# APL Experiment 1 (A) :

# Class, Object and Constructor

---

## 1A]

## Working with user defined classes creating objects and using different types of constructors

**Problem Statement:**

Design a Java program that simulates a **Library Management System** using user-defined classes, objects, and constructors. The program should demonstrate the use of different types of constructors, such as default constructors, parameterized constructors, and constructors that involve overloading.

**Requirements:**

1. **Class Definitions:**
    - **Book**: The class should represent a book with the following attributes:
        - Title (String)
        - Author (String)
        - ISBN (String)
        - Price (double)
    - **Library**: This class will manage a collection of books and include the following attributes:
        - Library Name (String)
        - Address (String)
        - List of Books (ArrayList of Book objects)
2. **Constructors:**
    - **Book Class**:
        - A **default constructor** that initializes the book's attributes with default values (empty strings for String attributes and 0 for the price).

        - A **parameterized constructor** that initializes the attributes with values provided by the user.
        - An **overloaded constructor** to initialize only the title and author, leaving other attributes to be set later.
    - **Library Class**:
        - A **default constructor** that initializes the library's name and address to default values.
        - A **parameterized constructor** that initializes the library's name, address, and a list of books (through the ArrayList).

3. **Operations:**
    - Allow the user to:
        - Add books to the library collection.
        - Display the details of all the books in the library.
        - Display the total value of the books in the library.
        - Search for a book by ISBN.
4. **Sample Output:**
    - When displaying a book, show the details like title, author, ISBN, and price.
    - When displaying the library's collection, show the name of the library, address, and the books in it.
    - The total value should sum up the prices of all books in the library.

**Example:**

Enter Library Information:

Library Name: Central Library

Library Address: Main St, Springfield

Enter Book Details:

Title: Java Programming

Author: John Doe

ISBN: 123456789

Price: 50.75

Book added to the library.

Enter Book Details:

Title: Data Structures

Author: Jane Smith

ISBN: 987654321

Price: 45.25

Book added to the library.

Library Details:

Library Name: Central Library

Library Address: Main St, Springfield

Books in the Library:

1. Java Programming, Author: John Doe, ISBN: 123456789, Price: 50.75

2. Data Structures, Author: Jane Smith, ISBN: 987654321, Price: 45.25

Total value of books in library: 96.00

**Guidelines:**

- Make use of constructors effectively to initialize object data.
- Use appropriate access modifiers (public, private) and methods for encapsulation.
- Use ArrayLists to manage dynamic lists of books.