

## Algorithm: BMI Calculator with Health Tips

This document details the sequential steps executed by the application.

### Step 1: Start Program

- 1.1 Initialize the application via the `main()` entry point.
- 1.2 Display the welcome message: "Welcome to the BMI Calculator with Health Tips".

### Step 2: Input Data

- 2.1 Call the `get_user_data()` function.
- 2.2 Prompt user: "Enter your weight in kilograms: ".
- 2.3 Prompt user: "Enter your height in centimeters: ".

### Step 3: Input Validation (Type Check)

- 3.1 Attempt to convert the received weight and height strings into floating-point numbers.
- 3.2 IF the conversion fails (non-numeric input):
  - 3.2.1 Catch `ValueError`.
  - 3.2.2 Print "Invalid input. Please enter numeric values."
  - 3.2.3 Return `None` values.
  - 3.2.4 Terminate program execution.
- 3.3 ELSE (conversion successful):
  - 3.3.1 Return valid `weight` and `height` to the main function.

### Step 4: Object Initialization & Logic Validation

- 4.1 Create an instance of the `BMI` class with the valid `weight` and `height`.
- 4.2 IF `weight` is  $\leq 0$  OR `height` is  $\leq 0$ :
  - 4.2.1 Raise a `ValueError` with message: "Weight and height must be positive numbers."
  - 4.2.2 Catch the error in `main()`.
  - 4.2.3 Print the error message.
  - 4.2.4 Terminate program execution.
- 4.3 ELSE: Proceed to calculation.

### Step 5: BMI Calculation

- 5.1 Convert height to meters:

$$\text{height\_m} = \frac{\text{height\_cm}}{100}$$

- 5.2 Apply BMI formula:

$$BMI = \frac{weight}{height\_m^2}$$

- 5.3 Round the result to two decimal places.
- 5.4 Store the value in `self.bmi`.

### Step 6: Categorization

- 6.1 Instantiate `HealthTips` with the calculated BMI.
- 6.2 Compare BMI against standard thresholds to determine `category`:
  - 6.2.1 IF  $BMI < 18.5$ : Set category to "Underweight".
  - 6.2.2 ELSE IF  $18.5 \leq BMI < 24.9$ : Set category to "Normal weight".
  - 6.2.3 ELSE IF  $25.0 \leq BMI < 29.9$ : Set category to "Overweight".
  - 6.2.4 ELSE ( $BMI \geq 30.0$ ): Set category to "Obese".

### Step 7: Tip Selection

- 7.1 Based on the `category` determined in Step 6, select the corresponding advice string.
  - Underweight: Focus on nutrient density and protein.
  - Normal Weight: Focus on maintenance and balance.
  - Overweight: Focus on activity and portion control.
  - Obese: Focus on medical support and lifestyle changes.

### Step 8: Display Output

- 8.1 Print: "Your BMI is: [value]".
- 8.2 Print: "Category: [category]".
- 8.3 Print: "Health Tips:" followed by the selected advice text.

### Step 9: End

- 9.1 Terminate the application.