

Raj Kumar Goel Institute of Technology, Ghaziabad



Session : 2023-24

OBJECT ORIENTED PROGRAMMING WITH JAVA LAB BCS452

Submitted by: _____

Roll no. : _____

Submitted to:

Dr. Pramod kr. Sagar

Teacher's Signature

**BACHELOR OF TECHNOLOGY
IN
COMPUTER SCIENCE AND ENGINEERING
DEPARTMENT OF CSE**

PROGRAM EDUCATIONAL OUTCOMES (PEOs)

PEO 1: Learning: Our graduates to be competent with sound knowledge in field of Computer Science & Engineering.

PEO 2: Employable: To develop the ability among students to synthesize data and technical concepts for application to software product design for successful careers that meet the needs of Indian and multinational companies.

PEO 3: Innovative: To develop research oriented analytical ability among students to prepare them for making technical contribution to the society.

PEO 4: Entrepreneur / Contribution: To develop excellent leadership quality among students which they can use at different levels according to their experience and contribute for progress and development in the society.

PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to:

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to

comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: The ability to use standard practices and suitable programming environment to develop software solutions.

PSO2: The ability to employ latest computer languages and platforms in creating innovative career opportunities.

COURSE OUTCOMES (COs)

B217.1	Develop a simple JAVA program using Eclipse platform.
B217.2	Implement OOPs concepts using basics of JAVA Programming.
B217.3	Handle error in JAVA using Exception Handling.
B217.4	Create JAVA package and construct programming using I/O package.
B217.5	Create a front-end web application using Spring Boot.

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
B217.1	2	2	3	3	2				2			2
B217.2	2	2	3	3	2				2			2
B217.3	2	2	3	3	2				2			2
B217.4	2	2	3	3	2				2			2
B217.5	2	2	3	3	2				2			2
B217	2	2	3	3	2				2			2

CO-PSO MAPPING

	PSO1	PSO2
B217.1	2	2
B217.2	2	2
B217.3	2	2
B217.4	2	2
B217.5	2	2
B217	2	2

LIST OF EXPERIMENTS

Expt. No.	Title of Experiments	Date of Experiment	Faculty Signature
1.	Write a Java program that prompts the user for a float value and convert the given number of type float into integer data type.		
2.	Write a Java program that prompts the user for a character, converts it to its ASCII value, and displays the result.		
3.	Gopal is developing a Java program that requires reading a person's first name, middle name, and last name as command-line arguments. The program needs to concatenate these names with space and print the full name in a single line. Can you provide the Java code that Gopal can use to achieve this task?		
4.	Teja is very enthusiastic about writing programs, one day he thought of printing the 4 command line arguments in reverse order. What would be the program that works for Teja?		
5.	You are developing a program to determine the month of the year based on the given month number. The months are represented by numbers from 1 to 12, where 1 corresponds to January, 2 to February, and so on. Create a Java program using a switch-case statement that takes the month number as input and prints the corresponding month of the year. Here is the mapping between month numbers and months: 1: January 2: February 3: March 4: April 5: May		
6.	You are developing a Library Book Management System, and a crucial aspect is the Book class. This class is intended to represent individual books within the system. The Book class should have attributes title and publication year, and you need to implement methods to get and set these attributes. Consider the following scenario: Attributes: title: Represents the title of the book. publicationyear: Represents the year the book was published.		

	<p>Methods:</p> <p>getTitle(): Returns the title of the book.</p> <p>getPublicationYear(): Returns the publication year of the book.</p> <p>setTitle(String title): Sets the title of the book.</p> <p>setPublicationYear(int publicationYear): Sets the publication year of the book.</p>		
7.	<p>Create a class named Person with the following characteristics:</p> <ul style="list-style-type: none"> • A String variable name. • A method inputName() that takes user input for the name. • A method displayName() that prints the name to the console. <p>Create a class named Citizen that inherits from Person and has the following characteristics:</p> <ul style="list-style-type: none"> • An int variable age. • A method inputAge() that takes user input for the age. • A method displayAge() that prints the age to the console. <p>Note: The main class has been provided to you in the editor. The MainPerson class creates an instance of Citizen, takes user input for name and age, and then displays the entered name and age. The program demonstrates the use of inheritance, where the Citizen class inherits attributes and methods from the Person class.</p>		
8.	<p>Create an abstract class called Shape</p> <ul style="list-style-type: none"> • Declare an abstract method of type double: calculateArea(). This method will be implemented by subclasses. • Implement a concrete method named displayDetails() that displays information about the shape, including its area. <p>Next, create two subclasses called Rectangle and Circle that extend the Shape class:</p> <ul style="list-style-type: none"> • Implement the calculateArea() method in the Rectangle class. It should take input from the user for the length (double) and width (double) of the rectangle and calculate its area. • Implement the calculateArea() method in the Circle class. It should take input from the user for the radius (double) of the circle and calculate its area. <p>Note: The main method and the input statements are already provided.</p>		

9.	<p>Neha is developing a Java program that involves accessing elements in an array. She wants to make sure that her program handles cases where the index provided by the user is outside the valid range of the array. Can you guide Neha in designing the program and implementing error handling for array index out of bounds?</p> <p>Input Format: The first line is the integer that represents the size of the array. The second line is the integers separated by space. The third line is the integer that represents the index at which the user wants to access the array element.</p> <p>Output Format: The output depends on the validity of the index. If the index is out of bounds, the program should display "Error: Index out of bounds".</p>		
10.	<p>Rohan is developing a Java program to calculate the square root of a given number. He wants to ensure that the program gracefully handles cases where the input number is negative and the number cannot be parsed as an integer. Assist Rohan in designing the program and implementing the necessary exception handling to achieve this.</p> <p>Input Format: The input consists of a single integer representing the number for which the square root is to be calculated.</p> <p>Output Format: The output is a double value(up to 2 decimal points) representing the square root of the input number. If the input number is negative, the program should display "Error: Square root of a negative number is not possible". Also, if the input number cannot be parsed as an integer, the program should display "Error: Invalid input".</p>		
11.	<p>Write a Java program to print alternating alphabets and numbers based on user-defined counts n, ensuring termination after reaching the specified count, and handling inputs greater than zero.</p> <p>Constraint:</p> <ul style="list-style-type: none"> $0 \leq n \leq 10$ <p>Input Format:</p> <ul style="list-style-type: none"> The input consists of the number of characters to print (Integer). <p>Output format:</p> <ul style="list-style-type: none"> The output represents characters alternating between alphabets ('A' to 'Z'), numbers (1 to n) and prints the name of the thread followed by the character or number being printed. <p>Sample Input and Output: Enter the number of characters to print: 5</p>		

	Thread-0: A Thread-1: 1 Thread-0: B Thread-1: 2 Thread-0: C Thread-1: 3 Thread-0: D Thread-1: 4 Thread-0: E Thread-1: 5 Note: Output should strictly match with the test cases.		
12.	<p>Develop a Java application to implement currency converter (Dollar to INR, EURO to INR, Yen to INR and vice versa), distance converter (meter to KM, miles to KM and vice versa), time converter (hours to minutes, seconds and vice versa) using packages.</p> <p>Note:</p> <ol style="list-style-type: none"> 1. Create a package for each converter (currency, distance, and time). 2. Implement classes for each converter inside their respective packages. 3. Use the main class to provide a user interface for selecting the type of conversion and calling the appropriate converter class. 4. Your output should match the test cases as displayed. <p>Assume the following values for currency converter 1 euro = 89.2 INR 1 yen = 0.67 INR 1 dollar = 74.5 INR</p>		
13.	<p>Raj is tasked with developing a security authentication system in Java. To enhance user security, Raj decided to implement a feature that checks if a user's password is a palindrome. He chooses to use the StringBuilder class from the java.lang package for efficient string manipulation.</p> <p>Can you help Raj, design and implement a Java class PalindromeChecker that takes a user's entered password, checks if it is a palindrome, and provides a secure and user-friendly response?</p> <p>Input Format: The input line reads a string representing the password.</p> <p>Output Format: The output line prints a string <password> is a palindrome if it is a palindrome otherwise it will print <password> is not a palindrome.</p> <p>Note: Use println() to print the output statements.</p>		

14.	<p>Rathika is preparing to submit her project abstract to the university. The university has imposed a rule stating that the abstract file must not exceed 250 characters, including spaces. Rathika has finalized her abstract but is uncertain whether it meets the university's criteria.</p> <p>Your task is to create a Java program that helps Rathika determine whether her abstract file is eligible for submission. The program should read the content of the abstract from a text file, count the total number of characters (including spaces), and then provide feedback to Rathika about the eligibility of her abstract and at the end print the total character count.</p> <p>Ensure that your program handles situations where the file does not exist or if there are any issues with file reading.</p> <p>Input format: The input is the file name.</p> <p>Output format: The output displays whether the abstract is eligible or not and prints the total character count. If the file doesn't exist it prints the error message as File does not exist.</p>		
15.	<p>Michael wants to reverse the order of lines in a text file. He needs a Java program that reads the content of the file and reverses the order of lines. Implement the program to assist Michael in achieving this. If the file does not exist print the error message saying "Error: Unable to read the file".</p> <p>Input Format: The input consists of a single line containing the name of the input file.</p> <p>Output Format: The program should print the contents of the file with the lines reversed.</p>		
16.	Create industry-oriented application using Spring Framework.		
17.	Test RESTful web services using Spring Boot.		
18.	Test Frontend web application with Spring Boot.		