

# DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

## Experiment 3

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**Branch: BE-CSE**

**Semester: 6<sup>th</sup>**

**Subject Name: Project Based Learning  
in Java with Lab**

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**Section/Group: IOT-636/A**

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**Subject Code: 22CSH-359**

1. **Aim: a)** Write a Java program to calculate the square root of a number entered by the user. Use try-catch to handle invalid inputs (e.g., negative numbers or non-numeric values).  
  
**b.)** Write a Java program to simulate an ATM withdrawal system. The program should:  
Ask the user to enter their PIN.  
Allow withdrawal if the PIN is correct and the balance is sufficient.  
Throw exceptions for invalid PIN or insufficient balance.  
Ensure the system always shows the remaining balance, even if an exception occurs

## 2. **Implementation/Code:**

**a.) import**

`java.util.Scanner;`

`public class`

`SquareRootCalculator {`

`public static void`

`main(String[] args) {`

`Scanner scanner = new`

`Scanner(System.in);`

`try {`

`System.out.print("Enter  
a number: ");`

`double number =  
scanner.nextDouble();`

`if (number < 0) {`

`throw new  
IllegalArgumentException("  
Square root of a negative  
number is not valid.");  
        }`

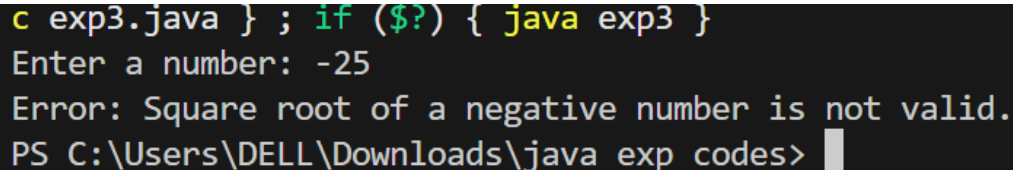
`double squareRoot =  
Math.sqrt(number);`

`System.out.println("Square  
root: " + squareRoot);  
    } catch`

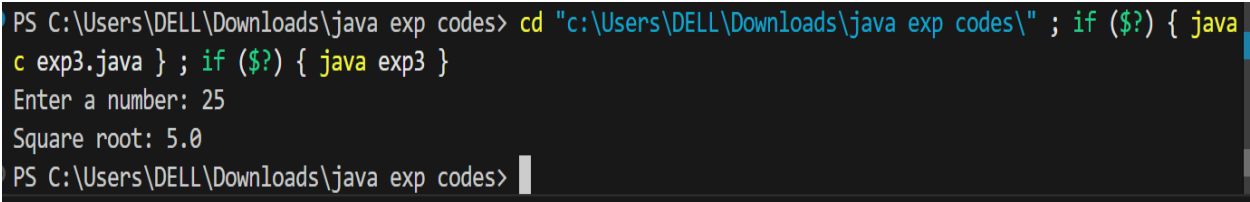
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```
(IllegalArgumentException  
e) {  
  
    System.out.println("Error: "  
+ e.getMessage());  
    } catch (Exception e) {  
  
    System.out.println("Invalid  
input! Please enter a valid  
number.");  
    } finally {  
        scanner.close();  
    }  
}  
}
```

## 3.Output



```
c exp3.java } ; if ($?) { java exp3 }  
Enter a number: -25  
Error: Square root of a negative number is not valid.  
PS C:\Users\DELL\Downloads\java exp codes>
```



```
PS C:\Users\DELL\Downloads\java exp codes> cd "c:\Users\DELL\Downloads\java exp codes\" ; if ($?) { java  
c exp3.java } ; if ($?) { java exp3 }  
Enter a number: 25  
Square root: 5.0  
PS C:\Users\DELL\Downloads\java exp codes>
```

## 4.Code :b)

```
import java.util.Scanner;  
  
public class ATM {  
    private static final int  
        CORRECT_PIN = 1234; //  
        Predefined PIN  
    private static double balance  
        = 5000.0; // Initial  
        balance  
  
    public static void  
        main(String[] args) {  
        Scanner scanner = new  
        Scanner(System.in);  
  
        try {
```

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```
        System.out.print("Enter
your PIN: ");
        int enteredPin =
scanner.nextInt();

        if (enteredPin !=
CORRECT_PIN) {
            throw new
SecurityException("Invalid
PIN! Access denied.");
        }

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

        if (amount > balance) {
            throw new
IllegalArgumentException("
Insufficient balance!");
        }

        balance -= amount;
        System.out.println("Wit
hdrawal successful!
Amount withdrawn: " +
amount);
    } catch (SecurityException
e) {
        System.out.println("Erro
r: " + e.getMessage());
    } catch
(IllegalArgumentException
e) {
        System.out.println("Erro
r: " + e.getMessage());
    } catch (Exception e) {
        System.out.println("Inva
lid input! Please enter a
valid number.");
    } finally {
        System.out.println("Re
maining balance: " +
balance);
        scanner.close();
    }
}
}
```

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## 3b)Output

```
PS C:\Users\DELL\Downloads\java exp codes> cd "c:\Users\DELL\Downloads\java exp codes\" ; if ($?) { j
c ATM.java } ; if ($?) { java ATM }
Enter your PIN: 1234
Enter withdrawal amount: 250
Withdrawal successful! Amount withdrawn: 250.0
Remaining balance: 4750.0
```

```
PS C:\Users\DELL\Downloads\java exp codes> cd "c:\Users\DELL\Downloads\java exp codes\" ; if ($?) { j
c ATM.java } ; if ($?) { java ATM }
Enter your PIN: 4587
Error: Invalid PIN! Access denied.
Remaining balance: 5000.0
```

## Learning Outcomes:

1. **Exception Handling** – Learn to use try-catch to handle invalid inputs, incorrect PINs, and insufficient balance errors.
2. **User Input & Validation** – Understand how to take user input, check for correct data types, and prevent negative or invalid entries.
3. **Mathematical & Financial Operations** – Perform square root calculations and simulate ATM withdrawals with balance checks.
4. **Security & Authentication** – Implement basic security by validating user PINs and handling authentication failures.
5. **Resource Management** – Use the finally block to ensure important actions, like displaying the remaining balance, always execute