Assignment on
Lambdas and Functional Programming

Subject: CSW2 (CSE3141) **Branch: CSE&CSIT**
Session: Feb 2024 to April 2024 **Section : All**

Q1. Create a functional interface Calculator with methods for addition, subtraction, multiplication, and division. Implement these methods using lambda expressions. Define the Calculator functional interface with methods for arithmetic operations. Implement the interface methods using lambda expressions for basic arithmetic operations.

Q2. Write a program that sorts a list of strings based on their lengths in descending order. Define a custom comparator using a lambda expression that compares strings based on their lengths. Use the custom comparator to sort the list of strings in descending order of length.

Q3. Write a program that demonstrates lazy evaluation by creating a lazy sequence of prime numbers. Define a lazy sequence using lambda expressions that generates prime numbers. Demonstrate lazy evaluation by printing the first few prime numbers from the lazy sequence.

Q4. Create a functional interface Shape with a method double area() and a default method void printArea(). Implement the interface using lambda expressions for different shapes. Define the Shape functional interface with an area method. Implement the interface for shapes like circle, square, and rectangle using lambda expressions. Use the default method to print the area of each shape.

Q5. Write a program that reads a list of strings, converts them to uppercase, filters out the strings starting with a vowel, and then prints the remaining strings.

Q6. Write a program that demonstrates a function returning another function, where the inner function calculates the square of a number. Define a function that returns another function. The inner function should calculate the square of a given number. Demonstrate the use of the returned function to calculate squares.

Q7.Write a program that calculates factorial using a recursive lambda expression. Define a recursive lambda expression to calculate factorial. Use the lambda expression to calculate factorial of a given number.

Q8. Write a program that creates a thread using a lambda expression as the Runnable and prints "Hello, CSW2!" from the thread. Define a lambda expression that implements the Runnable interface and prints "Hello, CSW2!". Create a thread using the lambda expression and start the thread.

Q9. Write a program that implements the producer-consumer problem using lambda expressions and threads. Define a bounded buffer class that implements a queue. Create producer and consumer classes that use lambda expressions to produce and consume items from the bounded buffer. Create and start multiple producer and consumer threads to demonstrate the producer-consumer problem.

Q10. Write a Java program that takes a LocalDateTime object and formats it to a custom string format ("yyyy-MM-dd HH:mm:ss"). Define a LocalDateTime object representing a specific date and time. Use DateTimeFormatter to format the LocalDateTime object to the desired string format.

Q11. Write a Java program that converts a given date and time in UTC to the local date and time of a specific time zone (e.g., "America/New_York"). Parse a string representing a date and time in UTC format. Convert the parsed Instant to a ZonedDateTime using a specific ZoneId.