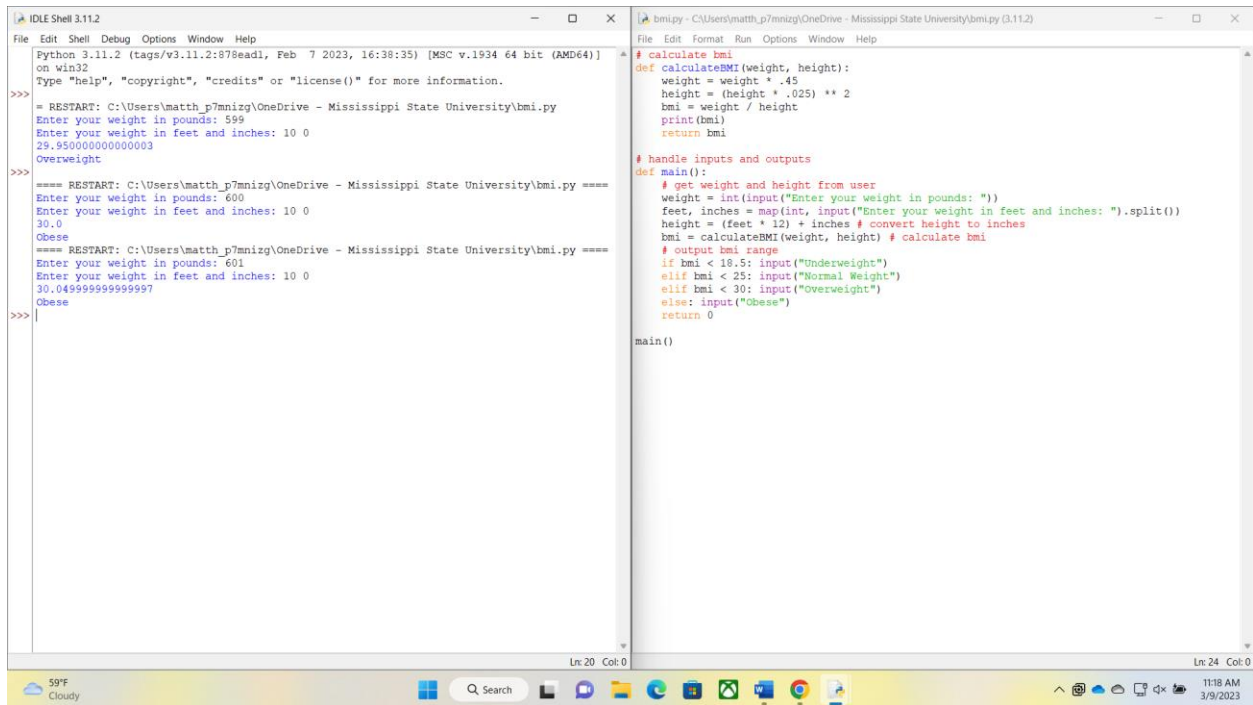
```
# calculate bmi
def calculateBMI(weight, height):
    weight = weight * .45
    height = (height * .025) ** 2
    bmi = weight / height
    print(bmi)
    return bmi

# handle inputs and outputs
def main():
    # get weight and height from user
    weight = int(input("Enter your weight in pounds: "))
    feet, inches = map(int, input("Enter your weight in feet and inches: ").split())
    height = (feet * 12) + inches # convert height to inches
    bmi = calculateBMI(weight, height) # calculate bmi
    # output bmi range
    if bmi < 18.5: input("Underweight")
    elif bmi < 25: input("Normal Weight")
    elif bmi < 30: input("Overweight")
    else: input("Obese")
    return 0

main()
```

The taskbar at the bottom shows the system clock as 11:18 AM on 3/9/2023, and the weather as 59°F Cloudy.

Boundary 30



The image shows a screenshot of a Python IDE with two windows. The left window, titled 'IDLE Shell 3.11.2', displays the execution output of a BMI calculator script. The right window, titled 'bmi.py - C:\Users\matth_p7mnizg\OneDrive - Mississippi State University\bmi.py (3.11.2)', shows the source code of the script.

Left Window (IDLE Shell 3.11.2) Output:

```
Python 3.11.2 (tags/v3.11.2:878ead1, Feb 7 2023, 16:38:35) [MSC v.1934 64 bit (AMD64)]
on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:\Users\matth_p7mnizg\OneDrive - Mississippi State University\bmi.py
Enter your weight in pounds: 599
Enter your weight in feet and inches: 10 0
29.950000000000003
Overweight
>>>
==== RESTART: C:\Users\matth_p7mnizg\OneDrive - Mississippi State University\bmi.py ====
Enter your weight in pounds: 600
Enter your weight in feet and inches: 10 0
30.0
Obese
>>>
==== RESTART: C:\Users\matth_p7mnizg\OneDrive - Mississippi State University\bmi.py ====
Enter your weight in pounds: 601
Enter your weight in feet and inches: 10 0
30.049999999999997
Obese
>>>
```

Right Window (bmi.py) Source Code:

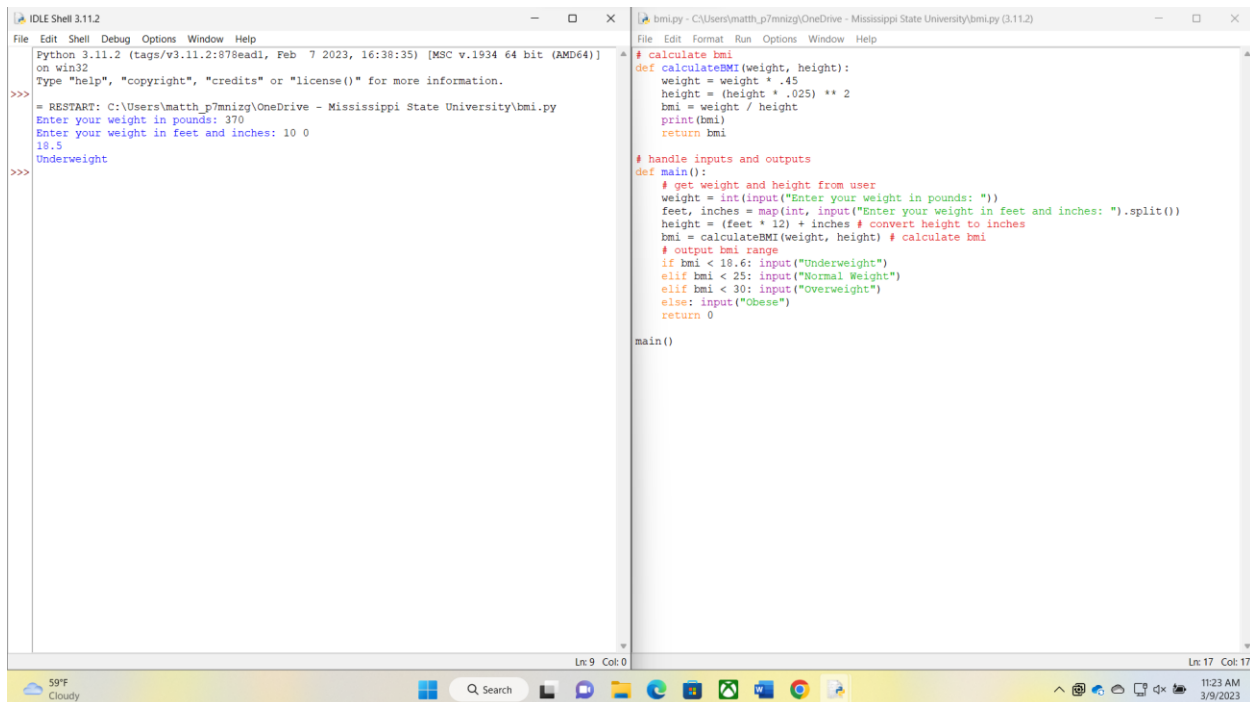
```
# calculate bmi
def calculateBMI(weight, height):
    weight = weight * .45
    height = (height * .025) ** 2
    bmi = weight / height
    print(bmi)
    return bmi

# handle inputs and outputs
def main():
    # get weight and height from user
    weight = int(input("Enter your weight in pounds: "))
    feet, inches = map(int, input("Enter your weight in feet and inches: ").split())
    height = (feet * 12) + inches # convert height to inches
    bmi = calculateBMI(weight, height) # calculate bmi
    # output bmi range
    if bmi < 18.5: input("Underweight")
    elif bmi < 25: input("Normal Weight")
    elif bmi < 30: input("Overweight")
    else: input("Obese")
    return 0

main()
```

Boundary Shift

I implemented a boundary shift by .1 at the lower boundary for “Normal Weight” by changing the line “if bmi < 18.5” to “if bmi < 18.6” in my code. When I tested this boundary using the Boundary 18.5 test case listed above, it returned “Underweight” instead of “Normal Weight”. Since the actual result did not match the test result, it means my test case caught this boundary shift. The picture below shows my updated code and the result of this test case.



The screenshot displays two windows from an IDE. The left window, titled 'IDLE Shell 3.11.2', shows the execution of a Python script. The user entered '370' for weight and '10 0' for height (feet and inches). The script calculated a BMI of 18.5 and output 'Underweight'. The right window, titled 'bmi.py - C:\Users\matth.p7mning\OneDrive - Mississippi State University\bmi.py (3.11.2)', shows the source code. The code defines a 'calculateBMI' function and a 'main' function. The 'calculateBMI' function takes weight and height as arguments, converts height from feet and inches to total inches, and calculates the BMI. The 'main' function prompts the user for weight and height, calls 'calculateBMI', and prints the result. The code includes comments for each step. The status bar at the bottom indicates the current line and column for both windows.

```
Python 3.11.2 (tags/v3.11.2:878ead1, Feb 7 2023, 16:38:35) [MSC v.1934 64 bit (AMD64)]
on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:\Users\matth.p7mning\OneDrive - Mississippi State University\bmi.py
Enter your weight in pounds: 370
Enter your weight in feet and inches: 10 0
18.5
Underweight
>>>
```

```
# calculate bmi
def calculateBMI(weight, height):
    weight = weight * .45
    height = (height * .025) ** 2
    bmi = weight / height
    print(bmi)
    return bmi

# handle inputs and outputs
def main():
    # get weight and height from user
    weight = int(input("Enter your weight in pounds: "))
    feet, inches = map(int, input("Enter your weight in feet and inches: ").split())
    height = (feet * 12) + inches # convert height to inches
    bmi = calculateBMI(weight, height) # calculate bmi
    # output bmi range
    if bmi < 18.6: input("Underweight")
    elif bmi < 25: input("Normal Weight")
    elif bmi < 30: input("Overweight")
    else: input("Obese")
    return 0

main()
```

Setup & Execution Instructions

1. Find bmi.py here: <https://github.com/mbrobinson1538/BMCalculator/blob/main/bmi.py>
2. Click on the “raw” button at the top right of the code.
3. Right click and save as a python file.
4. Download python here: <https://www.python.org/downloads/>
5. Run bmi.py using python.
6. Follow the instructions on the screen.
7. Exit the program by pressing the “enter” key.