PL/SQL Practical: Library Fine Management System

Objective:
Create an unnamed PL/SQL code block using control structures and exception handling to manage book returns in a library system. The system calculates fines based on the number of overdue days and updates the borrower and fine records accordingly.

```
-- Step 1: Create Borrower table
CREATE TABLE Borrower (
  Roll_no NUMBER PRIMARY KEY,
  Name VARCHAR2(50),
  DateofIssue DATE,
  NameofBook VARCHAR2(100),
  Status CHAR(1)
);

-- Step 2: Create Fine table
CREATE TABLE Fine (
  Fine_id NUMBER GENERATED BY DEFAULT ON NULL AS IDENTITY PRIMARY KEY,
  Roll_no NUMBER,
  Fine_Date DATE,
  Amt NUMBER(10,2),
  CONSTRAINT fk_fine_borrower FOREIGN KEY (Roll_no) REFERENCES Borrower(Roll_no)
);

-- Step 3: Insert sample data into Borrower table
INSERT INTO Borrower (Roll_no, Name, DateofIssue, NameofBook, Status)
VALUES (1, 'Himanshu', TRUNC(SYSDATE) - 20, 'Data Structures', 'I');

INSERT INTO Borrower (Roll_no, Name, DateofIssue, NameofBook, Status)
VALUES (2, 'Ram', TRUNC(SYSDATE) - 35, 'Operating Systems', 'I');

-- Step 4: Unnamed PL/SQL Block with Control Structure and Exception Handling
SET SERVEROUTPUT ON;

DECLARE
  v_roll_no Borrower.Roll_no%TYPE := &Enter_Roll_No;
  v_book_name Borrower.NameofBook%TYPE := '&Enter_Book_Name';
  v_date_of_issue Borrower.DateofIssue%TYPE;
  v_days NUMBER;
  v_fine_amt NUMBER := 0;
  e_not_found EXCEPTION;

BEGIN
  -- Fetch Date of Issue
  SELECT DateofIssue INTO v_date_of_issue
  FROM Borrower
  WHERE Roll_no = v_roll_no AND NameofBook = v_book_name AND Status = 'I';

  v_days := TRUNC(SYSDATE - v_date_of_issue);

  -- Calculate Fine based on days
  IF v_days BETWEEN 15 AND 30 THEN
    v_fine_amt := v_days * 5;
  ELSIF v_days > 30 THEN
    v_fine_amt := v_days * 50;
  ELSE
    v_fine_amt := 0;
  END IF;

  -- Update Status
  UPDATE Borrower
  SET Status = 'R'
  WHERE Roll_no = v_roll_no AND NameofBook = v_book_name;

  -- Insert Fine details if applicable
  IF v_fine_amt > 0 THEN
    INSERT INTO Fine (Roll_no, Fine_Date, Amt)
    VALUES (v_roll_no, TRUNC(SYSDATE), v_fine_amt);
```

```
  END IF;

  DBMS_OUTPUT.PUT_LINE('Book Returned Successfully!');
  DBMS_OUTPUT.PUT_LINE('Days: ' || v_days || ', Fine: ' || v_fine_amt);

EXCEPTION
  WHEN NO_DATA_FOUND THEN
    DBMS_OUTPUT.PUT_LINE('No record found for the given Roll Number and Book Name!');
  WHEN e_not_found THEN
    DBMS_OUTPUT.PUT_LINE('Borrower record not found.');
  WHEN OTHERS THEN
    DBMS_OUTPUT.PUT_LINE('An unexpected error occurred: ' || SQLERRM);
END;
/

-- Step 5: Verify Results
SELECT * FROM Borrower;
SELECT * FROM Fine;
```

Explanation:

1. Borrower table stores issued books.
2. Fine table stores calculated fines with roll number and date.
3. The PL/SQL block calculates fine based on days between issue and return date.
4. Control structures (IF-ELSIF) decide fine logic.
5. Exception handling manages missing records or other runtime errors.
6. Status changes from 'I' (Issued) to 'R' (Returned).