**Exercise 2**

**Aim:**

To create a calculator program that performs various mathematical operations and functions based on user input

**Algorithm**

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| --- | --- | --- |
| Step 1 | **:** | Start the Program. |
| Step 2 | **:** | Get the choice of operation as the Input from the User |
| Step 3 | **:** | Based on the user's choice perform the selected operation |
| Step 4 | **:** | Display the Results |
| Step 5 | **:** | Stop the Program. |

**Program:**

import math

# Display the available operations to the user

print("\nAvailable operations:")

print("1. Addition (+)")

print("2. Subtraction (-)")

print("3. Multiplication (\*)")

print("4. Division (/)")

print("5. Square Root (√)")

print("6. Exponentiation (x^y or exp)")

print("7. Sine (sin) in radians")

print("8. Cosine (cos) in radians")

print("9. Tangent (tan) in radians")

print("10. Logarithm (log base 10)")

# Get the user's choice of operation

operation = int(input("\nChoose an operation (1-10): "))

# Handle operations that require two numbers

if operation in [1, 2, 3, 4, 6]:

num1 = float(input("\nEnter the first number: "))

num2 = float(input("Enter the second number: "))

# Handle operations that require only one number

elif operation in [5, 7, 8, 9, 10]:

num1 = float(input("Enter the number: "))

else:

print("\nInvalid operation! Please choose a valid option.")

exit()

# Perform the chosen operation using the math functions

if operation == 1: # Addition

result = num1 + num2

elif operation == 2: # Subtraction

result = num1 - num2

elif operation == 3: # Multiplication

result = num1 \* num2

elif operation == 4: # Division

result = num1 / num2 if num2 != 0 else "undefined (cannot divide by zero)"

elif operation == 5: # Square Root

result = math.sqrt(num1) if num1 >= 0 else "undefined (negative number)"

elif operation == 6: # Exponentiation (x^y or exp)

result = math.pow(num1, num2) # Raises num1 to the power of num2

elif operation == 7: # Sine

result = math.sin(math.radians(num1)) # Convert degrees to radians before calculating

elif operation == 8: # Cosine

result = math.cos(math.radians(num1)) # Convert degrees to radians before calculating

elif operation == 9: # Tangent

result = math.tan(math.radians(num1)) # Convert degrees to radians before calculating

elif operation == 10: # Logarithm (base 10)

result = math.log10(num1) if num1 > 0 else "undefined (non-positive number)"

# Display the result of the operation

print(f"\nResult: {result}")

# Optionally print a message when the calculator ends

print("\nCalculator program ended.")

**Output**

**Result:**  
The Python calculator program was successfully created and executed, performing various mathematical operations based on user input.