AI ASSISTED CODING

LABTEST-02

NAME:CH.RAMCHARAN

ENROLL.NO:2403A52069

BATCH:04

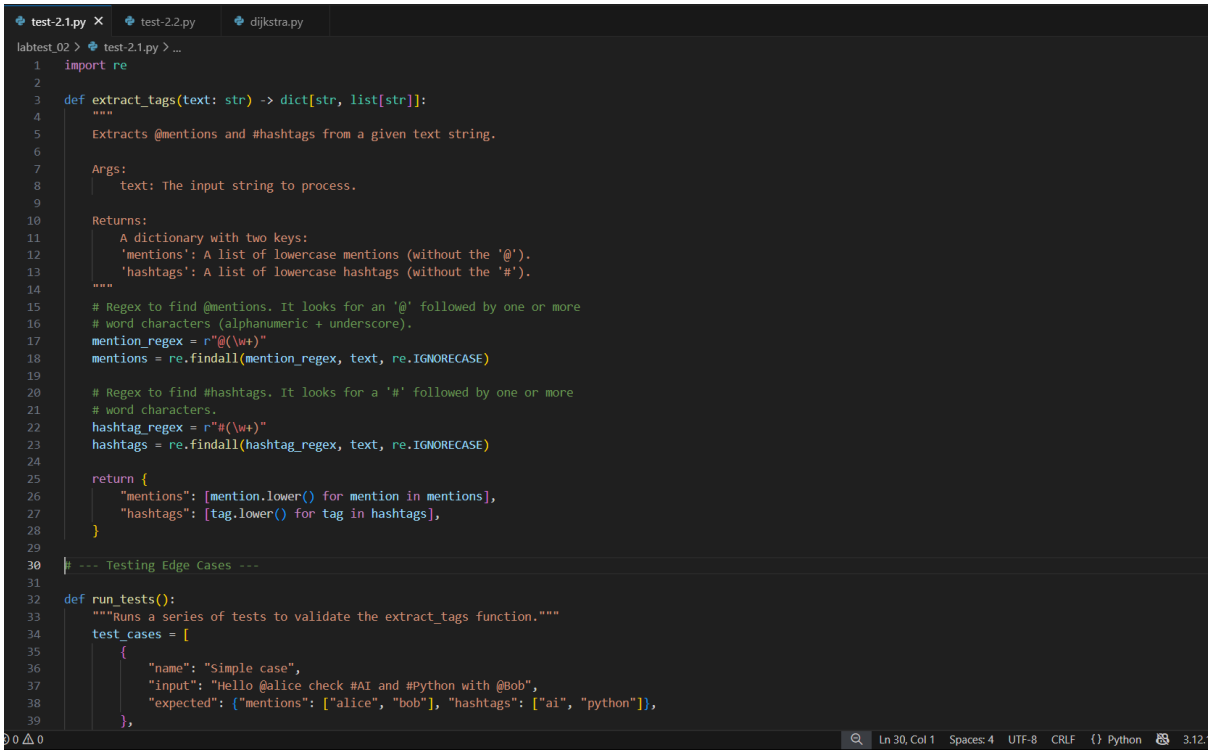
TASK-01:

Use regrex to extract @ mentions and # hashtags (case-insensitive) and return lower case list.

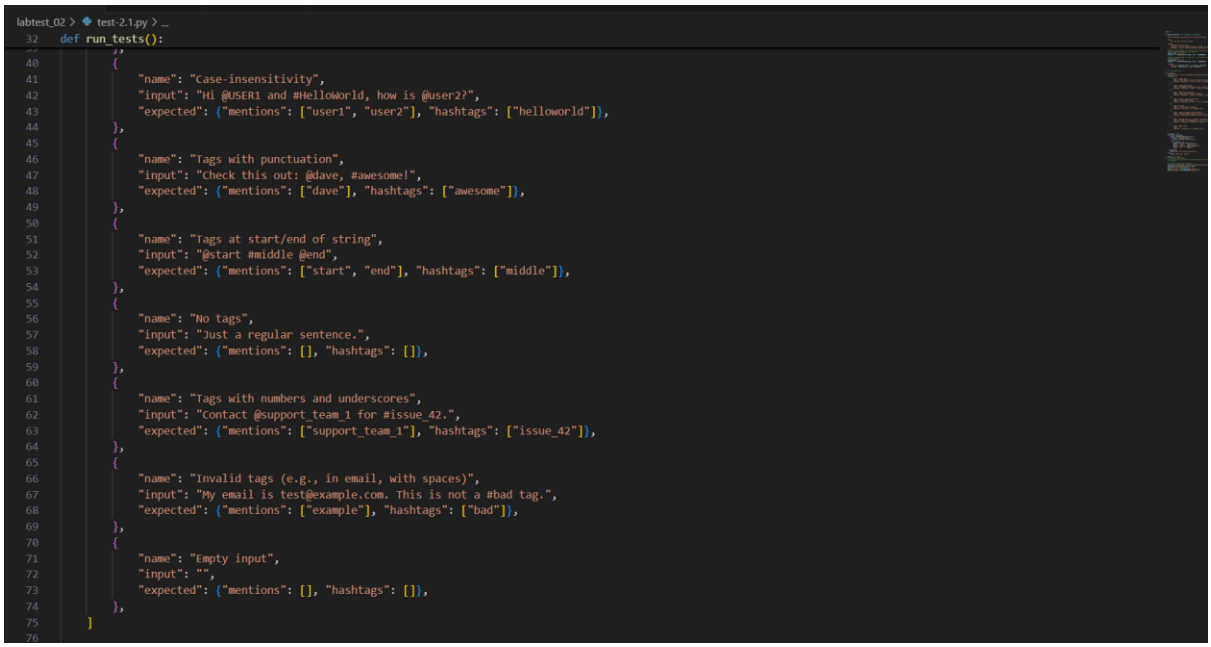
PROMPT:

Generate a python code which accepts a input string as input and performs the operation like segregating the words which starts with the hashtags “#” and mentions “@” and place them in a list in lower case.

CODE:



```python
import re

def extract_tags(text: str) -> dict[str, list[str]]:
    """
    Extracts @mentions and #hashtags from a given text string.

    Args:
        text: The input string to process.

    Returns:
        A dictionary with two keys:
        'mentions': A list of lowercase mentions (without the '@').
        'hashtags': A list of lowercase hashtags (without the '#').
    """
    # Regex to find @mentions. It looks for an '@' followed by one or more
    # word characters (alphanumeric + underscore).
    mention_regex = r"@(\w+)"
    mentions = re.findall(mention_regex, text, re.IGNORECASE)

    # Regex to find #hashtags. It looks for a '#' followed by one or more
    # word characters.
    hashtag_regex = r"#(\w+)"
    hashtags = re.findall(hashtag_regex, text, re.IGNORECASE)

    return {
        "mentions": [mention.lower() for mention in mentions],
        "hashtags": [tag.lower() for tag in hashtags],
    }

# --- Testing Edge Cases ---

def run_tests():
    """Runs a series of tests to validate the extract_tags function."""
    test_cases = [
        {
            "name": "Simple case",
            "input": "Hello @alice check #AI and #Python with @Bob",
            "expected": {"mentions": ["alice", "bob"], "hashtags": ["ai", "python"]},
        },
```



```python
def run_tests():
        {
            "name": "Case-insensitivity",
            "input": "Hi @USER1 and #HelloWorld, how is @user2?",
            "expected": {"mentions": ["user1", "user2"], "hashtags": ["helloworld"]},
        },
        {
            "name": "Tags with punctuation",
            "input": "Check this out: @dave, #awesome!",
            "expected": {"mentions": ["dave"], "hashtags": ["awesome"]},
        },
        {
            "name": "Tags at start/end of string",
            "input": "@start #middle @end",
            "expected": {"mentions": ["start", "end"], "hashtags": ["middle"]},
        },
        {
            "name": "No tags",
            "input": "Just a regular sentence.",
            "expected": {"mentions": [], "hashtags": []},
        },
        {
            "name": "Tags with numbers and underscores",
            "input": "Contact @support_team_1 for #issue_42.",
            "expected": {"mentions": ["support_team_1"], "hashtags": ["issue_42"]},
        },
        {
            "name": "Invalid tags (e.g., in email, with spaces)",
            "input": "My email is test@example.com. This is not a #bad tag.",
            "expected": {"mentions": ["example"], "hashtags": ["bad"]},
        },
        {
            "name": "Empty input",
            "input": "",
            "expected": {"mentions": [], "hashtags": []},
        },
    ]
```

```python
def run_tests():

    all_passed = True
    for test in test_cases:
        result = extract_tags(test["input"])
        if result == test["expected"]:
            print(f"✅ PASSED: {test['name']}")
        else:
            all_passed = False
            print(f"❌ FAILED: {test['name']}")
            print(f"  Input:    '{test['input']}'")
            print(f"  Expected: {test['expected']}")
            print(f"  Got:      {result}")

    if all_passed:
        print("\nAll tests passed successfully!")
    else:
        print("\nSome tests failed.")

if __name__ == "__main__":
    # --- Dynamic Input Usage ---
    # You can still run the tests by calling run_tests() here if you want.
    # run_tests()

    # Ask the user for input dynamically
    user_input = input("Enter a sentence with @mentions and #hashtags: ")
    extracted_data = extract_tags(user_input)
    print("\n--- Extracted Tags ---")
    print(f"Mentions: {extracted_data['mentions']}")
    print(f"Hashtags: {extracted_data['hashtags']}")

```

OUTPUT:

```
PS C:\Users\ramch\OneDrive\Desktop\ai> & C:/Users/ramch/AppData/Local/Programs/Python/Python312/python.exe c:/Users/ramch/OneDrive/Desktop/ai/labtest_02/test-2.1.py
Enter a sentence with @mentions and #hashtags: Hello @alice check #AI and #Python with @Bob

--- Extracted Tags ---
Mentions: ['alice', 'bob']
Hashtags: ['ai', 'python']
PS C:\Users\ramch\OneDrive\Desktop\ai>
```

OBSERVATION:

This Python script acts like a social media tag finder for any piece of text. It's designed to read a sentence and intelligently pull out all the words that start with a # (hashtags) or an @ (mentions). The script is smart enough to ignore punctuation attached to the tags and isn't case-

sensitive. After you provide a sentence, it neatly organizes the findings into two separate, lowercase lists—one for all the mentions and one for all the hashtags—and displays them.

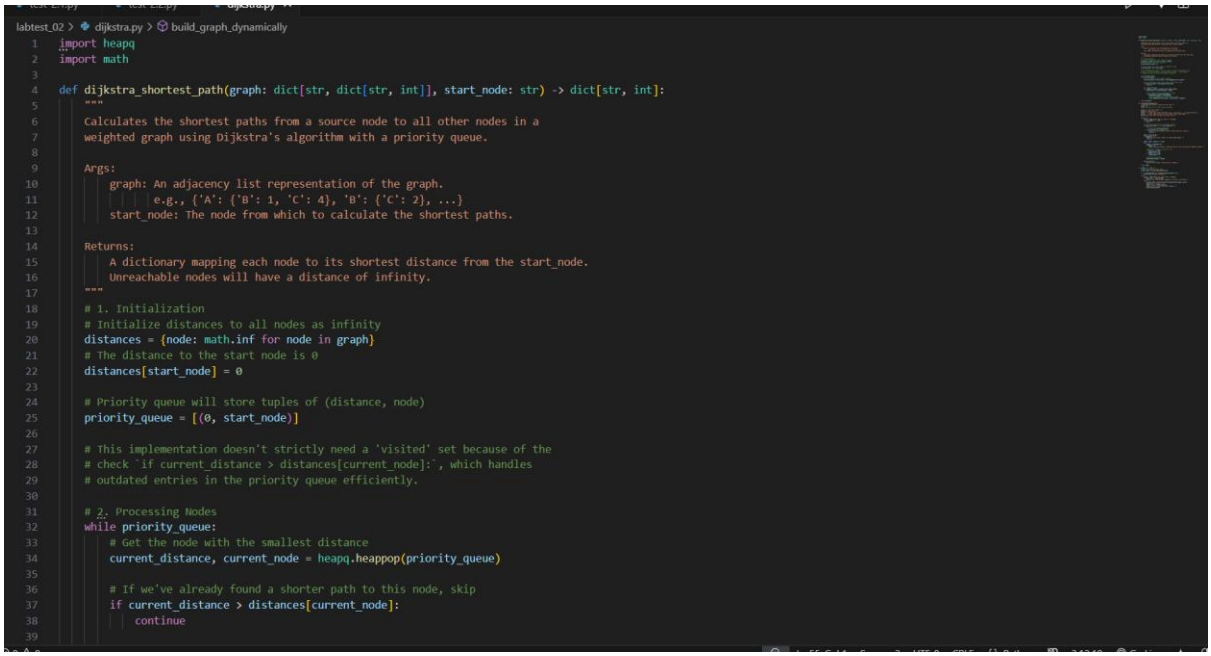
TASK-02:

Implement Dijkstra from a source node 'A' to all nodes using a priority queue

PROMPT:

Generate a python script which finds the shortest distance by taking the input as nodes which are graphs and asks from which node you want the shortest path and give the result in the structured dictionary format.

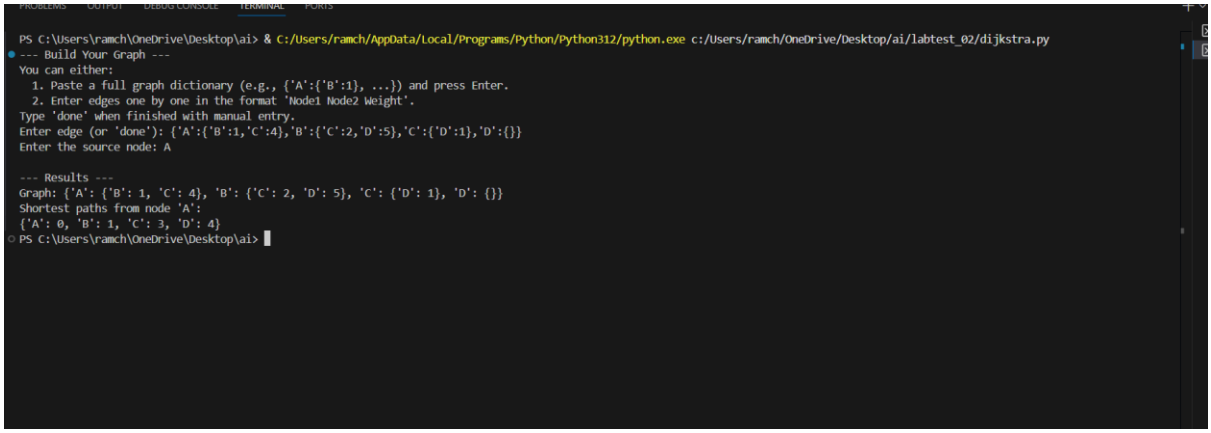
CODE:



```python
def dijkstra_shortest_path(graph: dict[str, dict[str, int]], start_node: str) -> dict[str, int]:

        # 3. Edge Relaxation
        for neighbor, weight in graph[current_node].items():
            new_distance = current_distance + weight

            # If a shorter path to the neighbor is found
            if new_distance < distances[neighbor]:
                distances[neighbor] = new_distance
                # Push the updated path to the priority queue
                heapq.heappush(priority_queue, (new_distance, neighbor))

    return distances

def build_graph_dynamically():
    """Interactively builds a graph from user input."""
    graph = {}
    import ast # Use ast for safe literal evaluation

    print("--- Build Your Graph ---")
    print("You can either:")
    print("  1. Paste a full graph dictionary (e.g., {'A':{'B':1}, ...}) and press Enter.")
    print("  2. Enter edges one by one in the format 'Node1 Node2 Weight'.")
    print("Type 'done' when finished with manual entry.")

    while True:
        entry = input("Enter edge (or 'done'): ").strip()
        if entry.lower() == 'done':
            break

        # Try to parse the input as a dictionary literal
        if entry.startswith('{') and entry.endswith('}'):
            try:
                return ast.literal_eval(entry)
            except (ValueError, SyntaxError):
                print("Invalid dictionary format. Please check your syntax.")
                continue

        parts = entry.split()
```

```python
def build_graph_dynamically():
                print("Invalid format. Please use 'Node1 Node2 Weight'.")
                continue

            node1, node2, weight_str = parts
            try:
                weight = int(weight_str)
                if weight < 0:
                    print("Warning: Dijkstra's algorithm may not work correctly with negative weights.")

                # Add nodes to graph if they don't exist
                if node1 not in graph:
                    graph[node1] = {}
                if node2 not in graph:
                    graph[node2] = {}

                # Add the directed edge
                graph[node1][node2] = weight

            except ValueError:
                print("Invalid weight. Please enter an integer.")

    return graph
if __name__ == "__main__":
    # Build the graph from user input
    network_graph = build_graph_dynamically()

    if not network_graph and isinstance(network_graph, dict):
        print("Graph is empty. Exiting.")
    else:
        source = input("Enter the source node: ").strip()
        if source not in network_graph:
            print(f"Error: Source node '{source}' not found in the graph.")
        else:
            shortest_paths = dijkstra_shortest_path(network_graph, source)
            print(f"\n--- Results ---")
            print(f"Graph: {network_graph}")
            print(f"Shortest paths from node '{source}':")
            print(shortest_paths)
```

OUTPUT:



OBSERVATION:

This Python script acts like a GPS for a network you define. It uses Dijkstra's algorithm, a classic method to find the shortest path from a single starting point to all other locations. The script first asks you to build the network map, either by pasting a full dictionary or by adding connections one by one. After you specify your starting "source" node, it calculates the minimum "distance" (or cost) to every other node. The results show a simple list of each destination and the shortest possible route cost to get there from your start point.