Hochschule München, Fakultät 07, SoSe 2016

**Datenbanken 2**

# Dokumentation zu Übung 2

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## Aufgabe 2 (1. Möglichkeit)

```
-------------------------------------------------------------
-- DDL for Type ADRESSE_T
-------------------------------------------------------------
CREATE OR REPLACE TYPE "ADRESSE_T" AS OBJECT(
Strasse VARCHAR2(30),
HNR INTEGER,
PLZ INTEGER,
Ort VARCHAR2(20)) NOT FINAL;
```

```
/
-------------------------------------------------------------
-- DDL for Type KONTENLISTE
-------------------------------------------------------------
CREATE OR REPLACE TYPE "KONTENLISTE" as table of REF Konto_t;
```

```
/
-------------------------------------------------------------
-- DDL for Type KONTENLISTE
-------------------------------------------------------------
CREATE OR REPLACE TYPE "KONTENLISTE" as table of REF Konto_t;
```

```
/
-------------------------------------------------------------
-- DDL for Type KONTO_T
-------------------------------------------------------------
CREATE OR REPLACE TYPE "KONTO_T" AS OBJECT(
KNR INTEGER,
Kontostand NUMBER(10,2),
Typ INTEGER(1)) NOT FINAL;
```

```
/
-------------------------------------------------------------
-- DDL for Type PERSON_T
-------------------------------------------------------------
CREATE OR REPLACE TYPE "PERSON_T" AS OBJECT(
Kd_NR INTEGER,
Nachname VARCHAR2(20),
Vorname VARCHAR2(20),
Adresse REF Adresse_t,
Status INTEGER(1),
Konten Kontenliste) NOT FINAL;
```

```
/
--------------------------------------------------------
--  DDL for Type ZWEIGSTELLE_T
--------------------------------------------------------
CREATE OR REPLACE TYPE "ZWEIGSTELLE_T" AS OBJECT(
ZName VARCHAR2(20),
Adresse REF Adresse_t,
Leiter    Integer,
Konten   Kontenliste) NOT FINAL;
```

```
/
--------------------------------------------------------
--  DDL for Table ADRESSEN
--------------------------------------------------------
CREATE TABLE "ADRESSEN" OF "ADRESSE_T"

--------------------------------------------------------
--  DDL for Table KONTEN
--------------------------------------------------------
CREATE TABLE "KONTEN" OF "KONTO_T"

--------------------------------------------------------
--  DDL for Table KUNDEN
--------------------------------------------------------
CREATE TABLE "KUNDEN" OF "PERSON_T"
NESTED TABLE "KONTEN" STORE AS "KONTEN_KD"

--------------------------------------------------------
--  DDL for Table ZWEIGSTELLEN
--------------------------------------------------------
CREATE TABLE "ZWEIGSTELLEN" OF "ZWEIGSTELLE_T"
NESTED TABLE "KONTEN" STORE AS "KONTEN_ZWEIGST"
```

## Aufgabe 3 (1. Möglichkeit)

```
-------------------------------------------------------------
--  Inserts in Table ADRESSEN
-------------------------------------------------------------
Insert into ADRESSEN (STRASSE,HNR,PLZ,ORT) values ('Simseestr.','3','80800','Musterhausen'
   );
Insert into ADRESSEN (STRASSE,HNR,PLZ,ORT) values ('Hochstr.','1','80000','Muenchhausen');
Insert into ADRESSEN (STRASSE,HNR,PLZ,ORT) values ('Eschenweg','12','80335','Muenchen');
Insert into ADRESSEN (STRASSE,HNR,PLZ,ORT) values ('Muenchnerstr.','33','80801','Muenchen'
   );
Insert into ADRESSEN (STRASSE,HNR,PLZ,ORT) values ('Schellingstr.','42','53620','
   Hasenbuettel');
```

```
-------------------------------------------------------------
--  Inserts in Table KONTEN
-------------------------------------------------------------
Insert into KONTEN (KNR,KONTOSTAND,TYP) values ('120768','234,56','0');
Insert into KONTEN (KNR,KONTOSTAND,TYP) values ('348973','12567,56','1');
Insert into KONTEN (KNR,KONTOSTAND,TYP) values ('678453','-456,78','1');
Insert into KONTEN (KNR,KONTOSTAND,TYP) values ('987654','789,65','1');
Insert into KONTEN (KNR,KONTOSTAND,TYP) values ('745363','-23,67','0');
```

```
-------------------------------------------------------------
--  Inserts in Table KUNDEN
-------------------------------------------------------------
Insert into KUNDEN values (PERSON_T('2345','Fach','Hans',(SELECT REF(adr) FROM ADRESSEN
   adr WHERE adr.STRASSE = 'Muenchnerstr.'),'0',Kontenliste()));
Insert into TABLE (SELECT KONTEN FROM KUNDEN WHERE KD_NR = '2345')(SELECT REF(k) FROM
   KONTEN k WHERE k.KNR = '120768' OR k.KNR = '348973');
```

```
Insert into KUNDEN values (PERSON_T('7654','Meier','Bernd',(SELECT REF(adr) FROM ADRESSEN
    adr WHERE adr.STRASSE = 'Eschenweg'),'1',Kontenliste((SELECT REF(k) FROM KONTEN k WHERE
     k.KNR = '987654'))));
Insert into KUNDEN values (PERSON_T('8764','Wiesner','Jan',(SELECT REF(adr) FROM ADRESSEN
    adr WHERE adr.STRASSE = 'Schellingstr.'),'0',Kontenliste()));
Insert into TABLE (SELECT KONTEN FROM KUNDEN WHERE KD_NR = '2345')(SELECT REF(k) FROM
    KONTEN k WHERE k.KNR = '348973' OR k.KNR = '678453' OR k.KNR = '745363');
```

```
-------------------------------------------------------------
--  Inserts in Table ZWEIGSTELLEN
-------------------------------------------------------------
Insert into ZWEIGSTELLEN values ('Bachdorf',(SELECT REF(adr) FROM ADRESSEN adr WHERE adr.
    strasse = 'Hochstr.'),'1768',Kontenliste());
Insert into TABLE (SELECT KONTEN FROM ZWEIGSTELLEN WHERE ZNAME = 'Bachdorf')(SELECT REF(k)
     FROM KONTEN k WHERE k.KNR = '120768' OR k.KNR = '348973' OR k.KNR = '678453');
Insert into ZWEIGSTELLEN values ('Riedering',(SELECT REF(adr) FROM ADRESSEN adr WHERE adr.
    strasse = 'Simseestr.'),'9823',Kontenliste());
Insert into TABLE (SELECT KONTEN FROM ZWEIGSTELLEN WHERE ZNAME = 'Riedering')(SELECT REF(k
    ) FROM KONTEN k WHERE k.KNR = '745363' OR k.KNR = '987654');
```



## Aufgabe 4 (1. Möglichkeit)

```
-------------------------------------------------------------
--  SELECT Statement gibt "alle Kontonummern mit Konostand, Art und Adresse der
    Zweigstelle" aus
-------------------------------------------------------------
SELECT z.ZNAME AS Zweigstellenname, DEREF(z.ADRESSE).STRASSE AS Strasse, DEREF(z.ADRESSE).
    HNR AS Hausnummer, DEREF(z.ADRESSE).PLZ AS PLZ, DEREF(z.ADRESSE).ORT AS ORT, DEREF(k.
```

```
COLUMN_VALUE).KNR AS Kontonummer, DEREF(k.COLUMN_VALUE).KONTOSTAND AS Kontonstand,
DEREF(k.COLUMN_VALUE).TYP AS Typ FROM ZWEIGSTELLEN z, TABLE(z.KONTEN) k;

--> Result
```

| ZWEIGSTELLENNAME | STRASSE | HAUSNUMMER | PLZ | ORT | KONTONUMMER | KONTOSTAND | TYP |
|---|---|---|---|---|---|---|---|
| Bachdorf | Hochstr. | 1 | 80000 | Muenchhausen | 120768 | 234,56 | 0 |
| Bachdorf | Hochstr. | 1 | 80000 | Muenchhausen | 348973 | 12567,56 | 1 |
| Bachdorf | Hochstr. | 1 | 80000 | Muenchhausen | 678453 | -456,78 | 1 |
| Riedering | Simseestr. | 3 | 80800 | Musterhausen | 987654 | 789,65 | 1 |
| Riedering | Simseestr. | 3 | 80800 | Musterhausen | 745363 | -23,67 | 0 |

```
-------------------------------------------------------------
-- SELECT Statement gibt "alle Kontonummern mit Adresse aller Kontoinhaber" aus
-------------------------------------------------------------
SELECT kd.VORNAME AS Vorname, kd.NACHNAME AS Nachname, DEREF(k.COLUMN_VALUE).KNR AS
Kontonummer, DEREF(kd.ADRESSE).STRASSE AS Strasse, DEREF(kd.ADRESSE).HNR AS Hausnummer,
DEREF(kd.ADRESSE).PLZ AS PLZ, DEREF(kd.ADRESSE).Ort AS ORT FROM KUNDEN kd, TABLE(kd.
KONTEN) k;

--> Result
```

| VORNAME | NACHNAME | KONTONUMMER | STRASSE | HAUSNUMMER | PLZ | ORT |
|---|---|---|---|---|---|---|
| Bernd | Meier | 987654 | Eschenweg | 12 | 80335 | Muenchen |
| Hans | Fach | 348973 | Muenchnerstr. | 33 | 80801 | Muenchen |
| Hans | Fach | 120768 | Muenchnerstr. | 33 | 80801 | Muenchen |
| Jan | Wiesner | 745363 | Schellingstr. | 42 | 53620 | Hasenbuettel |
| Jan | Wiesner | 348973 | Schellingstr. | 42 | 53620 | Hasenbuettel |
| Jan | Wiesner | 678453 | Schellingstr. | 42 | 53620 | Hasenbuettel |

## Aufgabe 2 (2. Möglichkeit)

```
--------------------------------------------------------
--  DDL for Type ADRESSE_T2
--------------------------------------------------------

CREATE OR REPLACE TYPE "ADRESSE_T2" AS OBJECT(
Strasse VARCHAR2(30),
HNR INTEGER,
PLZ INTEGER,
Ort VARCHAR2(20)) NOT FINAL;
```

```
/
--------------------------------------------------------
--  DDL for Type PERSON_T2
--------------------------------------------------------

CREATE OR REPLACE TYPE "PERSON_T2" AS OBJECT(
Kd_NR INTEGER,
Nachname VARCHAR2(20),
Vorname VARCHAR2(20),
Adresse REF Adresse_t2,
Status INTEGER(1)) NOT FINAL;
```

```
/
--------------------------------------------------------
--  DDL for Type KUNDENLISTE2
--------------------------------------------------------

CREATE OR REPLACE TYPE "KUNDENLISTE2" as table of REF PERSON_t2
    ;%
```

```
/
--------------------------------------------------------
--  DDL for Type KONTO_T2
--------------------------------------------------------

CREATE OR REPLACE TYPE "KONTO_T2" AS OBJECT(
KNR INTEGER,
Kontostand NUMBER(10,2),
Typ INTEGER(1),
Kunden2 Kundenliste2) NOT FINAL;
```

```
/
--------------------------------------------------------
--  DDL for Type KONTENLISTE2
--------------------------------------------------------
```

```
CREATE OR REPLACE TYPE "KONTENLISTE2" as table of Konto_t2;
```

```
/
--------------------------------------------------------
--  DDL for Type ZWEIGSTELLE_T2
--------------------------------------------------------
CREATE OR REPLACE TYPE "ZWEIGSTELLE_T2" AS OBJECT(
ZName VARCHAR2(20),
Adresse2 REF Adresse_t2,
Leiter    Integer,
Konten2   Kontenliste2) NOT FINAL;
```

```
/
--------------------------------------------------------
--  DDL for Table ADRESSEN2
--------------------------------------------------------
CREATE TABLE "ADRESSEN2" OF "ADRESSE_T2"
```

```
--------------------------------------------------------
--  DDL for Table KUNDEN2
--------------------------------------------------------
CREATE TABLE "KUNDEN2" OF "PERSON_T2"
```

```
--------------------------------------------------------
--  DDL for Table ZWEIGSTELLEN
--------------------------------------------------------
CREATE TABLE "ZWEIGSTELLEN2" OF "ZWEIGSTELLE_T2"
NESTED TABLE "KONTEN2" STORE AS "KONTEN_ZWEIGST2" (NESTED TABLE
    "KUNDEN2" STORE AS "KUNDEN_ZWEIGST2");
```

## Aufgabe 3 (2. Möglichkeit)

```
-------------------------------------------------------
--  Inserts in Table ADRESSEN2
-------------------------------------------------------
Insert into ADRESSEN2 (STRASSE,HNR,PLZ,ORT) values ('Simseestr.','3','80800','Musterhausen
    ');
Insert into ADRESSEN2 (STRASSE,HNR,PLZ,ORT) values ('Hochstr.','1','80000','Muenchhausen')
    ;
Insert into ADRESSEN2 (STRASSE,HNR,PLZ,ORT) values ('Eschenweg','12','80335','Muenchen');
Insert into ADRESSEN2 (STRASSE,HNR,PLZ,ORT) values ('Muenchnerstr.','33','80801','Muenchen
    ');
Insert into ADRESSEN2 (STRASSE,HNR,PLZ,ORT) values ('Schellingstr.','42','53620','
    Hasenbuettel');
```

```
-------------------------------------------------------
--  Inserts in Table KUNDEN2
-------------------------------------------------------
Insert into KUNDEN2 values ('2345','Fach','Hans',(SELECT REF(adr) FROM ADRESSEN2 adr WHERE
     adr.STRASSE = 'Muenchnerstr.'),'0');
Insert into KUNDEN2 values ('7654','Meier','Bernd',(SELECT REF(adr) FROM ADRESSEN2 adr
    WHERE adr.STRASSE = 'Eschenweg'),'1');
Insert into KUNDEN2 values ('8764','Wiesner','Jan',(SELECT REF(adr) FROM ADRESSEN2 adr
    WHERE adr.STRASSE = 'Schellingstr.'),'0');
```

```
-------------------------------------------------------
--  Inserts in Table ZWEIGSTELLEN
-------------------------------------------------------
Insert into ZWEIGSTELLEN2 values ('Bachdorf',(SELECT REF(adr) FROM ADRESSEN2 adr WHERE adr
    .STRASSE = 'Hochstr.'),'1768',Kontenliste2(KONTO_T2('120768','234,56','0',Kundenliste2
```

```
    ()),KONTO_T2('348973','12567,56','1',Kundenliste2()),KONTO_T2('678453','-456,78','1',
    Kundenliste2())));
--> Bemerkung: INSERT into table (SELECT z.KONTEN2 FROM ZWEIGSTELLEN2 z WHERE z.ZNAME ='
    BACHDORF') values('678453','-456,78','1',Kundenliste2()); //Einfuegen in die Nested
    Table Konten
Insert into ZWEIGSTELLEN2 values ('Riedering',(SELECT REF(adr) FROM ADRESSEN2 adr WHERE
    adr.STRASSE = 'Simseestr.'),'9823',Kontenliste2(KONTO_T2('987654','789,65','1',
    Kundenliste2((SELECT REF(kd) FROM KUNDEN2 kd WHERE kd.KD_NR = '8764'))),KONTO_T2('
    745363','-23,67','0',Kundenliste2((SELECT REF(kd) FROM KUNDEN2 kd WHERE kd.KD_NR = '
    7654')))));

-- befuellen der jeweiligen NESTED TABLE Kundenliste2
Insert into TABLE (SELECT k.KUNDEN2 FROM ZWEIGSTELLEN2 z, TABLE(z.KONTEN2) k WHERE z.ZNAME
    = 'Bachdorf' AND k.KNR = '120768')(SELECT REF(kd) FROM KUNDEN2 kd WHERE kd.KD_NR = '
    2345');
Insert into TABLE (SELECT k.KUNDEN2 FROM ZWEIGSTELLEN2 z, TABLE(z.KONTEN2) k WHERE z.ZNAME
    = 'Bachdorf' AND k.KNR = '348973')(SELECT REF(kd) FROM KUNDEN2 kd WHERE kd.KD_NR = '
    2345' OR kd.KD_NR = '8764');
Insert into TABLE (SELECT k.KUNDEN2 FROM ZWEIGSTELLEN2 z, TABLE(z.KONTEN2) k WHERE z.ZNAME
    = 'Bachdorf' AND k.KNR = '678453')(SELECT REF(kd) FROM KUNDEN2 kd WHERE kd.KD_NR = '
    8764');

-- Alternatvie wenn SELECT nicht direkt in Kundenliste2()
--> Insert into TABLE (SELECT k.KUNDEN2 FROM ZWEIGSTELLEN2 z, TABLE(z.KONTEN2) k WHERE z.
    ZNAME = 'Riedering' AND k.KNR = '987654')(SELECT REF(kd) FROM KUNDEN2 kd WHERE kd.KD_NR
    = '7654');
--> Insert into TABLE (SELECT k.KUNDEN2 FROM ZWEIGSTELLEN2 z, TABLE(z.KONTEN2) k WHERE z.
    ZNAME = 'Riedering' AND k.KNR = '745363')(SELECT REF(kd) FROM KUNDEN2 kd WHERE kd.KD_NR
    = '8764');
```

## Aufgabe 4 (2. Möglichkeit)

```
-------------------------------------------------------------
-- SELECT Statement gibt "alle Kontonummern mit Konostand, Art und Adresse der
   Zweigstelle" aus
-------------------------------------------------------------
SELECT z.ZNAME AS Filiale, DEREF(z.ADRESSE2).STRASSE AS Strasse, DEREF(z.ADRESSE2).HNR AS
    Hausnummer, DEREF(z.ADRESSE2).PLZ AS PLZ, DEREF(z.ADRESSE2).ORT AS Ort ,k.KNR AS
    Kontonummer, k.KONTOSTAND AS Kontostand, k.TYP AS Typ FROM ZWEIGSTELLEN2 z, TABLE(z.
    KONTEN2) k;

--> Result:
```

| FILIALE | STRASSE | HAUSNUMMER | PLZ | ORT | KONTONUMMER | KONTOSTAND | TYP |
|---|---|---|---|---|---|---|---|
| Bachdorf | Hochstr. | 1 | 80000 | Muenchhausen | 120768 | 234,56 | 0 |
| Bachdorf | Hochstr. | 1 | 80000 | Muenchhausen | 348973 | 12567,56 | 1 |
| Bachdorf | Hochstr. | 1 | 80000 | Muenchhausen | 678453 | -456,78 | 1 |
| Riedering | Simseestr. | 3 | 80800 | Musterhausen | 987654 | 789,65 | 1 |
| Riedering | Simseestr. | 3 | 80800 | Musterhausen | 745363 | -23,67 | 0 |

```
-------------------------------------------------------------
-- SELECT Statement gibt "alle Kontonummern mit Adresse aller Kontoinhaber" aus
-------------------------------------------------------------
SELECT DEREF(kd.COLUMN_VALUE).VORNAME AS Vorname, DEREF(kd.COLUMN_VALUE).NACHNAME AS
    Nachname, DEREF(DEREF(kd.COLUMN_VALUE).ADRESSE).STRASSE AS Strasse, DEREF(DEREF(kd.
    COLUMN_VALUE).ADRESSE).HNR AS Hausnummer, DEREF(DEREF(kd.COLUMN_VALUE).ADRESSE).PLZ AS
    PLZ, DEREF(DEREF(kd.COLUMN_VALUE).ADRESSE).ORT AS Ort, k.KNR AS Kontonummer, k.
    Kontostand AS Kontostand FROM ZWEIGSTELLEN2 z, TABLE(z.KONTEN2) k, TABLE(k.KUNDEN2) kd;

--> Result:
```

| VORNAME | NACHNAME | STRASSE | HAUSNUMMER | PLZ | ORT | KONTONUMMER | KONTOSTAND |
|---|---|---|---|---|---|---|---|
| Hans | Fach | Muenchnerstr. | 33 | 80801 | Muenchen | 120768 | 234,56 |
| Hans | Fach | Muenchnerstr. | 33 | 80801 | Muenchen | 348973 | 12567,56 |
| Jan | Wiesner | Schellingstr. | 42 | 53620 | Hasenbuettel | 348973 | 12567,56 |
| Jan | Wiesner | Schellingstr. | 42 | 53620 | Hasenbuettel | 678453 | -456,78 |
| Jan | Wiesner | Schellingstr. | 42 | 53620 | Hasenbuettel | 987654 | 789,65 |
| Bernd | Meier | Eschenweg | 12 | 80335 | Muenchen | 745363 | -23,67 |

## Aufgabe 5

```
-------------------------------------------------------------
--  DDL for Type PHONENUMBERLIST (NESTED TABLE in CONTACT)
-------------------------------------------------------------
  CREATE OR REPLACE TYPE "PHONENUMBERLIST" as table of VARCHAR2
      (12);

/
-------------------------------------------------------------
--  DDL for Type CONTACT_T (GLOBALE TABLE)
-------------------------------------------------------------
  CREATE OR REPLACE TYPE "CONTACT_T" AS OBJECT(
Street  VARCHAR2(30),
HNUMBER INTEGER,
Code VARCHAR2(5),
City VARCHAR2(20),
Phone_Numbers PHONENUMBERLIST,
Fax VARCHAR2(12)) NOT FINAL;
```

```
/
-------------------------------------------------------------
--  DDL for Type SHAREHOLDER_T (GLOBALE TABLE)
-------------------------------------------------------------
CREATE OR REPLACE TYPE "SHAREHOLDER_T" AS OBJECT(
Sholder_ID  INTEGER,
Sholder_Name VARCHAR2(30),
Sholder_Contact REF Contact_T) NOT FINAL;

/
-------------------------------------------------------------
--  DDL for Type OWN_SHARES_T
-------------------------------------------------------------
  CREATE OR REPLACE TYPE "OWN_SHARES_T" AS OBJECT(
Sholder_ID REF Shareholder_t,
Share_Amount INTEGER) NOT FINAL;

/
-------------------------------------------------------------
--  DDL for Type SHAREHOLDERLIST (NESTED TABLE in COMPANY)
-------------------------------------------------------------
  CREATE OR REPLACE TYPE "SHAREHOLDERLIST" as table of
      Own_Shares_t;
```

```
/
-----------------------------------------------------------------
-- DDL for Type MANAGEMENT_T (GLOBALE TABLE)
-----------------------------------------------------------------
  CREATE OR REPLACE TYPE "MANAGEMENT_T" AS OBJECT(
Manag_ID INTEGER,
Manag_Name VARCHAR2(30),
Manag_Contact REF Contact_T) NOT FINAL;

/
-----------------------------------------------------------------
-- DDL for Type DIRECTOR_T
-----------------------------------------------------------------
  CREATE OR REPLACE TYPE "DIRECTOR_T" AS OBJECT(
Manag_ID REF Management_t,
Bonus INTEGER) NOT FINAL;

/
-----------------------------------------------------------------
-- DDL for Type DIRECTORLIST (NESTED TABLE in COMPANY)
-----------------------------------------------------------------
  CREATE OR REPLACE TYPE "DIRECTORLIST" as table of Director_t;

/
-----------------------------------------------------------------
-- DDL for Type MANAGER_T
-----------------------------------------------------------------
  CREATE OR REPLACE TYPE "MANAGER_T" AS OBJECT(
Manag_ID REF Management_t,
Manag_Type VARCHAR2(30),
Yearly_Salary VARCHAR2(10)) NOT FINAL;

/
-----------------------------------------------------------------
-- DDL for Type MANAGERLIST (NESTED TABLE in COMPANY)
-----------------------------------------------------------------
  CREATE OR REPLACE TYPE "MANAGERLIST" as table of Manager_t;
```

```
/
-----------------------------------------------------------------
-- DDL for Type EMPLOYEE_T
-----------------------------------------------------------------
  CREATE OR REPLACE TYPE "EMPLOYEE_T" AS OBJECT(
```

```
Emp_ID VARCHAR2(5),
Emp_Name VARCHAR2(30),
Emp_Contact REF Contact_T) NOT FINAL;

/
-----------------------------------------------------------------
--  DDL for Type EMPLOYEE_FULLTIME_T
-----------------------------------------------------------------
  CREATE OR REPLACE TYPE "EMPLOYEE_FULLTIME_T" UNDER "
      EMPLOYEE_T" (
   Annual_Wage INTEGER,
   Emp_Bonus INTEGER) NOT FINAL;

/
-----------------------------------------------------------------
--  DDL for Type EMPLOYEE_PARTTIME_T
-----------------------------------------------------------------
  CREATE OR REPLACE TYPE "EMPLOYEE_PARTTIME_T" UNDER "
      EMPLOYEE_T" (
   Weekly_Wage INTEGER) NOT FINAL;

/
-----------------------------------------------------------------
--  DDL for Type EMPLOYEE_CASUAL_T
-----------------------------------------------------------------
  CREATE OR REPLACE TYPE "EMPLOYEE_CASUAL_T" UNDER "EMPLOYEE_T"
      (
   Hourly_Wage INTEGER) NOT FINAL;

/
-----------------------------------------------------------------
--  DDL for Type EMPLOYEELIST (NESTED TABLE in DEPARTMENT)
-----------------------------------------------------------------
  CREATE OR REPLACE TYPE "EMPLOYEELIST" as table of Employee_t;
```

```
/
-----------------------------------------------------------------
--  DDL for Type DEPARTMENT_T
-----------------------------------------------------------------
  CREATE OR REPLACE TYPE "DEPARTMENT_T" AS OBJECT(
Dept_ID INTEGER,
Dept_Name VARCHAR2(20),
Dept_Head VARCHAR2(25),
Dept_Employees EMPLOYEELIST) NOT FINAL;
```

```
/
-------------------------------------------------------------------
-- DDL for Type DEPARTMENTS (NESTED TABLE in STORE)
-------------------------------------------------------------------
  CREATE OR REPLACE TYPE "DEPARTMENTLIST" as table of
     Department_t;
```

```
/
-------------------------------------------------------------------
-- DDL for Type TRANSACTION_T (GLOBALE TABLE)
-------------------------------------------------------------------
  CREATE OR REPLACE TYPE "TRANSACTION_T" AS OBJECT(
Trans_ID INTEGER,
Trans_Date DATE,
Store_Contact REF Contact_T,
Quantity INTEGER) NOT FINAL;

/
-------------------------------------------------------------------
-- DDL for Type TRANSACTIONLIST (NESTED TABLE in ITEM)
-------------------------------------------------------------------
  CREATE OR REPLACE TYPE "TRANSACTIONLIST" as table of REF
     Transaction_t;
```

```
/
-------------------------------------------------------------------
-- DDL for Type ITEM_T (GLOBALE TABLE)
-------------------------------------------------------------------
  CREATE OR REPLACE TYPE "ITEM_T" AS OBJECT(
Item_ID VARCHAR2(5),
Item_Name VARCHAR2(20),
Item_Desc VARCHAR2(20),
Item_Cost VARCHAR2(4),
Item_Price VARCHAR2(5),
Item_Trans TRANSACTIONLIST) NOT FINAL;

/
-------------------------------------------------------------------
-- DDL for Type ITEMLIST (NESTED TABLE in MAKER)
-------------------------------------------------------------------
  CREATE OR REPLACE TYPE "ITEMLIST" as table of REF Item_t;
```

```
/
-----------------------------------------------------------------
--  DDL for Type AVAILABLE_IN_T
-----------------------------------------------------------------

  CREATE OR REPLACE TYPE "AVAILABLE_IN_T" AS OBJECT(
Item_ID REF Item_t,
Item_Stock INTEGER) NOT FINAL;

/
-----------------------------------------------------------------
--  DDL for Type AVAILABLELIST (NESTED TABLE in STORE)
-----------------------------------------------------------------

  CREATE OR REPLACE TYPE "AVAILABLELIST" as table of
     Available_In_t;
```

```
/
-----------------------------------------------------------------
--  DDL for Type STORE_T
-----------------------------------------------------------------

  CREATE OR REPLACE TYPE "STORE_T" AS OBJECT(
Store_ID VARCHAR2(5),
Store_Location VARCHAR2(20),
Store_Contact REF Contact_T,
Store_Manage VARCHAR2(30),
Store_Depts DEPARTMENTLIST,
Store_Items AVAILABLELIST) NOT FINAL;

/
-----------------------------------------------------------------
--  DDL for Type STORELIST (NESTED TABLE in COMPANY)
-----------------------------------------------------------------

  CREATE OR REPLACE TYPE "STORELIST" as table of Store_t;
```

```
/
-----------------------------------------------------------------
--  DDL for Type CUSTOMER_T (GLOBALE TABLE)
-----------------------------------------------------------------

  CREATE OR REPLACE TYPE "CUSTOMER_T" AS OBJECT(
Cust_ID VARCHAR2(5),
Cust_Name VARCHAR2(20),
Cust_Contact REF Contact_t,
Cust_Gender INTEGER(1),
Cust_DOB DATE,
```

```
Cust_Bonus_Points INTEGER,
Cust_Trans TRANSACTIONLIST) NOT FINAL;
```

```
/
-----------------------------------------------------------------
-- DDL for Type MAKER_T (GLOBALE TABLE)
-----------------------------------------------------------------

  CREATE OR REPLACE TYPE "MAKER_T" AS OBJECT(
Maker_ID VARCHAR2(5),
Maker_Name VARCHAR2(20),
Maker_Contact REF Contact_T,
Items ITEMLIST) NOT FINAL;
```

```
/
-----------------------------------------------------------------
-- DDL for Type COMP_TYPE_T
-----------------------------------------------------------------

  CREATE OR REPLACE TYPE "COMP_TYPE_T" AS OBJECT(
Typ_Desc VARCHAR2(30)) NOT FINAL;

/
-----------------------------------------------------------------
-- DDL for Type COMP_TYPE1_T
-----------------------------------------------------------------

  CREATE OR REPLACE TYPE "COMP_TYPE1_T" UNDER COMP_TYPE_T(
Area  VARCHAR2(5)) NOT FINAL;

/
-----------------------------------------------------------------
-- DDL for Type COMP_TYPE2_T
-----------------------------------------------------------------

  CREATE OR REPLACE TYPE "COMP_TYPE2_T" UNDER COMP_TYPE_T(
Market  VARCHAR2(10)) NOT FINAL;

/
-----------------------------------------------------------------
-- DDL for Type COMPANY_T (GLOBALE TABLE)
-----------------------------------------------------------------
CREATE OR REPLACE TYPE "COMPANY_T" AS OBJECT(
Comp_ID  INTEGER,
Comp_Name VARCHAR2(20),
Comp_Contact REF Contact_T,
Comp_Type COMP_TYPE_T,
```

```
Comp_Sholders SHAREHOLDERLIST,
Comp_Manager MANAGERLIST,
Comp_Directors DIRECTORLIST,
Comp_Stores STORELIST) NOT FINAL;
```

```
-----------------------------------------------------------
-- DDL for Table CONTACT
-----------------------------------------------------------

  CREATE TABLE "CONTACT" OF "CONTACT_T"
  NESTED TABLE "PHONE_NUMBERS" STORE AS "PHONE";

-----------------------------------------------------------
-- DDL for Table SHAREHOLDERS
-----------------------------------------------------------

  CREATE TABLE "SHAREHOLDERS" OF "SHAREHOLDER_T";

-----------------------------------------------------------
-- DDL for Table MANAGEMENT
-----------------------------------------------------------

  CREATE TABLE "MANAGEMENT" OF "MANAGEMENT_T";

-----------------------------------------------------------
-- DDL for Table ITEMS
-----------------------------------------------------------

  CREATE TABLE "ITEMS" OF "ITEM_T"
  NESTED TABLE "ITEM_TRANS" STORE AS "TRANSACTIONS_ITEM";

-----------------------------------------------------------
-- DDL for Table TRANSACTIONS
-----------------------------------------------------------

  CREATE TABLE "TRANSACTIONS" OF "TRANSACTION_T";

-----------------------------------------------------------
-- DDL for Table MAKER
-----------------------------------------------------------

  CREATE TABLE "MAKER" OF "MAKER_T"
  NESTED TABLE "ITEMS" STORE AS "ITEMS_MAKER";

-----------------------------------------------------------
-- DDL for Table CUSTOMERS
-----------------------------------------------------------

  CREATE TABLE "CUSTOMERS" OF "CUSTOMER_T"
  NESTED TABLE "CUST_TRANS" STORE AS "TRANSACTIONS_CUST";
```

```
-- ------------------------------------------------------
-- DDL for Table COMPANIES
-- ------------------------------------------------------
  CREATE TABLE "COMPANIES" OF "COMPANY_T"
  NESTED TABLE "COMP_SHOLDERS" STORE AS "SHOLDRES"
  NESTED TABLE "COMP_MANAGER" STORE AS "MANAGER"
  NESTED TABLE "COMP_DIRECTORS" STORE AS "DIRECTOR"
  NESTED TABLE "COMP_STORES" STORE AS "STORES" (NESTED TABLE "
      STORE_DEPTS" STORE AS "DEPARTMENTS_STORE" (NESTED TABLE "
      DEPT_EMPLOYEES" STORE AS "EMPLOYEES_DEPT") )
```