Assignment 6

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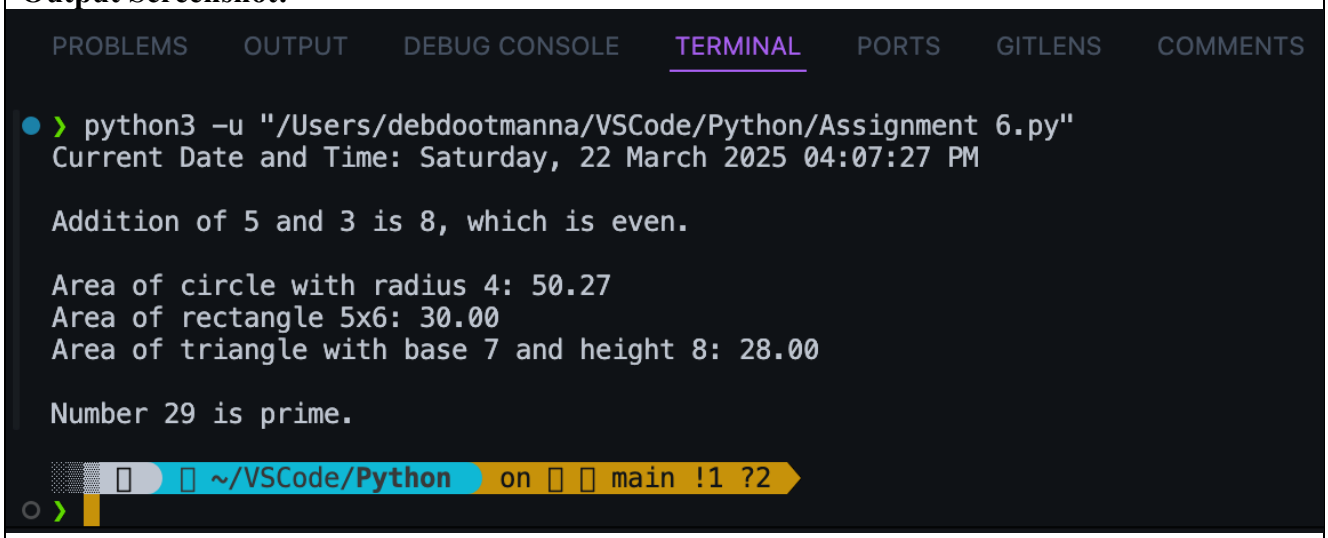
Aim: Create a custom Python module that contains two functions: calculate_area for calculating the area of different shapes (circle, rectangle, triangle) and is_prime for checking if a number is prime, then import and use this module in your main script to perform calculations. Import and use this module in your main script. Import the datetime module and use it to display the current date and time, as well as format it in a readable way.
Code:

```
import datetime
import math

# Basic arithmetic functions
def add(a, b):
    return a + b

def is_even(num):
    return num % 2 == 0

# Functions for shape operations and prime check
def calculate_area(shape, *dimensions):
    """
    Calculate area for:
      - circle: dimensions = (radius,)
      - rectangle: dimensions = (length, width)
      - triangle: dimensions = (base, height)
    """
    if shape.lower() == 'circle':
        if len(dimensions) != 1:
            raise ValueError("Circle area requires 1 dimension
(radius)")
        radius = dimensions[0]
        return math.pi * radius ** 2
    elif shape.lower() == 'rectangle':
        if len(dimensions) != 2:
            raise ValueError("Rectangle area requires 2 dimensions
(length, width)")
        length, width = dimensions
        return length * width
    elif shape.lower() == 'triangle':
        if len(dimensions) != 2:
            raise ValueError("Triangle area requires 2 dimensions
(base, height)")
```

```
        base, height = dimensions
        return 0.5 * base * height
    else:
        raise ValueError("Unsupported shape type")

def is_prime(n):
    if n <= 1:
        return False
    if n <= 3:
        return True
    if n % 2 == 0 or n % 3 == 0:
        return False
    i = 5
    while i * i <= n:
        if n % i == 0 or n % (i + 2) == 0:
            return False
        i += 6
    return True

def main():
    # Print current date and time in a readable format.
    now = datetime.datetime.now()
    formatted_date = now.strftime("%A, %d %B %Y %I:%M:%S %p")
    print(f"Current Date and Time: {formatted_date}\n")

    # Use basic arithmetic functions
    a, b = 5, 3
    result = add(a, b)
    even_status = "even" if is_even(result) else "odd"
    print(f"Addition of {a} and {b} is {result}, which is
{even_status}.\n")

    # Shape area calculations
    try:
        circle_area = calculate_area("circle", 4)
        rectangle_area = calculate_area("rectangle", 5, 6)
        triangle_area = calculate_area("triangle", 7, 8)

        print(f"Area of circle with radius 4: {circle_area:.2f}")
        print(f"Area of rectangle 5x6: {rectangle_area:.2f}")
        print(f"Area of triangle with base 7 and height 8:
{triangle_area:.2f}")
    except ValueError as e:
        print(e)
```

```
    # Prime check
    number = 29
    prime_status = "prime" if is_prime(number) else "not prime"
    print(f"\nNumber {number} is {prime_status}.")

if __name__ == "__main__":
    main()
```

Output Screenshot:



Conclusion/Summary:

This assignment demonstrates several core Python programming concepts:

Function definition and parameters: Created various functions with different parameter types including standard parameters (add, is_even), and variable arguments (calculate_area with *dimensions).
Conditional logic: Implemented decision-making through if-elif-else statements in the calculate_area and is_prime functions.
Error handling: Used raise ValueError to handle invalid inputs in the calculate_area function.
Mathematical operations: Leveraged the math library for constants (π) and implemented various calculations.
Date and time manipulation: Used the datetime module to format and display the current date and time.
String formatting: Applied f-strings for clean output and formatted numerical results with precision specifiers.
The program successfully performs arithmetic operations, geometric calculations, and primality testing while providing meaningful output to the user. The modular design with separate functions for each responsibility makes the code maintainable and reusable.

Student Signature & Date	**Marks:**	**Evaluator Signature & Date**