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Weather Modelling with Quadratic Equation

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import os

def quadratic_model(a, b, c, x):
    """
    Calculate the value of the quadratic equation  $y = ax^2 + bx + c$ .
    """
    return a * x**2 + b * x + c

default_a = 1
default_b = -2
default_c = 1

def keyboard_input():
    print("Enter coefficients for the quadratic equation ( $y = ax^2 + bx + c$ ):")
    a = float(input("a: "))
    b = float(input("b: "))
    c = float(input("c: "))
    x = float(input("Enter the x value to predict y: "))
    return a, b, c, x

def read_from_file(filename):
    inputs = []
    try:
        with open(filename, 'r') as file:
            for line in file:
                values = line.strip().split(',')
                if len(values) == 4: # Ensure correct number of inputs
                    inputs.append(tuple(map(float, values)))
                else:
                    print(f"Skipping invalid line: {line.strip()}")
    except Exception as e:
        print(f"Error reading file: {e}")
    return inputs

def save_results(filename, results):
    try:
        with open(filename, 'w') as file:
            for result in results:
                file.write(",".join(map(str, result)) + "\n")
            print(f"Results saved to {filename}")
    except Exception as e:
        print(f"Error saving results: {e}")

def main():
    results = []
    print("Weather Modeling using a Quadratic Equation\n")
    print("Choose an input method:")
    print("1. Hardcoded values")
    print("2. Keyboard input")
    print("3. Read from file")
    choice = input("Enter your choice (1/2/3): ")

    if choice == '1':
        x = float(input("Enter the x value to predict y: "))
        y = quadratic_model(default_a, default_b, default_c, x)

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    y = quadratic_model(default_a, default_b, default_c, x)
    results.append((default_a, default_b, default_c, x, y))
elif choice == '2':
    a, b, c, x = keyboard_input()
    y = quadratic_model(a, b, c, x)
    results.append((a, b, c, x, y))
elif choice == '3':
    filename = input("Enter the filename to read from: ")
    inputs = read_from_file(filename)
    for a, b, c, x in inputs:
        y = quadratic_model(a, b, c, x)
        results.append((a, b, c, x, y))
else:
    print("Invalid choice!")

print("\nResults:")
for result in results:
    print(f"Coefficients (a={result[0]}, b={result[1]}, c={result[2]}), x={result[3]} => y={result[4]}")

save_filename = input("Enter the filename to save results: ")
save_results(save_filename, results)

if __name__ == "__main__":
    main()

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Weather Modeling using a Quadratic Equation

Choose an input method:

1. Hardcoded values
2. Keyboard input
3. Read from file

Enter your choice (1/2/3): 1

Enter the x value to predict y: -4

Results:

Coefficients (a=1, b=-2, c=1), x=-4.0 => y=25.0

Enter the filename to save results: seengineering

Results saved to seengineering

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def quadratic_model(a, b, c, x):
    """
    Calculate the value of the quadratic equation y = ax^2 + bx + c.
    """
    return a * x**2 + b * x + c

def read_from_file(filename):
    """
    Read coefficients and x values from a file.
    """
    inputs = []
    try:
        with open(filename, 'r') as file:
            for line in file:
                values = line.strip().split(',')
                if len(values) == 4:
                    inputs.append(tuple(map(float, values)))
            else:
                print(f"Skipping invalid line: {line.strip()}")
    except FileNotFoundError:
        print(f"Error: File '{filename}' not found.")
    except ValueError as e:
        print(f"Error processing file: {e}")
    return inputs

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def save_results(filename, results):
    """
    Save the results to a file.
    """
    try:
        with open(filename, 'w') as file:
            file.write("a,b,c,x,y\n") # Add header
            for result in results:
                file.write(",".join(map(str, result)) + "\n")
            print(f"Results saved to {filename}")
    except Exception as e:
        print(f"Error saving results: {e}")

def stage_1():
    """
    Hardcoded variables for the quadratic equation.
    """
    a, b, c, x = 1, -2, 1, 2 # Hardcoded coefficients and x value
    y = quadratic_model(a, b, c, x)
    print(f"Hardcoded values: a={a}, b={b}, c={c}, x={x} => y={y}")

def stage_2():
    """
    Keyboard input for coefficients and x value.
    """
    print("Enter coefficients for the quadratic equation (y = ax^2 + bx + c):")
    a = float(input("a: "))
    b = float(input("b: "))
    c = float(input("c: "))
    x = float(input("Enter the x value to predict y: "))
    y = quadratic_model(a, b, c, x)
    print(f"Keyboard input values: a={a}, b={b}, c={c}, x={x} => y={y}")

def stage_3():
    """
    Read input values from a file and calculate y.
    """
    filename = input("Enter the filename to read from: ")
    inputs = read_from_file(filename)
    results = []
    for a, b, c, x in inputs:
        y = quadratic_model(a, b, c, x)
        results.append((a, b, c, x, y))
        print(f"File input values: a={a}, b={b}, c={c}, x={x} => y={y}")
    return results

def stage_4():
    """
    Handle multiple sets of inputs for both manual and file modes.
    """
    print("Choose an input method:")
    print("1. Enter manually")
    print("2. Read from file")
    choice = input("Enter your choice (1/2): ")

    results = []
    if choice == '1':
        n = int(input("How many sets of inputs? "))
        for _ in range(n):
            a = float(input("a: "))
            b = float(input("b: "))
            c = float(input("c: "))
            x = float(input("x: "))
            y = quadratic_model(a, b, c, x)
            results.append((a, b, c, x, y))
    else:
        filename = input("Enter the filename to read from: ")
        inputs = read_from_file(filename)
        results = []
        for a, b, c, x in inputs:
            y = quadratic_model(a, b, c, x)
            results.append((a, b, c, x, y))
    return results

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    b = float(input("b: "))
    c = float(input("c: "))
    x = float(input("x: "))
    y = quadratic_model(a, b, c, x)
    results.append((a, b, c, x, y))
    print(f"Manual input values: a={a}, b={b}, c={c}, x={x} => y={y}")
elif choice == '2':
    filename = input("Enter the filename to read from: ")
    inputs = read_from_file(filename)
    for a, b, c, x in inputs:
        y = quadratic_model(a, b, c, x)
        results.append((a, b, c, x, y))
        print(f"File input values: a={a}, b={b}, c={c}, x={x} => y={y}")
else:
    print("Invalid choice!")


return results

def main():
    print("Weather Modeling using a Quadratic Equation\n")
    print("Stages:")
    print("1. Hardcoding variables")
    print("2. Keyboard input")
    print("3. Reading from file")
    print("4. Multiple sets of inputs and saving results")
    stage = int(input("Choose a stage (1-4): "))

    results = []
    if stage == 1:
        stage_1()
    elif stage == 2:
        stage_2()
    elif stage == 3:
        results = stage_3()
    elif stage == 4:
        results = stage_4()
        save_filename = input("Enter the filename to save results: ")
        save_results(save_filename, results)
    else:
        print("Invalid stage selected!")

if __name__ == "__main__":
    main()

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 Weather Modeling using a Quadratic Equation

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Stages:
1. Hardcoding variables
2. Keyboard input
3. Reading from file
4. Multiple sets of inputs and saving results
Choose a stage (1-4): 4
Choose an input method:
1. Enter manually
2. Read from file
Enter your choice (1/2): 2
Enter the filename to read from: sowmi
Enter the filename to save results: sowmi1
Results saved to sowmi1

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