

LAB ASSIGNMENT-19.2

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COURSE:AI ASSISTED CODING

BATCH:01(AIML)

QUESTIONS:

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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;

}

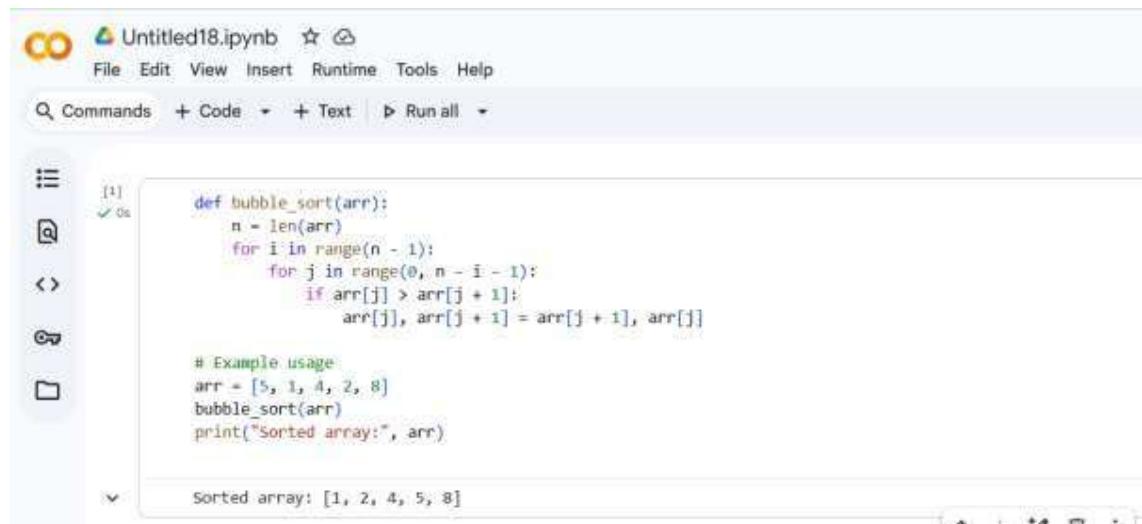
}

}

}

}

```



The screenshot shows a Jupyter Notebook interface with the following details:

- Title:** Untitled18.ipynb
- Toolbar:** File, Edit, View, Insert, Runtime, Tools, Help
- Cell Type:** Code
- Code Content:**

```

def bubble_sort(arr):
    n = len(arr)
    for i in range(n - 1):
        for j in range(0, n - i - 1):
            if arr[j] > arr[j + 1]:
                arr[j], arr[j + 1] = arr[j + 1], arr[j]

# Example usage:
arr = [5, 1, 4, 2, 8]
bubble_sort(arr)
print("Sorted array:", arr)

```
- Output:** Sorted array: [1, 2, 4, 5, 8]

The screenshot shows a Jupyter Notebook interface with the following details:

- Title Bar:** Untitled18.ipynb
- Toolbar:** File, Edit, View, Insert, Runtime, Tools, Help
- Commands Bar:** Commands, + Code, + Text, Run all
- Code Cell:** Contains Python code for bubble sort, including error handling for empty lists and non-numeric values.
- Output Cell:** Shows the execution results for three test cases: a valid input list [5, 1, 4, 2, 8], an empty list [], and a list containing a non-numeric value 'a'.

```
def bubble_sort(arr):
    # Check if list is empty
    if not arr:
        print("Error: The input list is empty.")
        return

    # Check for non-numeric values
    if not all(isinstance(x, (int, float)) for x in arr):
        print("Error: The list contains non-numeric values.")
        return

    n = len(arr)
    for i in range(n - 1):
        for j in range(0, n - i - 1):
            if arr[j] > arr[j + 1]:
                arr[j], arr[j + 1] = arr[j + 1], arr[j]

    print("Sorted array:", arr)

# Test Cases
bubble_sort([5, 1, 4, 2, 8])      # Valid input
bubble_sort([])                   # Empty list
bubble_sort([5, 'a', 3, 2])       # Non-numeric input
```

...
... Sorted array: [1, 2, 4, 5, 8]
Error: The input list is empty.
Error: The list contains non-numeric values.

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 userfriendly messages without crashing the program.

CODE :

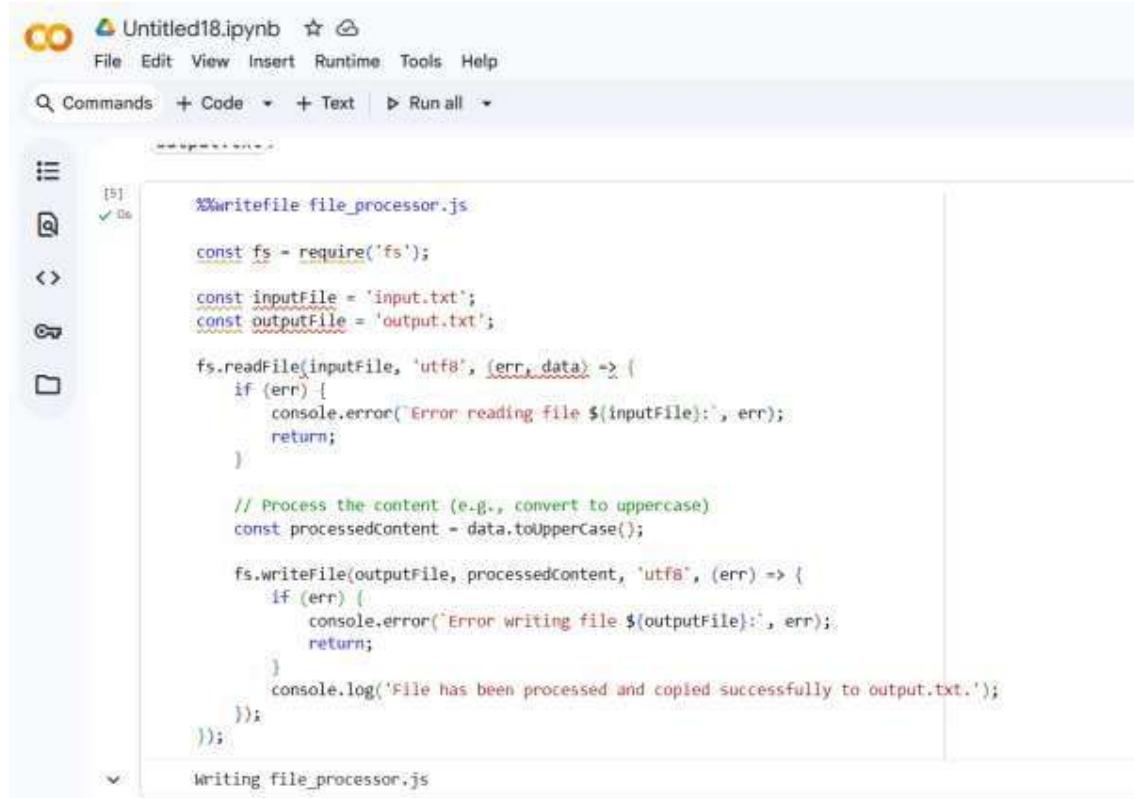
```
#include <iostream>
#include <fstream>
#include <string> using
namespace std;

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;  
}  
  
return 0;
```



The screenshot shows a Jupyter Notebook interface with the title "Untitled18.ipynb". The menu bar includes File, Edit, View, Insert, Runtime, Tools, and Help. Below the menu is a toolbar with Commands, Code, Text, and Run all. On the left is a sidebar with icons for file operations. The main area displays a code cell output:

```
%writefile file_processor.js  
const fs = require('fs');  
const inputFile = 'input.txt';  
const outputFile = 'output.txt';  
  
fs.readFile(inputFile, 'utf8', (err, data) => {  
    if (err) {  
        console.error(`Error reading file ${inputFile}:`, err);  
        return;  
    }  
  
    // Process the content (e.g., convert to uppercase)  
    const processedContent = data.toUpperCase();  
  
    fs.writeFile(outputFile, processedContent, 'utf8', (err) => {  
        if (err) {  
            console.error(`Error writing file ${outputFile}:`, err);  
            return;  
        }  
        console.log('File has been processed and copied successfully to output.txt.');  
    });  
});  
  
writing file_processor.js
```

Untitled18.ipynb

File Edit View Insert Runtime Tools Help

Commands + Code + Text ▶ Run all

Writing file_processor.js

Next, let's run the Node.js script we just created.

[6] `!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.

(7) `with open('output.txt', 'r') as f:
 output_content = f.read()

print("Content of "output.txt":\n" + output_content + "\n")`

Content of `output.txt`:

...
HELLO FROM C++ LEGACY SYSTEM!
THIS IS A TEST LINE.
NODE.JS WILL PROCESS THIS.
...

Untitled18.ipynb

File Edit View Insert Runtime Tools Help

Commands + Code + Text ▶ Run all

mv input.txt input_original.txt
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.

[8] `!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.

[9] `!mv input_original.txt input.txt
print("Restored 'input.txt'.")`

Restored 'input.txt'.

Running the script again with the `input.txt` file restored.

[10] `!node file_processor.js`

File has been processed and copied successfully to output.txt.

Untitled18.ipynb

File Edit View Insert Runtime Tools Help

Commands + Code + Text ▶ Run all

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

```
[4] ✓ 0s
  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.\n')

      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`.

```
[5] ✓ 0s
  #>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.');
    });
  });
}
```

Untitled18.ipynb

File Edit View Insert Runtime Tools Help

Commands + Code + Text ▶ Run all

```
[6] ✓ 0s
  // 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():
```

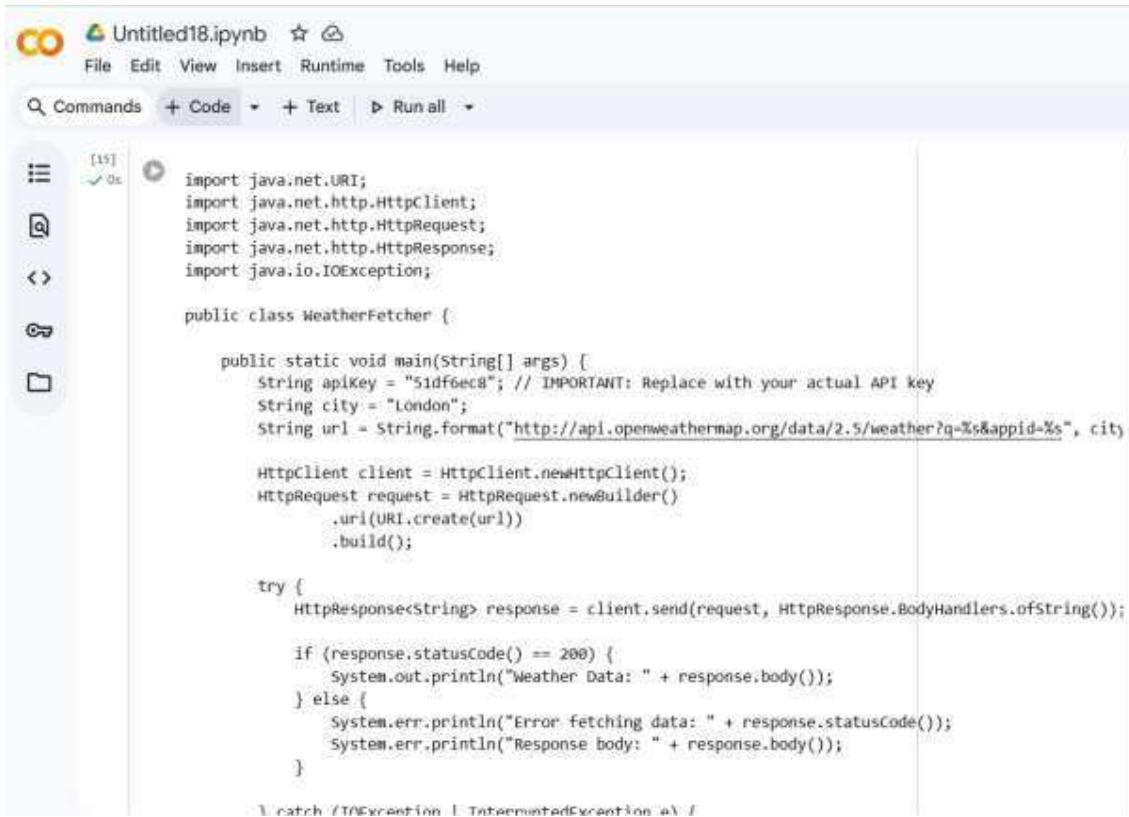
```

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()

```



The screenshot shows a Jupyter Notebook interface with the following details:

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- Toolbar Buttons:** Commands, Code, Text, Run all
- Code Cell:**

```

import java.net.URI;
import java.net.http.HttpClient;
import java.net.http.HttpRequest;
import java.net.http.HttpResponse;
import java.io.IOException;

public class WeatherFetcher {

    public static void main(String[] args) {
        String apiKey = "51df6ec8"; // IMPORTANT: Replace with your actual API key
        String city = "London";
        String url = String.format("http://api.openweathermap.org/data/2.5/weather?q=%s&appid=%s", city);

        HttpClient client = HttpClient.newHttpClient();
        HttpRequest request = HttpRequest.newBuilder()
            .uri(URI.create(url))
            .build();

        try {
            HttpResponse<String> response = client.send(request, HttpResponse.BodyHandlers.ofString());

            if (response.statusCode() == 200) {
                System.out.println("Weather Data: " + response.body());
            } else {
                System.err.println("Error fetching data: " + response.statusCode());
                System.err.println("Response body: " + response.body());
            }
        } catch (IOException | InterruptedException e) {
            e.printStackTrace();
        }
    }
}

```

The screenshot shows a Google Colab interface with a code cell containing Java code. The code uses the HttpClient API to send a GET request to an OpenWeatherMap API endpoint and handle the response. A tooltip 'Overwriting WeatherFetcher.java' is visible at the bottom of the code cell.

```
HttpClient client = HttpClient.newHttpClient();
HttpRequest request = HttpRequest.newBuilder()
    .uri(URI.create(url))
    .build();

try {
    HttpResponse<String> response = client.send(request, HttpResponse.BodyHandlers.ofString());

    if (response.statusCode() == 200) {
        System.out.println("Weather Data: " + response.body());
    } else {
        System.err.println("Error fetching data: " + response.statusCode());
        System.err.println("Response body: " + response.body());
    }
} catch (IOException | InterruptedException e) {
    System.err.println("An error occurred during the API call: " + e.getMessage());
    e.printStackTrace();
}
}

Overwriting WeatherFetcher.java
```

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

The screenshot shows a Google Colab interface with a code cell containing Java code. A blue play button icon is positioned next to the code cell, indicating it can be executed. The code is identical to the one shown in the previous screenshot, demonstrating how to fetch weather data from OpenWeatherMap.

```
work. For demonstration purposes, I'll write this Java code to a file named WeatherFetcher.java.

import java.io.IOException;
import java.net.URI;
import java.net.http.HttpClient;
import java.net.http.HttpRequest;
import java.net.http.HttpResponse;
import java.time.Duration; // Import Duration for timeouts

public class WeatherFetcher {

    public static void main(String[] args) {
        // IMPORTANT: Replace with your actual API key, or use an invalid one for testing 401 error
        String apiKey = "51df6ec8";
        String city = "London";
        String url = String.format("http://api.openweathermap.org/data/2.5/weather?q=%s&ampappid=%s", city);

        HttpClient client = HttpClient.newBuilder()
            .connectTimeout(Duration.ofSeconds(10)) // Set connection timeout
            .build();

        HttpRequest request = HttpRequest.newBuilder()
            .uri(URI.create(url))
            .timeout(Duration.ofSeconds(15)) // Set request timeout
            .build();

        try {
```

Untitled18.ipynb

File Edit View Insert Runtime Tools Help

Commands + Code + Text ▶ Run all

```
try {
    HttpResponse<String> response = client.send(request, HttpResponse.BodyHandlers.ofString());
    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.statusCode());
        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 respond.");
    } 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();
}
```