Experiment 3

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Semester: 6th **Date of Performance: 25/01/25**
Subject Name: PBLJ LAB **Subject Code: 22CSH-359**

1. **Aim:** Develop a program for

a) Easy Level: Square Root Calculation

b) Medium Level: ATM Withdrawal System

c) Hard level: University Enrollment System

2. **Implementation/Code:**

a)
```
import java.util.Scanner;

public class SquareRootCalculator { public static void main(String[] args) {
Scanner scanner = new Scanner(System.in); System.out.print("Enter a number:
"); try { double num = scanner.nextDouble();          if (num < 0) {
throw new IllegalArgumentException("Error: Cannot calculate the square root
of a negative number.");
}
System.out.println("Square Root: " + Math.sqrt(num));
} catch (IllegalArgumentException e) {
System.out.println(e.getMessage());
} catch (Exception e) {
System.out.println("Error: Invalid input. Please enter a numeric value.");
} finally {          scanner.close();
}
}
```

b)
```
import          java.util.Scanner;          class
InvalidPinException extends Exception { public
InvalidPinException(String      message)      {
super(message);
   }
} class InsufficientBalanceException extends Exception
{ public InsufficientBalanceException(String message) {
super(message);
   }
```

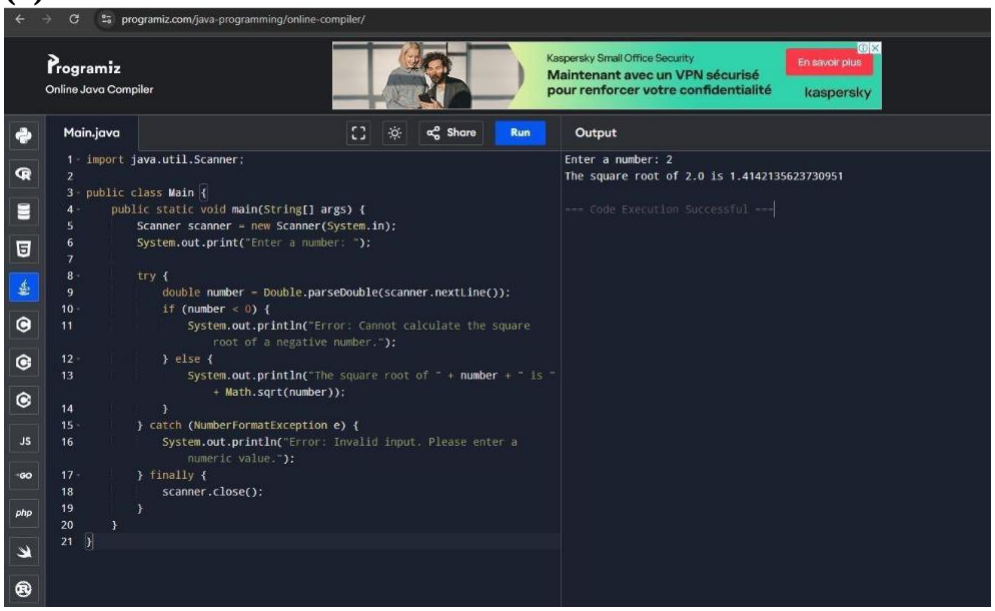
```
}
public class ATM { private static final int PIN = 1234; private static double balance =
3000.0;


public static void main(String[] args) {        Scanner scanner = new Scanner(System.in);
try {
System.out.print("Enter PIN: ");            int enteredPin = scanner.nextInt();            if
(enteredPin != PIN) {                throw new InvalidPinException("Error: Invalid PIN."); }
System.out.print("Withdraw Amount: ");            double withdrawAmount =
scanner.nextDouble(); if (withdrawAmount > balance) {
throw new InsufficientBalanceException("Error: Insufficient balance. Current Balance: "
+ balance);
}

balance -= withdrawAmount;
System.out.println("Withdrawal successful! Remaining Balance: " + balance);

} catch (InvalidPinException | InsufficientBalanceException e) {
System.out.println(e.getMessage());
} catch (Exception e) {
System.out.println("Error: Invalid input.");
} finally {
System.out.println("Final Balance: " + balance);            scanner.close();
}
}
```

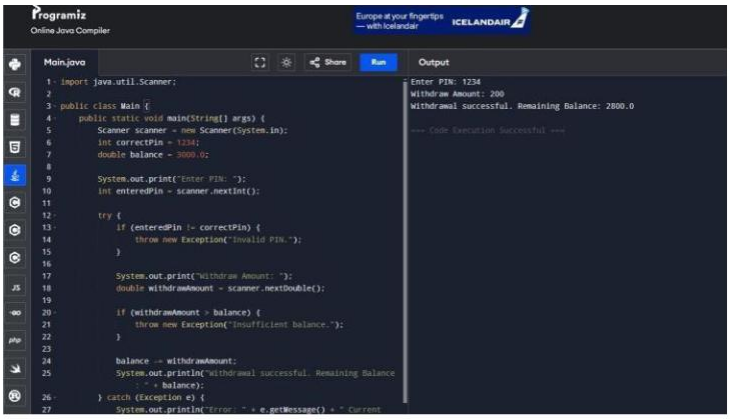
c)
```
import java.util.HashMap; import
java.util.Scanner;

class CourseFullException extends Exception {
public CourseFullException(String message) {
super(message);
   }
}

class PrerequisiteNotMetException extends Exception
{ public PrerequisiteNotMetException(String message)
{ super(message);
   }
}
public class UniversityEnrollment {
```

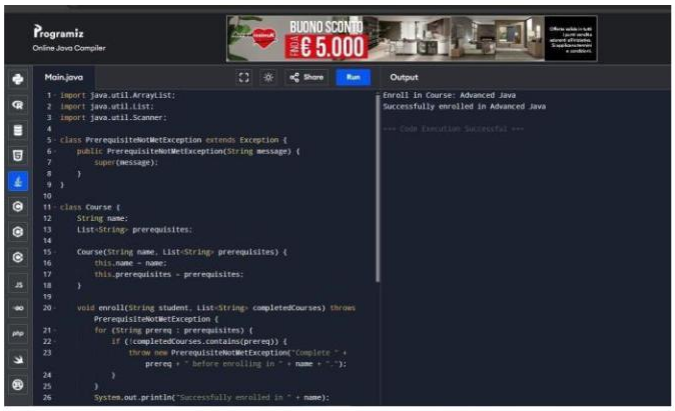
```
    private static final int MAX_ENROLLMENT = 2; private static
HashMap<String, Integer> courseEnrollments = new HashMap<>(); private static
HashMap<String, String> prerequisites = new HashMap<>();

    public static void main(String[] args) { // Defining course prerequisites
prerequisites.put("Advanced Java", "Core Java"); prerequisites.put("Machine
Learning", "Mathematics");
        Scanner scanner = new Scanner(System.in);
try {
            System.out.print("Enroll in Course: ");
            String course = scanner.nextLine();
            System.out.print("Prerequisite: "); String
prerequisite = scanner.nextLine(); if
(prerequisites.containsKey(course) &&
!prerequisites.get(course).equals(prerequisite)) {
                throw new PrerequisiteNotMetException("Error:
PrerequisiteNotMetException - Complete "
                        + prerequisites.get(course) + " before enrolling in " + course + ".");
            }

            int enrolledCount = courseEnrollments.getOrDefault(course, 0);
            if (enrolledCount >= MAX_ENROLLMENT) {
                throw new CourseFullException("Error: CourseFullException - The course is
full.");
            }

            courseEnrollments.put(course, enrolledCount + 1);
            System.out.println("Enrollment successful for " + course + ".");

        } catch (PrerequisiteNotMetException | CourseFullException e)
            { System.out.println(e.getMessage());
        } finally {
scanner.close();
        }
    }
}
```

3. Output:

(a)







(b) **(c)**

6 . Learning Outcomes:

- Exception Handling & Robust Code – Learn to use try-catch, throw, and custom exceptions for handling errors like invalid input, insufficient balance, and unmet prerequisites.
- User Input & Decision Making – Gain experience in handling user inputs, validating conditions (PIN check, balance check, prerequisites), and controlling program flow. OOP &
- Data Management – Understand object-oriented principles like custom exception classes and use data structures (e.g., HashMap) for managing enrollments dynamically.