



**MODERN EDUCATION SOCIETY'S**

**NOWROSJEE WADIA COLLEGE**

**(An Autonomous College under Savitribai Phule Pune University)**

**Laboratory course on SADP and Microservices**

**National Education Policy (NEP) Syllabus**

**To be implemented from Academic Year 2023-2024**

**M.Sc.(Computer Science)-Part II**

**Semester III**

**2024-25**

**Co-Ordinator**

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**Prepared by**

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**Roll No. :**

**Name :**

**SOFTWARE ARCHITECTURE AND DESIGN PATTERNS AND MICROSERVICES**

**ASSIGNMENT COMPLETION SHEET**

<b>Sr.No</b>	<b>Assignment Name</b>	<b>Marks</b>
<b>1</b>	<b>Creational Design Patterns</b>	
<b>2</b>	<b>Structural Design Patterns</b>	
<b>3</b>	<b>Behavioral Design Patterns</b>	
<b>4</b>	<b>Spring Framework</b>	
<b>5</b>	<b>Microservices</b>	
Total out of 25		
Total out of 10 (Convert 25 into 10)		

**Signature of Batch In-charge:**

**Internal Examiner :**

**External Examiner :**

**Date :**

# Assignment 1: Creational Design Patterns

## Pre-Reading

- ✓ Concepts of Design Patterns and Basics of Java
- ✓ Creational Design Patterns –Abstract Factory, Factory Method, Singleton

## Lab Assignments

1. Write a Java Program to implement Factory method for Pizza Store with createPizza(), orderPizza(), prepare(), Bake(), cut(), box(). Use this to create a variety of pizza's like NyStyleCheesePizza, ChicagoStyleCheesePizza etc.
2. Write a Java Program to implement Singleton pattern for multithreading.
3. Write a Java Program to implement Abstract factory pattern for various functionalities of the mobile phone, such as taking a photo, recording a video.

### Extra Practice Assignment :

1. Write a Java Program to implement Abstract factory pattern to create cars and specifications specific to North America, Europe.
2. Write a Java Program to implement Singleton pattern to create the singleton class LoggerService with a private constructor and a public static method to get the instance.

Signature of the instructor

Date

### Assignment Evaluation

0: Not done	<input type="text"/>	2: Late Complete	<input type="text"/>	4: Complete	<input type="text"/>
1: Incomplete	<input type="text"/>	3: Needs Improvement	<input type="text"/>	5: Well Done	<input type="text"/>

## Assignment 2 : Structural Design Patterns

### Pre-Reading

- ✓ Concept of Design Patterns and Basics of Java.
- ✓ Structural Design Patterns – Adapter, Decorator, Bridge, Proxy

### Lab Assignments

1. Write a Java Program to implement I/O Decorator for converting uppercase letters to lowercase letters.
2. Write a Java Program to implement Adapter pattern for Enumeration iterator.
3. Write a Java Program to implement Bridge design pattern to produce and assemble the two different vehicles.

### Extra Practice Assignment :

1. Write a java program to implement Adapter pattern to design Heart Model to Beat Model.
2. Write a java program to implement Proxy Pattern which efficiently manages the loading and displaying of images by introducing a proxy that controls access to the real image object.

Signature of the instructor

Date

### Assignment Evaluation

0: Not done

2: Late Complete

4: Complete

1: Incomplete

3: Needs

Improvement

5: Well Done

# Assignment 3: Behavioral Design Patterns

## Pre-Reading

- ✓ Concept of Design Patterns and Basics of Java.
- ✓ Behavioral Design Patterns – Observer, Command, Iterator, State

## Lab Assignments

1. Write a JAVA Program to implement built-in support (java.util.Observable) Weather station with members temperature, humidity, pressure and methods measurementsChanged(), set Measurement(), getTemperature(), getHumidity(), getPressure().
2. Write a Java Program to implement an undo command to test Ceiling fan.
3. Write a Java Program to implement Iterator Pattern for Designing Menu like Breakfast, Lunch or Dinner Menu.

## Extra Practice Assignment :

1. Write a Java Program to implement State Pattern for Gumball Machine. Create an instance variable that holds the current state from there, we just need to handle all actions, behaviors and state transitions that can happen. For actions we need to implement methods to insert a quarter, remove a quarter, turning the crank and display gumball.
2. Write a Java Program to implement command pattern to test Remote Control.

Signature of the instructor

Date

## Assignment Evaluation

0: Not done

2: Late Complete

4: Complete

1: Incomplete

3: Needs Improvement

5: Well Done

## Assignment 4: Spring Framework

### Pre-Reading/ Prerequisites

- ✓ Spring Framework
- ✓ Java and Advanced Java
- ✓ Eclipse IDE, JDBC Module

### Lab Assignments

1. Design simple HR Application using Spring Framework.
2. Create a task management API where users can manage tasks, categories, and due dates using Spring Framework.
3. Develop a simple user registration and login module using spring boot. Also validates the user registration fields.
4. Write a java program to implement microservice to accept the details of Employee(Eno, Ename, Designation, DeptName,Salary) from a user and store it into the fat file.

### Extra Practice Assignment :

1. Create an ERP system that handles inventory, sales, and financial data using Spring Framework.
2. Design a simple inventory system using Spring Framework.

Signature of the instructor  Date

### Assignment Evaluation

0: Not done	<input data-bbox="467 1598 553 1682" type="text"/>	2: Late Complete	<input data-bbox="938 1598 1024 1682" type="text"/>	4: Complete	<input data-bbox="1336 1598 1422 1682" type="text"/>
1: Incomplete	<input data-bbox="467 1745 553 1829" type="text"/>	3: Needs Improvement	<input data-bbox="938 1745 1024 1829" type="text"/>	5: Well Done	<input data-bbox="1336 1745 1422 1829" type="text"/>

## Assignment 5: Microservices

### Pre-Reading / Prerequisites

- ✓ Microservices
- ✓ Spring Framework
- ✓ Java and Advanced Java
- ✓ Eclipse IDE, JDBC Module

### Lab Assignments

1. Develop a module as a microservice to create a student management application using spring boot in java.(Refer assignment 4, Q.3)
2. Create a microservice to display the details of all employees of the specific department. (Refer assignment 4, Q.4)
3. Create HR application as a microservices to send the message to the candidate as “You have been selected for an interview”.(Refer assignment 4, Q.1)

### Extra Practice Assignment :

1. Create a spring boot application to set up an API gateway into the Student management Microservices project using the Spring Cloud Gateway library.

Signature of the instructor

Date

### Assignment Evaluation

0: Not done

2: Late Complete

4: Complete

1: Incomplete

3: Needs  
Improvement

5: Well Done