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2024_28_III_OOPS Using Java Lab

REC_2028_OOPS using Java_Week 8_CY

Attempt : 1
Total Mark : 40
Marks Obtained : 40

Section 1 : Coding

1. Problem Statement

Tim was tasked with creating a user profile system that validates the user's date of birth input. The system should throw a custom exception, InvalidDateOfBirthException, if the date is not in the specified format "dd-mm-yyyy" or if it represents an invalid calendar date.

The main method takes user input, validates the date of birth, and prints whether it is valid or not.

Input Format

The input consists of a string, representing the date of birth of the user.

Output Format

The output displays one of the following results:

If the entered date of birth is valid according to the specified format, the program prints:

"[Date] is a valid date of birth"

If the entered date of birth is not valid according to the specified format, the program prints:

"Invalid date: [Date]"

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 01-01-2000

Output: 01-01-2000 is a valid date of birth

Answer

```
import java.util.Scanner;
import java.text.SimpleDateFormat;
import java.text.ParseException;

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

public class Main {
    public static void validateDOB(String dob) throws InvalidDateOfBirthException
{
        SimpleDateFormat sdf = new SimpleDateFormat("dd-MM-yyyy");
        sdf.setLenient(false);  // Strict parsing to validate date correctness

        try {
            sdf.parse(dob);
        } catch (ParseException e) {
            throw new InvalidDateOfBirthException("Invalid date: " + dob);
        }
```

```
    }

    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        String dob = sc.nextLine();
        sc.close();

        try {
            validateDOB(dob);
            System.out.print(dob + " is a valid date of birth ");
        } catch (InvalidDateOfBirthException e) {
            System.out.print("Invalid date: " + dob + " ");
        }
    }
}
```

Status : Correct **Marks : 10/10**

2. Problem Statement

Alice is designing a program that requires users to enter positive numbers. She wants to implement a solution that validates whether the entered number is positive. In case the input is not a positive number, she wants to throw a custom exception.

The number should be a positive integer.If this condition is violated, the program should throw a custom exception:InvalidPositiveNumberException with the message "Invalid input. Please enter a positive integer."

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

Input Format

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

Output Format

The output is displayed in the following format:

If the validation passes, print

"Number {number} is positive."

The {number} represents the entered positive integer.

If the entered number is negative then it displays

"Error: Invalid input. Please enter a positive integer."

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 100
Output: Number 100 is positive.

Answer

```
import java.util.Scanner;

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

public class Main {
    public static void validatePositiveNumber(int n) throws
InvalidPositiveNumberException {
        if (n <= 0) {
            throw new InvalidPositiveNumberException("Invalid input. Please enter a
positive integer.");
        }
    }

    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        sc.close();
```

```
        try {
            validatePositiveNumber(n);
            System.out.print("Number " + n + " is positive. ");
        } catch (InvalidPositiveNumberException e) {
            System.out.print("Error: " + e.getMessage() + " ");
        }
    }
}
```

Status : Correct **Marks : 10/10**

3. Problem Statement

Faustus is managing his bank account and wants to create a program to update his account balance based on certain conditions. However, he needs to handle specific scenarios related to invalid inputs and insufficient balances. Faustus wants to update his account balance. He inputs the current balance and the amount to be updated.

The initial account balance should be positive. If Faustus enters a negative initial balance, the program should throw an InvalidAmountException with the message "Invalid amount. Please enter a positive initial balance."If the amount to be updated is negative, the program should check if the subtraction results in a negative balance. If so, it should throw an InsufficientBalanceException with the message "Insufficient balance."If the amount to be updated is positive, it should be added to the current balance, and the new balance should be printed.

Implement a custom exception, InvalidAmountException, and InsufficientBalanceException, to manage his bank account.

Input Format

The first line of input consists of a double value 'd', representing the initial account balance.

The second line of input consists of a double value 'd1', representing the amount to be updated.

Output Format

The output is displayed in the following format:

If the validation passes, print

"Account balance updated successfully! New balance: {new_balance}"

where {new_balance} is the updated account balance.

If the initial bank amount is negative it displays

"Error: Invalid amount. Please enter a positive initial balance."

If the updated amount exceeds the initial account balance in withdrawal it displays

"Error: Insufficient balance."

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 1000
500
Output: Account balance updated successfully! New balance: 1500.0

Answer

```
import java.util.Scanner;

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

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

```
public class Main {
    public static double updateBalance(double balance, double updateAmount)
throws InvalidAmountException, InsufficientBalanceException {
        if (balance < 0) {
            throw new InvalidAmountException("Invalid amount. Please enter a
positive initial balance.");
        }
        if (updateAmount < 0) {
            if (balance + updateAmount < 0) {
                throw new InsufficientBalanceException("Insufficient balance.");
            } else {
                balance += updateAmount; // subtracting because updateAmount is
negative
            }
        } else {
            balance += updateAmount;
        }
        return balance;
    }

    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        double balance = sc.nextDouble();
        double updateAmount = sc.nextDouble();
        sc.close();

        try {
            double newBalance = updateBalance(balance, updateAmount);
            System.out.print("Account balance updated successfully! New balance: "
+ newBalance + " ");
        } catch (InvalidAmountException e) {
            System.out.print("Error: " + e.getMessage() + " ");
        } catch (InsufficientBalanceException e) {
            System.out.print("Error: " + e.getMessage() + " ");
        }
    }
}
```

Status : Correct **Marks : 10/10**

4. Problem Statement

Hemanth is designing a banking system for XYZ Bank. The system should allow customers to perform deposit, withdrawal, and balance inquiry operations. Implement exception handling for scenarios involving invalid transaction amounts or insufficient funds.

Create two custom exception classes, InvalidAmountException and InsufficientFundsException, both extending the Exception class.Throw an InvalidAmountException with a message if the deposit amount is less than or equal to zero.Throw an InsufficientFundsException if the withdrawal amount is greater than the available balance.Deduct the withdrawal amount from the balance if the withdrawal is successful.

Assist Hemanth in designing the program.

Input Format

The first line of input consists of a double value B, representing the initial balance.

The second line consists of a double value D, representing the deposit amount.

The third line consists of a double value W, representing the withdrawal amount.

Output Format

If the withdrawal is successful, print the amount withdrawn and the current balance, rounded off to one decimal place.

If an InvalidAmountException occurs, print "Error: [D] is not valid".

If an InsufficientFundsException occurs, print "Error: Insufficient funds".

Refer to the sample output for formatting specifications.

Sample Test Case

Input: 1050.1
270.2
150.3
Output: Amount Withdrawn: 150.3

Current Balance: 1170.0

Answer

```
import java.util.Scanner;

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

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

public class Main {
    public static double deposit(double balance, double amount) throws
InvalidAmountException {
        if (amount <= 0) {
            throw new InvalidAmountException(amount + " is not valid");
        }
        return balance + amount;
    }

    public static double withdraw(double balance, double amount) throws
InsufficientFundsException {
        if (amount > balance) {
            throw new InsufficientFundsException("Insufficient funds");
        }
        return balance - amount;
    }

    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        double balance = sc.nextDouble();
        double depositAmount = sc.nextDouble();
        double withdrawalAmount = sc.nextDouble();
        sc.close();

        try {
```

```
            balance = deposit(balance, depositAmount);
            balance = withdraw(balance, withdrawalAmount);
            System.out.printf("Amount Withdrawn: %.1f Current Balance: %.1f ",
withdrawalAmount, balance);
        } catch (InvalidAmountException e) {
            System.out.print("Error: " + e.getMessage() + " ");
        } catch (InsufficientFundsException e) {
            System.out.print("Error: " + e.getMessage() + " ");
        }
    }
}
```

Status : Correct ***Marks : 10/10***