Project 2
Due Date: July 1st 2023

Title: Multi-Functional Calculator: Arithmetic Operations and Area Calculation

Description:
The Multi-Functional Calculator is a powerful tool designed to assist users in performing arithmetic calculations and finding the areas of different geometric shapes. It combines the convenience of a standard calculator with the added functionality of shape-specific area calculations.

Key Features:

1. Arithmetic Operations: The calculator supports essential arithmetic operations, including addition, subtraction, multiplication, and division. Users can perform calculations with ease by entering the operands and selecting the desired operation.

2. Shape Area Calculation: The calculator goes beyond basic arithmetic and enables users to find the areas of various shapes. It provides predefined formulas and input prompts for calculating the area of shapes such as rectangles, circles, triangles, and squares.

3. Intuitive User Interface: The calculator features a user-friendly interface that guides users through the different functionalities. It presents clear instructions and prompts for entering the required values, ensuring a seamless user experience.

4. Accurate and Reliable Results: The calculator ensures precise calculations and accurate results for both arithmetic operations and shape area calculations. It leverages robust algorithms and adheres to established mathematical formulas, minimizing the possibility of errors.

5. Versatility: The Multi-Functional Calculator caters to a wide range of users, including students, professionals, and individuals in various fields. It serves as a versatile tool for quick calculations and area determination, eliminating the need for manual computations or separate specialized tools.

6. Educational Value: The calculator not only provides results but also promotes learning by showcasing the formulas and steps involved in finding the area of each shape. Users can gain a better understanding of geometric concepts and enhance their mathematical knowledge.

Required:

The following list will contain the defined functions required for the project to be complete. Make sure you understand what it is asking and how it is being defined. Working with mathematical formulas needs specific data, which is important to know how to input the values to receive the correct output.

intro() - This function will print the following " Project 2
Multi-Functional Calculator: Arithmetic Operations and Area Calculation.
The Multi-Functional Calculator is a powerful tool designed to assist users in performing arithmetic calculations and finding the areas of different geometric shapes. It combines the convenience of a standard calculator with the added functionality of shape-specific area calculations."

add() - Requires two parameters, with both parameters having default values of 0. Returns the sum of the two given parameters
subtract() - Requires two parameters, with both parameters having default values of 0. Returns the difference of the two given parameters
divide() - Requires two parameters, with numerator default value is 0 and denominator default value is 1. This function is required to have a try and catch, to check whether the user entered a 0 for the denominator value. Returns the division of numerator and denominator.
multiply() - Requires two parameters, with default value of both sets as 1. Returns the product of the given two numbers.
rectArea() - required parameters 'base' and 'height' set both default values of 1. Returns the area of the rectangle.
Formula: Area = base * height
sqrArea() - required parameters 'base' and 'base' set both default values of 1. Returns the area of the rectangle.
Formula: Area = base * base
circArea() - requires parameters 'radius' set default value of 1. Returns the area of a circle.
Formula: PI * radius^2
triArea() - requires parameters ' base ' and ' height ' with default value of 1. Returns the area of a triangle.
Formula: (base*height) / 2
cubeVol() - requires 1 parameter 'side ' with default value of 1. Returns the volume of a cube.
Formula: Volume = side * side * side
rectVol() - requires 3 parameters 'length' , 'width' , 'height' with default values of 1. Returns the volume of the rectangular prism.
Formula: Volume = length * width * height

cyliVol() - requires 2 parameters ‘radius’, ‘width’ with default values of 1. Returns the volume of the cylinder.
Formula: Volume = PI * radius^2 * height
SphereVol() - requires 1 parameters ‘radius’ with default parameter of 1. Returns the volume of a sphere.
Formula: Volume = (4/3)*PI*radius^3
mainMenu() - This function prints out the menu available for the user to select an option. Once it is selected it will do the following calculation and ask the user for the data necessary to make it possible.

Optional:
Generate a list that contains the options chosen by the user, another list that will contain the input data from the user, and a third list that contains the results of the calculations. Then use a for loop to print out what the user chose and which functions were used the most. For example if the user chose to find the area of a triangle more than other formulas, then it will print “ The user was doing more calculations to find the area of a triangle.”
Using matplot, show a graph where the x values are the results , and y are the values used to get the result.

Screenshots:

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functionality of shape-specific area calculations.


Calculator Menu:
1. Arithmetic Operation
2. Area of Shapes
3. Volumes of 3D shapes
0. Exit

Select an option: 1
1. Add
2. Subtract
3. Multiply
4. Divide
0. Go back

Select an option: 4
Enter a numerator:1
Enter a denomenator:4
1 / 4 = 0.25
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Calculator Menu:
1. Arithmetic Operation
2. Area of Shapes
3. Volumes of 3D shapes
0. Exit

Select an option: 1
1. Add
2. Subtract
3. Multiply
4. Divide
0. Go back

Select an option: 4
Enter a numerator:1
Enter a denomenator:0
1 / 0 = Cannot divide by zero!

Calculator Menu:
1. Arithmetic Operation
2. Area of Shapes
3. Volumes of 3D shapes
0. Exit

Select an option: 2
1. Area of rectangle
2. Area of  square
3. Area of circle
4. Area of triangle
0. Go back

Select an option: 3
Enter radius of Circle:5
Area of Circle:  3.141592653589793 * 5 ^2 = 78.53981633974483

Calculator Menu:
1. Arithmetic Operation
2. Area of Shapes
3. Volumes of 3D shapes
0. Exit
```

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Calculator Menu:
1. Arithmetic Operation
2. Area of Shapes
3. Volumes of 3D shapes
0. Exit

Select an option: 3
1. Volume of rectangular prism
2. Volume of  cube
3. Volume of  Cylinder
4. Volume of  cube
0. Go back

Select an option: 4
Enter a side:5
Volume of cube:
5 * 5 * 5 = 125
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Overall, the Multi-Functional Calculator is a comprehensive tool that combines the convenience of a standard calculator with the added benefit of shape area calculations. It offers a seamless user experience, accurate results, and educational value, making it an indispensable asset for anyone in need of arithmetic operations and area calculations.