

# Rajalakshmi Engineering College

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## 2024\_28\_III\_OOPS Using Java Lab

### REC\_2028\_OOPS using Java\_Week 8\_PAH

Attempt : 1  
Total Mark : 40  
Marks Obtained : 40

#### **Section 1 : Coding**

##### **1. Problem Statement**

Daniel is developing a program to verify the age of users. He wants to ensure that the entered age is within a valid range. Write a program to help Daniel implement this age-checking feature using custom exceptions.

Daniel needs a program that takes an integer input representing a person's age. If the age is between 0 and 150 (inclusive), the program should print "Age is valid!". If the age is less than 0 or greater than 150, the program should throw a custom exception (InvalidAgeException) with the message "Invalid age. Please enter an age between 0 and 150."

Implement a custom exception, InvalidAgeException, to handle cases where the entered age does not meet the specified criteria.

***Input Format***

The input consists of an integer value 'n', representing the age.

### ***Output Format***

The output is displayed in the following format:

If the age is valid (between 0 and 150, inclusive), print

"Age is valid!".

If the age is invalid, print

"Error: Invalid age. Please enter an age between 0 and 150."

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 45

Output: Age is valid!

### ***Answer***

```
import java.util.Scanner;
class AgeChecker {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        try {
            int age = scanner.nextInt();
            checkAge(age);
            System.out.println("Age is valid!");
        } catch (InvalidAgeException | java.util.InputMismatchException e) {
            System.out.println("Error: " + e.getMessage());
        } finally {
            scanner.close();
        }
    }
}
```

```
private static void checkAge(int age) throws InvalidAgeException {
    if (age < 0 || age > 150) {
        throw new InvalidAgeException("Invalid age. Please enter an age between
0 and 150.");
```

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

**Status :** Correct

**Marks :** 10/10

## 2. Problem Statement

An HR software system is being developed to process employee payrolls. During payroll processing, the system must ensure that no employee has a negative salary and that no employee's salary exceeds 2,00,000. If either condition occurs, the system should throw a custom exception.

Create a custom exception `InvalidSalaryException` and a class `Employee` that processes salary according to the following rules:

If `salary < 0`, throw `InvalidSalaryException` with the message: "Salary cannot be negative". If `salary > 200000`, throw `InvalidSalaryException` with the message: "Salary exceeds threshold limit". Otherwise, display: "Salary processed successfully for <empName>: <salary>".

The payroll processing should always display: "Payroll process completed" at the end, regardless of whether an exception occurs.

### ***Input Format***

The first line of input contains an integer representing the employee ID.

The second line contains a string representing the employee's name.

The third line contains a floating-point number representing the salary of the employee.

### ***Output Format***

If the salary is valid: "Salary processed successfully for <empName>: <salary>"

"Payroll process completed"

If the salary is invalid: "<Exception Message>"

"Payroll process completed"

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: 101

Rahul

150000.0

Output: Salary processed successfully for Rahul: 150000.0

Payroll process completed

### **Answer**

```
import java.util.Scanner;

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

class Employee {
    int empId;
    String empName;
    double salary;

    public Employee(int empId, String empName, double salary) {
        this.empId = empId;
        this.empName = empName;
        this.salary = salary;
    }

    public void processSalary() throws InvalidSalaryException {
        if (salary < 0) {
            throw new InvalidSalaryException("Salary cannot be negative");
        }
    }
}
```

```

        if (salary > 200000) {
            throw new InvalidSalaryException("Salary exceeds threshold limit");
        }
        System.out.println("Salary processed successfully for " + empName + ":" + salary);
    }
}

class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        try {
            int empId = scanner.nextInt();
            scanner.nextLine();
            String empName = scanner.nextLine();
            double salary = scanner.nextDouble();
            Employee employee = new Employee(empId, empName, salary);
            try {
                employee.processSalary();
            } catch (InvalidSalaryException e) {
                System.out.println(e.getMessage());
            }
        } finally {
            System.out.println("Payroll process completed");
            scanner.close();
        }
    }
}

```

**Status : Correct**

**Marks : 10/10**

### 3. Problem Statement

Enigma is developing a simple web application that takes a user-input URL, validates it, and throws a custom exception `InvalidURLException` if the URL does not start with "http://" or "https://".

The main method prompts the user for input, validates the URL, and prints whether it is valid or not.

### ***Input Format***

The input consists of a string, representing the URL entered by the user.

### ***Output Format***

The output displays one of the following results:

If the entered URL is valid according to the specified format, the program prints:

"[URL] is a valid URL"

If the entered URL is not valid according to the specified format, the program prints:

"Invalid URL format: [URL]"

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: http://www.example.com

Output: http://www.example.com is a valid URL

### ***Answer***

```
import java.util.Scanner;
class WebApplication {
    public static void main(String[] args) {
        String userInputURL = getUserInputURL();
        try {
            validateURL(userInputURL);
            System.out.println(userInputURL+" is a valid URL");
        } catch (InvalidURLException e) {
            System.out.println(e.getMessage()+userInputURL);
        }
    }
    private static String getUserInputURL() {
```

```
Scanner scanner = new Scanner(System.in);
    return scanner.nextLine();
}

private static void validateURL(String url) throws InvalidURLException {
    if (!(url.startsWith("http://") || url.startsWith("https://"))) {
        throw new InvalidURLException("Invalid URL format: ");
    }
}

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

**Status :** Correct

**Marks :** 10/10

#### 4. Problem Statement

You are tasked to create a program that defines a custom exception `GradeException`. The program should include a `Student` class with fields for the student's name, age, and grade. Implement a method in the `Student` class that checks the grade, and if the grade is below 40, it should throw a `GradeException`. Otherwise, it should display the student's details.

##### ***Input Format***

The input consists of three parameters in separate lines:

1. A string representing the student's name.
2. An integer representing the student's age.
3. An integer representing the student's grade.

##### ***Output Format***

The output will display the student's details if the grade is valid.

If the grade is below 40, the program will display an error message "Grade is below 40".

Refer to the sample output for formatting specifications.

### **Sample Test Case**

Input: Alice  
20  
85

Output: Name: Alice  
Age: 20  
Grade: 85

### **Answer**

```
import java.util.Scanner;
class GradeException extends Exception {
    GradeException(String message) {
        System.out.println(message);
    }
}

class Student {
    String name;
    int age;
    int grade;

    Student(String studentName, int studentAge, int studentGrade) {
        name = studentName;
        age = studentAge;
        grade = studentGrade;
    }

    void validateGrade() throws GradeException {
        if (grade < 40) {
            throw new GradeException("Grade is below 40");
        }
    }

    void displayDetails() {
        System.out.println("Name: " + name);
        System.out.println("Age: " + age);
        System.out.println("Grade: " + grade);
    }
}
```

```
}

public class Main {
    public static void main(String[] args) {
        try {
            java.util.Scanner scanner = new java.util.Scanner(System.in);
            String studentName = scanner.nextLine();
            int studentAge = scanner.nextInt();
            int studentGrade = scanner.nextInt();
            Student student = new Student(studentName, studentAge, studentGrade);
            student.validateGrade();
            student.displayDetails();
            scanner.close();
        } catch (GradeException e) {
        }
    }
}
```

**Status :** Correct

**Marks :** 10/10