Laboratory 3 - Python List Operations and Data Structures

Laboratory Objectives

- Write a Python program that extensively utilizes Python list operations, including advanced manipulations.
- Employ loops, conditional statements, input/output, and functions to demonstrate various data structure manipulations including using lists as stacks and queues.

Program Instructions

1. **Advanced List Operations**

❖ **Create "functions.py" and implement the following list operations:**

- append_item (list, item): Adds an item to the end of the list.
- insert_item (list, index, item): Inserts an item at a specified index.
- remove_item (list, item): Removes the first occurrence of the specified item.
- pop_item (list, index=-1): Pops an item from the list at the given index.
- clear_list (list): Clears all items from the list.
- sort_list (list): Sorts the list in ascending order.
- reverse_list (list): Reverses the order of items in the list.
- index_of_item (list, item): Returns the index of the first occurrence of the item.
- count_item (list, item): Counts how many times the item appears in the list.
- slice_list (list, start, end): Returns a slice of the list from start to end index.
- delete_item(list, item): Return a list with the item removed using the 'del' keyword

2. Stack and Queue Implementations

❖ **Stack Operations**:

- push_stack(stack,item): add item to stack
- pop_stack(stack): remove item from stack.

❖ **Queue Operations**:

- enqueue(queue, item): add an item to the queue.
- dequeue(queue): remove an element of a queue

3. Interactive Menu for Data Structure Manipulation

Implement a menu-driven interface in main.py to select and perform operations on the list, stack, or queue.

Menu Options:

- List Operations (Add, Insert, Remove, Pop, Clear, Sort, Reverse, Index, Count, Slice)
- Stack Operations (Push, Pop)
- Queue Operations (Enqueue, Dequeue)
- Exit

4. Example Output

*** MAIN MENU ***

1. List Operations
2. Stack Operations
3. Queue Operations
4. Exit

Enter your choice: 1

*** LIST OPERATIONS ***

1. Append item
2. Insert item
3. Remove item
4. Pop item
5. Clear list
6. Sort list
7. Reverse list
8. Index of item
9. Count of item
10. Slice list
11. Return to Main Menu

Enter your choice: 1

Enter item to append: apple Item

'apple' appended successfully! ***

CURRENT LIST: ['apple'] ***

Enter your choice: 11

*** MAIN MENU ***
2. Stack Operations

Enter your choice: 2

*** STACK OPERATIONS ***

1. Push item

2. Pop item

3. Return to Main Menu

Enter your choice: 1

Enter item to push: cherry

Item 'cherry' pushed to stack!

*** CURRENT STACK: ['cherry']

*** Enter your choice: 3

*** MAIN MENU ***

3. Queue Operations

Enter your choice: 3

*** QUEUE OPERATIONS

*** 1. Enqueue item

2. Dequeue item

3. Return to Main Menu

Enter your choice: 1

Enter item to enqueue: pear

Item 'pear' enqueued!

*** CURRENT QUEUE: ['pear']

*** Enter your choice: 3

*** MAIN MENU ***

4. Exit

Enter your choice: 4

Exiting program...