

UNIT TESTING

17.10.2012.

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Pregled predavanja

- Testiranje općenito
- Unit testing u PL/SQL-u
- Razvoj upravljan testiranjem
- Primjeri i pregled alata za UT u PL/SQL-u

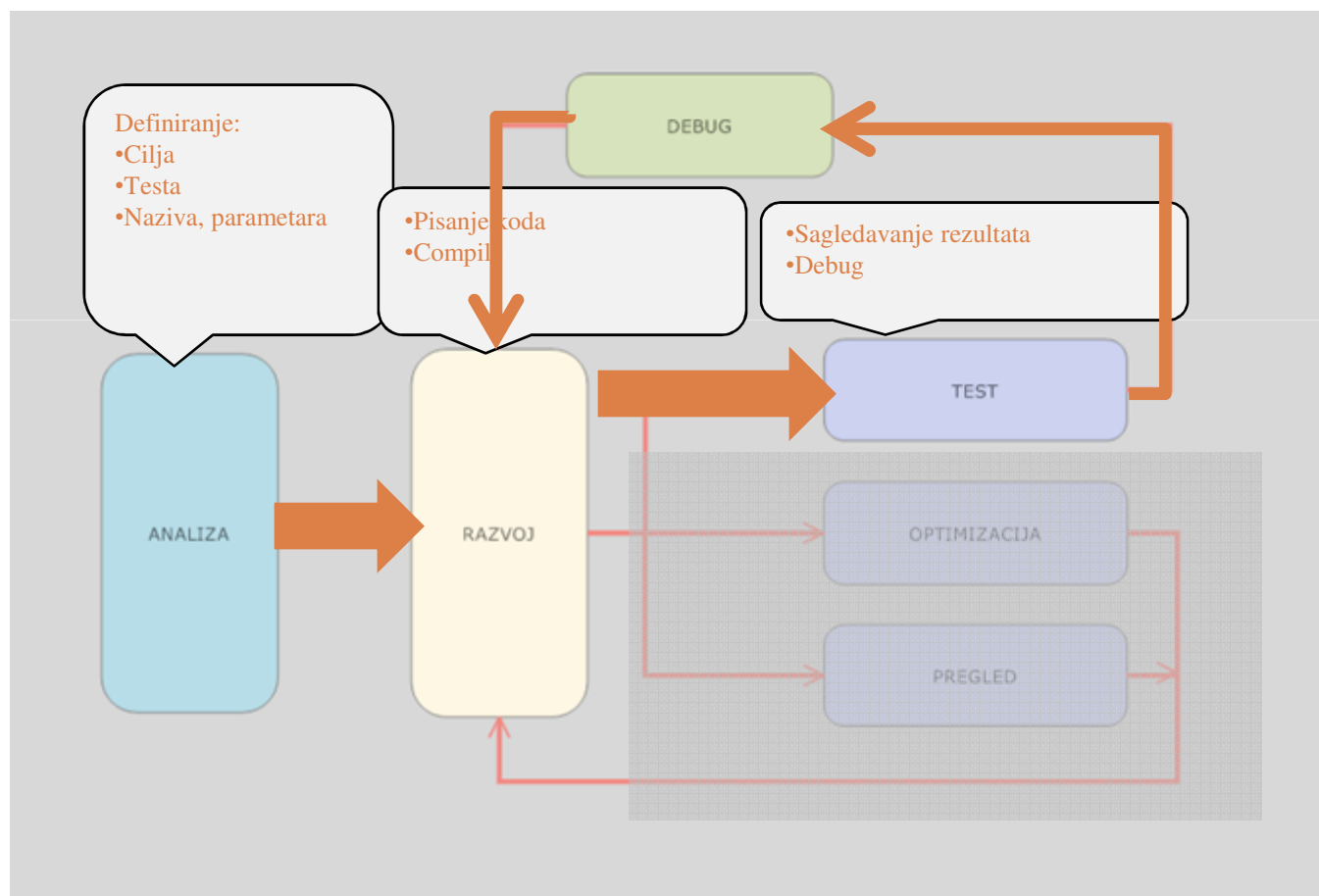
Testiranje

- Funkcijsko testiranje
 - Testira korisnik ili QA timovi
- Stress testing
 - Uglavnom DBA
 - Više korisnika, podataka
- Unit testing
 - Testira developer
 - Fundamentalni test, test zasebnog dijela koda
- Continuous Integration
 - Kao krajnji cilj unit testinga

Unit Testing/PLSQL

- Standardni problemi
 - Moramo testirati sadržaj DB objekata
 - Pisanje testnih skripti
 - Provjeravanje rezultata
 - Da li smo pokrili sve ishode?
 - Prekasno testiranje u procesu razvoja

Razvoj upravljan testiranjem



Definiranje jedinice

- Specificiranje jedinice
 - ▣ Logičko sagledavanje dokumentacije
- Definiranje zaglavlja
 - ▣ Naziv, ulazno/izlazni parametri
- Definiranje uvjeta koje jedinica mora zadovoljavati
 - ▣ Željeno ponašanje
- Pisanje testnog koda
 - ▣ Prije koda jedinice

Primjer 1-varijanta SUBSTR

Specificiranje jedinice:

- Napisati funkciju koja je varijacija SUBSTR funkcije, vraća dio stringa između navedenih pozicija
- ('abcdefgh',2,4)
- ('abcdefgh',2,300)
- ('abcdefgh',-2,-4)
- ('abcdefgh',0,3) ili ('abcdefgh',1,3)

Steven Feuerstein

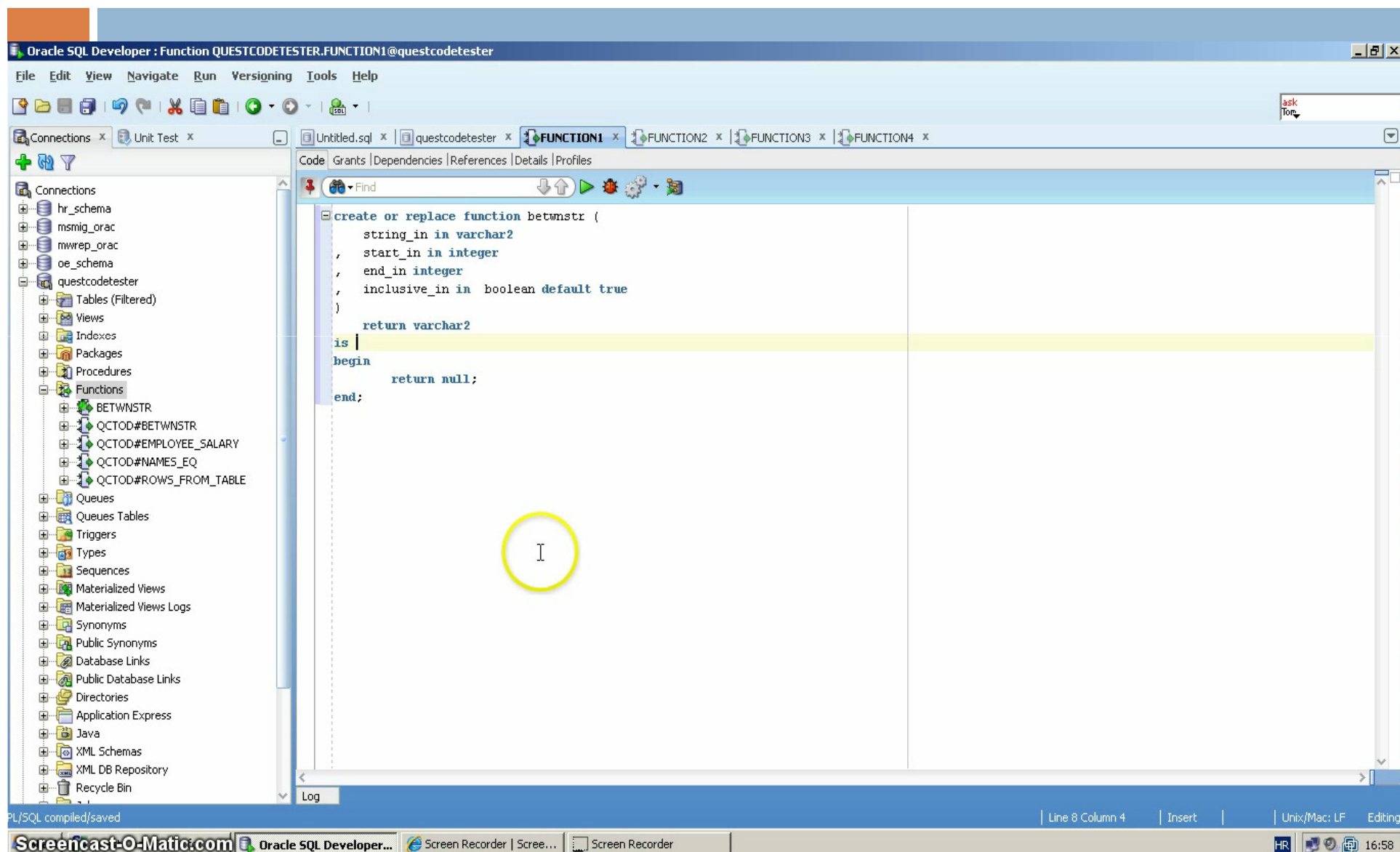
<http://www.oracleplsqlprogramming.com/UnitTest/Presentations/>

Primjer 1 -definiranje testa

Definiranje zaglavlja:

```
FUNCTION betwnstr (  
    string_in    IN  VARCHAR2  
    , start_in   IN  PLS_INTEGER  
    , end_in     IN  PLS_INTEGER  
    , inclusive_in IN  BOOLEAN default true  
)  
RETURN VARCHAR2 DETERMINISTIC
```


Primjer 1 -definiranje testa



The screenshot shows the Oracle SQL Developer interface. The left pane displays the database schema tree for the 'questcodetester' user, with the 'Functions' folder expanded to show the 'BETWNSTR' function. The main editor window displays the following SQL code:

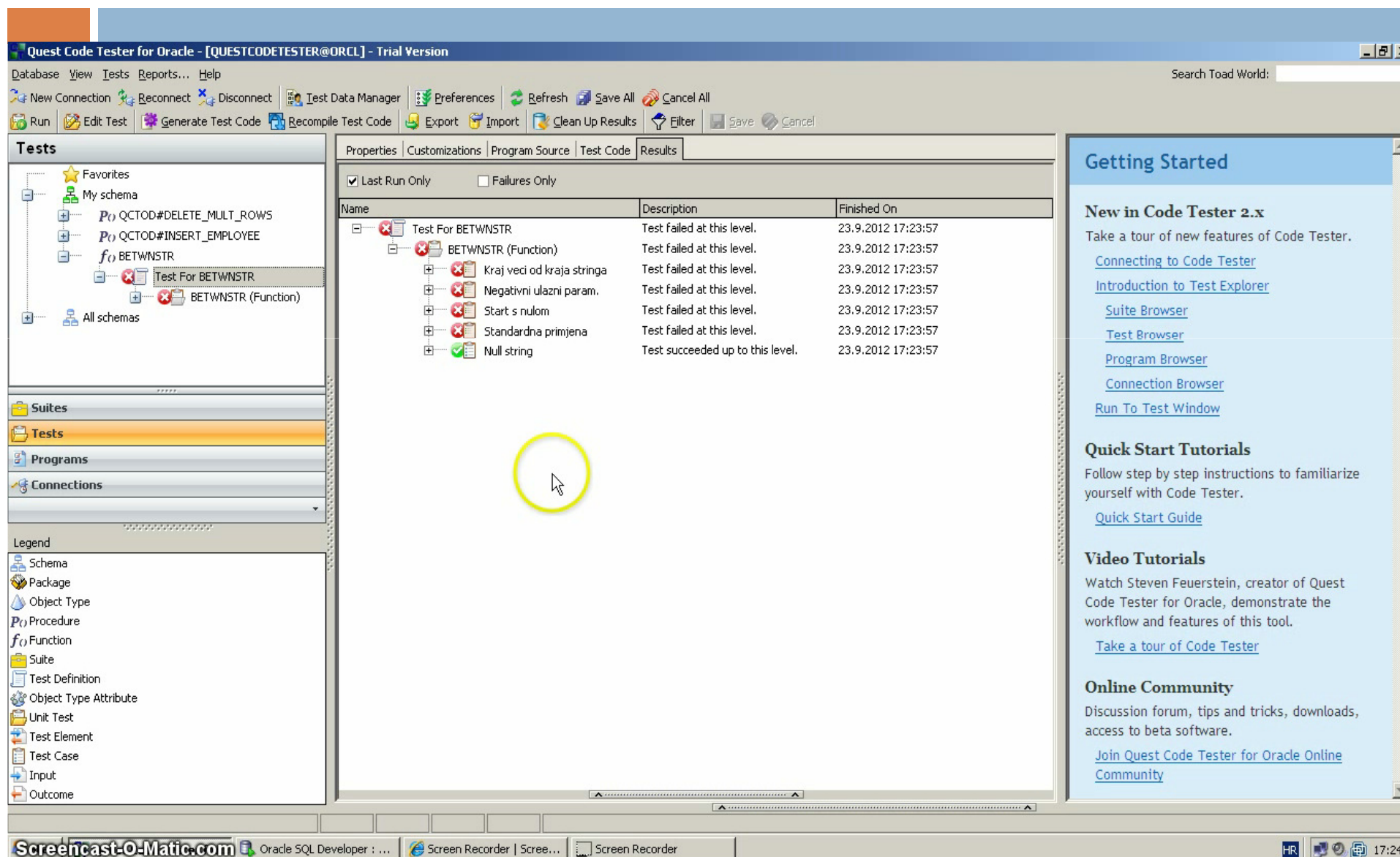
```

create or replace function betwnstr (
    string_in in varchar2
    , start_in in integer
    , end_in integer
    , inclusive_in in boolean default true
)
return varchar2
is
begin
    return null;
end;

```

The 'is' keyword and the 'begin' line are highlighted in yellow. A yellow circle highlights the cursor position at the end of the 'is' line. The status bar at the bottom indicates 'Line 8 Column 4 | Insert | Unix/Mac: LF | Editing'.

Primjer 1 -test i razvoj



Quest Code Tester for Oracle - [QUESTCODETESTER@ORCL] - Trial Version

Database View Tests Reports... Help

New Connection Reconnect Disconnect Test Data Manager Preferences Refresh Save All Cancel All

Run Edit Test Generate Test Code Recompile Test Code Export Import Clean Up Results Filter Save Cancel

Search Toad World: _____

Properties Customizations Program Source Test Code Results

Last Run Only Failures Only

Name	Description	Finished On
Test For BETWNSTR	Test failed at this level.	23.9.2012 17:23:57
BETWNSTR (Function)	Test failed at this level.	23.9.2012 17:23:57
Kraj veci od kraja stringa	Test failed at this level.	23.9.2012 17:23:57
Negativni ulazni param.	Test failed at this level.	23.9.2012 17:23:57
Start s nulom	Test failed at this level.	23.9.2012 17:23:57
Standardna primjena	Test failed at this level.	23.9.2012 17:23:57
Null string	Test succeeded up to this level.	23.9.2012 17:23:57

Getting Started

New in Code Tester 2.x

Take a tour of new features of Code Tester.

- [Connecting to Code Tester](#)
- [Introduction to Test Explorer](#)
- [Suite Browser](#)
- [Test Browser](#)
- [Program Browser](#)
- [Connection Browser](#)
- [Run To Test Window](#)

Quick Start Tutorials

Follow step by step instructions to familiarize yourself with Code Tester.

- [Quick Start Guide](#)

Video Tutorials

Watch Steven Feuerstein, creator of Quest Code Tester for Oracle, demonstrate the workflow and features of this tool.

- [Take a tour of Code Tester](#)

Online Community

Discussion forum, tips and tricks, downloads, access to beta software.

- [Join Quest Code Tester for Oracle Online Community](#)

ScreenCast-O-Matic.com Oracle SQL Developer : ... Screen Recorder | Scree... Screen Recorder

HR 17:24

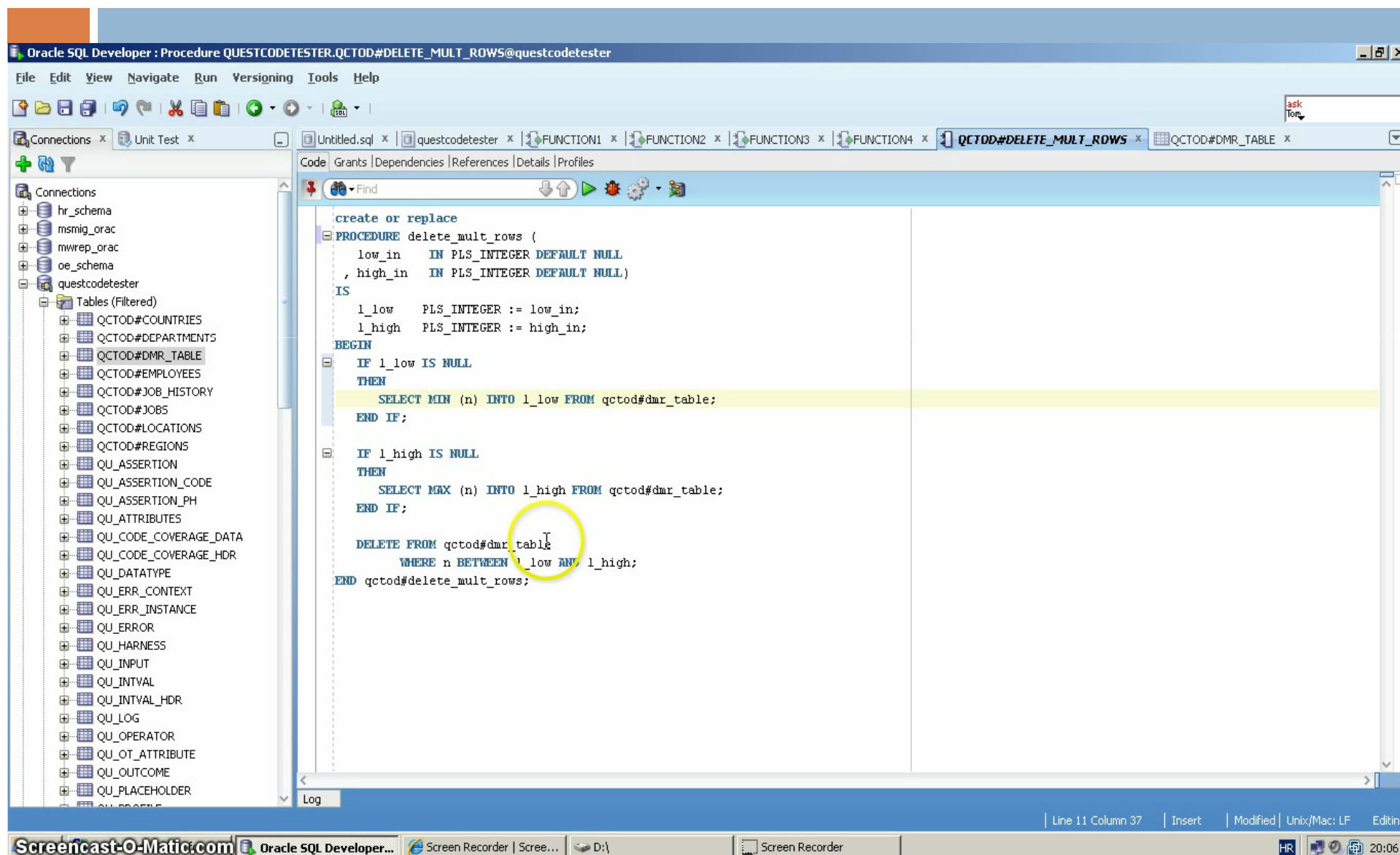
Primjer 2-Test procedure

- Porcedura za brisanje redaka iz tablice
- Ovisno o ulaznim parametrima briše se broj redaka iz tablice

```

PROCEDURE delete_mult_rows
(
  low_in   IN PLS_INTEGER DEFAULT NULL
, high_in  IN PLS_INTEGER DEFAULT NULL
)
  
```

Primjer 2-Test procedure



Oracle SQL Developer : Procedure QUESTCODETESTER.QCTOD#DELETE_MULT_ROWS@questcodestester

File Edit View Navigate Run Versioning Tools Help

Connections x Unit Test x

Connections

- hr_schema
- msmig_orac
- mwrep_orac
- oe_schema
- questcodestester
 - Tables (Filtered)
 - QCTOD#COUNTRIES
 - QCTOD#DEPARTMENTS
 - QCTOD#DMR_TABLE
 - QCTOD#EMPLOYEES
 - QCTOD#JOB_HISTORY
 - QCTOD#JOBS
 - QCTOD#LOCATIONS
 - QCTOD#REGIONS
 - QU_ASSERTION
 - QU_ASSERTION_CODE
 - QU_ASSERTION_PH
 - QU_ATTRIBUTES
 - QU_CODE_COVERAGE_DATA
 - QU_CODE_COVERAGE_HDR
 - QU_DATATYPE
 - QU_ERR_CONTEXT
 - QU_ERR_INSTANCE
 - QU_ERROR
 - QU_HARNESS
 - QU_INPUT
 - QU_INTVAL
 - QU_INTVAL_HDR
 - QU_LOG
 - QU_OPERATOR
 - QU_OT_ATTRIBUTE
 - QU_OUTCOME
 - QU_PLACEHOLDER

```

create or replace
PROCEDURE delete_mult_rows (
  low_in   IN PLS_INTEGER DEFAULT NULL
  , high_in IN PLS_INTEGER DEFAULT NULL)
IS
  l_low   PLS_INTEGER := low_in;
  l_high  PLS_INTEGER := high_in;
BEGIN
  IF l_low IS NULL
  THEN
    SELECT MIN (n) INTO l_low FROM qctod#dmr_table;
  END IF;

  IF l_high IS NULL
  THEN
    SELECT MAX (n) INTO l_high FROM qctod#dmr_table;
  END IF;

  DELETE FROM qctod#dmr_table
    WHERE n BETWEEN l_low AND l_high;
END qctod#delete_mult_rows;

```

Unit test u SQL Dveloperu

- Primjer s upitom kao ulaznim parametrom

The screenshot displays the Oracle SQL Developer interface. On the left, the 'Unit Tests' tree shows a test suite named 'ZABRANA' containing a test case 'AWARD_BONUS'. The main editor window shows the PL/SQL code for the 'award_bonus' procedure, which takes 'emp_id' and 'sales_amt' as input parameters. The procedure logic includes a query to fetch 'commission_pct' from the 'employees3' table, a null check, and an update to 'salary' based on the commission. A yellow circle highlights the cursor position at the end of the procedure code.

```
create or replace
PROCEDURE award_bonus (
  emp_id NUMBER, sales_amt NUMBER) AS
  commission REAL;
  comm_missing EXCEPTION;
BEGIN
  SELECT commission_pct INTO commission
    FROM employees3
    WHERE employee_id = emp_id;

  IF commission IS NULL THEN
    RAISE comm_missing;
  ELSE
    UPDATE employees3
      SET salary = salary + sales_amt*commission
      WHERE employee_id = emp_id;
  END IF;
END award_bonus;
```

Zaključak

- Pomoću alata QCT i SQIDeveloper UT brzo generiramo testni kod
- Gotove analize rezultata testiranja
- Moguće modifikacije testnog koda
- “High level” opisi ishoda, funkcionalna dokumentacija