

Advanced Programming Practice

Assignment 10

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1. Write a python program to calculate the sum of Two numbers and Three numbers. However, if the sum is between 120 to 320 it will return 200.

```
def sum_two_num(num1, num2):  
    return num1 + num2  
  
def sum_three_num(num1, num2, num3):  
    return num1 + num2 + num3  
  
def sumrange(sum_result):  
    if 120 <= sum_result <= 320:  
        return 200  
    else:  
        return sum_result  
  
# Input two numbers  
num1 = float(input("Enter the first number: "))  
num2 = float(input("Enter the second number: "))  
  
# Calculate the sum of two numbers  
result_twonum = sum_two_num(num1, num2)  
  
# Input three numbers  
num3 = float(input("Enter the third number: "))  
  
# Calculate the sum of three numbers  
result_threenum = sum_three_num(num1, num2, num3)
```

Check if the sum is within the specified range

```
final_result_twonum= sumrange(result_twonum)
```

```
final_result_threenum = sumrange(result_threenum)
```

Print the results

```
print(f"Sum of two numbers: {final_result_twonum}")
```

```
print(f"Sum of three numbers: {final_result_threenum}")
```

```
Shell Clear  
Enter the first number: 10  
Enter the second number: 20  
Enter the third number: 30  
Sum of two numbers: 30.0  
Sum of three numbers: 60.0  
> |
```

2. Implement a python function to find the Maximum of Three numbers.

```
def maxofnum(num1, num2, num3):  
    # Using the built-in max() function to find the maximum  
    maximum = max(num1, num2, num3)  
    return maximum  
  
# Input three numbers from the user  
num1 = float(input("Enter the first number: "))  
num2 = float(input("Enter the second number: "))  
num3 = float(input("Enter the third number: "))  
  
# Call the function to find the maximum  
maximum = maxofnum(num1, num2, num3)  
  
# Display the maximum number  
print(f"The maximum number among {num1}, {num2}, and {num3} is:  
{maximum}")
```

```
Shell Clear  
Enter the first number: 20  
Enter the second number: 25  
Enter the third number: 45  
The maximum number among 20.0, 25.0, and 45.0 is: 45.0  
> |
```

3. Write a python program to calculate the Factorial of a given number.

```
def factorial(n):  
    if n < 0:  
        return "Factorial is not defined for negative numbers"  
    elif n == 0:  
        return 1  
    else:  
        result = 1  
        for i in range(1, n + 1):  
            result *= i  
        return result  
  
# Input a number from the user  
num = int(input("Enter a non-negative integer : "))  
  
# Calculate the factorial  
result = factorial(num)  
  
# Display the result  
if type(result) == int:  
    print(f"The factorial of {num} is {result}.")  
else:  
    print(result)
```

```
Shell Clear  
Enter a non-negative integer : 5  
The factorial of 5 is 120.  
> |
```

4. Write a python program to Check if a Number is Even or Odd and also check whether it is Prime or not.

```
def is_even(number):
```

```
    return number % 2 == 0
```

```
def is_prime(number):
```

```
    if number <= 1:
```

```
        return False
```

```
    if number <= 3:
```

```
        return True
```

```
    if number % 2 == 0 or number % 3 == 0:
```

```
        return False
```

```
    i = 5
```

```
    while i * i <= number:
```

```
        if number % i == 0 or number % (i + 2) == 0:
```

```
            return False
```

```
        i += 6
```

```
    return True
```

```
# Input a number from the user
```

```
num = int(input("Enter a positive integer: "))
```

```
# Check if it's even or odd
```

```
if is_even(num):
```

```
    print(f"{num} is even.")
else:
    print(f"{num} is odd.")

# Check if it's prime or not
if is_prime(num):
    print(f"{num} is a prime number.")
else:
    print(f"{num} is not a prime number.")
```

Shell Clear

```
Enter a positive integer: 33
33 is odd.
33 is not a prime number.
> |
```

5. Implement a python function to Reverse a given String and also check for palindrome or not.

```
def reverse_and_check_palindrome(input_str):  
    # Remove spaces and convert to lowercase for a case-insensitive check  
    clean_str = input_str.replace(" ", "").lower()  
    reversed_str = clean_str[::-1]  
    return reversed_str == clean_str  
  
# Input a string  
user_input = input("Enter a string: ")  
  
# Call the function to check for palindrome  
is_palindrome = reverse_and_check_palindrome(user_input)  
  
# Display the results  
if is_palindrome:  
    print(f'{user_input}' is a palindrome.")  
else:  
    print(f'{user_input}' is not a palindrome.")
```

```
Shell Clear  
Enter a string: mom  
'mom' is a palindrome.  
> |
```

6. Write a python program to Generate Fibonacci Sequence.

```
def fibonacci(n):  
    fibonacci_sequence = []  
    a, b = 0, 1  
    for _ in range(n):  
        fibonacci_sequence.append(a)  
        a, b = b, a + b  
    return fibonacci_sequence  
  
# Input the number of terms  
num_terms = int(input("Enter the number of terms for the Fibonacci sequence:  
"))  
  
# Generate the Fibonacci sequence  
fib_sequence = fibonacci(num_terms)  
  
# Display the sequence  
print("Fibonacci Sequence:")  
for num in fib_sequence:  
    print(num, end=" ")
```

```
Shell Clear  
Enter the number of terms for the Fibonacci sequence: 20  
Fibonacci Sequence:  
>  
0 1 1 2 3 5 8 13 21 34 55 89 144 233 377 610 987 1597 2584 4181 >
```


7. Write a python program to calculate the area and perimeter of different geometric shapes (circle, rectangle, triangle, etc.).

```
import math
```

```
# Function to calculate the area and perimeter of a circle
```

```
def circle_area_and_perimeter(radius):
```

```
    area = math.pi * radius**2
```

```
    perimeter = 2 * math.pi * radius
```

```
    return area, perimeter
```

```
# Function to calculate the area and perimeter of a rectangle
```

```
def rectangle_area_and_perimeter(length, width):
```

```
    area = length * width
```

```
    perimeter = 2 * (length + width)
```

```
    return area, perimeter
```

```
# Function to calculate the area and perimeter of a triangle
```

```
def triangle_area_and_perimeter(base, height, side1, side2, side3):
```

```
    if side1 + side2 > side3 and side1 + side3 > side2 and side2 + side3 > side1:
```

```
        s = (base + side1 + side2 + side3) / 2
```

```
        area = math.sqrt(s * (s - base) * (s - side1) * (s - side2) * (s - side3)
```

```
    )
```

```
        perimeter = base + side1 + side2 + side3
```

```
        return area, perimeter
```

```
    else:
```

```
        return "Invalid triangle. The provided side lengths cannot form a triangle."
```

```
# Menu to select a shape
print("Select a geometric shape:")
print("1. Circle")
print("2. Rectangle")
print("3. Triangle")
choice = int(input("Enter your choice (1/2/3): "))

if choice == 1:
    radius = float(input("Radius of the circle: "))
    area, perimeter = circle_area_and_perimeter(radius)
    print(f"Area of the circle: {area}")
    print(f"Perimeter of the circle: {perimeter}")
elif choice == 2:
    length = float(input("Length of the rectangle: "))
    width = float(input("Width of the rectangle: "))
    area, perimeter = rectangle_area_and_perimeter(length, width)
    print(f"Area of the rectangle: {area}")
    print(f"Perimeter of the rectangle: {perimeter}")
elif choice == 3:
    base = float(input("Enter the base of the triangle: "))
    height = float(input("Enter the height of the triangle: "))
    side1 = float(input("Length of side 1: "))
    side2 = float(input("Length of side 2: "))
    side3 = float(input("Length of side 3: "))
    result = triangle_area_and_perimeter(base, height, side1, side2, side3)
    if isinstance(result, tuple):
```

```
    area, perimeter = result
    print(f"Area of the triangle: {area}")
    print(f"Perimeter of the triangle: {perimeter}")
else:
    print(result)
else:
    print("Invalid choice. Please select a valid option (1/2/3).")
```

```
Shell Clear
Select a geometric shape:
1. Circle
2. Rectangle
3. Triangle
Enter your choice (1/2/3): 2
Length of the rectangle: 34
Width of the rectangle: 25
Area of the rectangle: 850.0
Perimeter of the rectangle: 118.0
> |
```

8. Implement a python function to Convert Celsius to Fahrenheit and Fahrenheit to Celsius.

```
def temperature_converter(temp, scale):  
    if scale == "C":  
        fahrenheit = (temp * 9/5) + 32  
        return fahrenheit, "F"  
    elif scale == "F":  
        celsius = (temp - 32) * 5/9  
        return celsius, "C"  
    else:  
        return "Invalid scale. Please use 'C' for Celsius or 'F' for Fahrenheit."  
  
# Input temperature and scale from the user  
temp = float(input("Enter the temperature: "))  
scale = input("Enter the scale (C for Celsius, F for Fahrenheit): ").upper()  
  
result, target_scale = temperature_converter(temp, scale)  
  
if target_scale == "F":  
    print(f"{temp} degrees {scale} is equal to {result} degrees Fahrenheit.")  
else:  
    print(f"{temp} degrees {scale} is equal to {result} degrees Celsius.")
```

Shell

Clear

```
Enter the temperature: 45  
Enter the scale (C for Celsius, F for Fahrenheit): C  
45.0 degrees C is equal to 113.0 degrees Fahrenheit.  
> |
```

9. Write a Python program that accepts a string and counts the number of upper and lower case letters.

```
def count(input_string):  
    upper_count = 0  
    lower_count = 0  
  
    for char in input_string:  
        if char.isupper():  
            upper_count += 1  
        elif char.islower():  
            lower_count += 1  
  
    return upper_count, lower_count  
  
# Input a string  
user_input = input("Enter a string: ")  
# Call the function to count upper and lower case letters  
upper_count, lower_count = count(user_input)  
  
# Display the results  
print(f"Number of uppercase letters: {upper_count}")  
print(f"Number of lowercase letters: {lower_count}")
```

Shell

Clear

```
Enter a string: AdyaSingh  
Number of uppercase letters: 2  
Number of lowercase letters: 7  
> |
```

10. Write a python program to perform Arithmetic operations on Complex Numbers.

```
# Input complex numbers from the user
```

```
real_part1 = float(input("Enter the real part of the first complex number: "))
```

```
imaginary_part1 = float(input("Enter the imaginary part of the first complex number: "))
```

```
complex_num1 = complex(real_part1, imaginary_part1)
```

```
real_part2 = float(input("Enter the real part of the second complex number: "))
```

```
imaginary_part2 = float(input("Enter the imaginary part of the second complex number: "))
```

```
complex_num2 = complex(real_part2, imaginary_part2)
```

```
# Arithmetic operations on complex numbers
```

```
addition_result = complex_num1 + complex_num2
```

```
subtraction_result = complex_num1 - complex_num2
```

```
multiplication_result = complex_num1 * complex_num2
```

```
division_result = complex_num1 / complex_num2
```

```
# Display the results
```

```
print(f"Addition Result: {addition_result}")
```

```
print(f"Subtraction Result: {subtraction_result}")
```

```
print(f"Multiplication Result: {multiplication_result}")
```

```
print(f"Division Result: {division_result}")
```

Shell

Clear

```
Enter the real part of the first complex number: 2
Enter the imaginary part of the first complex number: 3
Enter the real part of the second complex number: 3
Enter the imaginary part of the second complex number: 2
Addition Result: (5+5j)
Subtraction Result: (-1+1j)
Multiplication Result: 13j
Division Result: (0.9230769230769231+0.38461538461538464j)
> |
```