



DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

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Experiment - 3

Student Name : Suryansh Gehlot

UID: 22BCS10900

Branch: BE-CSE

Section/Group: KRG 2B

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Subject Name: Java

Subject Code: 22CSH-352

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
```



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```
        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;
```



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```
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();
```

```
    }
```

```
}
```



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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();
```



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```
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 + ".");  
    }
```

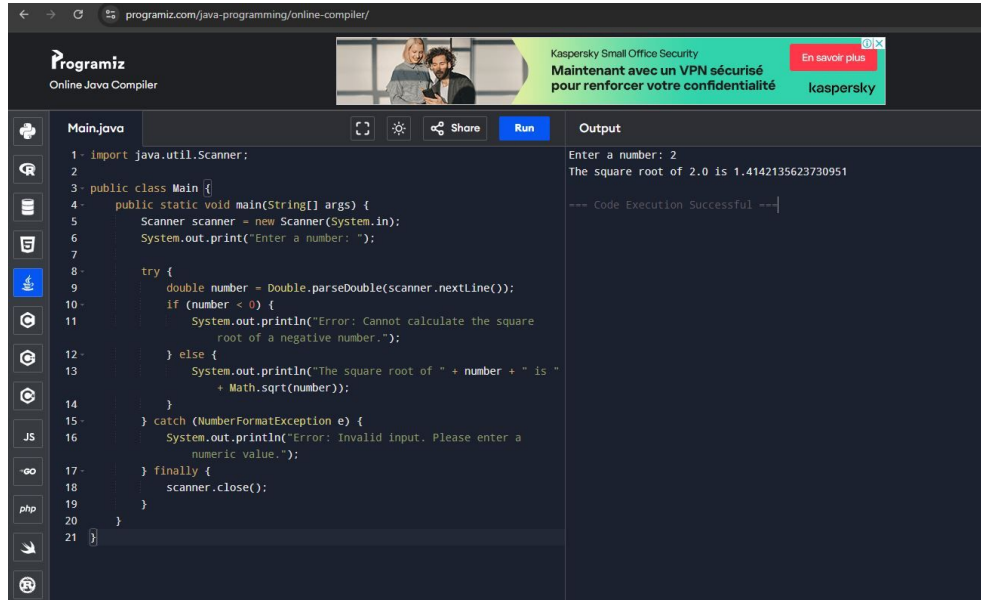
```
    int enrolledCount = courseEnrollments.getDefault(course, 0);  
    if (enrolledCount >= MAX_ENROLLMENT) {  
        throw new CourseFullException("Error: CourseFullException - The course is  
full.");  
    }
```

```
    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:

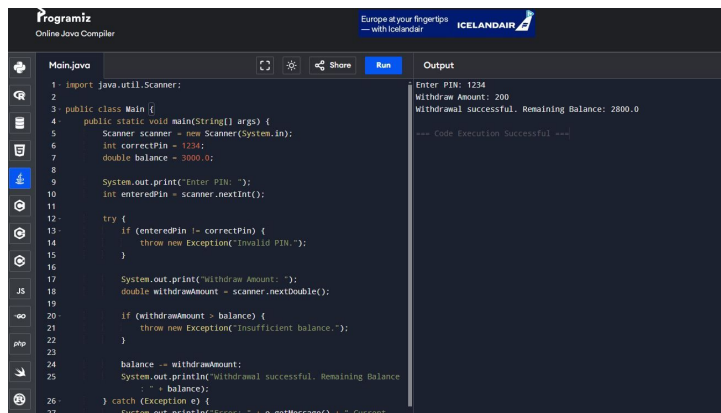
(a)



```

1- import java.util.Scanner;
2
3- public class Main {
4-     public static void main(String[] args) {
5-         Scanner scanner = new Scanner(System.in);
6-         System.out.print("Enter a number: ");
7
8-         try {
9-             double number = Double.parseDouble(scanner.nextLine());
10-            if (number < 0) {
11-                System.out.println("Error: Cannot calculate the square
root of a negative number.");
12-            } else {
13-                System.out.println("The square root of " + number + " is "
+ Math.sqrt(number));
14-            }
15-        } catch (NumberFormatException e) {
16-            System.out.println("Error: Invalid input. Please enter a
numeric value.");
17-        } finally {
18-            scanner.close();
19-        }
20-    }
21- }
  
```

Output: Enter a number: 2
The square root of 2.0 is 1.4142135623730951
--- Code Execution Successful ---

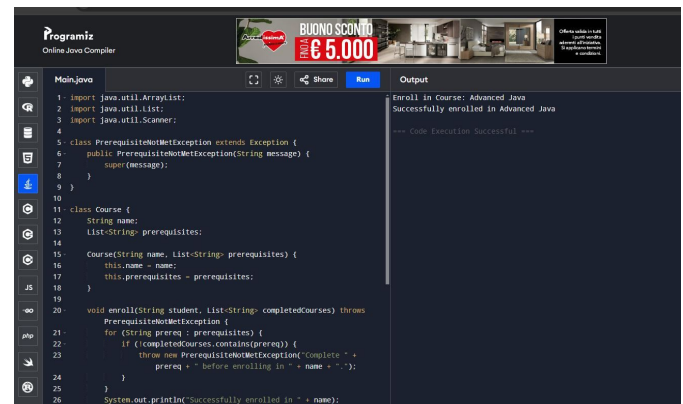


```

1- import java.util.Scanner;
2
3- public class Main {
4-     public static void main(String[] args) {
5-         Scanner scanner = new Scanner(System.in);
6-         int correctPin = 1234;
7-         double balance = 3000.0;
8
9-         System.out.print("Enter PIN: ");
10-        int enteredPin = scanner.nextInt();
11
12-        try {
13-            if (enteredPin != correctPin) {
14-                throw new Exception("Invalid PIN.");
15-            }
16-
17-            System.out.print("Withdraw Amount: ");
18-            double withdrawAmount = scanner.nextDouble();
19
20-            if (withdrawAmount > balance) {
21-                throw new Exception("Insufficient balance.");
22-            }
23
24-            balance -= withdrawAmount;
25-            System.out.println("Withdrawal successful. Remaining Balance
: " + balance);
26-        } catch (Exception e) {
27-            System.out.println("Error: " + e.getMessage() + ". Current
  
```

Output: Enter PIN: 1234
Withdraw Amount: 200
Withdrawal successful. Remaining Balance: 2800.0
--- Code Execution Successful ---

(b)



```

1- import java.util.ArrayList;
2- import java.util.List;
3- import java.util.Scanner;
4
5- class PrerequisiteNotMetException extends Exception {
6-     public PrerequisiteNotMetException(String message) {
7-         super(message);
8-     }
9- }
10
11- class Course {
12-     String name;
13-     List<String> prerequisites;
14
15-     Course(String name, List<String> prerequisites) {
16-         this.name = name;
17-         this.prerequisites = prerequisites;
18-     }
19
20-     void enroll(String student, List<String> completedCourses) throws
PrerequisiteNotMetException {
21-         for (String prereq : prerequisites) {
22-             if (!completedCourses.contains(prereq)) {
23-                 throw new PrerequisiteNotMetException("Complete " +
prereq + " before enrolling in " + name + ".");
24-             }
25-         }
26-         System.out.println("Successfully enrolled in " + name);
  
```

Output: Enroll in Course: Advanced Java
Successfully enrolled in Advanced Java
--- Code Execution Successful ---

(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.