SOFTWARE ENGINEERING LAB TASK 3

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Implement weather modelling using the quadratic solution in stages: hard coding variables keyboard input, read from a file, for a single set of input, multiple sets of inputs. save all versions, debug, fix problems, create a GitHub account**.**

Aim:

To model temperature changes over time using the quadratic equation:
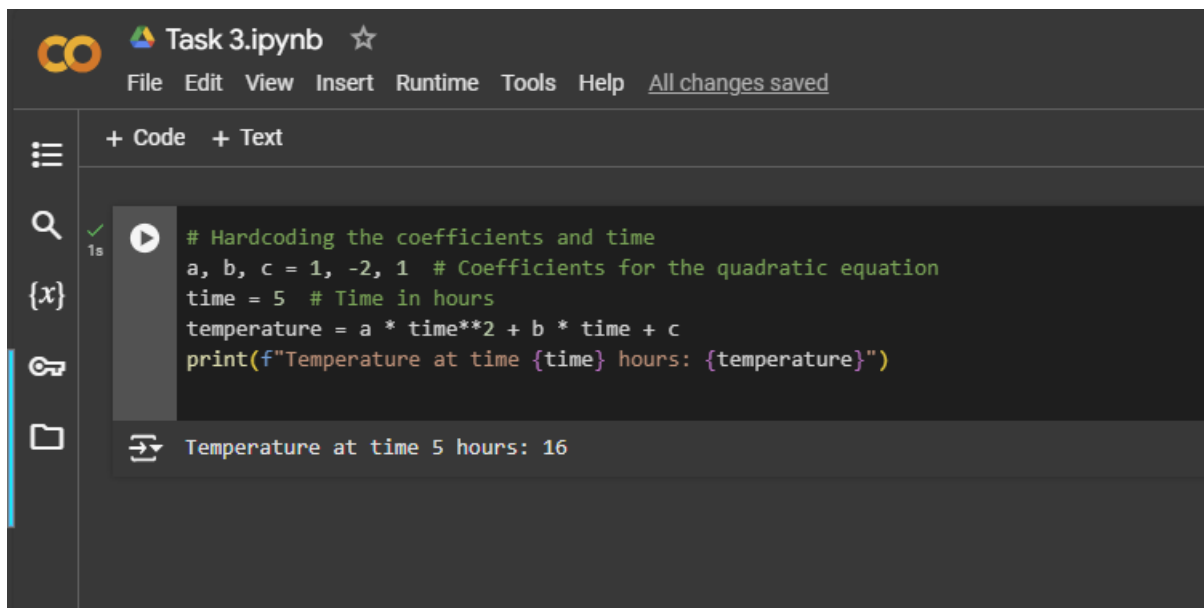
Temperature=a×(time)^2+b×(time)+c

This program will demonstrate multiple stages of input processing and ensure the solution is debugged and saved to GitHub.

Steps for Implementation

1. Hardcoding Variables

- Use predefined values for coefficients a, b, and c.

- This stage uses fixed values for the coefficients of the quadratic equation

- This step serves as a proof of concept to test the formula and ensure the program produces correct results before introducing dynamic inputs.
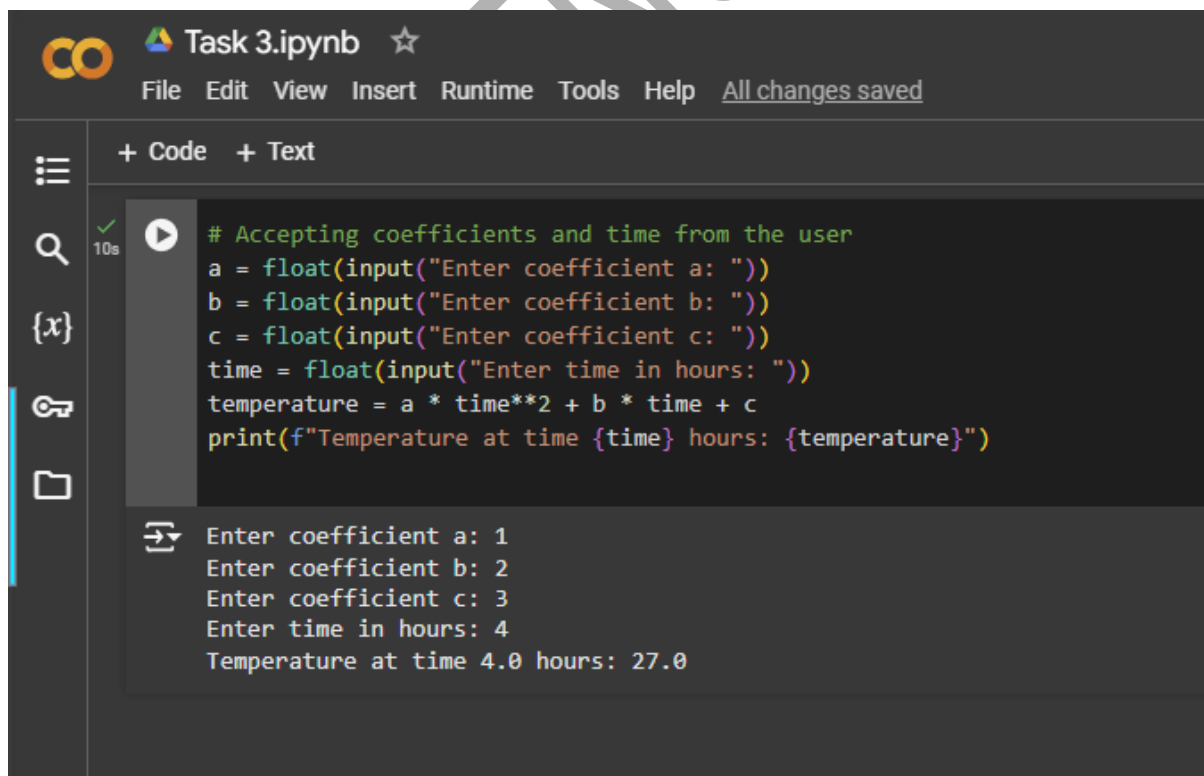
```
# Hardcoding the coefficients and time
a, b, c = 1, -2, 1  # Coefficients for the quadratic equation
time = 5  # Time in hours
temperature = a * time**2 + b * time + c
print(f"Temperature at time {time} hours: {temperature}")
```

```
Temperature at time 5 hours: 16
```

2. Accepting Variables via Keyboard Input

Here, the program dynamically accepts inputs from the user using Python's input() function. This makes the program interactive and flexible.

```
# Accepting coefficients and time from the user
a = float(input("Enter coefficient a: "))
b = float(input("Enter coefficient b: "))
c = float(input("Enter coefficient c: "))
time = float(input("Enter time in hours: "))
temperature = a * time**2 + b * time + c
print(f"Temperature at time {time} hours: {temperature}")
```

```
Enter coefficient a: 1
Enter coefficient b: 2
Enter coefficient c: 3
Enter time in hours: 4
Temperature at time 4.0 hours: 27.0
```

Create respective files and upload to drive

Name	Reason suggested	Owner	Location	
📄 multiple_inputs.txt	You uploaded • 11:12 PM	S me	📁 My Drive	⋮
co Task 3.ipynb	You modified • 11:11 PM	S me	📁 Colab Notebooks	⋮
co Task 2.ipynb	You opened • 11:04 PM	S me	📁 Colab Notebooks	⋮
📄 single_input.txt	You opened • 11:06 PM	S me	📁 My Drive	⋮
📄 inputs.txt	You uploaded • 6:54 PM	S me	📁 My Drive	👤 ⬇ ✏ ☆ ⋮
📄 input.txt	You created • 6:52 PM	S me	📁 My Drive	⋮

3. Reading Variables from a File

(a) Single Set of Inputs

In this step, the coefficients a, b, c, and time are read from a file that contains a single line of data.

Input File (single_input.txt): 1, -2, 1, 5

```
[6] from google.colab import drive
    drive.mount('/content/drive')

    Drive already mounted at /content/drive; to attempt to forcibly remount, call drive.mount("/content/drive", force_remount=True).

    # Reading a single set of coefficients from a file
    with open('single_input.txt', 'r') as file:
        line = file.readline()
        a, b, c, time = map(float, line.split(','))
        temperature = a * time**2 + b * time + c
        print(f"Temperature at time {time} hours: {temperature}")

    Temperature at time 5.0 hours: 16.0
```

(b) Multiple Sets of Inputs

This step handles a file with multiple lines, where each line represents a set of coefficients and time values.

Input File Example (multiple_inputs.txt):

```
# Reading multiple sets of coefficients from a file
with open('multiple_inputs.txt', 'r') as file:
    for line in file:
        a, b, c, time = map(float, line.split(','))
        temperature = a * time**2 + b * time + c
        print(f"Temperature at time {time} hours: {temperature}")
```

```
Temperature at time 5.0 hours: 16.0
Temperature at time 10.0 hours: 197.0
Temperature at time 3.0 hours: 5.0
```

Start coding or generate with AI.

4. Debugging and Error Handling

Add checks to prevent common runtime errors such as missing files or incorrect input formats.

File Not Found Error:

```
[11] try:
        with open('multiple_inputs.txt', 'r') as file:
            data = file.read()
    except FileNotFoundError:
        print("Error: The specified file does not exist.")
```

```
[12] try:
        with open('single_input.txt', 'r') as file:
            data = file.read()
    except FileNotFoundError:
        print("Error: The specified file does not exist.")
```
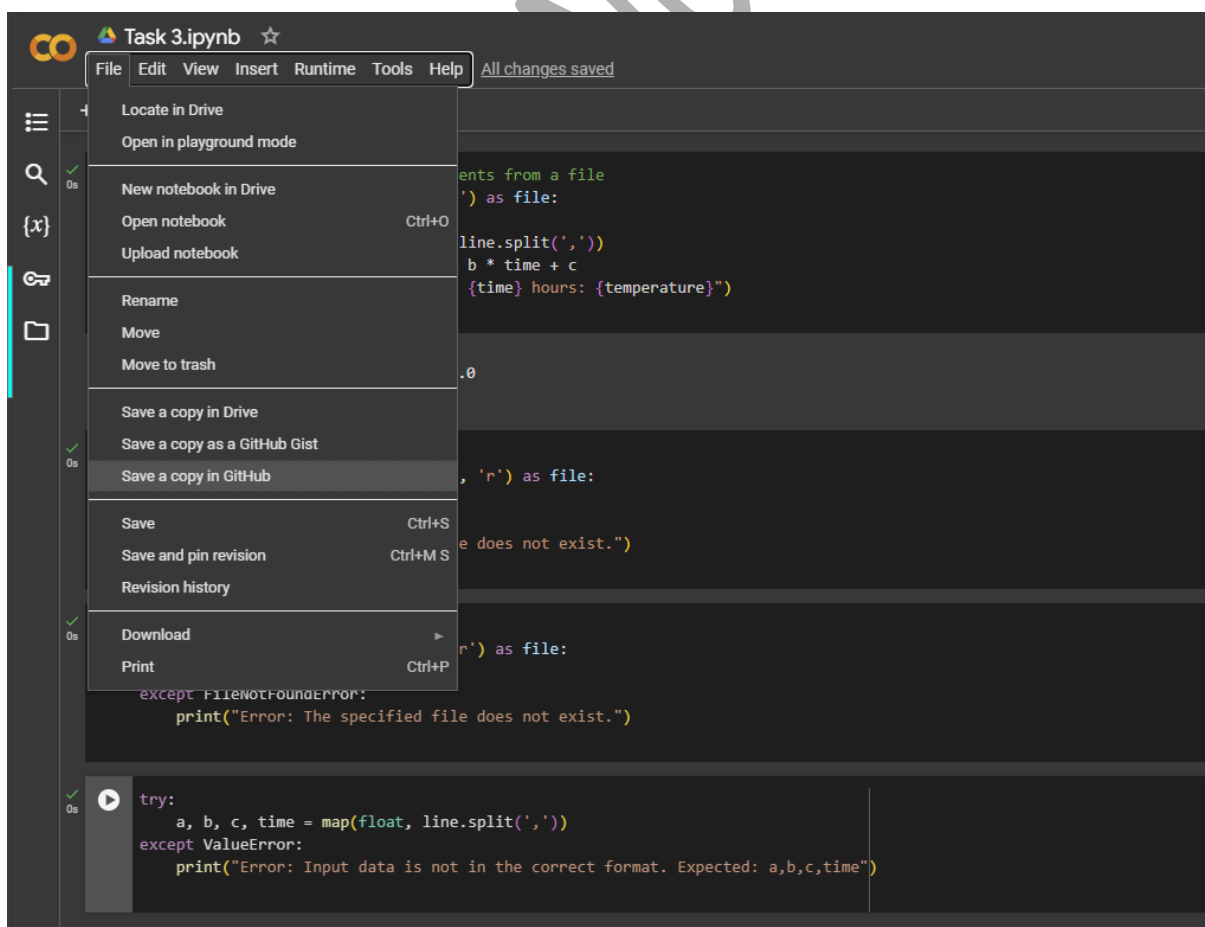
Invalid Input Format Error:

```python
try:
    a, b, c, time = map(float, line.split(','))
except ValueError:
    print("Error: Input data is not in the correct format. Expected: a,b,c,time")
```
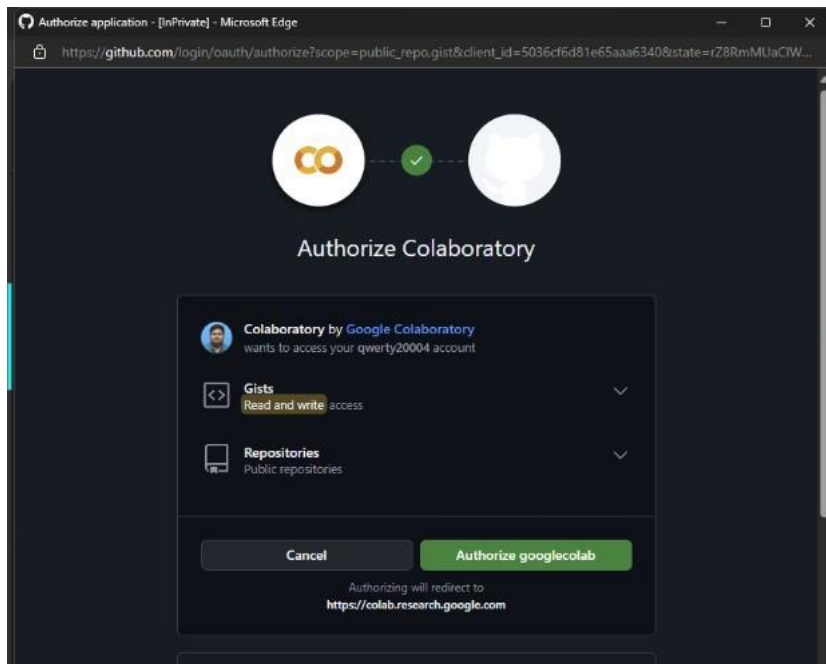
5. Saving Versions

After each stage, save the implementation in a separate code cell or file for record-keeping.
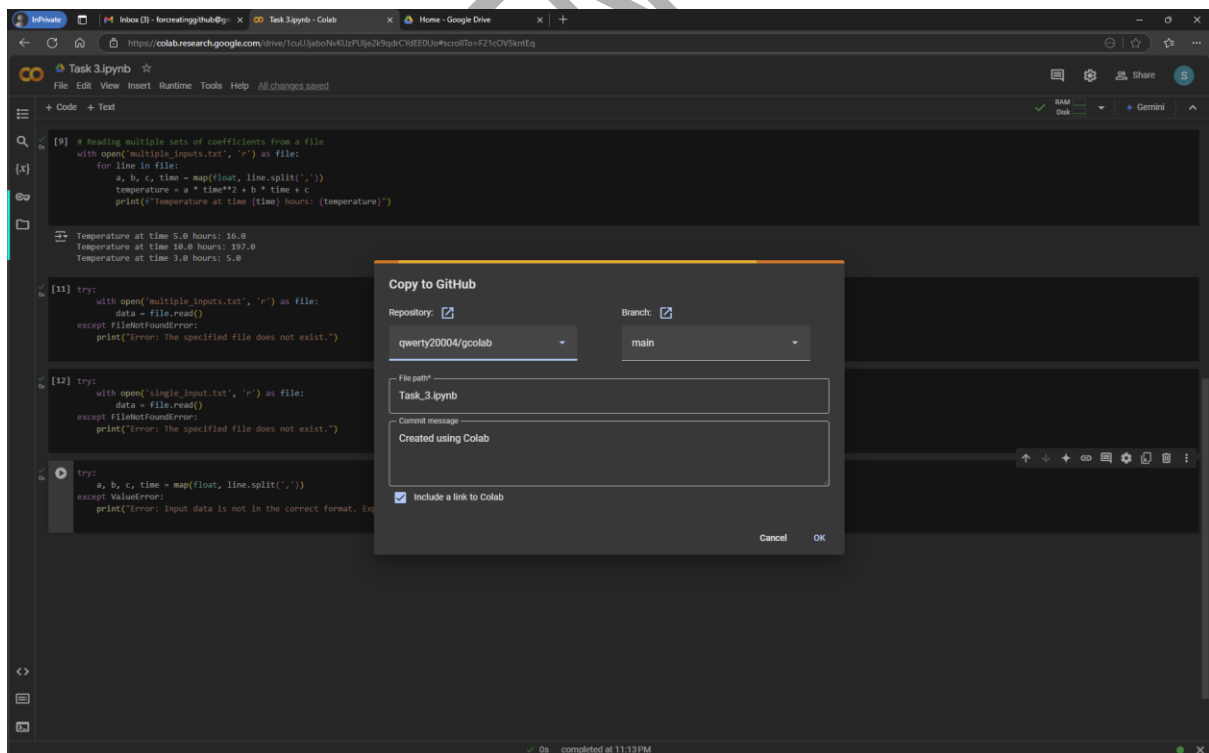
6. Pushing the Project to GitHub

Step 1: Click on file and select option "Save a copy in GitHub"

Step 2: Authorize Collaboratory

Step 3: Click on 'OK' for copying to GitHub.

Step 4: Pushed into GitHub