Ch-6 Data Structure-I

What is a Stack?

A **stack** is a linear data structure that follows the **LIFO** principle:
Last In, First Out
The element inserted **last** is the **first** to be removed.

Operations on Stack

Operation	Description	Example
push()	Insert (add) an element to the top	stack.append(10)
pop()	Remove (delete) the element from the top	stack.pop()

Implementation of Stack Using List

In Python, stacks can be implemented using **list** with append() and pop().

```
stack = []
# Push elements
stack.append(10)
stack.append(20)
stack.append(30)
print("Stack after pushes:", stack)

# Pop elements
print("Popped item:", stack.pop())
print("Stack after pop:", stack)
```

Output:

```
Stack after pushes: [10, 20, 30]
Popped item: 30
Stack after pop: [10, 20]
```

Complete Example: Menu-driven Stack Program

```
stack = []

while True:
    print("\n1. Push\n2. Pop\n3. Display\n4. Exit")
    choice = int(input("Enter your choice: "))

    if choice == 1:
        item = input("Enter item to push: ")
        stack.append(item)
    elif choice == 2:
        if len(stack) == 0:
            print("Stack is empty!")
        else:
            print("Popped:", stack.pop())
    elif choice == 3:
        print("Stack contents:", stack)
    elif choice == 4:
        break
    else:
        print("Invalid choice")
```