LAB ASSIGNMENT-19.2

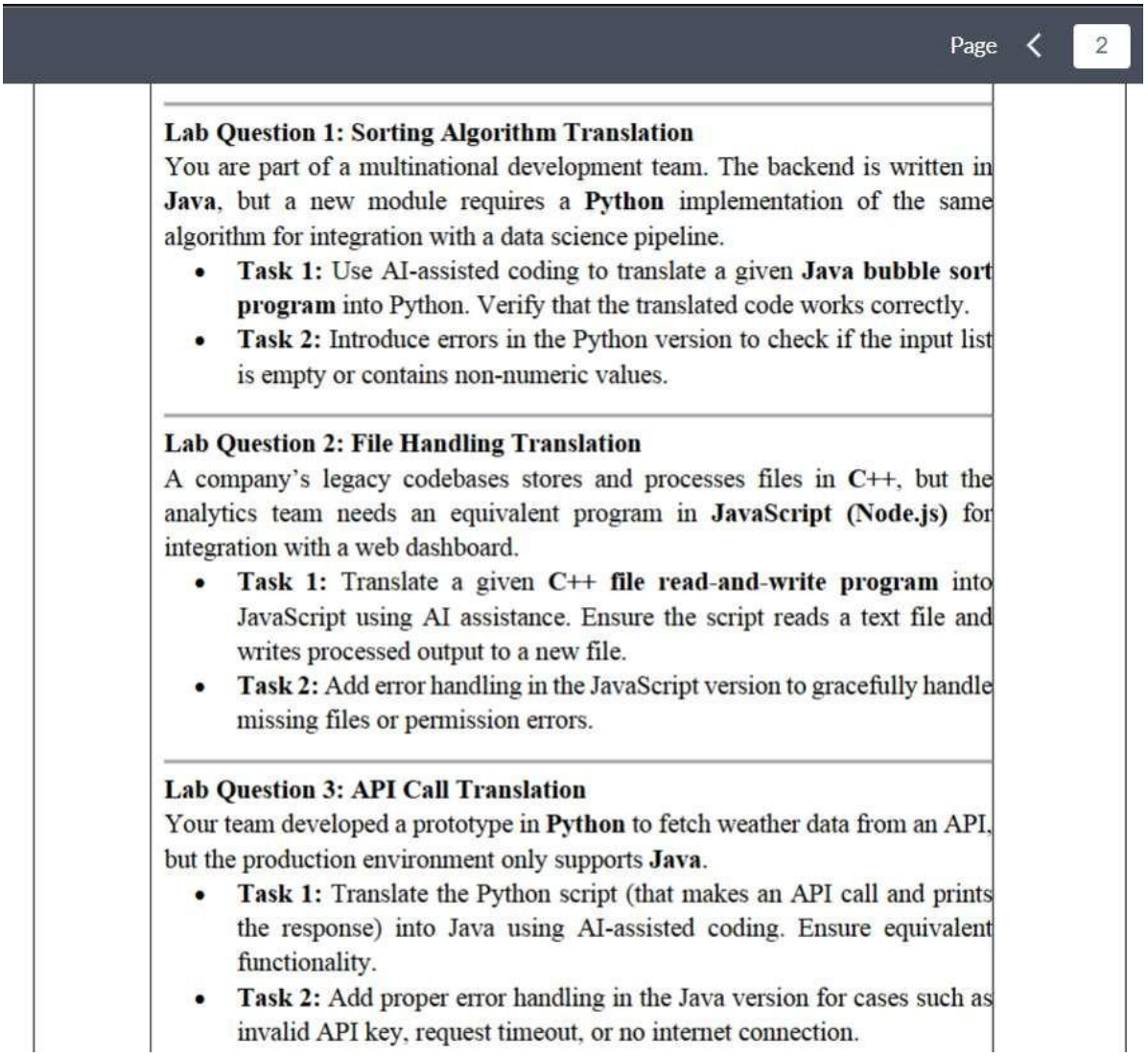
NAME : P.Hansini Reddy

ROLL NO:2403A510D5

COURSE:AI ASSISTED CODING

BATCH:01(AIML)

QUESTIONS:



Lab Question 1: Sorting Algorithm Translation

You are part of a multinational development team. The backend is written in **Java**, but a new module requires a **Python** implementation of the same algorithm for integration with a data science pipeline.

- **Task 1:** Use AI-assisted coding to translate a given **Java bubble sort program** into Python. Verify that the translated code works correctly.
- **Task 2:** Introduce errors in the Python version to check if the input list is empty or contains non-numeric values.

Lab Question 2: File Handling Translation

A company's legacy codebases stores and processes files in **C++**, but the analytics team needs an equivalent program in **JavaScript (Node.js)** for integration with a web dashboard.

- **Task 1:** Translate a given **C++ file read-and-write program** into JavaScript using AI assistance. Ensure the script reads a text file and writes processed output to a new file.
- **Task 2:** Add error handling in the JavaScript version to gracefully handle missing files or permission errors.

Lab Question 3: API Call Translation

Your team developed a prototype in **Python** to fetch weather data from an API, but the production environment only supports **Java**.

- **Task 1:** Translate the Python script (that makes an API call and prints the response) into Java using AI-assisted coding. Ensure equivalent functionality.
- **Task 2:** Add proper error handling in the Java version for cases such as invalid API key, request timeout, or no internet connection.

LAB QUESTION 1:

PROMPT:

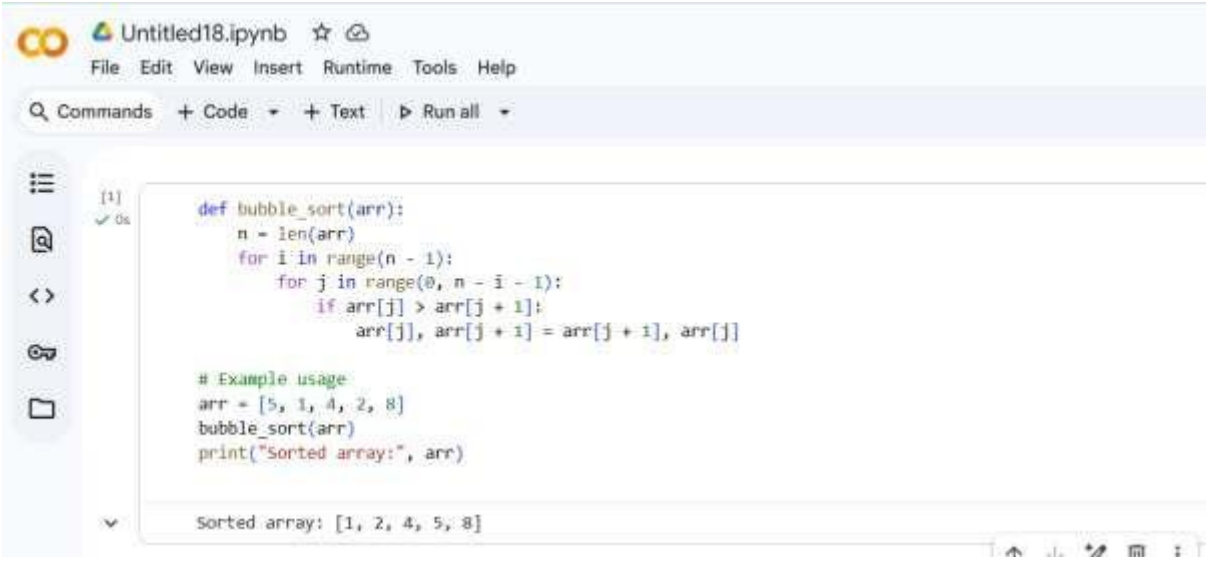
You are part of a multinational development team.
The backend system uses Java, but a new module requires a Python implementation for integration with a data science pipeline.

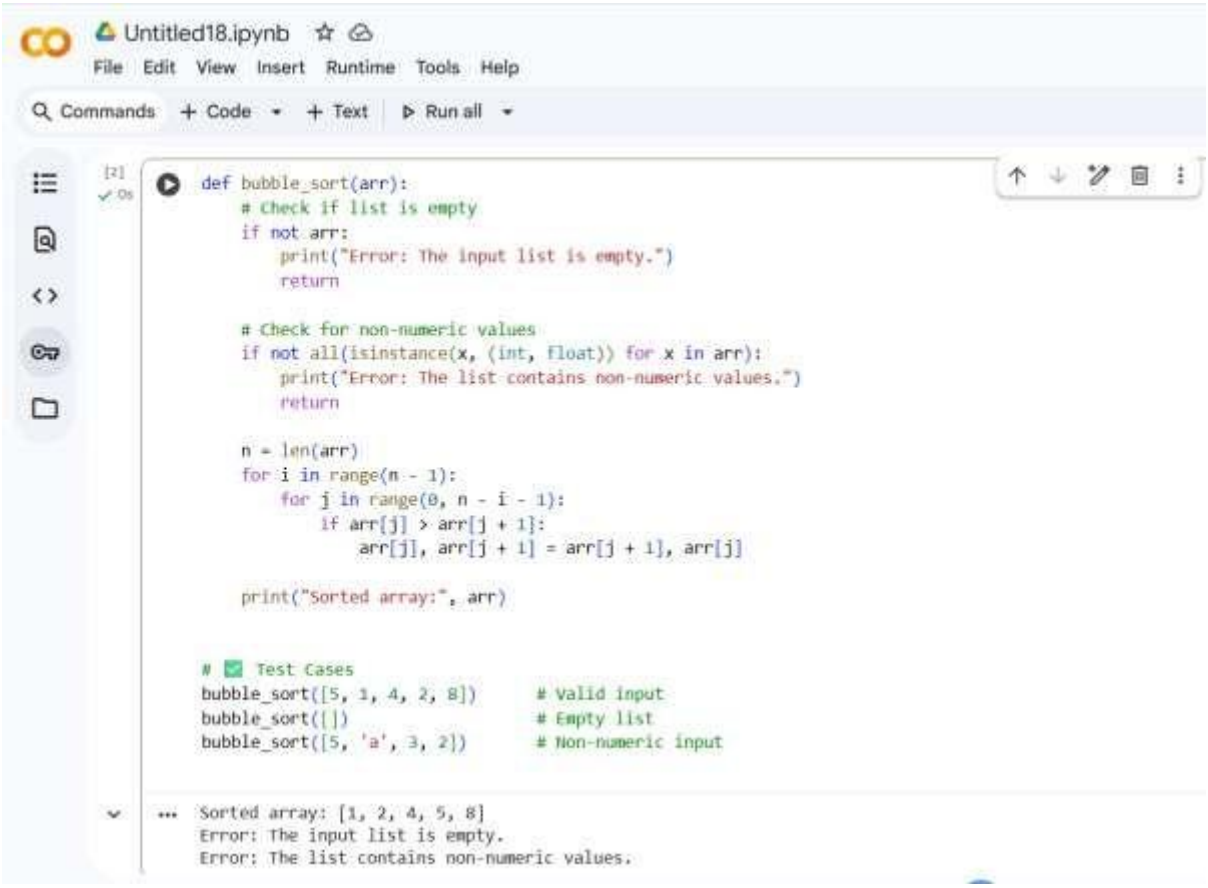
Task 1: Use AI-assisted coding to translate the following Java Bubble Sort program into Python and verify that it works correctly.
Task 2: Modify the Python version to include error handling that checks if the input list is empty or contains non-numeric values. If so, print an appropriate error message instead of sorting.

CODE:

```
public class BubbleSort {
    public static void main(String[] args) {
        int[] arr = {5, 1, 4, 2, 8};
        bubbleSort(arr);
        System.out.println("Sorted array:");
        for (int num : arr) {
            System.out.print(num + " ");
        }
    }

    static void bubbleSort(int[] arr) {
        int n = arr.length;
```

```
        for (int i = 0; i < n - 1; i++) {
            for (int j = 0; j < n - i - 1; j++) {
                if (arr[j] > arr[j + 1]) {
                    int temp = arr[j];
                    arr[j] = arr[j + 1];
                    arr[j + 1] = temp;
                }
            }
        }
    }
}
```





LAB QUESTION 2:

PROMPT:

You are part of a development team that is modernizing a company's legacy C++ system.
The old system reads a text file, processes its content, and writes the results to a new file.

Task 1: Use AI-assisted coding to translate the given C++ file read-and-write program into JavaScript (Node.js).
Ensure that the JavaScript version correctly reads data from a text file and writes processed output (for example, uppercase text) into a new file.

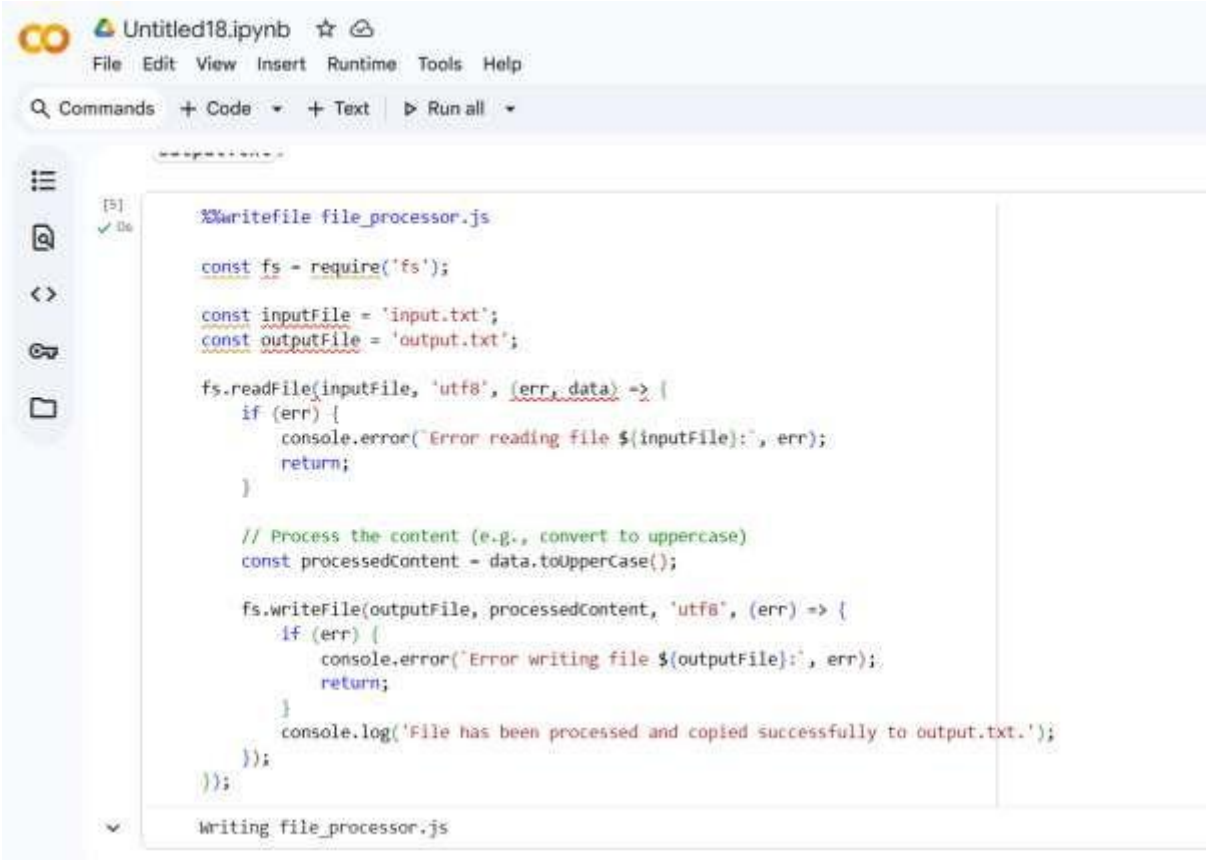
Task 2

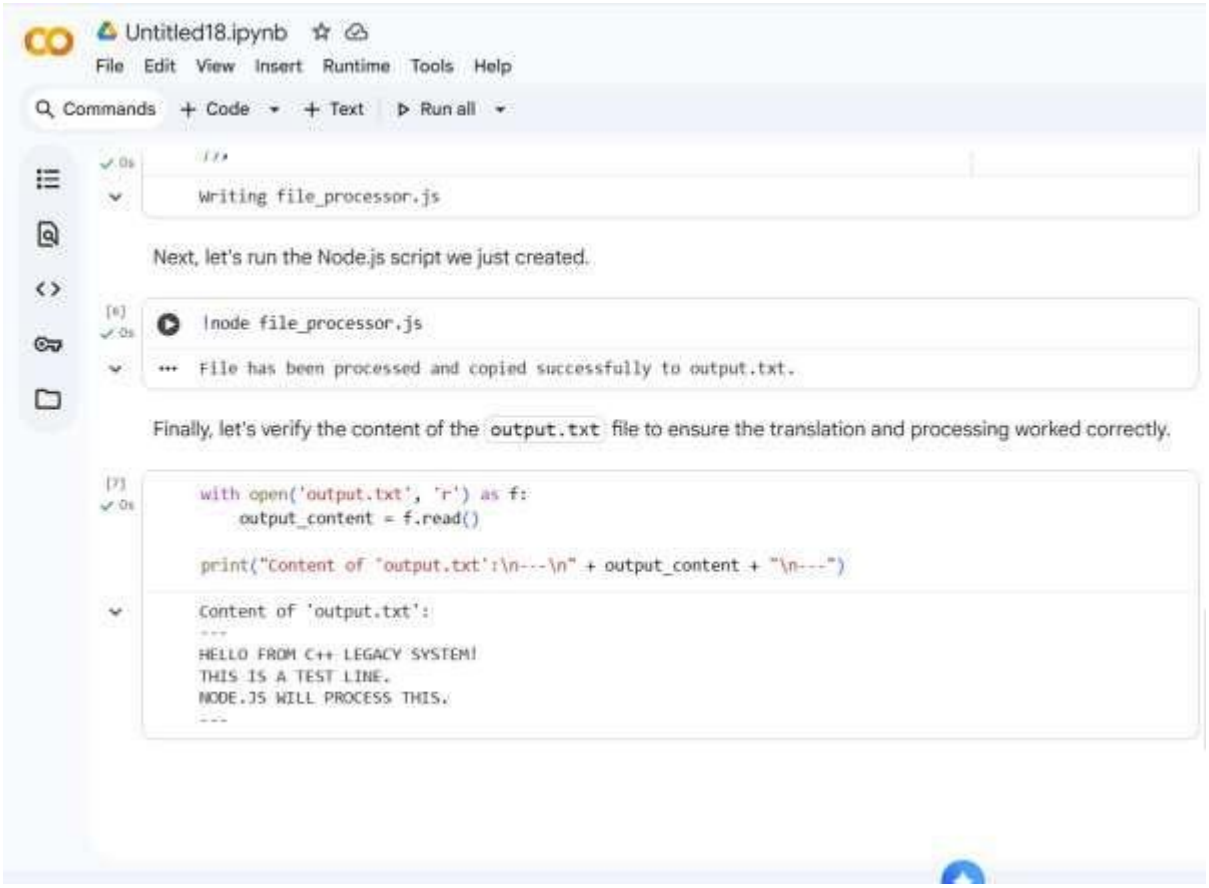
Extend the JavaScript (Node.js) file-handling program by adding **error handling**.
The updated script should handle missing input files, invalid permissions, or any I/O errors gracefully, showing user-friendly messages without crashing the program.

CODE :

```
#include <iostream>
#include <fstream>
#include <string>
using namespace std;

int main() {
    ifstream inputFile("input.txt");
    ofstream outputFile("output.txt");
    string line;

    if (inputFile.is_open() && outputFile.is_open()) {
        while (getline(inputFile, line)) {
            outputFile << line << endl;
        }
        cout << "File has been copied successfully." << endl;
    } else {
        cout << "Error opening file." << endl;
    }

    inputFile.close();
```

```
    outputFile.close();

    return 0;
}
```

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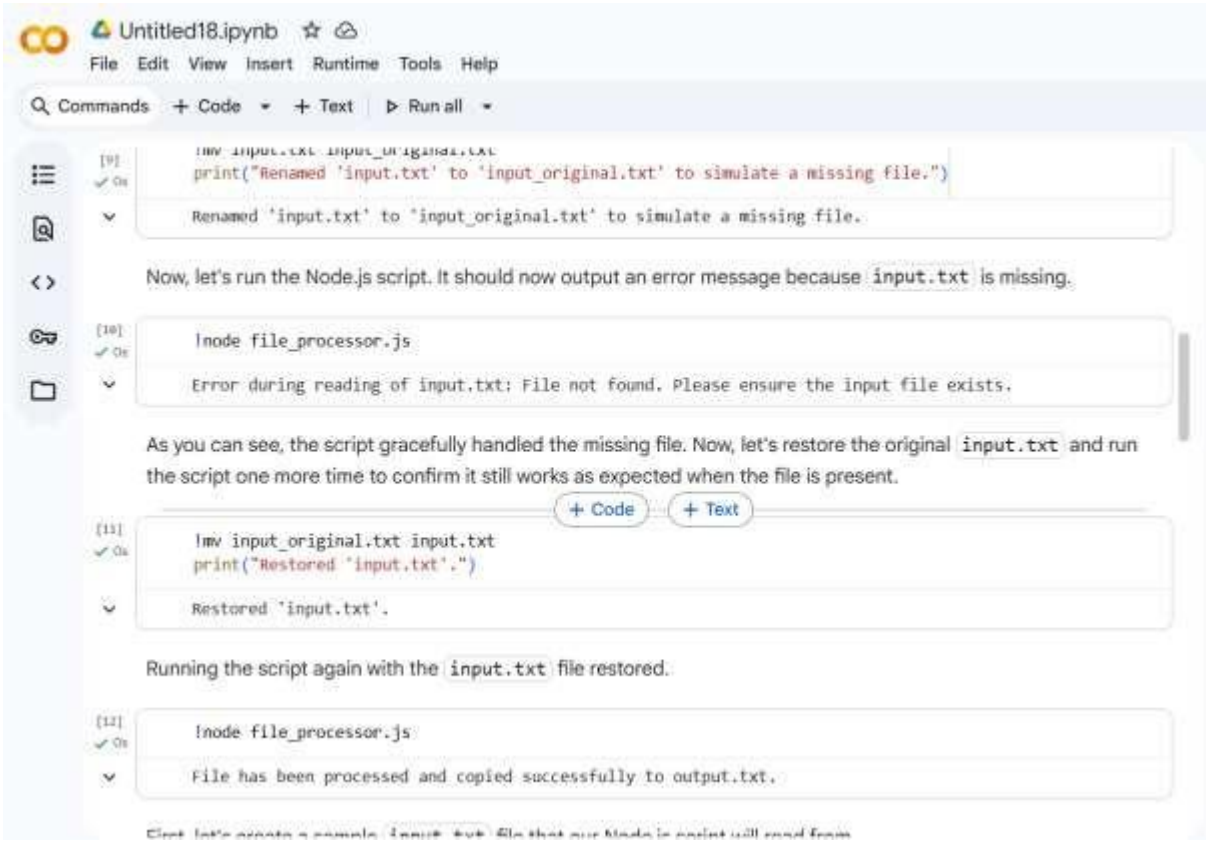
Commands + Code + Text Run all
Writing file_processor.js
Next, let's run the Node.js script we just created.
!node file_processor.js
File has been processed and copied successfully to output.txt.
Finally, let's verify the content of the output.txt file to ensure the translation and processing worked correctly.
with open('output.txt', 'r') as f:
output_content = f.read()
print("Content of 'output.txt':\n---\n" + output_content + "\n---")
Content of 'output.txt':

HELLO FROM C++ LEGACY SYSTEM!
THIS IS A TEST LINE.
NODE.JS WILL PROCESS THIS.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print("Renamed 'input.txt' to 'input_original.txt' to simulate a missing file.")
Renamed 'input.txt' to 'input_original.txt' to simulate a missing file.
Now, let's run the Node.js script. It should now output an error message because input.txt is missing.
!node file_processor.js
Error during reading of input.txt: File not found. Please ensure the input file exists.
As you can see, the script gracefully handled the missing file. Now, let's restore the original input.txt and run the script one more time to confirm it still works as expected when the file is present.
+ Code + Text
!mv input_original.txt input.txt
print("Restored 'input.txt'.")
Restored 'input.txt'.
Running the script again with the input.txt file restored.
!node file_processor.js
File has been processed and copied successfully to output.txt.

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First, let's create a sample `input.txt` file that our Node.js script will read from.

[4]

```
with open('input.txt', 'w') as f:
    f.write('Hello from C++ legacy system!\n')
    f.write('This is a test line.\n')
    f.write('Node.js will process this.')

print("Created 'input.txt' successfully.")
```

```
Created 'input.txt' successfully.
```

Now, here is the JavaScript (Node.js) translation of your C++ program. It uses Node.js's built-in `fs` module to handle file operations. I've also added a step to convert the content to uppercase before writing it to `output.txt`.

[8]

```
%%writefile file_processor.js

const fs = require('fs');

const inputFile = 'input.txt';
const outputFile = 'output.txt';

// Function to handle errors gracefully with more specific messages
function handleError(err, operation, filePath) {
    let errorMessage = `Error during ${operation} of ${filePath}: `;
    if (err.code === 'ENOENT') {
        errorMessage += 'File not found. Please ensure the input file exists.';
    } else if (err.code === 'EACCES') {
        errorMessage += 'Permission denied. Please check file permissions.';
    } else {
        errorMessage += `An unexpected I/O error occurred: ${err.message}`;
    }
    console.error(errorMessage);
}

fs.readFile(inputFile, 'utf8', (err, data) => {
    if (err) {
        handleError(err, 'reading', inputFile);
        return;
    }

    // Process the content (e.g., convert to uppercase)
    const processedContent = data.toUpperCase();

    fs.writeFile(outputFile, processedContent, 'utf8', (err) => {
        if (err) {
            handleError(err, 'writing', outputFile);
            return;
        }
        console.log('File has been processed and copied successfully to output.txt.');
    });
});
```

LAB QUESTION 3:

PROMPT:

API Call Translation

You are part of a software development team migrating a data pipeline from Python to Java.
The Python prototype makes an API call to fetch weather data and prints the response.

Task 1: Use AI-assisted coding to translate the following Python API call program into Java while ensuring equivalent functionality (fetch data and print the JSON response).

Task 2

Extend the translated Java API program to include **robust error handling**.
The Java version should gracefully handle the following scenarios:

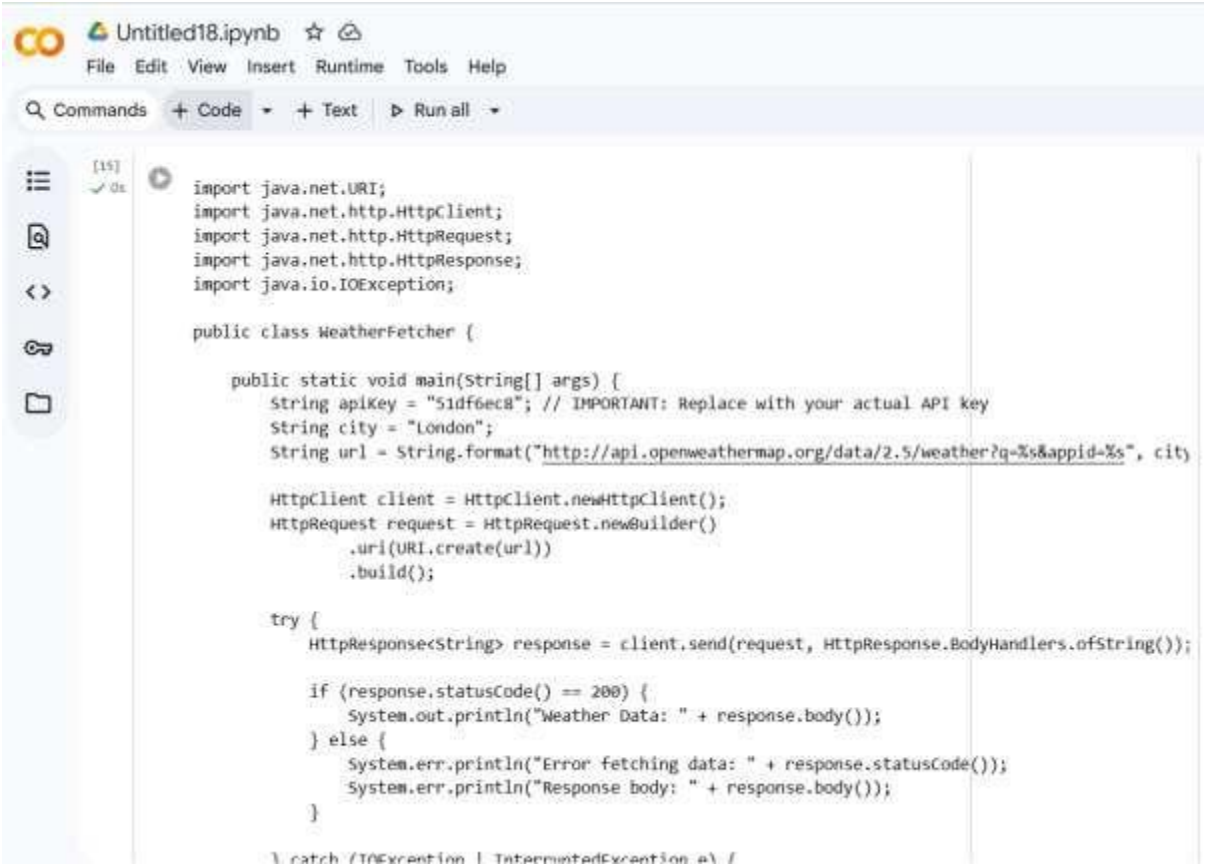
- Invalid API key (HTTP 401)
- Request timeout
- No internet connection or network issues

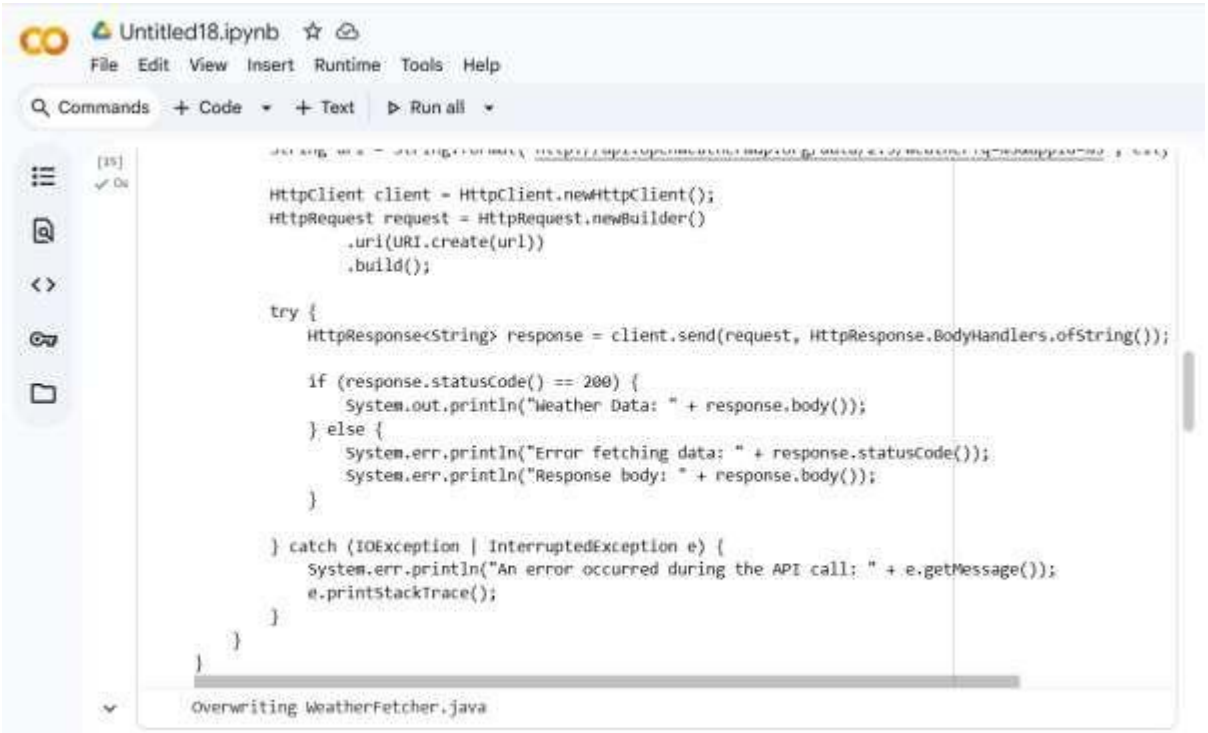
Print clear error messages for each case without the program crashing.

CODE:

```
import requests


def get_weather():
```

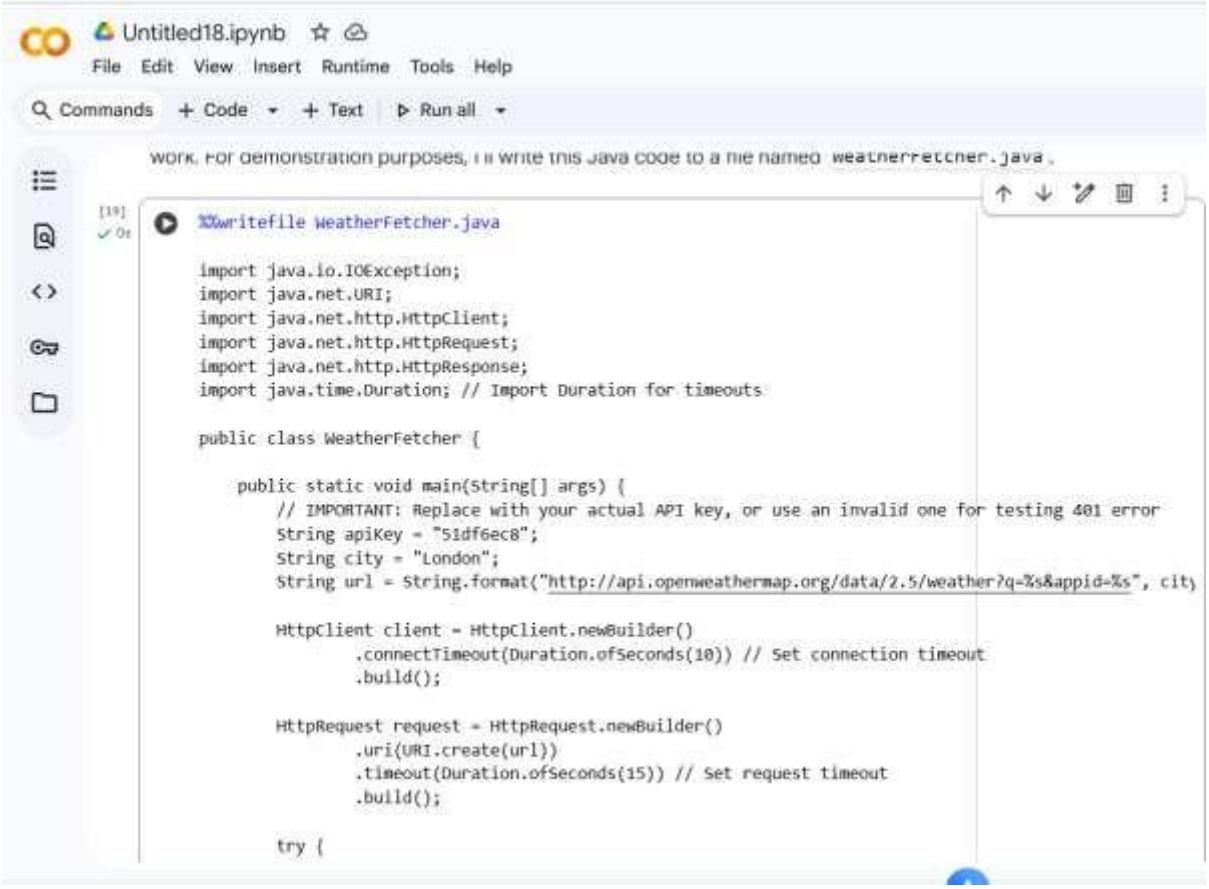
```
    api_key = "your_api_key_here"
    city = "London"
    url =
f"http://api.openweathermap.org/data/2.5/weather?q={city}&appid={api_key}
"

    response = requests.get(url)
    if response.status_code == 200:
        print("Weather Data:", response.json())
    else:
        print("Error fetching data:", response.status_code)

get_weather()
```

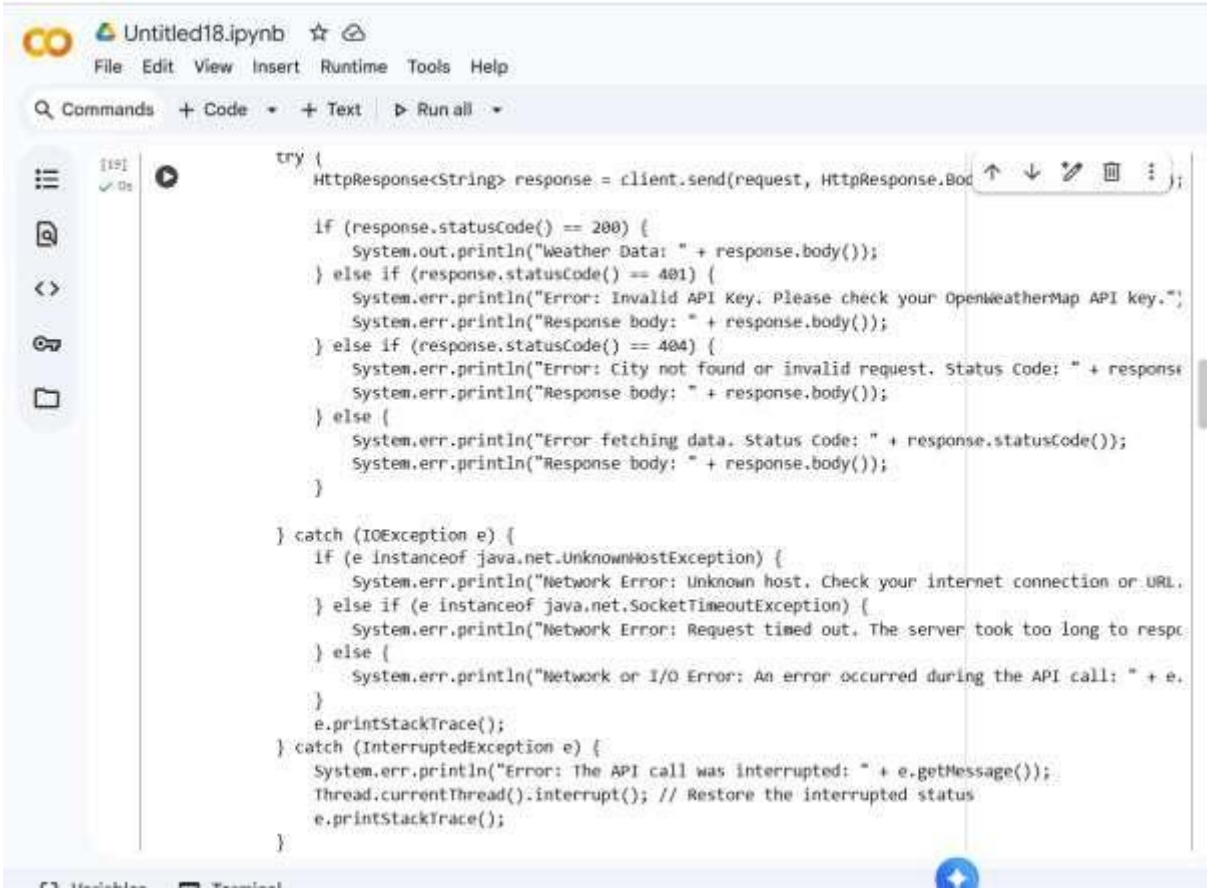




Now, let's compile and run the Java code.

Since Colab primarily supports Python, we'll compile and run the Java code using shell commands. Please ensure

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try {
HttpResponse<String> response = client.send(request, HttpResponse.Bod
if (response.statusCode() == 200) {
System.out.println("Weather Data: " + response.body());
} else if (response.statusCode() == 401) {
System.err.println("Error: Invalid API Key. Please check your OpenWeatherMap API key.");
System.err.println("Response body: " + response.body());
} else if (response.statusCode() == 404) {
System.err.println("Error: City not found or invalid request. Status Code: " + response
System.err.println("Response body: " + response.body());
} else {
System.err.println("Error fetching data. Status Code: " + response.statusCode());
System.err.println("Response body: " + response.body());
}
} catch (IOException e) {
if (e instanceof java.net.UnknownHostException) {
System.err.println("Network Error: Unknown host. Check your internet connection or URL.
} else if (e instanceof java.net.SocketTimeoutException) {
System.err.println("Network Error: Request timed out. The server took too long to respo
} else {
System.err.println("Network or I/O Error: An error occurred during the API call: " + e.
}
e.printStackTrace();
} catch (InterruptedException e) {
System.err.println("Error: The API call was interrupted: " + e.getMessage());
Thread.currentThread().interrupt(); // Restore the interrupted status
e.printStackTrace();
}