# Oracle9*i*: Develop PL/SQL Program Units

**Student Guide • Volume 2**

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# Contents

# Additional Practices

## Additional Practices Overview

These additional practices are provided as a supplement to the course *Develop PL/SQL Program Units*. In these practices, you apply the concepts that you learned in *Develop PL/SQL Program Units*.

The additional practices comprise of two parts:

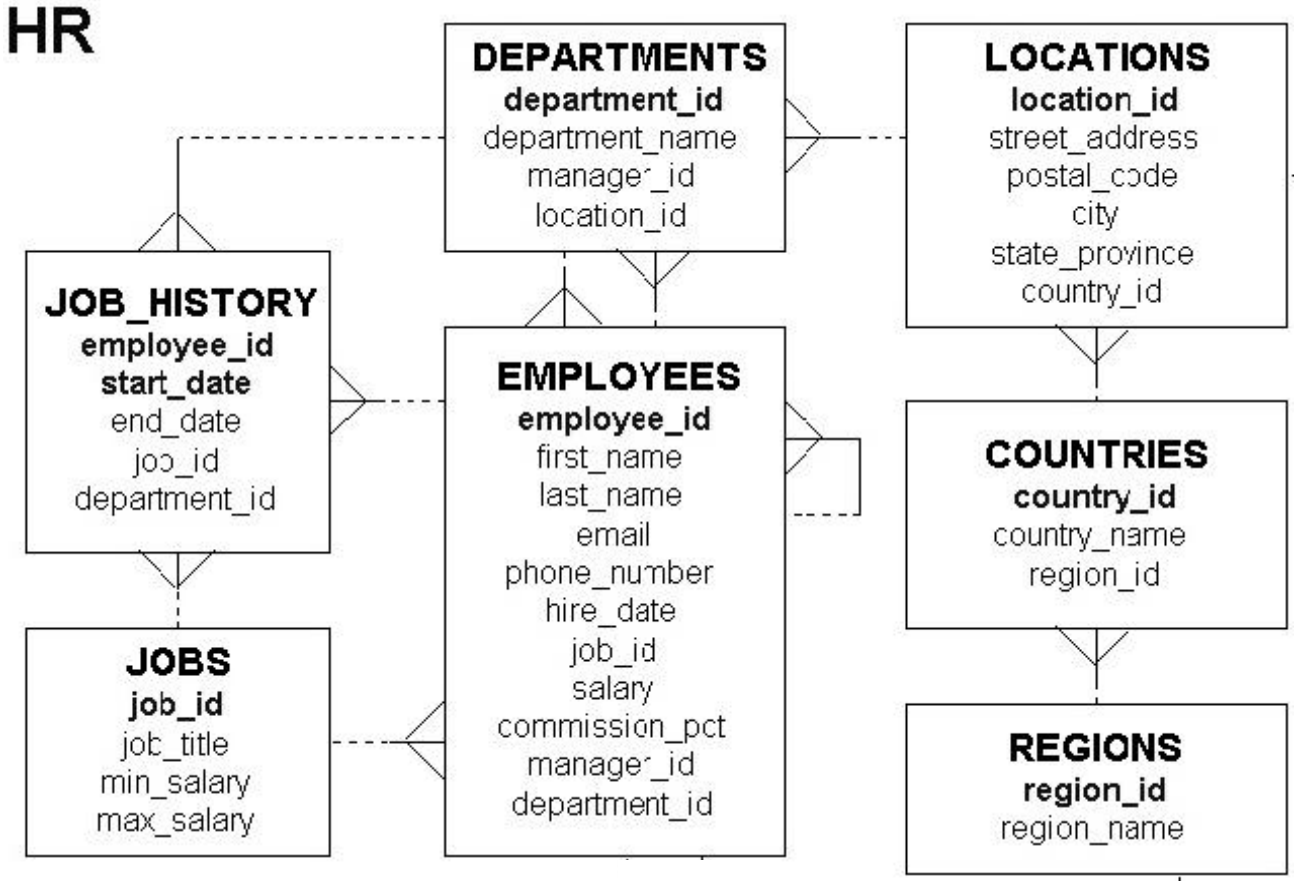
Part A provides supplemental practice to create stored procedures, functions, packages, and triggers, and to use the Oracle-supplied packages with *i*SQL*Plus as the development environment. The tables used in this portion of the additional practices include `EMPLOYEES`, `JOBS`, `JOB_HISTORY`, and `DEPARTMENTS`.

Part B is a case study which can be completed at the end of the course. This part supplements the practices for creating and managing program units. The tables used in the case study are based on a video database and contain the `TITLE`, `TITLE_COPY`, `RENTAL`, `RESERVATION`, and `MEMBER` tables.

An entity relationship diagram is provided at the start of part A and part B. Each entity relationship diagram displays the table entities and their relationships. More detailed definitions of the tables and the data contained in each of the tables is provided in the appendix *Additional Practices: Table Descriptions and Data*.

**Part A**: **Entity Relationship Diagram**

**Human Resources**



## Part A

**Note: These exercises can be used for extra practice when discussing how to create procedures.**

1. In this practice, create a program to add a new job into the JOBS table.
   a. Create a stored procedure called ADD_JOBS to enter a new order into the JOBS table.

      The procedure should accept three parameters. The first and second parameters supplies a job ID and a job title. The third parameter supplies the minimum salary. Use the maximum salary for the new job as twice the minimum salary supplied for the job ID.

   b. Disable the trigger SECURE_DML before invoking the procedure. Invoke the procedure to add a new job with job ID SY_ANAL, job title System Analyst, and minimum salary of 6,000.

   c. Verify that a row was added and remember the new job ID for use in the next exercise.

      Commit the changes.

| JOB_ID | JOB_TITLE | MIN_SALARY | MAX_SALARY |
|---|---|---|---|
| SY_ANAL | System Analyst | 6000 | 12000 |

2. In this practice, create a program to add a new row to the JOB_HISTORY table for an existing employee.

**Note:** Disable all triggers on the EMPLOYEES, JOBS, and JOB_HISTORY tables before invoking the procedure in part b. Enable all these triggers after executing the procedure.

   a. Create a stored procedure called ADD_JOB_HIST to enter a new row into the JOB_HISTORY table for an employee who is changing his job to the new job ID that you created in question 1b.

      Use the employee ID of the employee who is changing the job and the new job ID for the employee as parameters. Obtain the row corresponding to this employee ID from the EMPLOYEES table and insert it into the JOB_HISTORY table. Make hire date of this employee as the start date and today's date as end date for this row in the JOB_HISTORY table.

      Change the hire date of this employee in the EMPLOYEES table to today's date. Update the job ID of this employee to the job ID passed as parameter (Use the job ID of the job created in question 1b) and salary equal to minimum salary for that job ID + 500.

      Include exception handling to handle an attempt to insert a nonexistent employee.

   b. Disable triggers (Refer to the note at the beginning of this question.)

      Execute the procedure with employee ID 106 and job ID SY_ANAL as parameters.

      Enable the triggers that you disabled.

   c. Query the tables to view your changes, and then commit the changes.

| EMPLOYEE_ID | START_DAT | END_DATE | JOB_ID | DEPARTMENT_ID |
|---|---|---|---|---|
| 106 | 05-FEB-98 | 04-MAY-01 | IT_PROG | 60 |

| JOB_ID | SALARY |
|---|---|
| SY_ANAL | 6500 |

## Part A

3. In this practice, create a program to update the minimum and maximum salaries for a job in the JOBS table.
   a. Create a stored procedure called UPD_SAL to update the minimum and maximum salaries for a specific job ID in the JOBS table.

      Pass three parameters to the procedure: the job ID, a new minimum salary, and a new maximum salary for the job. Add exception handling to account for an invalid job ID in the JOBS table. Also, raise an exception if the maximum salary supplied is less than the minimum salary. Provide an appropriate message that will be displayed if the row in the JOBS table is locked and cannot be changed.

   b. Execute the procedure. You can use the following data to test your procedure:

```
EXECUTE upd_sal ('SY_ANAL',7000,140)
EXECUTE upd_sal ('SY_ANAL',7000,14000)
```

```
ERROR ... MAX SAL SHOULD BE > MIN SAL
BEGIN upd_sal ('SY_ANAL', 7000, 140); END;
*
ERROR at line 1:
ORA-20001: Data error..Max salary should be more than min salary
ORA-06512: at "SH9.UPD_SAL", line 32
ORA-06512: at line 1
```

```
PL/SQL procedure successfully completed.
```

   c. Query the JOBS table to view your changes, and then commit the changes.

| JOB_ID | JOB_TITLE | MIN_SALARY | MAX_SALARY |
|---|---|---|---|
| SY_ANAL | System Analyst | 7000 | 14000 |

```
Commit complete.
```

## Part A

4. In this practice, create a procedure to monitor whether employees have exceeded their average salary limits.

   a. Add a column to the EMPLOYEES table by executing the following command: (labaddA_4.sql)

   ```
   ALTER TABLE employees
    ADD (sal_limit_indicate  VARCHAR2(3) DEFAULT 'NO'
         CONSTRAINT emp_sallimit_ck CHECK
        (sal_limit_indicate IN ('YES', 'NO')));
   ```

   b. Write a stored procedure called CHECK_AVG_SAL. This checks each employee's average salary limit from the JOBS table against the salary that this employee has in the EMPLOYEES table and updates the SAL_LIMIT_INDICATE column in the EMPLOYEES table when this employee has exceeded his or her average salary limit.

   Create a cursor to hold employee IDs, salaries, and their average salary limit. Find the average salary limit possible for an employee's job from the JOBS table. Compare the average salary limit possible for each employee to exact salaries and if the salary is more than the average salary limit, set the employee's SAL_LIMIT_INDICATE column to YES; otherwise, set it to NO. Add exception handling to account for a record being locked.

## Part A

c. Execute the procedure, and then test the results.

Query the EMPLOYEES table to view your modifications, and then commit the changes.

| JOB_ID | MIN_SALARY | SALARY | MAX_SALARY |
|---|---|---|---|
| SY_ANAL | 7000 | 7000 | 14000 |

**Note: These exercises can be used for extra practice when discussing how to create functions.**

5. Create a program to retrieve the number of years of service for a specific employee.

a. Create a stored function called GET_SERVICE_YRS to retrieve the total number of years of service for a specific employee.

The function should accept the employee ID as a parameter and return the number of years of service. Add error handling to account for an invalid employee ID.

b. Invoke the function. You can use the following data:

```
EXECUTE DBMS_OUTPUT.PUT_LINE(get_service_yrs(999))
```

**Hint:** The above statement should produce an error message because there is no employee with employee ID 999.

```
EXECUTE DBMS_OUTPUT.PUT_LINE ('Approximately .... ' ||
                              get_service_yrs(106) || ' years')
```

**Hint:** The above statement should be successful and return the number of years of service for employee with employee ID 106.

c. Query the JOB_HISTORY and EMPLOYEES tables for the specified employee to verify that the modifications are accurate.

| EMPLOYEE_ID | JOB_ID | DURATION |
|---|---|---|
| 102 | IT_PROG | 5.52876712 |
| 101 | AC_ACCOUNT | 4.10136986 |
| 101 | AC_MGR | 3.38082192 |
| 201 | MK_REP | 3.83835616 |
| 114 | ST_CLERK | 1.77260274 |
| 122 | ST_CLERK | .997260274 |
| 200 | AD_ASST | 5.75342466 |
| 176 | SA_REP | .77260274 |
| 176 | SA_MAN | .997260274 |
| 200 | AC_ACCOUNT | 4.50410959 |
| 106 | IT_PROG | 3.24556171 |

11 rows selected.

| JOB_ID | DURATION |
|---|---|
| SY_ANAL | .000092719 |

## Part A

6. In this practice, create a program to retrieve the number of different jobs that an employee worked during his or her service.
   a. Create a stored function called `GET_JOB_COUNT` to retrieve the total number of different jobs on which an employee worked.

      The function should accept one parameter to hold the employee ID. The function will return the number of different jobs that employee worked until now. This also includes the present job. Add exception handling to account for an invalid employee ID.

      **Hint:** Verify distinct job IDs from the `JOB_HISTORY` table. Verify whether the current job ID is one of the job IDs on which the employee worked.

   b. Invoke the function. You can use the following data:

```
EXECUTE DBMS_OUTPUT.PUT_LINE('Employee worked on ' ||
              get_job_count(176) || ' different jobs.')
```

```
Employee worked on 2 different jobs.
PL/SQL procedure successfully completed.
```

**Note: These exercises can be used for extra practice when discussing how to create packages.**

7. Create a package specification and body called `EMP_JOB_PKG` that contains your `ADD_JOBS`, `ADD_JOB_HIST`, and `UPD_SAL` procedures, as well as your `GET_SERVICE_YRS` function.
   a. Make all the constructs public. Consider whether you still need the stand-alone procedures and functions that you just packaged.
   b. Disable all the triggers before invoking the procedure and enable them after invoking the procedure, as suggested in question 2b.

      Invoke your `ADD_JOBS` procedure to create a new job with ID `PR_MAN`, job title `Public Relations Manager`, and salary of 6,250.

      Invoke your `ADD_JOB_HIST` procedure to modify the job of employee with employee ID 110 to job ID `PR_MAN`.

      **Hint:** All of the above calls to the functions should be successful.
   c. Query the `JOBS`, `JOB_HISTORY`, and `EMPLOYEES` tables to verify the results.

| JOB_ID | JOB_TITLE | MIN_SALARY | MAX_SALARY |
|---|---|---|---|
| PR_MAN | Public Relations Manager | 6250 | 12500 |

| EMPLOYEE_ID | START_DAT | END_DATE | JOB_ID | DEPARTMENT_ID |
|---|---|---|---|---|
| 110 | 28-SEP-97 | 04-MAY-01 | FI_ACCOUNT | 100 |

| JOB_ID | SALARY |
|---|---|
| PR_MAN | 6750 |

## Part A

**Note: These exercises can be used for extra practice when discussing how to use Oracle-supplied packages.**

8. In this practice, use an Oracle-supplied package to schedule your `GET_JOB_COUNT` function to run semiannually.

   a. Create an anonymous block to call the `DBMS_JOB` Oracle-supplied package.

      Invoke the package function `DBMS_JOB.SUBMIT` and pass the following four parameters: a variable to hold the job number, the name of the subprogram you want to submit, `SYSDATE` as the date when the job will run, and an interval of `ADDMONTHS(SYSDATE , 6)` for semiannual submission.

      **Note:** To force the job to run immediately, call `DBMS_JOB.RUN(your_job_number)` after calling `DBMS_JOB.SUBMIT`. This executes the job waiting in the queue.

      Execute the anonymous block.

   b. Check your results by querying the `EMPLOYEES` and `JOB_HISTORY` tables and querying the `USER_JOBS` dictionary view to see the status of your job submission.

      Your output should appear similar to the following output:

| JOB | WHAT | SCHEMA_USER | LAST_DATE | NEXT_DATE | INTERVAL |
|---|---|---|---|---|---|
| 1 | BEGIN DBMS_OUTPUT.PUT_LINE (get_job_count(110)); END; | SH9 | 04-MAY-01 | 04-NOV-01 | ADD_MONTHS(SYSDATE, 6) |

**Note: These exercises can be used for extra practice when discussing how to create database triggers.**

9. In this practice, create a trigger to ensure that the job ID of any new employee being hired to department 80 (the Sales department) is a sales manager or representative.

   a. Disable all the previously created triggers as discussed in question 2b.

   b. Create a trigger called `CHK_SALES_JOB`.

      Fire the trigger before every row that is changed after insertions and updates to the `JOB_ID` column in the `EMPLOYEES` table. Check that the new employee has a job ID of `SA_MAN` or `SA_REP` in the `EMPLOYEES` table. Add exception handling and provide an appropriate message so that the update fails if the new job ID is not that of a sales manager or representative.

   c. Test the trigger. You can use the following data:

```
UPDATE employees
 SET job_id = 'AD_VP'
 WHERE employee_id = 106;
UPDATE employees
 SET job_id = 'AD_VP'
 WHERE employee_id = 179;
UPDATE employees
 SET job_id = 'SA_MAN'
 WHERE employee_id = 179;
```

   **Hint:** The middle statement should produce the error message specified in your trigger.

**Part A**

d. Query the EMPLOYEES table to view the changes. Commit the changes.

| JOB_ID | DEPARTMENT_ID | SALARY |
|---|---|---|
| SA_MAN | 80 | 6200 |

e. Enable all the triggers that you previously disabled, as discussed in question 2b.

10. In this practice, create a trigger to ensure that the minimum and maximum salaries of a job are never modified such that the salary of an existing employee with that job ID is out of the new range specified for the job.

a. Create a trigger called CHECK_SAL_RANGE.

Fire the trigger before every row that is changed when data is updated in the MIN_SALARY and MAX_SALARY columns in the JOBS table. For any minimum or maximum salary value that is changed, check that the salary of any existing employee with that job ID in the EMPLOYEES table falls within the new range of salaries specified for this job ID. Include exception handling to cover a salary range change that affects the record of any existing employee.

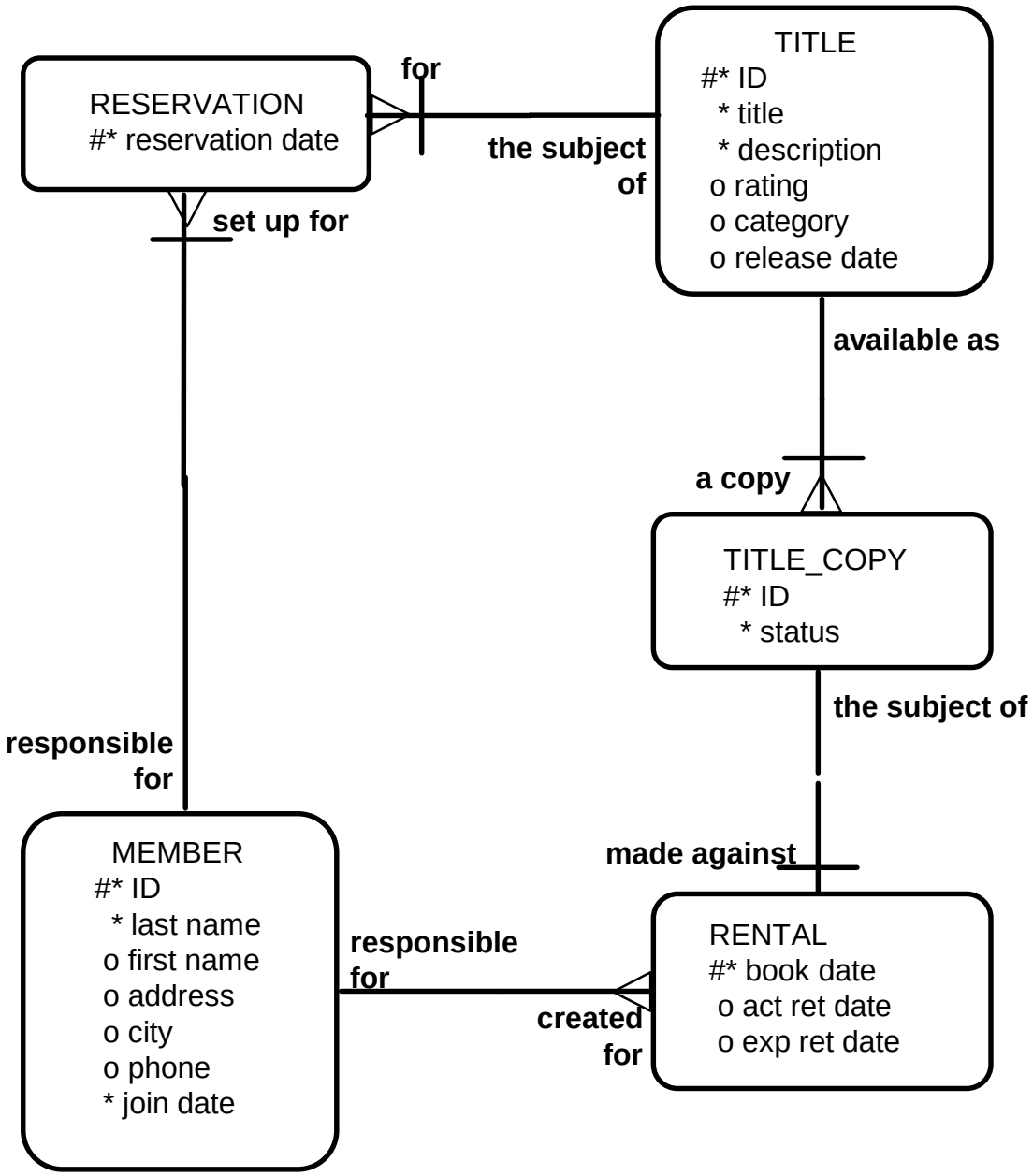
b. Test the trigger. You can use the following data:

```
SELECT * FROM jobs WHERE job_id = 'SY_ANAL';
```

| JOB_ID | JOB_TITLE | MIN_SALARY | MAX_SALARY |
|---|---|---|---|
| SY_ANAL | System Analyst | 7000 | 14000 |

```
SELECT employee_id, job_id, salary
 FROM  employees
 WHERE job_id = 'SY_ANAL';
UPDATE jobs
 SET min_salary = 5000, max_salary = 7000
 WHERE job_id = 'SY_ANAL';
UPDATE jobs
 SET min_salary = 7000, max_salary = 18000
 WHERE job_id = 'SY_ANAL';
```

**Part B**: **Entity Relationship Diagram**



### Part B

In this exercise, create a package named `VIDEO` that contains procedures and functions for a video store application. This application allows customers to become a member of the video store. Any members can rent movies, return rented movies, and reserve movies. Additionally, create a trigger to ensure that any data in the video tables is modified only during business hours.

Create the package using *i*SQL*Plus and use the `DBMS_OUTPUT` Oracle supplied package to display messages.

The video store database contains the following tables: `TITLE`, `TITLE_COPY`, `RENTAL`, `RESERVATION`, and `MEMBER`. The entity relationship diagram is shown on the previous page.

## Part B

1. Run the script `buildvid1.sql` to create all of the required tables and sequences needed for this exercise.

   Run the script `buildvid2.sql` to populate all the tables created through by the script `buildvid1.sql`

2. Create a package named `VIDEO` with the following procedures and functions:
   a. `NEW_MEMBER`: A public procedure that adds a new member to the `MEMBER` table. For the member ID number, use the sequence `MEMBER_ID_SEQ`; for the join date, use `SYSDATE`. Pass all other values to be inserted into a new row as parameters.
   b. `NEW_RENTAL`: An overloaded public function to record a new rental. Pass the title ID number for the video that a customer wants to rent and either the customer's last name or his member ID number into the function. The function should return the due date for the video. Due dates are three days from the date the video is rented. If the status for a movie requested is listed as `AVAILABLE` in the `TITLE_COPY` table for one copy of this title, then update this `TITLE_COPY` table and set the status to `RENTED`. If there is no copy available, the function must return `NULL`. Then, insert a new record into the `RENTAL` table identifying the booked date as today's date, the copy ID number, the member ID number, the title ID number and the expected return date. Be aware of multiple customers with the same last name. In this case, have the function return `NULL`, and display a list of the customers' names that match and their ID numbers.
   c. `RETURN_MOVIE`: A public procedure that updates the status of a video (available, rented, or damaged) and sets the return date. Pass the title ID, the copy ID and the status to this procedure. Check whether there are reservations for that title, and display a message if it is reserved. Update the `RENTAL` table and set the actual return date to today's date. Update the status in the `TITLE_COPY` table based on the status parameter passed into the procedure.
   d. `RESERVE_MOVIE`: A private procedure that executes only if all of the video copies requested in the `NEW_RENTAL` procedure have a status of `RENTED`. Pass the member ID number and the title ID number to this procedure. Insert a new record into the `RESERVATION` table and record the reservation date, member ID number, and title ID number. Print out a message indicating that a movie is reserved and its expected date of return.
   e. `EXCEPTION_HANDLER`: A private procedure that is called from the exception handler of the public programs. Pass to this procedure the `SQLCODE` number, and the name of the program (as a text string) where the error occurred. Use `RAISE_APPLICATION_ERROR` to raise a customized error. Start with a unique key violation (-1) and foreign key violation (-2292). Allow the exception handler to raise a generic error for any other errors.

**Part B**

You can use the following data to test your routines:

```
EXECUTE video.new_member
   ('Haas', 'James', 'Chestnut Street', 'Boston', '617-123-4567')
```

```
PL/SQL procedure successfully completed.
```

```
EXECUTE video.new_member
   ('Biri', 'Allan', 'Hiawatha Drive', 'New York', '516-123-4567')
```

```
PL/SQL procedure successfully completed.
```

```
EXECUTE DBMS_OUTPUT.PUT_LINE(video.new_rental(110, 98))
```

```
09-MAR-01
PL/SQL procedure successfully completed.
```

```
EXECUTE DBMS_OUTPUT.PUT_LINE(video.new_rental(109, 93))
```

```
09-MAR-01
PL/SQL procedure successfully completed.
```

```
EXECUTE DBMS_OUTPUT.PUT_LINE(video.new_rental(107, 98))
```

```
Movie reserved. Expected back on: 05-MAR-01
PL/SQL procedure successfully completed.
```

```
EXECUTE DBMS_OUTPUT.PUT_LINE(video.new_rental('Biri', 97))
```

```
Warning! More than one member by this name.
111 Biri, Allan
108 Biri, Ben
PL/SQL procedure successfully completed.
```

```
EXECUTE DBMS_OUTPUT.PUT_LINE(video.new_rental(97, 97))
```

```
BEGIN DBMS_OUTPUT.PUT_LINE(video.new_rental(97, 97)); END;
*
ERROR at line 1:
ORA-20002: NEW_RENTAL has
attempted to use a foreign key value that is invalid
ORA-06512: at "PLPU.VIDEO", line 13
ORA-06512: at "PLPU.VIDEO", line 120
ORA-06512: at line 1
```

**Part B**

```
EXECUTE video.return_movie(98, 1, 'AVAILABLE')
```

```
Put this movie on hold -- reserved by member #107
PL/SQL procedure successfully completed.
```

```
EXECUTE video.return_movie(95, 3, 'AVAILABLE')
```

```
PL/SQL procedure successfully completed.
```

```
EXECUTE video.return_movie(111, 1, 'RENTED')
```

```
BEGIN video.return_movie(111, 1, 'RENTED'); END;
*
ERROR at line 1:
ORA-20999: Unhandled error in RETURN_MOVIE. Please contact your application
administrator with the following information: ORA-01403: no data found
ORA-06512: at "PLPU.VIDEO", line 16
ORA-06512: at "PLPU.VIDEO", line 80
ORA-06512: at line 1
```

## Part B

3. The business hours for the video store are 8:00 a.m. to 10:00 p.m., Sunday through Friday, and 8:00 a.m. to 12:00 a.m. on Saturday. To ensure that the tables can only be modified during these hours, create a stored procedure that is called by triggers on the tables.

   a. Create a stored procedure called `TIME_CHECK` that checks the current time against business hours. If the current time is not within business hours, use the `RAISE_APPLICATION_ERROR` procedure to give an appropriate message.

   b. Create a trigger on each of the five tables. Fire the trigger before data is inserted, updated, and deleted from the tables. Call your `TIME_CHECK` procedure from each of these triggers.

   c. Test your trigger.

      **Note:** In order for your trigger to fail, you need to change the time to be outside the range of your current time in class. For example, while testing, you may want valid video hours in your trigger to be from 6:00 p.m. to 8:00 a.m.

# Additional Practice Solutions

## Part A: Additional Practice 1 Solutions

1. In this practice, create a program to add a new job into the JOBS table.

   a. Create a stored procedure called ADD_JOBS to enter a new order into the JOBS table.

   The procedure should accept three parameters. The first and second parameters supplies a job ID and a job title. The third parameter supplies the minimum salary. Use the maximum salary for the new job as twice the minimum salary supplied for the job ID.

```
CREATE OR REPLACE PROCEDURE add_jobs
  (p_jobid   IN jobs.job_id%TYPE,
   p_jobtitle  IN jobs.job_title%TYPE,
   p_minsal  IN jobs.min_salary%TYPE
  )
IS
   v_maxsal  jobs.max_salary%TYPE;
BEGIN
   v_maxsal := 2 * p_minsal;
  INSERT INTO jobs
    (job_id, job_title, min_salary, max_salary)
  VALUES
    (p_jobid, p_jobtitle, p_minsal, v_maxsal);
  DBMS_OUTPUT.PUT_LINE ('Added the following row
                 into the JOBS table ...');
  DBMS_OUTPUT.PUT_LINE (p_jobid || '  ' || p_jobtitle ||
                        ' '|| p_minsal || '  ' || v_maxsal);
END add_jobs;
/
```

   b. Disable the trigger SECURE_DML before invoking the procedure. Invoke the procedure to add a new job with job ID SY_ANAL, job title System Analyst, and minimum salary of 6,000.

```
ALTER TRIGGER secure_employees DISABLE;

EXECUTE add_jobs ('SY_ANAL', 'System Analyst', 6000)
```

   c. Verify that a row was added and remember the new job ID for use in the next exercise.

   Commit the changes.

```
SELECT *
FROM   jobs
WHERE  job_id = 'SY_ANAL';
```

## Part A: Additional Practice 2 Solutions

2. In this practice, create a program to add a new row to the JOB_HISTORY table, for an existing employee.

   **Note:** Disable all triggers on the EMPLOYEES, JOBS, and JOB_HISTORY tables before invoking the procedure in part b. Enable all these triggers after executing the procedure.

   a. Create a stored procedure called ADD_JOB_HIST to enter a new row into the JOB_HISTORY table for an employee who is changing his job to the new job ID that you created in question 1b.

   Use the employee ID of the employee who is changing the job and the new job ID for the employee as parameters. Obtain the row corresponding to this employee ID from the EMPLOYEES table and insert it into the JOB_HISTORY table. Make hire date of this employee as start date and today's date as end date for this row in the JOB_HISTORY table.

   Change the hire date of this employee in the EMPLOYEES table to today's date. Update the job ID of this employee to the job ID passed as parameter (Use the job ID of the job created in question 1b) and salary equal to minimum salary for that job ID + 500.

   Include exception handling to handle an attempt to insert a nonexistent employee.

```
CREATE OR REPLACE PROCEDURE add_job_hist
  (p_empid IN employees.employee_id%TYPE,
   p_jobid IN jobs.job_id%TYPE)
IS
BEGIN
   INSERT INTO job_history
     SELECT employee_id, hire_date, SYSDATE, job_id, department_id
     FROM   employees
     WHERE  employee_id = p_empid;
   UPDATE employees
     SET  hire_date = SYSDATE,
          job_id = p_jobid,
          salary = (SELECT min_salary+500
                    FROM   jobs
                    WHERE  job_id = p_jobid)
   WHERE employee_id = p_empid;
   DBMS_OUTPUT.PUT_LINE ('Added employee ' ||p_empid||
              ' details to the JOB_HISTORY table');
   DBMS_OUTPUT.PUT_LINE ('Updated current job of employee '
                                 ||p_empid|| ' to '|| p_jobid);
EXCEPTION
   WHEN NO_DATA_FOUND THEN
    RAISE_APPLICATION_ERROR (-20001, 'Employee does not exist!');
END add_job_hist;
/
```

b. Disable triggers. (See the note at the beginning of this question.)
Execute the procedure with employee ID `106` and job ID `SY_ANAL` as parameters.
Enable the triggers that you disabled.

```
ALTER TABLE employees DISABLE ALL TRIGGERS;
ALTER TABLE jobs DISABLE ALL TRIGGERS;
ALTER TABLE job_history DISABLE ALL TRIGGERS;

 EXECUTE add_job_hist(106, 'SY_ANAL')

ALTER TABLE employees ENABLE ALL TRIGGERS;
ALTER TABLE jobs ENABLE ALL TRIGGERS;
ALTER TABLE job_history ENABLE ALL TRIGGERS;
```

c. Query the tables to view your changes, and then commit the changes.

```
SELECT *   FROM   job_history
WHERE  employee_id = 106;

SELECT job_id, salary   FROM   employees
WHERE  employee_id = 106;
```

## Part A: Additional Practice 3 Solutions

3. In this practice, create a program to update the minimum and maximum salaries for a job in the JOBS table.

   a. Create a stored procedure called UPD_SAL to update the minimum and maximum salaries for a specific job ID in the JOBS table.

      Pass three parameters to the procedure: the job ID, a new minimum salary, and a new maximum salary for the job. Add exception handling to account for an invalid job ID in the JOBS table. Also, raise an exception if the maximum salary supplied is less than the minimum salary. Provide an appropriate message that will be displayed if the row in the JOBS table is locked and cannot be changed.

```
CREATE OR REPLACE PROCEDURE upd_sal
 (p_jobid   IN jobs.job_id%type,
  p_minsal  IN jobs.min_salary%type,
  p_maxsal  IN jobs.max_salary%type)
IS
  v_dummy          VARCHAR2(1);
  e_resource_busy  EXCEPTION;
  sal_error        EXCEPTION;
  PRAGMA           EXCEPTION_INIT (e_resource_busy , -54);
BEGIN
  IF (p_maxsal < p_minsal) THEN
   DBMS_OUTPUT.PUT_LINE('ERROR. MAX SAL SHOULD BE > MIN SAL');
    RAISE sal_error;
  END IF;
  SELECT ''
    INTO v_dummy
    FROM jobs
    WHERE job_id = p_jobid
    FOR UPDATE OF min_salary NOWAIT;
  UPDATE jobs
    SET    min_salary =  p_minsal,
           max_salary =  p_maxsal
    WHERE  job_id  = p_jobid;
EXCEPTION
  WHEN e_resource_busy THEN
  RAISE_APPLICATION_ERROR (-20001, 'Job information is
                            currently locked, try later.');
  WHEN NO_DATA_FOUND THEN
    RAISE_APPLICATION_ERROR
      (-20001, 'This job ID does not exist');
  WHEN sal_error THEN
    RAISE_APPLICATION_ERROR(-20001,'Data error..Max salary should
 be more than min salary');
END upd_sal;
/
```