

CEWP MOD4: JAVA PROGRAMMING**PROJECT DESCRIPTIONS****PROJECT 1: 2D GRAPHICS PROGRAMMING AND GUI PROGRAMMING IN JAVA**

There are two projects for the students to choose one from:

OPTION 1

This is about simulation of rolling a pair of dice.

- (a) Explain how you would develop a Java application that simulates a pair of dice. The application must have a GUI. The GUI should have a button labeled **Roll the Dice**. Each time the button is selected, the application should roll the dice, using random numbers to determine the value of each die. The result of the simulation of dice should be shown by placing the images of the dice facing up, such that the dice are horizontally next to each other.
- (b) Explain how the application could be extended in some meaningful way.
- (c) Find an application on the Web that simulates a pair of dice and present its technical quality-related limitations.

OPTION 2

Tic-Tac-Toe is a paper-and-pencil game involving two players who take turns marking the spaces in a three-by-three grid with 'X' or 'O'. The player who succeeds in placing three of their marks in a horizontal, vertical, or diagonal row is the winner.

- (a) Explain how you would develop a Tic-Tac-Toe simulator in Java when you are playing against (1) the computer, and (2) another human.
- (b) Find a Tic-Tac-Toe simulator on the Web and present its technical quality-related limitations.

PROJECT 2: CONCURRENT PROGRAMMING IN JAVA

- (a) State and demonstrate one advantage of a Java application with multiple threads over a Java application with a single thread.
- (b) State and demonstrate one disadvantage of a Java application with multiple threads.

PROJECT 3: DATABASE PROGRAMMING IN JAVA

This is about a human resource management system.

- (a) Explain how you would develop a Java application that creates a database named Personnel. The database should have a table named Employee, with columns for employee ID, name, position, and hourly pay rate. The employee ID should be the primary key.
- (b) Show that it is possible to insert at least five sample rows of data into the Employee table.