Fair Use Notice:

DATABASE SYSTEMS (SW215)

EXCEPTION HANDLING

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EXCEPTIONS

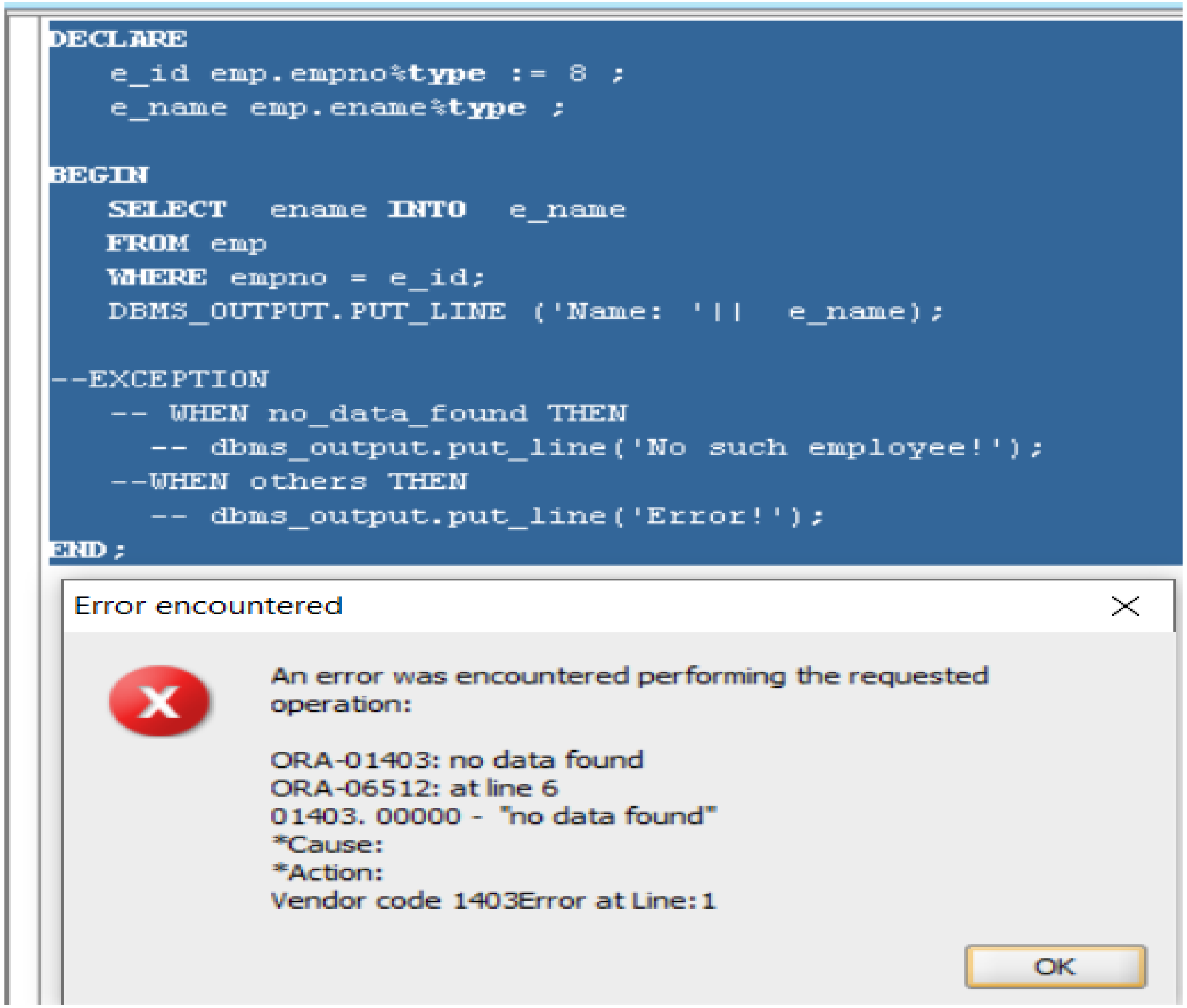
- Sometimes the normal flow of a PL/SQL program is disrupted due to the occurrence of an abnormal condition while execution.
- Such abnormal condition are known as exceptions.
- Exception may occur due to invalid user input, system failure or logical errors.
- Every exception in PL/SQL has an error number and an error message and some exceptions have names as well.
- Exception handling in a PL/SQL code is carried out in the EXCEPTION block.
- There are three categories of PL/SQL exceptions:
    1. PRE-DEFINED SYSTEM EXCEPTIONS.
    2. USER-DEFINED EXCEPTIONS.
    3. UNDEFINED SYSTEM EXCEPTIONS.

PRE-DEFINED SYSTEM EXCEPTIONS

- Every pre-defined exception has a name an error number, but these exceptions must be handled by their names.
- These exception are thrown automatically by the system.
- There is no need to raise pre-defined exceptions.
- There is no need to even declare the pre-defined exceptions any where in the PL/SQL code.

COMMON PRE-DEFINED EXCEPTIONS

Exception Name	Oracle Error	Description
DUP_VAL_ON_INDEX	ORA-00001	It is raised when duplicate values are attempted to be stored in a column with unique index.
INVALID_CURSOR	ORA-01001	It is raised when attempts are made to make a cursor operation that is not allowed, such as closing an unopened cursor.
LOGIN_DENIED	ORA-01017	It is raised when a program attempts to log on to the database with an invalid username or password.
NO_DATA_FOUND	ORA-01403	It is raised when a SELECT INTO statement returns no rows.
TOO_MANY_ROWS	ORA-01422	It is raised when a SELECT INTO statement returns more than one row.
ZERO_DIVIDE	ORA-01476	It is raised when an attempt is made to divide a number by zero.



```
DECLARE
   e_id emp.empno%type := 8 ;
   e_name emp.ename%type ;

BEGIN
   SELECT  ename INTO  e_name
   FROM emp
   WHERE empno = e_id;
   DBMS_OUTPUT.PUT_LINE ('Name: '||  e_name);

--EXCEPTION
   -- WHEN no_data_found THEN
     -- dbms_output.put_line('No such employee!');
   --WHEN others THEN
     -- dbms_output.put_line('Error!');
END;
```

Error encountered

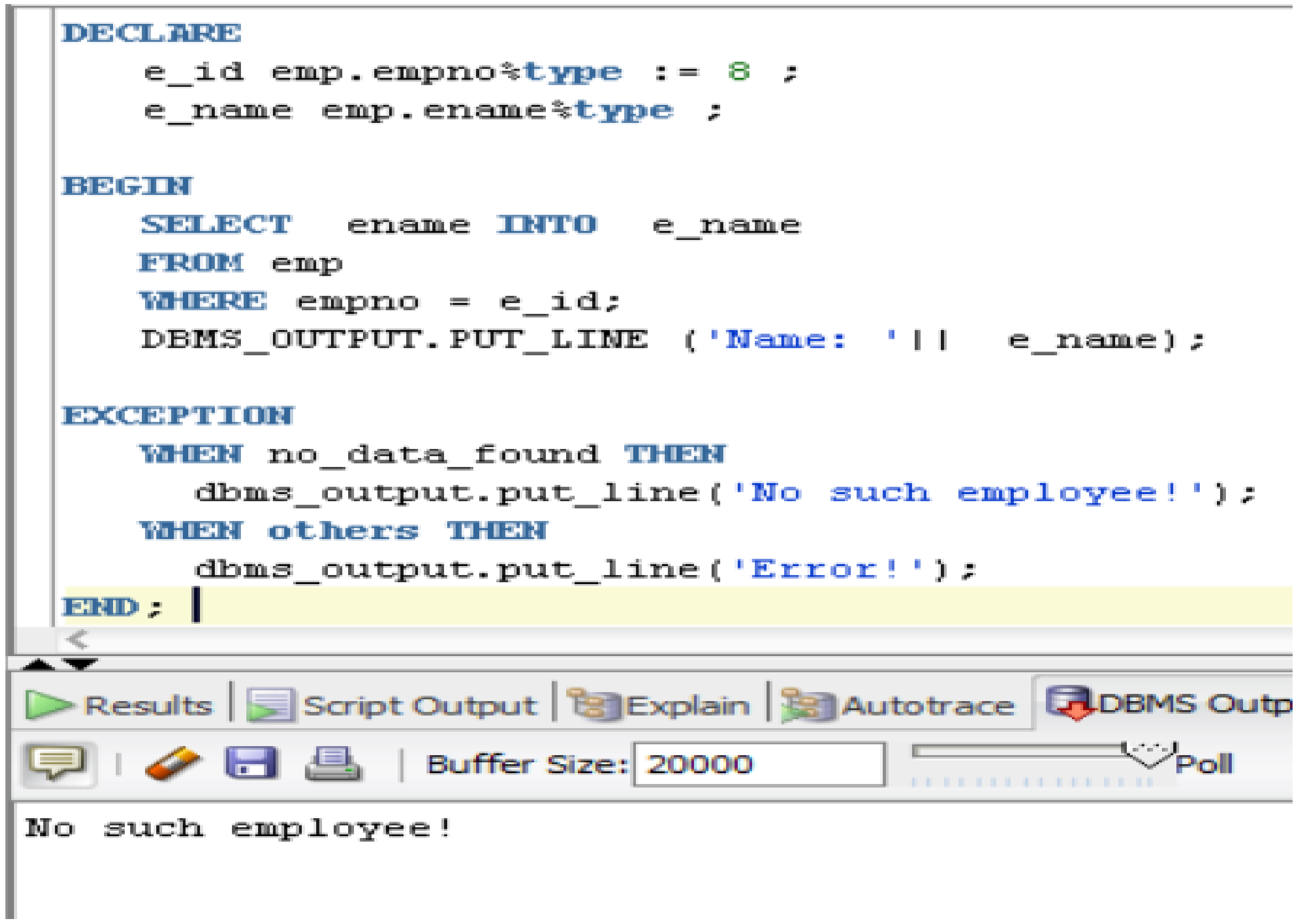
```
An error was encountered performing the requested
operation:

ORA-01403: no data found
ORA-06512: at line 6
01403. 00000 -  "no data found"
*Cause:
*Action:
Vendor code 1403Error at Line:1
```

SYNTAX:

```
DECLARE
        <declarations section>
BEGIN
        <executable command(s)>
EXCEPTION
        <exception handling goes here >
        WHEN exception1 THEN
                exception1-handling-statements
        WHEN exception2  THEN
                exception2-handling-statements
        WHEN exception3 THEN
                exception3-handling-statements
        ........
        WHEN OTHERS THEN
               exception4-handling-statements
END;
```

EXAMPLE:

```
DECLARE
  e_id emp.empno%type := 8 ;
  e_name emp.ename%type ;

BEGIN
  SELECT  ename INTO  e_name
  FROM emp
  WHERE empno= e_id;
  DBMS_OUTPUT.PUT_LINE ('Name: '||  e_name);

EXCEPTION
  WHEN no_data_found THEN
    dbms_output.put_line('No such employee!');
  WHEN others THEN
    dbms_output.put_line('Error!');
END;
/
```



```
DECLARE
    e_id emp.empno%type := 8 ;
    e_name emp.ename%type ;

BEGIN
    SELECT  ename INTO  e_name
    FROM emp
    WHERE empno = e_id;
    DBMS_OUTPUT.PUT_LINE ('Name: '||  e_name);

EXCEPTION
    WHEN no_data_found THEN
      dbms_output.put_line('No such employee!');
    WHEN others THEN
      dbms_output.put_line('Error!');
END;
```

```
No such employee!
```

USER-DEFINED EXCEPTIONS

- A user-defined exception must be declared and then raised explicitly, using either a RAISE statement or the procedure.
- These exceptions are declared with EXCEPTION datatype in the declarative section.
- User-defined exceptions can also be raised using the WHEN clause.

SYNTAX (USER-DEFINED EXCEPTION DECLARATION):

```
DECLARE
        my-exception EXCEPTION ;
```

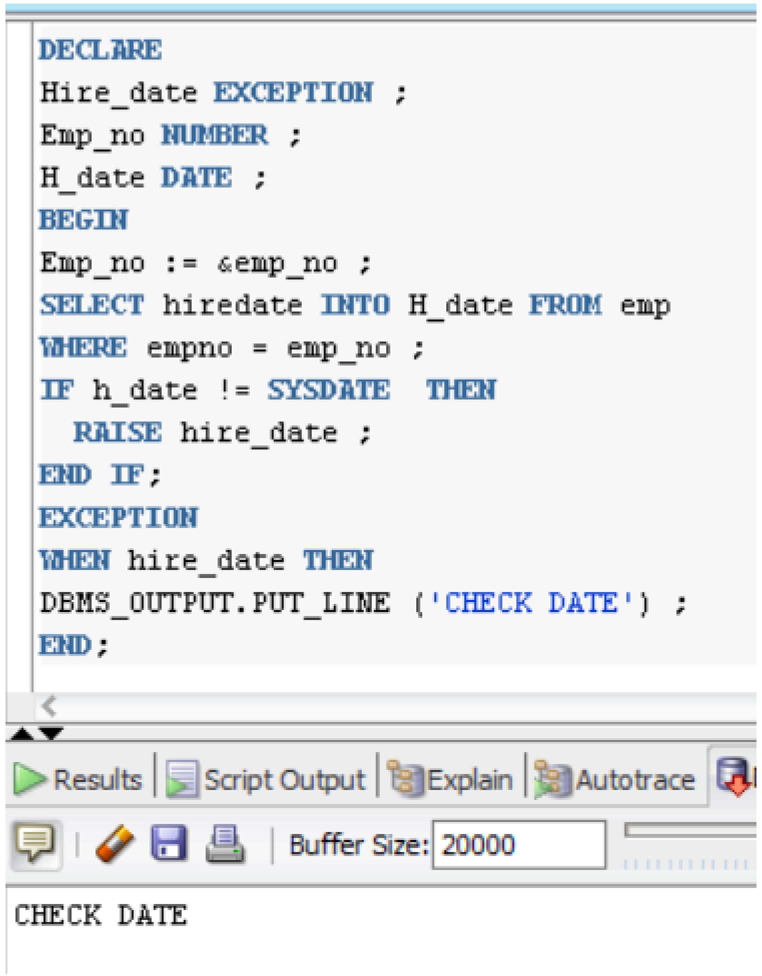
RAISING EXCEPTIONS

SYNTAX:

```
DECLARE
   exception_name EXCEPTION;
BEGIN
   IF condition THEN
      RAISE exception_name ;
   END IF ;
EXCEPTION
   WHEN exception_name THEN
   statement ;
END;
```

```
DECLARE
  c_id customers.id %type := &cc_id;
  c_name customerS.Name %type;
  c_addr customers.address %type;
  -- user defined exception
  ex_invalid_id  EXCEPTION;

BEGIN
  IF c_id <= 0 THEN
    RAISE ex_invalid_id ;
  ELSE
    SELECT  name, address INTO  c_name, c_addr
    FROM customers
    WHERE id = c_id;
    DBMS_OUTPUT.PUT_LINE ('Name: '||  c_name) ;
    DBMS_OUTPUT.PUT_LINE ('Address: ' || c_addr) ;
  END IF;

EXCEPTION
 -- user defined exception

  WHEN ex_invalid_id THEN
    dbms_output.put_line('ID must be greater
than zero!’) ;
 -- pre-defined exception

  WHEN no_data_found THEN
    dbms_output.put_line('No such customer!’) ;
  WHEN OTHERS THEN
    dbms_output.put_line('Error!’) ;
END;
```

```
DECLARE
Hire_date EXCEPTION ;
Emp_no NUMBER ;
H_date DATE ;
BEGIN
Emp_no := &emp_no ;
SELECT hiredate INTO H_date FROM emp
WHERE empno = emp_no ;
IF h_date != SYSDATE THEN
        RAISE hire_date ;
END IF;
EXCEPTION
WHEN hire_date THEN
DBMS_OUTPUT.PUT_LINE ('CHECK DATE') ;
END;
```



```
DECLARE
Hire_date EXCEPTION ;
Emp_no NUMBER ;
H_date DATE ;
BEGIN
Emp_no := &emp_no ;
SELECT hiredate INTO H_date FROM emp
WHERE empno = emp_no ;
IF h_date != SYSDATE  THEN
  RAISE hire_date ;
END IF;
EXCEPTION
WHEN hire_date THEN
DBMS_OUTPUT.PUT_LINE ('CHECK DATE') ;
END;
```

```
CHECK DATE
```

UN-DEFINED EXCEPTIONS

- The exceptions that are raised due to an error in PL/SQL or RDBMS processing and are not defined by PL/SQL are known as Un-defined exceptions.
- In PL/SQL only the most common exceptions have names and rest have only error numbers. These exception can bee assigned the names using the special procedure **PRAGMA EXCEPTION_INIT**.

TASK A

1. **Write a PL/SQL code that throws the DUP_VAL_ON_INDEX and then handles it with the help of an appropriate message.**
2. **Write a PL/SQL code that throws the TOO_MANY_ROWS and then handles it with the help of an appropriate message.**