

AI Assignment:11.2

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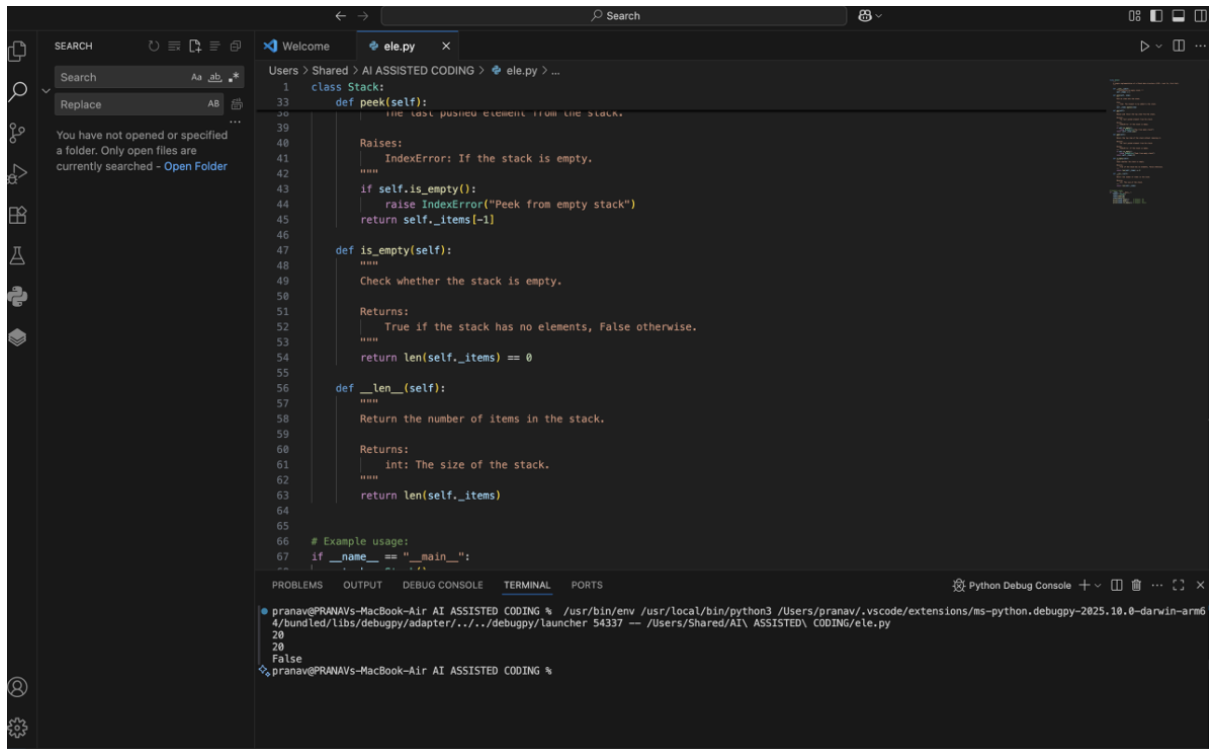
Name:balaji

Batch:06

Task Description #1 – Stack

Implementation Task: Use AI to generate a Stack class with push, pop, peek, and is\_empty methods. Sample Input Code: `class Stack: pass` Expected Output: • A functional stack implementation with all required methods and docstrings.

Code:



The screenshot shows a VS Code editor with a file named `ele.py` open. The code defines a `Stack` class with the following methods:

```
class Stack:
    def peek(self):
        """
        Returns:
        The last pushed element from the stack.
        """
        Raises:
        IndexError: If the stack is empty.
        if self.is_empty():
            raise IndexError("Peek from empty stack")
        return self._items[-1]

    def is_empty(self):
        """
        Check whether the stack is empty.
        Returns:
        True if the stack has no elements, False otherwise.
        """
        return len(self._items) == 0

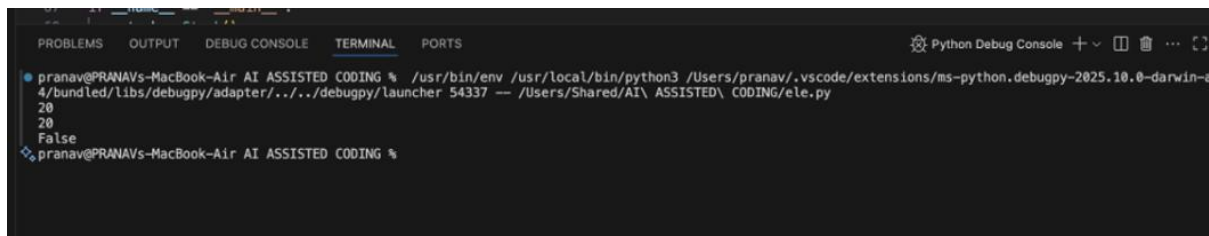
    def __len__(self):
        """
        Return the number of items in the stack.
        Returns:
        int: The size of the stack.
        """
        return len(self._items)

# Example usage:
if __name__ == "__main__":
    s = Stack()
    s.push(10)
    s.push(20)
    print(s.peek())
    print(s.is_empty())
    print(len(s))
```

The bottom panel shows the terminal output:

```
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING % /usr/bin/env /usr/local/bin/python3 /Users/pranav/.vscode/extensions/ms-python.debugpy-2025.10.0-darwin-arm64/bundled/libs/debugpy/adapter/../../debugpy/launcher 54337 -- /Users/Shared/AI\ ASSISTED\ CODING/ele.py
20
20
False
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING %
```

Output:



The screenshot shows a terminal window with the following output:

```
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING % /usr/bin/env /usr/local/bin/python3 /Users/pranav/.vscode/extensions/ms-python.debugpy-2025.10.0-darwin-arm64/bundled/libs/debugpy/adapter/../../debugpy/launcher 54337 -- /Users/Shared/AI\ ASSISTED\ CODING/ele.py
20
20
False
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING %
```

PROMPT : To generate a Stack class with push, pop, peek, and is\_empty methods.

Task Description #2 – Queue

Implementation Task: Use AI to implement a Queue using Python lists. Sample Input  
Code: class Queue: pass  
Expected Output:

- FIFO-based queue class with enqueue, dequeue, peek, and size methods

Code:

```

1 class Queue:
2     def size(self):
3         """
4         int: The size of the queue.
5         """
6         return len(self._items)
7
8     def enqueue(self, item):
9         """
10        Check whether the queue is empty.
11        Returns:
12        True if the queue has no elements, False otherwise.
13        """
14        return len(self._items) == 0
15
16 # Example usage:
17 if __name__ == "__main__":
18     queue = Queue()
19     queue.enqueue(10)
20     queue.enqueue(20)
21     queue.enqueue(30)
22     print(queue.peek()) # Output: 10
23     print(queue.dequeue()) # Output: 10
24
25 class Stack:

```

Output:

```

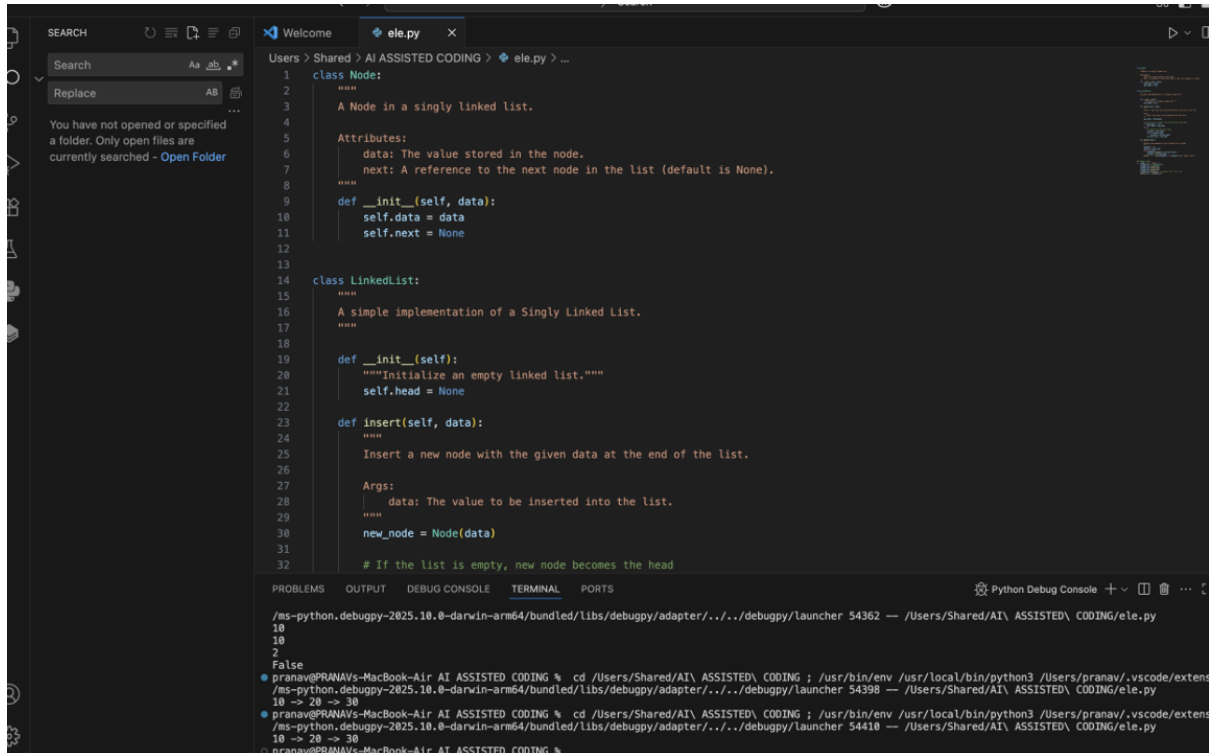
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING % /usr/bin/env /usr/local/bin/python3 /Users/pranav/.vscode
4/bundled/libs/debugpy/adapter/../../debugpy/launcher 54337 -- /Users/Shared/AI\ ASSISTED\ CODING/ele.py
20
20
False
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING % cd /Users/Shared/AI\ ASSISTED\ CODING ; /usr/bin/env /usr
/ms-python.debugpy-2025.10.0-darwin-arm64/bundled/libs/debugpy/adapter/../../debugpy/launcher 54362 -- /Us
10
10
2
False
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING %

```

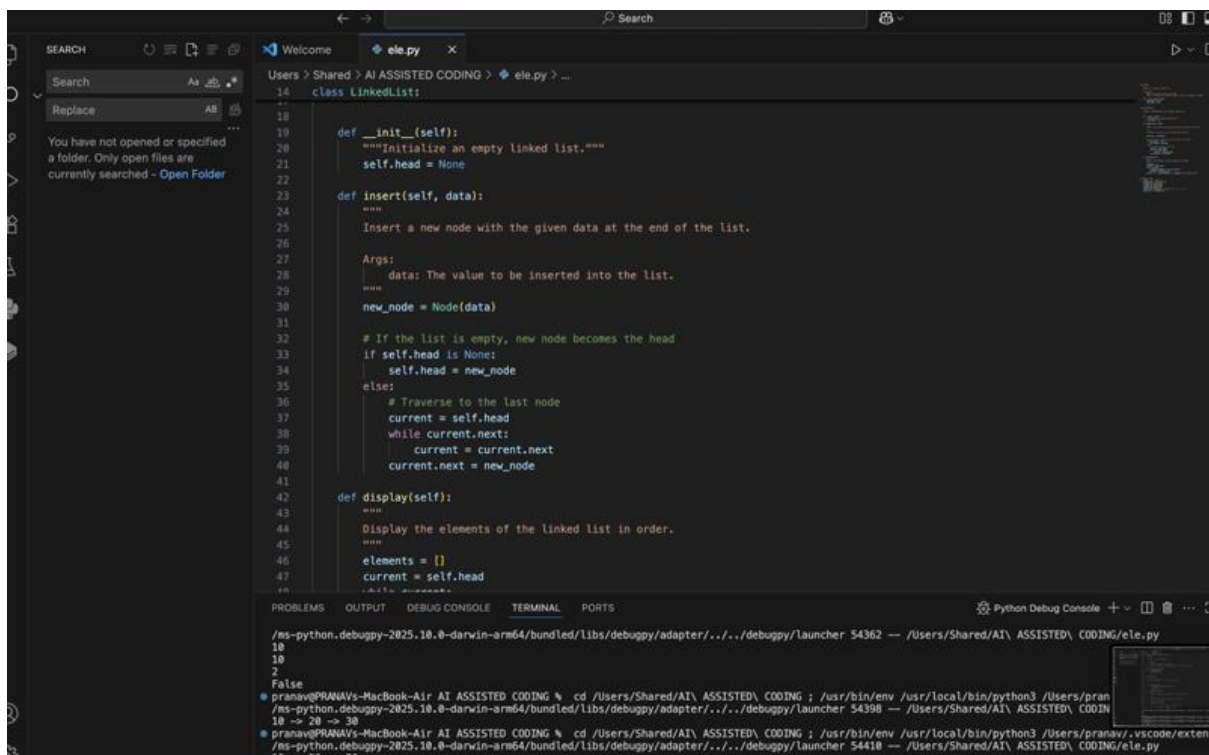
PROMPT : To implement a Queue using Python lists in a simple and basic way Task Description #3 – Linked List Task: Use AI to generate a Singly Linked List with insert and display methods. Sample Input Code: class Node:

pass class LinkedList: pass Expected Output: • A working linked list implementation with clear method documentation.

Code:



```
1 class Node:
2     """
3     A Node in a singly linked list.
4
5     Attributes:
6         data: The value stored in the node.
7         next: A reference to the next node in the list (default is None).
8     """
9     def __init__(self, data):
10         self.data = data
11         self.next = None
12
13
14 class LinkedList:
15     """
16     A simple implementation of a Singly Linked List.
17     """
18
19     def __init__(self):
20         """Initialize an empty linked list."""
21         self.head = None
22
23     def insert(self, data):
24         """
25         Insert a new node with the given data at the end of the list.
26
27         Args:
28             data: The value to be inserted into the list.
29         """
30         new_node = Node(data)
31
32         # If the list is empty, new node becomes the head
```



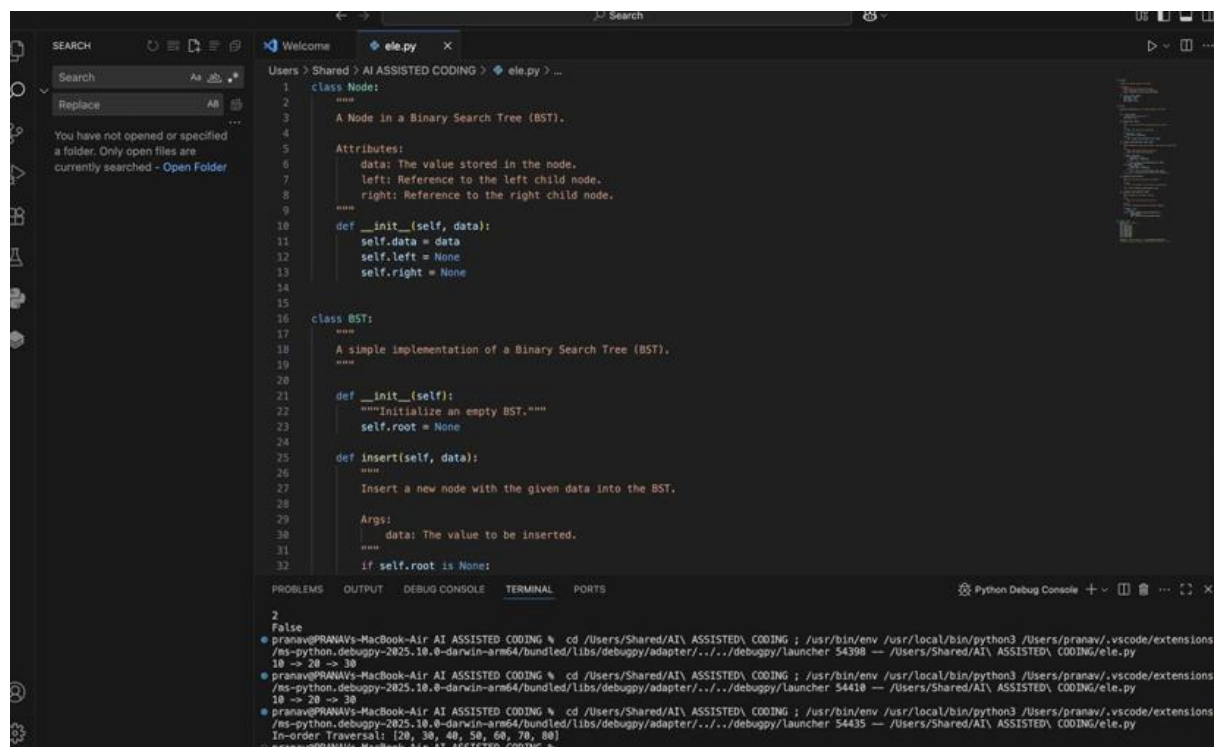
```
14 class LinkedList:
15
16     def __init__(self):
17         """Initialize an empty linked list."""
18         self.head = None
19
20     def insert(self, data):
21         """
22         Insert a new node with the given data at the end of the list.
23
24         Args:
25             data: The value to be inserted into the list.
26         """
27         new_node = Node(data)
28
29         # If the list is empty, new node becomes the head
30         if self.head is None:
31             self.head = new_node
32         else:
33             # Traverse to the last node
34             current = self.head
35             while current.next:
36                 current = current.next
37             current.next = new_node
38
39     def display(self):
40         """
41         Display the elements of the linked list in order.
42         """
43         elements = []
44         current = self.head
45
46         while current:
47             elements.append(current.data)
48             current = current.next
49
50         print(elements)
```

## Output:

```
/ms-python.debugpy-2025.10.0-darwin-arm64/bundled/libs/debugpy/adapter/../../debugpy/launcher 54362 -- /Users/Shared/AI\
10
10
2
False
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING % cd /Users/Shared/AI\ ASSISTED\ CODING ; /usr/bin/env /usr/local/bin/pyt
/ms-python.debugpy-2025.10.0-darwin-arm64/bundled/libs/debugpy/adapter/../../debugpy/launcher 54398 -- /Users/Shared/AI\
10 -> 20 -> 30
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING % cd /Users/Shared/AI\ ASSISTED\ CODING ; /usr/bin/env /usr/local/bin/pyt
/ms-python.debugpy-2025.10.0-darwin-arm64/bundled/libs/debugpy/adapter/../../debugpy/launcher 54410 -- /Users/Shared/AI\
10 -> 20 -> 30
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING %
```

PROMPT : To generate a Singly Linked List with insert and display methods using nodes Task Description #4 – Binary Search Tree (BST) Task: Use AI to create a BST with insert and in-order traversal methods. Sample Input Code: class BST: pass Expected Output: • BST implementation with recursive insert and traversal method

## Code:



```
class Node:
    """
    A Node in a Binary Search Tree (BST).

    Attributes:
        data: The value stored in the node.
        left: Reference to the left child node.
        right: Reference to the right child node.
    """
    def __init__(self, data):
        self.data = data
        self.left = None
        self.right = None

class BST:
    """
    A simple implementation of a Binary Search Tree (BST).
    """
    def __init__(self):
        """Initialize an empty BST."""
        self.root = None

    def insert(self, data):
        """
        Insert a new node with the given data into the BST.

        Args:
            data: The value to be inserted.
        """
        if self.root is None:
```

```
2
False
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING % cd /Users/Shared/AI\ ASSISTED\ CODING ; /usr/bin/env /usr/local/bin/python3 /Users/pranav/.vscode/extensions
/ms-python.debugpy-2025.10.0-darwin-arm64/bundled/libs/debugpy/adapter/../../debugpy/launcher 54398 -- /Users/Shared/AI\ ASSISTED\ CODING/e1e.py
10 -> 20 -> 30
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING % cd /Users/Shared/AI\ ASSISTED\ CODING ; /usr/bin/env /usr/local/bin/python3 /Users/pranav/.vscode/extensions
/ms-python.debugpy-2025.10.0-darwin-arm64/bundled/libs/debugpy/adapter/../../debugpy/launcher 54410 -- /Users/Shared/AI\ ASSISTED\ CODING/e1e.py
10 -> 20 -> 30
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING % cd /Users/Shared/AI\ ASSISTED\ CODING ; /usr/bin/env /usr/local/bin/python3 /Users/pranav/.vscode/extensions
/ms-python.debugpy-2025.10.0-darwin-arm64/bundled/libs/debugpy/adapter/../../debugpy/launcher 54435 -- /Users/Shared/AI\ ASSISTED\ CODING/e1e.py
In-order Traversal: [20, 30, 40, 50, 60, 70, 80]
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING %
```

```
class BST:
    """
    A simple implementation of a Binary Search Tree (BST).
    """
    def __init__(self):
        """Initialize an empty BST."""
        self.root = None

    def insert(self, data):
        """
        Insert a new node with the given data into the BST.
        """
        Args:
            data: The value to be inserted.
        """
        if self.root is None:
            self.root = Node(data)
        else:
            self._insert_recursive(self.root, data)

    def _insert_recursive(self, node, data):
        """
        Helper method to recursively insert a new value into the tree.
        """
        Args:
            node: The current node in the tree.
            data: The value to be inserted.
        """
        if data < node.data:
            if node.left is None:
                node.left = Node(data)
```

```
2
False
pranave@PRANAVs-MacBook-Air AI ASSISTED CODING % cd /Users/Shared/AI\ ASSISTED\ CODING ; /usr/bin/env /usr/local/bin/python3 /Users/pranave/.vscode/extensions/ms-python.debugpy-2025.10.0-darwin-arm64/bundled/Libs/debugpy/adapter/.../debugpy/launcher 54398 -- /Users/Shared/AI\ ASSISTED\ CODING/ele.py
10 -> 20 -> 30
pranave@PRANAVs-MacBook-Air AI ASSISTED CODING % cd /Users/Shared/AI\ ASSISTED\ CODING ; /usr/bin/env /usr/local/bin/python3 /Users/pranave/.vscode/extensions/ms-python.debugpy-2025.10.0-darwin-arm64/bundled/Libs/debugpy/adapter/.../debugpy/launcher 54418 -- /Users/Shared/AI\ ASSISTED\ CODING/ele.py
10 -> 20 -> 30
pranave@PRANAVs-MacBook-Air AI ASSISTED CODING % cd /Users/Shared/AI\ ASSISTED\ CODING ; /usr/bin/env /usr/local/bin/python3 /Users/pranave/.vscode/extensions/ms-python.debugpy-2025.10.0-darwin-arm64/bundled/Libs/debugpy/adapter/.../debugpy/launcher 54435 -- /Users/Shared/AI\ ASSISTED\ CODING/ele.py
In-order Traversal: [20, 30, 40, 50, 60, 70, 80]
pranave@PRANAVs-MacBook-Air AI ASSISTED CODING %
```

```
def _inorder_recursive(self, node):
    return (self._inorder_recursive(node.left) +
            [node.data] +
            self._inorder_recursive(node.right))

# Example usage:
if __name__ == "__main__":
    bst = BST()
    bst.insert(50)
    bst.insert(30)
    bst.insert(70)
    bst.insert(20)
    bst.insert(40)
    bst.insert(60)
    bst.insert(80)

    print("In-order Traversal:", bst.inorder_traversal())
    # Output: In-order Traversal: [20, 30, 40, 50, 60, 70, 80]
```

```
2
False
pranave@PRANAVs-MacBook-Air AI ASSISTED CODING % cd /Users/Shared/AI\ ASSISTED\ CODING ; /usr/bin/env /usr/local/bin/python3 /Users/pranave/.vscode/extensions/ms-python.debugpy-2025.10.0-darwin-arm64/bundled/Libs/debugpy/adapter/.../debugpy/launcher 54398 -- /Users/Shared/AI\ ASSISTED\ CODING/ele.py
10 -> 20 -> 30
pranave@PRANAVs-MacBook-Air AI ASSISTED CODING % cd /Users/Shared/AI\ ASSISTED\ CODING ; /usr/bin/env /usr/local/bin/python3 /Users/pranave/.vscode/extensions/ms-python.debugpy-2025.10.0-darwin-arm64/bundled/Libs/debugpy/adapter/.../debugpy/launcher 54418 -- /Users/Shared/AI\ ASSISTED\ CODING/ele.py
10 -> 20 -> 30
pranave@PRANAVs-MacBook-Air AI ASSISTED CODING % cd /Users/Shared/AI\ ASSISTED\ CODING ; /usr/bin/env /usr/local/bin/python3 /Users/pranave/.vscode/extensions/ms-python.debugpy-2025.10.0-darwin-arm64/bundled/Libs/debugpy/adapter/.../debugpy/launcher 54435 -- /Users/Shared/AI\ ASSISTED\ CODING/ele.py
In-order Traversal: [20, 30, 40, 50, 60, 70, 80]
pranave@PRANAVs-MacBook-Air AI ASSISTED CODING %
```

Output:

```
10 -> 20 -> 30
pranave@PRANAVs-MacBook-Air AI ASSISTED CODING % cd /Users/Shared/AI\ ASSISTED\ CODING ; /usr/bin/env /usr/local/bin/python3 /Users/pranave/.vscode/extensions/ms-python.debugpy-2025.10.0-darwin-arm64/bundled/Libs/debugpy/adapter/.../debugpy/launcher 54435 -- /Users/Shared/AI\ ASSISTED\ CODING/ele.py
In-order Traversal: [20, 30, 40, 50, 60, 70, 80]
pranave@PRANAVs-MacBook-Air AI ASSISTED CODING %
```

PROMPT : o create a BST with insert and in-order traversal methods. Task Description #5 – Hash Table Task: Use AI to implement a hash table with basic insert, search, and delete methods. Sample Input Code: class HashTable: pass Expected Output: • Collision handling using chaining, with well-commented methods



# Code:

The image displays two screenshots of a VS Code editor window, showing a Python script named `ele.py` implementing a hash table. The editor is in dark mode, and the file explorer on the left shows the project structure.

**Top Screenshot:** The code is as follows:

```
1 class HashTable:
2     return hash(key) % self.size
3
4 def insert(self, key, value):
5     """
6     Insert a key-value pair into the hash table.
7     If the key already exists, update its value.
8
9     Args:
10         key: The key to insert.
11         value: The value associated with the key.
12     """
13     index = self._hash(key)
14     bucket = self.table[index]
15
16     # Check if key already exists, update value
17     for i, (k, v) in enumerate(bucket):
18         if k == key:
19             bucket[i] = (key, value)
20             return
21
22     # Otherwise, add new key-value pair
23     bucket.append((key, value))
24
25 def search(self, key):
26     """
27     Search for a key in the hash table.
28
29     Args:
30         key: The key to look for.
31
32     Returns:
```

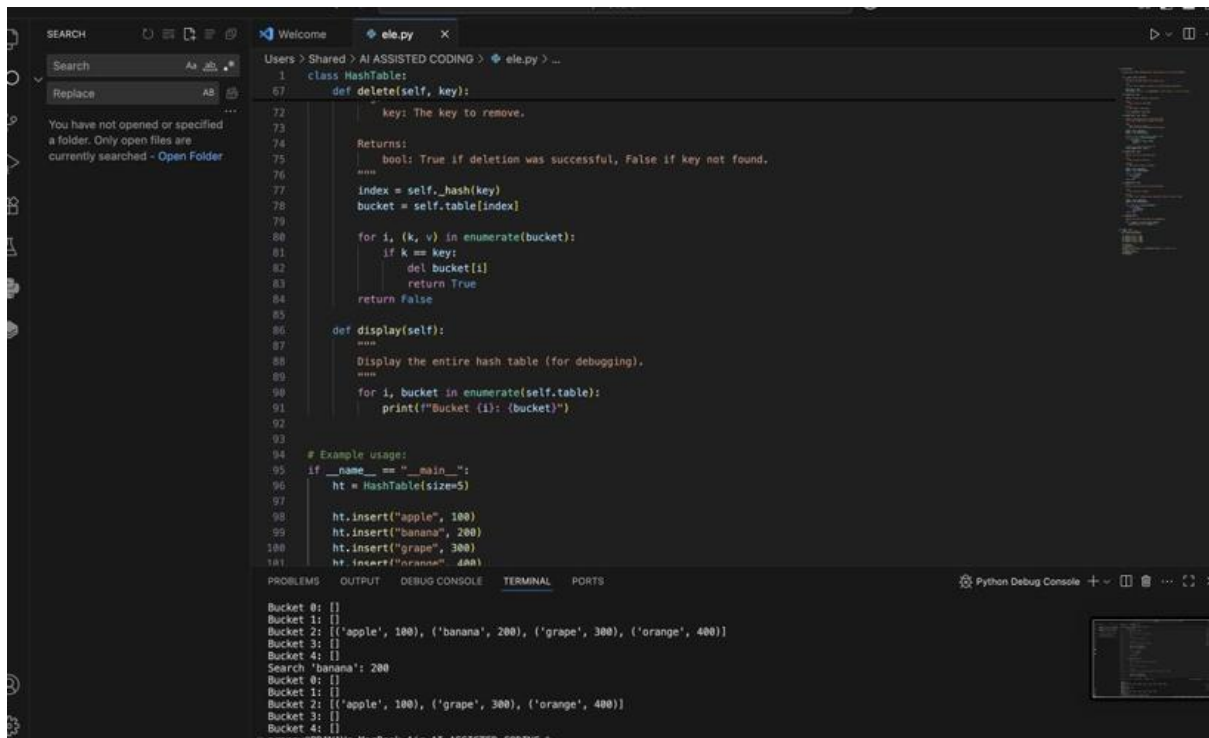
The terminal output shows the following:

```
Bucket 0: []
Bucket 1: []
Bucket 2: [('apple', 100), ('banana', 200), ('grape', 300), ('orange', 400)]
Bucket 3: []
Bucket 4: []
Search 'banana': 200
Bucket 0: []
Bucket 1: []
Bucket 2: [('apple', 100), ('grape', 300), ('orange', 400)]
Bucket 3: []
Bucket 4: []
```

**Bottom Screenshot:** The code is identical to the top screenshot. The terminal output shows the following:

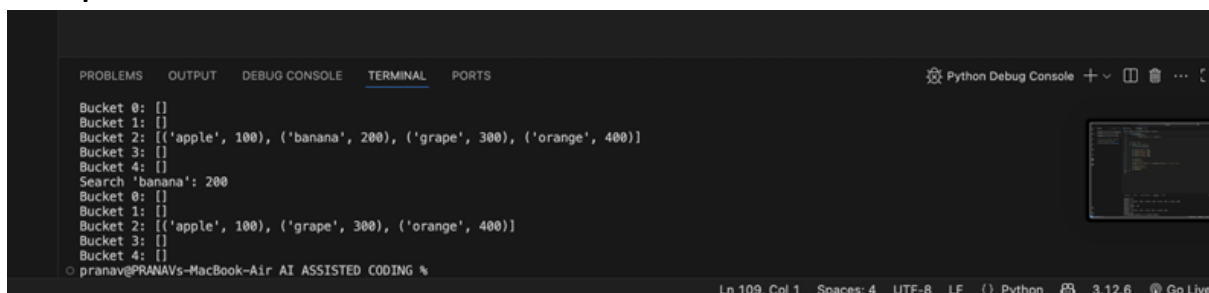
```
Bucket 0: []
Bucket 1: []
Bucket 2: [('apple', 100), ('banana', 200), ('grape', 300), ('orange', 400)]
Bucket 3: []
Bucket 4: []
Search 'apple': 100
Bucket 0: []
Bucket 1: []
Bucket 2: [('apple', 100), ('grape', 300), ('orange', 400)]
Bucket 3: []
Bucket 4: []
```





```
1 class HashTable:
2     def __init__(self, size):
3         self.table = [[] for _ in range(size)]
4
5     def insert(self, key, value):
6         """
7         key: The key to insert.
8         value: The value to insert.
9
10        Returns:
11        bool: True if insertion was successful, False if key already exists.
12        """
13        index = self._hash(key)
14        bucket = self.table[index]
15
16        for i, (k, v) in enumerate(bucket):
17            if k == key:
18                return False
19
20        bucket.append((key, value))
21        return True
22
23    def delete(self, key):
24        """
25        key: The key to remove.
26
27        Returns:
28        bool: True if deletion was successful, False if key not found.
29        """
30        index = self._hash(key)
31        bucket = self.table[index]
32
33        for i, (k, v) in enumerate(bucket):
34            if k == key:
35                del bucket[i]
36                return True
37
38        return False
39
40    def display(self):
41        """
42        Display the entire hash table (for debugging).
43        """
44        for i, bucket in enumerate(self.table):
45            print(f"Bucket {i}: {bucket}")
46
47    # Example usage:
48    if __name__ == "__main__":
49        ht = HashTable(size=5)
50
51        ht.insert("apple", 100)
52        ht.insert("banana", 200)
53        ht.insert("grape", 300)
54        ht.insert("orange", 400)
55
56        # Output:
57        Bucket 0: []
58        Bucket 1: []
59        Bucket 2: [('apple', 100), ('banana', 200), ('grape', 300), ('orange', 400)]
60        Bucket 3: []
61        Bucket 4: []
62        Search 'banana': 200
63        Bucket 0: []
64        Bucket 1: []
65        Bucket 2: [('apple', 100), ('grape', 300), ('orange', 400)]
66        Bucket 3: []
67        Bucket 4: []
```

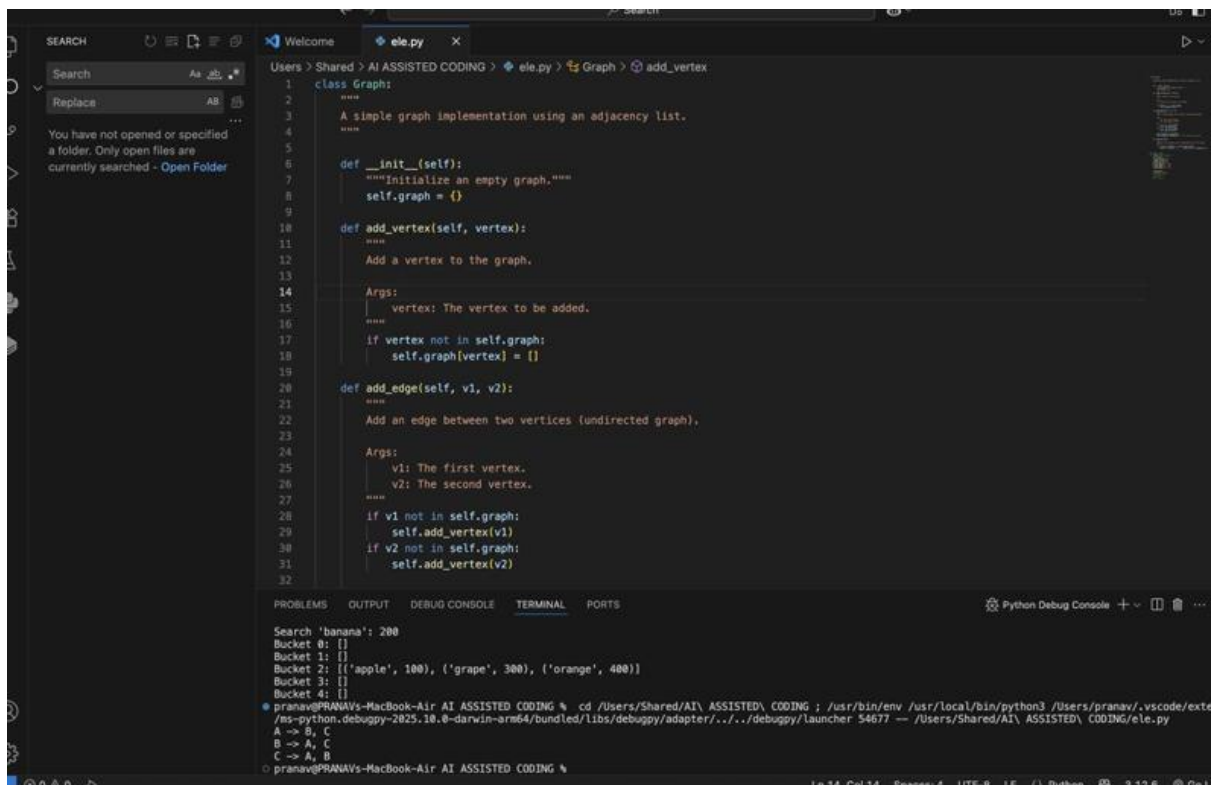
Output:



```
Bucket 0: []
Bucket 1: []
Bucket 2: [('apple', 100), ('banana', 200), ('grape', 300), ('orange', 400)]
Bucket 3: []
Bucket 4: []
Search 'banana': 200
Bucket 0: []
Bucket 1: []
Bucket 2: [('apple', 100), ('grape', 300), ('orange', 400)]
Bucket 3: []
Bucket 4: []
```

PROMPT : To implement a hash table with basic insert, search, and delete Methods Task Description #6 – Graph Representation Task: Use AI to implement a graph using an adjacency list. Sample Input Code: class Graph: pass Expected Output: • Graph with methods to add vertices, add edges, and display connections.

# Code:



```
class Graph:
    """
    A simple graph implementation using an adjacency list.
    """
    def __init__(self):
        """Initialize an empty graph."""
        self.graph = {}

    def add_vertex(self, vertex):
        """
        Add a vertex to the graph.

        Args:
            vertex: The vertex to be added.
        """
        if vertex not in self.graph:
            self.graph[vertex] = []

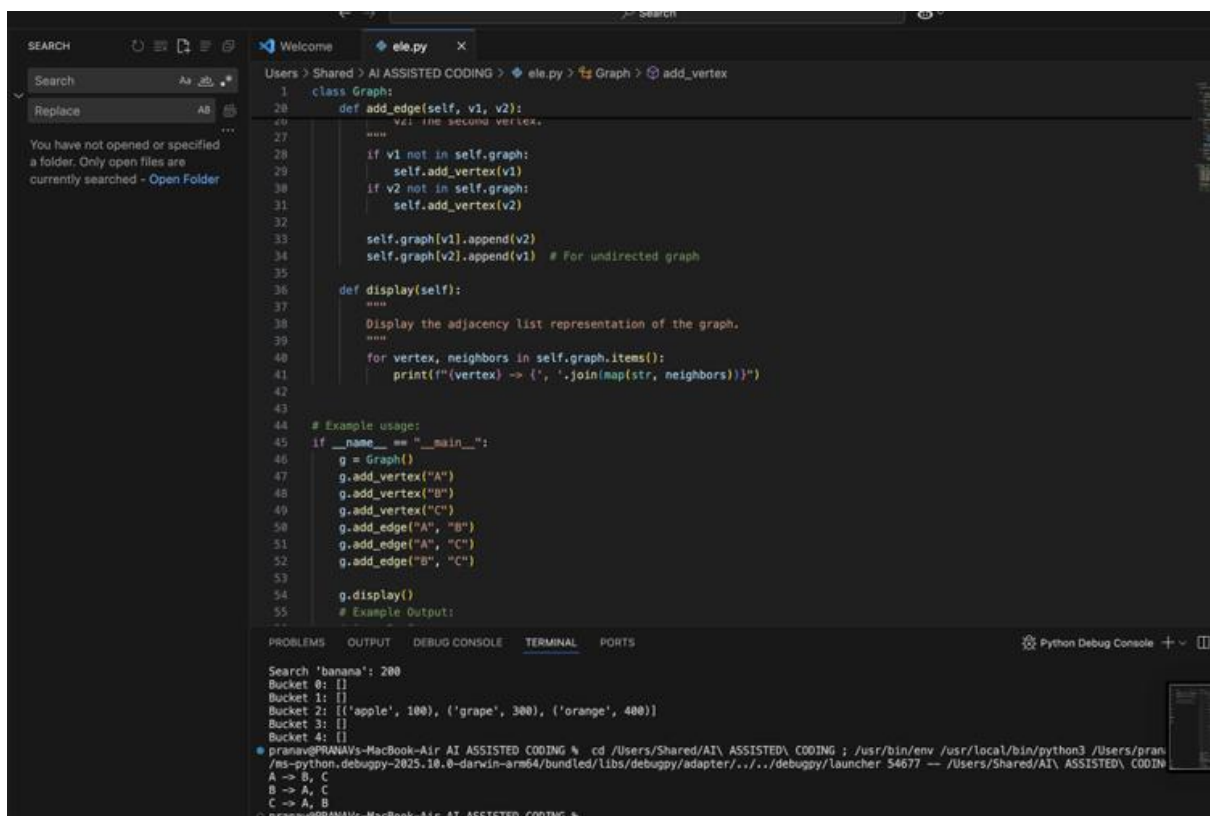
    def add_edge(self, v1, v2):
        """
        Add an edge between two vertices (undirected graph).

        Args:
            v1: The first vertex.
            v2: The second vertex.
        """
        if v1 not in self.graph:
            self.add_vertex(v1)
        if v2 not in self.graph:
            self.add_vertex(v2)

    def display(self):
        """
        Display the adjacency list representation of the graph.
        """
        for vertex, neighbors in self.graph.items():
            print(f"{vertex} -> {', '.join(map(str, neighbors))}")

# Example usage:
if __name__ == "__main__":
    g = Graph()
    g.add_vertex("A")
    g.add_vertex("B")
    g.add_vertex("C")
    g.add_edge("A", "B")
    g.add_edge("A", "C")
    g.add_edge("B", "C")
    g.display()

# Example Output:
A -> B, C
B -> A, C
C -> A, B
```



```
class Graph:
    """
    A simple graph implementation using an adjacency list.
    """
    def __init__(self):
        """Initialize an empty graph."""
        self.graph = {}

    def add_vertex(self, vertex):
        """
        Add a vertex to the graph.

        Args:
            vertex: The vertex to be added.
        """
        if vertex not in self.graph:
            self.graph[vertex] = []

    def add_edge(self, v1, v2):
        """
        Add an edge between two vertices (undirected graph).

        Args:
            v1: The first vertex.
            v2: The second vertex.
        """
        if v1 not in self.graph:
            self.add_vertex(v1)
        if v2 not in self.graph:
            self.add_vertex(v2)

        self.graph[v1].append(v2)
        self.graph[v2].append(v1) # For undirected graph

    def display(self):
        """
        Display the adjacency list representation of the graph.
        """
        for vertex, neighbors in self.graph.items():
            print(f"{vertex} -> {', '.join(map(str, neighbors))}")

# Example usage:
if __name__ == "__main__":
    g = Graph()
    g.add_vertex("A")
    g.add_vertex("B")
    g.add_vertex("C")
    g.add_edge("A", "B")
    g.add_edge("A", "C")
    g.add_edge("B", "C")
    g.display()

# Example Output:
A -> B, C
B -> A, C
C -> A, B
```

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS Python Debug Console
Search 'banana': 200
Bucket 0: []
Bucket 1: []
Bucket 2: [('apple', 100), ('grape', 300), ('orange', 400)]
Bucket 3: []
Bucket 4: []
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING % cd /Users/Shared/AI\ ASSISTED\ CODING ; /usr/bin/env /usr/local/bin/python3 /Users/pranav/.vscode/extensions/ms-python.debugpy-2025.10.0-darwin-arm64/bundled/libs/debugpy/adapter/../../debugpy/launcher 54677 -- /Users/Shared/AI\ ASSISTED\ CODING/ele.py
A -> B, C
B -> A, C
C -> A, B
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING %
```

Task Description #7 – Priority Queue Task: Use AI to implement a priority queue using Python’s heapq module.  
Sample Input Code: class PriorityQueue: pass  
Expected Output: • Implementation with enqueue (priority), dequeue (highest priority), and display methods

Code:

```
Code File Edit Selection View Go Run Terminal Window Help
SEARCH
Search Aa
Replace Ab
You have not opened or specified a folder. Only open files are currently searched - Open Folder

Users > Shared > AI ASSISTED CODING > ele.py > ...
1 import heapq
2
3 class PriorityQueue:
4     """
5     A simple Priority Queue implementation using heapq (min-heap).
6     By default, the lowest priority number has the highest priority.
7     """
8
9     def __init__(self):
10         """Initialize an empty priority queue."""
11         self._queue = []
12
13     def enqueue(self, item, priority):
14         """
15         Add an item to the priority queue.
16
17         Args:
18             item: The element to be added.
19             priority (int): The priority of the item (lower value = higher priority).
20         """
21         heapq.heappush(self._queue, (priority, item))
22
23     def dequeue(self):
24         """
25         Remove and return the item with the highest priority (lowest priority number).
26
27         Returns:
28             The item with the highest priority.
29
30         Raises:
31             IndexError: If the priority queue is empty.
32         """
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```

```
class PriorityQueue:
    def __init__(self):
        self._queue = []
        self._size = 0

    def __str__(self):
        return str(self._queue)

    def __len__(self):
        return self._size

    def enqueue(self, task, priority):
        """
        Enqueue a task with a given priority.
        """
        self._queue.append((task, priority))
        self._size += 1
        self._heapify()

    def dequeue(self):
        """
        Dequeue a task from the priority queue.
        """
        if self.is_empty():
            raise IndexError("Dequeue from empty priority queue")
        return self._heapop()[1]

    def display(self):
        """
        Display the contents of the priority queue (unsorted).
        """
        print("Priority Queue contents:", self._queue)

    def is_empty(self):
        """
        Check whether the priority queue is empty.
        """
        Returns:
            True if empty, False otherwise.
        """
        return len(self._queue) == 0

# Example usage:
if __name__ == "__main__":
    pq = PriorityQueue()
    pq.enqueue("Task A", 2)
    pq.enqueue("Task B", 1)
    pq.enqueue("Task C", 3)
```

Bucket 4: []

pranav@PRANAVS-MacBook-Air AI ASSISTED CODING % cd /Users/Shared/AI ASSISTED CODING ; /usr/bin/env /usr/local/bin/python3 /Users/pranav/.ms-python/debugpy-2025.10.0-darwin-arm64/bundled/Libs/debugpy/adapter/.../debugpy/launcher 54677 -- /Users/Shared/AI ASSISTED CODING

A -> B, C  
B -> A, C  
C -> A, B

pranav@PRANAVS-MacBook-Air AI ASSISTED CODING % cd /Users/Shared/AI ASSISTED CODING ; /usr/bin/env /usr/local/bin/python3 /Users/pranav/.ms-python/debugpy-2025.10.0-darwin-arm64/bundled/Libs/debugpy/adapter/.../debugpy/launcher 54765 -- /Users/Shared/AI ASSISTED CODING

Priority Queue contents: [(1, 'Task B'), (2, 'Task A'), (3, 'Task C')]  
Dequeued: Task B  
Dequeued: Task A

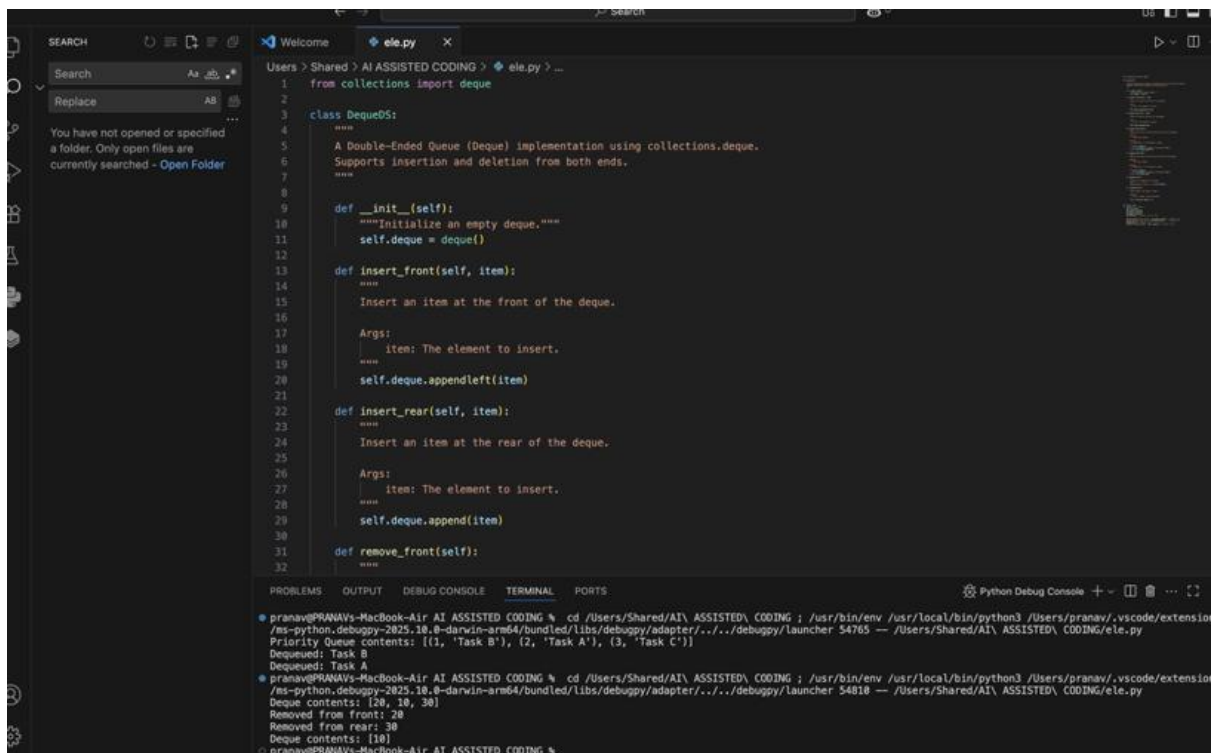
pranav@PRANAVS-MacBook-Air AI ASSISTED CODING %

## OUTPUT :

```
Priority Queue contents: [(1, 'Task B'), (2, 'Task A'), (3, 'Task C')]  
Dequeued: Task B  
Dequeued: Task A  
pranav@PRANAVS-MacBook-Air AI ASSISTED CODING %
```

PROMPT : To implement a priority queue using Python's heapq module. Task Description #8 – Deque Task: Use AI to implement a double-ended queue using collections.deque. Sample Input Code: class DequeDS: pass Expected Output: • Insert and remove from both ends with docstrings

# Code:



```
SEARCH
Search
Replace
AB
You have not opened or specified a folder. Only open files are currently searched - Open Folder

Welcome
ele.py
Users > Shared > AI ASSISTED CODING > ele.py > ...
1 from collections import deque
2
3 class DequeDS:
4     """
5     A Double-Ended Queue (Deque) implementation using collections.deque.
6     Supports insertion and deletion from both ends.
7     """
8
9     def __init__(self):
10         """Initialize an empty deque."""
11         self.deque = deque()
12
13     def insert_front(self, item):
14         """
15         Insert an item at the front of the deque.
16
17         Args:
18             item: The element to insert.
19         """
20         self.deque.appendleft(item)
21
22     def insert_rear(self, item):
23         """
24         Insert an item at the rear of the deque.
25
26         Args:
27             item: The element to insert.
28         """
29         self.deque.append(item)
30
31     def remove_front(self):
32         """
33
34 """
35
36 PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
Python Debug Console
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING % cd /Users/Shared/AI_ASSISTED_CODING ; /usr/bin/env /usr/local/bin/python3 /Users/pranav/.vscode/extensions/ms-python.debugpy-2025.18.0-darwin-arm64/bundled/libs/debugpy/adapter/../../debugpy/launcher 54765 -- /Users/Shared/AI_ASSISTED_CODING/ele.py
Priority Queue contents: [(1, 'Task B'), (2, 'Task A'), (3, 'Task C')]
Dequeued: Task B
Dequeued: Task A
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING % cd /Users/Shared/AI_ASSISTED_CODING ; /usr/bin/env /usr/local/bin/python3 /Users/pranav/.vscode/extensions/ms-python.debugpy-2025.18.0-darwin-arm64/bundled/libs/debugpy/adapter/../../debugpy/launcher 54818 -- /Users/Shared/AI_ASSISTED_CODING/ele.py
Deque contents: [20, 10, 30]
Removed from front: 20
Removed from rear: 30
Deque contents: [10]
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING %
```

The screenshot shows the VS Code editor with a file named `ele.py` open. The code defines a `DequeDS` class with the following methods:

- `remove_front(self)`: Removes and returns the item from the front of the deque. It raises `IndexError` if the deque is empty.
- `remove_rear(self)`: Removes and returns the item from the rear of the deque. It raises `IndexError` if the deque is empty.
- `display(self)`: Displays all elements of the deque.

The terminal output shows the execution of the code:

```
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING % cd /Users/Shared/AI ASSISTED CODING ; /usr/bin/env /usr/local/bin/python3 /Users/pranav/.vscode/extension
/ms-python.debugpy-2025.10.0-darwin-arm64/bundled/libs/debugpy/adapter/../../debugpy/launcher 54765 -- /Users/Shared/AI ASSISTED CODING
Priority Queue contents: [(1, 'Task B'), (2, 'Task A'), (3, 'Task C')]
Dequeued: Task B
Deque contents: [20, 10, 30]
Removed from front: 20
Removed from rear: 30
Deque contents: [10]
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING %
```

The screenshot shows the VS Code editor with the `ele.py` file. The code continues with the `is_empty` method and an example usage section:

- `is_empty(self)`: Checks whether the deque is empty. Returns `True` if empty, `False` otherwise.
- `Example usage`: A block of code demonstrating the usage of the `DequeDS` class.

The terminal output shows the execution of the code:

```
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING % cd /Users/Shared/AI ASSISTED CODING ; /usr/bin/env /usr/local/bin/python3 /Users/pranav/.vscode/extension
/ms-python.debugpy-2025.10.0-darwin-arm64/bundled/libs/debugpy/adapter/../../debugpy/launcher 54765 -- /Users/Shared/AI ASSISTED CODING
Priority Queue contents: [(1, 'Task B'), (2, 'Task A'), (3, 'Task C')]
Dequeued: Task B
Deque contents: [20, 10, 30]
Removed from front: 20
Removed from rear: 30
Deque contents: [10]
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING %
```



Output:

```
83 print("Removed from front:", dq.remove_front()) # Output: 20
84 < 1/1 > Accept Accept Word remove_rear() # Output: 30
85
86 print("Is deque empty?", dq.is_empty()) # Output: False
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS Python Debug Console

```
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING % cd /Users/Shared/AI\ ASSISTED\ CODING ; /usr/bin/env /usr/local/bin/python3 /Users/pranav/.vscode/extensions/ms-python.debugpy-2025.10.0-darwin-arm64/bundled/libs/debugpy/adapter/.../debugpy/launcher 54765 -- /Users/Shared/AI\ ASSISTED\ CODING/ele.py
Priority Queue contents: [(1, 'Task B'), (2, 'Task A'), (3, 'Task C')]
Dequeued: Task B
Dequeued: Task A
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING % cd /Users/Shared/AI\ ASSISTED\ CODING ; /usr/bin/env /usr/local/bin/python3 /Users/pranav/.vscode/extensions/ms-python.debugpy-2025.10.0-darwin-arm64/bundled/libs/debugpy/adapter/.../debugpy/launcher 54810 -- /Users/Shared/AI\ ASSISTED\ CODING/ele.py
Deque contents: [20, 10, 30]
Removed from front: 20
Removed from rear: 30
Deque contents: [10]
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING %
```

PROMPT : To implement a double-ended queue using collections.deque Task Description #9 – AI-Generated Data Structure Comparisons Task: Use AI to generate a comparison table of different data structures (stack, queue, linked list, etc.) including time complexities. Sample Input Code: # No code, prompt AI for a data structure comparison table Expected Output: • A markdown table with structure names, operations, and complexities

Code:

```
1 # Data Structure Comparison Table
2
3 | Data Structure | Insertion (Push/Enqueue/Insert) | Deletion (Pop/Dequeue/Delete) | Access (Indexing/Peek) | Search | Notes |
4 |---|---|---|---|---|---|
5 **Stack (List-based)** | O(1) (push) | O(1) (pop) | O(1) (peek) | O(n) | LIFO
6 **Queue (List-based)** | O(1) (enqueue at end) | O(1) (dequeue from front) | O(1) (peek front) | O(n) | FIFO
7 **Queue ('deque')** | O(1) | O(1) | O(1) | O(n) | Double-ended
8 **Singly Linked List** | O(1) (insert at head) / O(n) (end) | O(1) (delete at head) / O(n) (search position) | O(n) | O(n) | No random access
9 **Doubly Linked List** | O(1) (insert at head/tail if tracked) | O(1) (delete at head/tail if tracked) | O(n) | O(n) | Supports both directions
10 **Binary Search Tree (BST)** | O(log n) (avg), O(n) (worst) | O(log n) (avg), O(n) (worst) | O(log n) (avg) | O(log n) (avg) | No random access
11 **Balanced BST (AVL/Red-Black)** | O(log n) | O(log n) | O(log n) | O(log n) | No random access
12 **Hash Table** | O(1) avg, O(n) worst | O(1) avg, O(n) worst | O(1) avg | O(1) avg | Usual O(1) access
13 < > Accept Accept Word > > > | O(1) (remove edge, if known) | O(V+E) traversal | O(V+E) Space |
14 | O(1) (remove edge) | O(1) (check neighbors) | O(V^2) | Space |
15 **Trees** | O(n) (n = length of key) | O(n) | O(n) | O(n) | Efficiency
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS Python Debug Console

```
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING % cd /Users/Shared/AI\ ASSISTED\ CODING ; /usr/bin/env /usr/local/bin/python3 /Users/pranav/.vscode/extensions/ms-python.debugpy-2025.10.0-darwin-arm64/bundled/libs/debugpy/adapter/.../debugpy/launcher 54765 -- /Users/Shared/AI\ ASSISTED\ CODING/ele.py
Priority Queue contents: [(1, 'Task B'), (2, 'Task A'), (3, 'Task C')]
Dequeued: Task B
Dequeued: Task A
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING % cd /Users/Shared/AI\ ASSISTED\ CODING ; /usr/bin/env /usr/local/bin/python3 /Users/pranav/.vscode/extensions/ms-python.debugpy-2025.10.0-darwin-arm64/bundled/libs/debugpy/adapter/.../debugpy/launcher 54810 -- /Users/Shared/AI\ ASSISTED\ CODING/ele.py
Deque contents: [20, 10, 30]
Removed from front: 20
Removed from rear: 30
Deque contents: [10]
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING %
```



The screenshot shows a code editor with a table of data structures and their operations. The table has columns for the data structure, its operations, and its time complexity. The operations are listed in a table format within the code editor. Below the table, there is a terminal window showing the output of a Python script.

rt	Deletion (Pop/Dequeue/Delete)	Access (Indexing/Peak)	Search	Notes
0(1) (pop)	0(1) (peek)	0(n)	LIFO (Last-In, First-Out)	
0(n) (dequeue from front)	0(1) (peek front)	0(n)	FIFO (First-In, First-Out); 'deque' is faster	
0(1)	0(1)	0(n)	Efficient with 'collections.deque'	
0(n) (end)	0(1) (delete at head) / 0(n) (search position)	0(n)	0(n)	Sequential traversal only
if tracked	0(1) (delete at head/tail if tracked)	0(n)	0(n)	Supports both directions
0(n) (worst)	0(log n) (avg), 0(n) (worst)	0(log n) (avg)	0(log n) (avg)	Worst case = skewed tree
0(log n)	0(log n)	0(log n)	0(log n)	Always balanced
0(1) avg, 0(n) worst	0(1) avg	0(1) avg	0(1) avg	Uses hashing + chaining/probing
0(1) (remove edge, if known)	0(V+E) traversal	0(V+E)	0(V+E)	Space-efficient for sparse graphs
0(1) (remove edge)	0(V) (check neighbors)	0(V^2)	0(V^2)	Space 0(V^2), better for dense graphs
0(m)	0(m)	0(m)	0(m)	Efficient for prefix searches

The terminal window shows the output of a Python script. It displays the contents of a priority queue, the dequeued task, and the deque contents after removing elements from the front and rear.

```

pranav@PRANAVs-MacBook-Air AI ASSISTED CODING % cd /Users/Shared/AI\ ASSISTED\ CODING ; /usr/bin/env /usr/local/bin/python3 /Users/pranav/ms-python.debugpy-2025.10.0-darwin-arm64/bundled/libs/debugpy/adapter/../../debugpy/launcher 34765 -- /Users/Shared/AI\ ASSISTED\ CODING
Priority Queue contents: [(1, 'Task B'), (2, 'Task A'), (3, 'Task C')]
Dequeued: Task B
Dequeued: Task A
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING % cd /Users/Shared/AI\ ASSISTED\ CODING ; /usr/bin/env /usr/local/bin/python3 /Users/pranav/ms-python.debugpy-2025.10.0-darwin-arm64/bundled/libs/debugpy/adapter/../../debugpy/launcher 54810 -- /Users/Shared/AI\ ASSISTED\ CODING
Deque contents: [20, 10, 30]
Removed from front: 20
Removed from rear: 30
Deque contents: [10]
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING % cd /Users/Shared/AI\ ASSISTED\ CODING ; /usr/bin/env /usr/local/bin/python3 /Users/pranav/ms-python.debugpy-2025.10.0-darwin-arm64/bundled/libs/debugpy/adapter/../../debugpy/launcher 54847 -- /Users/Shared/AI\ ASSISTED\ CODING
Next order to serve: Order 1: Veg Sandwich
Serving: Order 1: Veg Sandwich
Cafeteria Order Queue: ['Order 1: Veg Sandwich', 'Order 2: Chicken Burger', 'Order 3: Cold Coffee']
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING %
  
```

Output:

The screenshot shows the output of a Python script in a terminal window. It displays the contents of a priority queue, the dequeued task, and the deque contents after removing elements from the front and rear.

```

Deque contents: [20, 10, 30]
Removed from front: 20
Removed from rear: 30
Deque contents: [10]
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING % cd /Users/Shared/AI\ ASSISTED\ CODING ; /usr/bin/env /usr/local/bin/python3 /Users/pranav/ms-python.debugpy-2025.10.0-darwin-arm64/bundled/libs/debugpy/adapter/../../debugpy/launcher 54847 -- /Users/Shared/AI\ ASSISTED\ CODING
Next order to serve: Order 1: Veg Sandwich
Serving: Order 1: Veg Sandwich
Cafeteria Order Queue: ['Order 1: Veg Sandwich', 'Order 2: Chicken Burger', 'Order 3: Cold Coffee']
pranav@PRANAVs-MacBook-Air AI ASSISTED CODING %
  
```

PROMPT : Your college wants to develop a Campus Resource Management System that handles: 1. Student Attendance Tracking – Daily log of students entering/exiting the campus. 2. Event Registration System – Manage participants in events with quick search and removal. 3. Library Book Borrowing – Keep track of available books and their due dates. 4. Bus Scheduling System – Maintain bus routes and stop connections. 5. Cafeteria Order Queue – Serve students in the order they arrive. Student Task: • For each feature, select the most appropriate data structure from the list below: o Stack o Queue o Priority Queue o Linked List o Binary Search

Tree (BST) o Graph o Hash Table o Deque • Justify your choice in 2–3 sentences per feature. • Implement one selected feature as a working Python program with AI- assisted code generation.