

**Sri Lanka Institute of Information Technology**  
**IT3020 - Database Systems (DBS)**  
**Laboratory Worksheet 02**

1.(a) define object types emp\_t and dept\_t with attributes of EMP and DEPT respectively. Use REF types for workdept (of EMP), and mgrno and admrdept (of DEPT).

```
CREATE TYPE emp_t AS OBJECT(  
    empno CHAR(6),  
    firstname VARCHAR2(12),  
    lastname VARCHAR2(15),  
    workdept REF dept_t,  
    sex CHAR(1),  
    birthdate DATE,  
    salary NUMBER(8,2)  
);  
/
```

```
CREATE TYPE dept_t;  
/
```

```
CREATE TYPE dept_t AS OBJECT(  
    deptno CHAR(3),  
    deptname VARCHAR2(36),  
    mgrno REF emp_t,  
    admrdept REF dept_t  
);  
/
```

```
COMMIT;
```

1.(b) Create tables (named as OREMP and ORDEPT) using the object types defined in (a), with appropriate primary keys and referential constraints.

```
CREATE TABLE OREMP OF emp_t(  
    PRIMARY KEY (empno)  
);
```

```
CREATE TABLE ORDEPT OF dept_t(  
    PRIMARY KEY (deptno)  
);
```

1.(c) Insert data into the object relational tables created in (b), using the data in EMP and DEPT tables given below. (First insert rows into oremp with null for workdept and rows into ordept with null for admrdept.

-- Insert into OREMP with null--

```
INSERT INTO OREMP VALUES (emp_t('000010','CHRISTINE','HAAS',NULL,'F',DATE '1953-08-14',72750));
INSERT INTO OREMP VALUES (emp_t('000020','MICHAEL','THOMPSON',NULL,'M',DATE '1968-02-02',61250));
INSERT INTO OREMP VALUES (emp_t('000030','SALLY','KWAN',NULL,'F',DATE '1971-05-11',58250));
INSERT INTO OREMP VALUES (emp_t('000060','IRVING','STERN',NULL,'M',DATE '1965-07-07',55555));
INSERT INTO OREMP VALUES (emp_t('000070','EVA','PULASKI',NULL,'F',DATE '1973-05-26',56170));
INSERT INTO OREMP VALUES (emp_t('000050','JOHN','GEYER',NULL,'M',DATE '1955-09-15',60175));
INSERT INTO OREMP VALUES (emp_t('000090','EILEEN','HENDERSON',NULL,'F',DATE '1961-05-15',49750));
INSERT INTO OREMP VALUES (emp_t('000100','THEODORE','SPENSER',NULL,'M',DATE '1976-12-18',46150));
```

-- Insert into ORDEPT with null--

```
INSERT INTO ORDEPT VALUES (dept_t('A00','SPIFFY COMPUTER SERVICE DIV.',NULL,NULL));
INSERT INTO ORDEPT VALUES (dept_t('B01','PLANNING',NULL,NULL));
INSERT INTO ORDEPT VALUES (dept_t('C01','INFORMATION CENTRE',NULL,NULL));
INSERT INTO ORDEPT VALUES (dept_t('D01','DEVELOPMENT CENTRE',NULL,NULL));
```

-- Update OREMP with REF values for workdept-

```
UPDATE OREMP e
SET workdept = (SELECT REF(d) FROM ORDEPT d WHERE d.deptno = 'A00')
WHERE empno = '000010';
```

```
UPDATE OREMP e
SET workdept = (SELECT REF(d) FROM ORDEPT d WHERE d.deptno = 'B01')
WHERE empno IN ('000020','000090','000100');
```

```
UPDATE OREMP e
SET workdept = (SELECT REF(d) FROM ORDEPT d WHERE d.deptno = 'C01')
WHERE empno IN ('000030','000050');
```

```
UPDATE OREMP e
SET workdept = (SELECT REF(d) FROM ORDEPT d WHERE d.deptno = 'D01')
WHERE empno IN ('000060','000070');
```

-- Update ORDEPT with actual REF values for mgrno and admrdept-

```
UPDATE ORDEPT d
SET mgrno = (SELECT REF(e) FROM OREMP e WHERE e.empno = '000010'),
    admrdept = (SELECT REF(dd) FROM ORDEPT dd WHERE dd.deptno = 'A00')
WHERE deptno = 'A00';
```

```
UPDATE ORDEPT d
SET mgrno = (SELECT REF(e) FROM OREMP e WHERE e.empno = '000020'),
    admrdept = (SELECT REF(dd) FROM ORDEPT dd WHERE dd.deptno = 'A00')
WHERE deptno = 'B01';
```

```
UPDATE ORDEPT d
SET mgrno = (SELECT REF(e) FROM OREMP e WHERE e.empno = '000030'),
    admrdept = (SELECT REF(dd) FROM ORDEPT dd WHERE dd.deptno = 'C01')
WHERE deptno = 'C01';
```

```
UPDATE ORDEPT d
SET mgrno = (SELECT REF(e) FROM OREMP e WHERE e.empno = '000060'),
    admrdept = (SELECT REF(dd) FROM ORDEPT dd WHERE dd.deptno = 'C01')
WHERE deptno = 'D01';
```

-- 2(a) Get the department name and manager's lastname for all departments. --

```
SELECT d.deptname AS Department_Name,  
       Deref(d.mgrno).lastname AS Manager_lastname  
FROM ORDEPT d;  
/
```

-- 2(b) Get the employee number, lastname and the department name of every employee. --

```
SELECT e.empno AS Employee_Number,  
       e.lastname,  
       Deref(e.workdept).deptname AS Dept_Name  
FROM oremp e;  
/
```

-- 2(c) For each department, display the department number, department name, and name of the administrative department. --

```
SELECT d.deptno,  
       d.deptname,  
       Deref(d.admrdept).deptname AS admin_dept_name  
FROM ORDEPT d;  
/
```

-- 2(d) For each department, display the department number, department name, the name of the administrative department and the last name of the manager of the administrative department.--

```
SELECT d.deptno,  
       d.deptname,  
       Deref(d.admrdept).deptname AS admin_dept_name,  
       Deref(Deref(d.admrdept).mgrno).lastname AS admin_mgr_lastname  
FROM ORDEPT d;  
/
```

-- 2(e) Display the employee number, firstname, lastname and salary of every employee, along with lastname and salary of the manager of the employee's work department. --

```
SELECT d.deptno,  
       d.deptname,  
       Deref(d.admrdept).deptname AS admin_dept_name,  
       Deref(Deref(d.admrdept).mgrno).lastname AS admin_mgr_lastname  
FROM ORDEPT d;  
/
```

-- 2(f) Show the average salary for men and the average salary for women for each department. Identify the department by both department number and name. --

```
SELECT Deref(e.workdept).deptno AS deptno,  
       Deref(e.workdept).deptname AS deptname,  
       AVG(CASE WHEN e.sex = 'M' THEN e.salary END) AS avg_male_salary,  
       AVG(CASE WHEN e.sex = 'F' THEN e.salary END) AS avg_female_salary  
FROM OREMP e  
GROUP BY Deref(e.workdept).deptno,  
         Deref(e.workdept).deptname;  
/
```

-- 04. To drop mutually dependent types, use: --

```
DROP TYPE emp_t FORCE;  
DROP TYPE dept_t FORCE;
```

```
DROP TABLE OREMP CASCADE CONSTRAINT;  
DROP TABLE ORDEPT CASCADE CONSTRAINT;
```

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