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SECTION : 607-A

//Problem 1: Square Root Calculation (Easy Level)

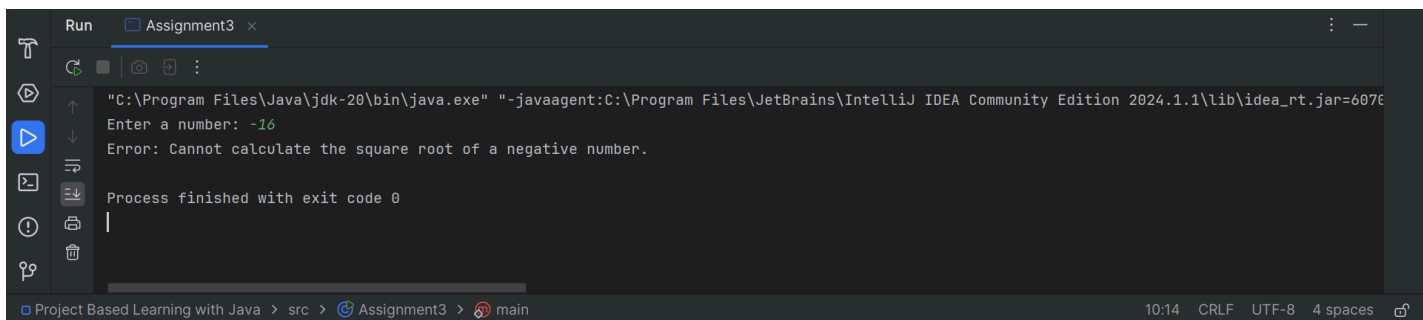
```
import java.util.Scanner;

public class SquareRootCalculator {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter a number: ");

        try {
            double number = Double.parseDouble(scanner.nextLine());

            if (number < 0) {
                throw new IllegalArgumentException("Error: Cannot calculate the square
root of a negative number.");
            }

            double result = Math.sqrt(number);
            System.out.println("Square Root: " + result);
        } catch (NumberFormatException e) {
            System.out.println("Error: Invalid input. Please enter a numeric value.");
        } catch (IllegalArgumentException e) {
            System.out.println(e.getMessage());
        } finally {
            scanner.close();
        }
    }
}
```



```
Run Assignment3 x
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2024.1.1\lib\idea_rt.jar=6076
Enter a number: -16
Error: Cannot calculate the square root of a negative number.

Process finished with exit code 0
```

Project Based Learning with Java > src > Assignment3 > main 10:14 CRLF UTF-8 4 spaces

Problem 2: ATM Withdrawal System (Medium Level)

```
import java.util.Scanner;

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

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

class ATM {
    private final int correctPin = 1234;
    private double balance = 3000;

    public void withdraw(int pin, double amount) throws InvalidPINException,
    InsufficientBalanceException {
        if (pin != correctPin) {
            throw new InvalidPINException("Error: Invalid PIN.");
        }
        if (amount > balance) {
            throw new InsufficientBalanceException("Error: Insufficient balance.");
        }
        balance -= amount;
        System.out.println("Withdrawal successful! Current Balance: " + balance);
    }

    public void displayBalance() {
        System.out.println("Current Balance: " + balance);
    }
}

public class ATMSystem {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        ATM atm = new ATM();

        try {
            System.out.print("Enter PIN: ");
```

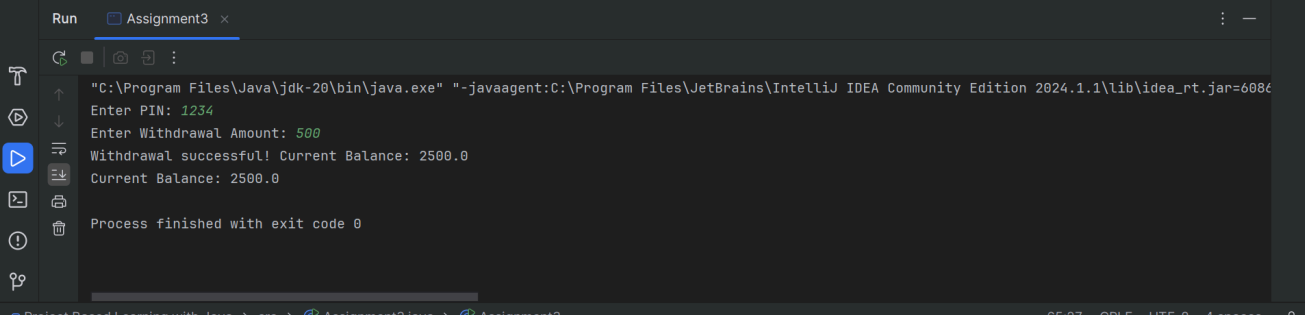
```

        int pin = scanner.nextInt();

        System.out.print("Enter Withdrawal Amount: ");
        double amount = scanner.nextDouble();

        atm.withdraw(pin, amount);
    } catch (InvalidPINException | InsufficientBalanceException e) {
        System.out.println(e.getMessage());
    } catch (Exception e) {
        System.out.println("Error: Invalid input.");
    } finally {
        atm.displayBalance();
        scanner.close();
    }
}
}
}

```



```

Run Assignment3 x
"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2024.1.1\lib\idea_rt.jar=6086...
Enter PIN: 1234
Enter Withdrawal Amount: 500
Withdrawal successful! Current Balance: 2500.0
Current Balance: 2500.0

Process finished with exit code 0

```

//Problem 3: University Enrollment System (Hard Level)

```

import java.util.HashMap;
import java.util.Map;
import java.util.Scanner;

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

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

```

```
}
```

```
class University {  
    private final Map<String, Integer> courses = new HashMap<>();  
    private final Map<String, String> prerequisites = new HashMap<>();  
    private final Map<String, Boolean> completedCourses = new HashMap<>();  
  
    public University() {  
        courses.put("Advanced Java", 2);  
        courses.put("Data Structures", 3);  
        courses.put("Algorithms", 2);  
  
        prerequisites.put("Advanced Java", "Core Java");  
    }  
  
    public void completeCourse(String course) {  
        completedCourses.put(course, true);  
    }  
  
    public void enroll(String course) throws CourseFullException,  
    PrerequisiteNotMetException {  
        if (!courses.containsKey(course)) {  
            throw new IllegalArgumentException("Error: Course not found.");  
        }  
  
        if (prerequisites.containsKey(course)) {  
            String prerequisite = prerequisites.get(course);  
            if (!completedCourses.getOrDefault(prerequisite, false)) {  
                throw new PrerequisiteNotMetException("Error: Complete " + prerequisite  
+ " before enrolling in " + course + ".");  
            }  
        }  
  
        if (courses.get(course) == 0) {  
            throw new CourseFullException("Error: " + course + " is full.");  
        }  
  
        courses.put(course, courses.get(course) - 1);  
        System.out.println("Enrollment successful in " + course + "!");  
    }  
}
```

```
public class Assignment3 {  
    public static void main(String[] args) {
```

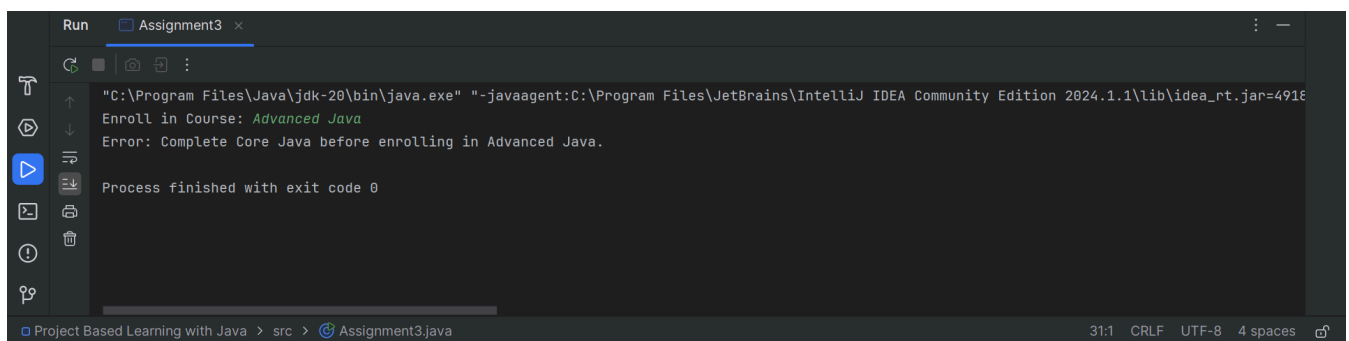
```

Scanner scanner = new Scanner(System.in);
University university = new University();

try {
    System.out.print("Enroll in Course: ");
    String course = scanner.nextLine();

    university.enroll(course);
} catch (CourseFullException | PrerequisiteNotMetException e) {
    System.out.println(e.getMessage());
} catch (Exception e) {
    System.out.println("Error: Invalid input.");
} finally {
    scanner.close();
}
}
}

```



The screenshot shows the Run console in IntelliJ IDEA for a project named 'Assignment3'. The console output is as follows:

```

"C:\Program Files\Java\jdk-20\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2024.1.1\lib\idea_rt.jar=4918
Enroll in Course: Advanced Java
Error: Complete Core Java before enrolling in Advanced Java.
Process finished with exit code 0

```

The status bar at the bottom indicates the file path 'Project Based Learning with Java > src > Assignment3.java' and the encoding '31:1 CRLF UTF-8 4 spaces'.