UNIVERSITATEA DIN BUCUREȘTI
FACULTATEA DE MATEMATICĂ ȘI INFORMATICĂ
SPECIALIZAREA INFORMATICĂ

DATA WAREHOUSE & BUSINESS INTELLIGENCE
- SCURSA -

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Exercitiul 1: Crearea bazei de date OLTP și a utilizatorilor

Crearea bazei de date OLTP

```
drop table client cascade constraints;
create table client(
id_client number(10) generated by default on null as identity,
nume varchar2(100),
tip_client varchar2(50) not null,
data_inscriere date default sysdate not null,
data_incetare date,
constraint client_pk primary key(id_client),
constraint client_uk unique (nume),
constraint client_ck check (tip_client in ('PF','PJ')));


drop table cont cascade constraints;
create table cont(
id_cont number(10) generated by default on null as identity,
tip_cont varchar2(10) not null,
nume_cont varchar2(20) not null,
sold number(10,2) default 0 not null,
data_creare date default sysdate not null,
data_inchidere date,
cod_client number(10) not null,
constraint cont_pk primary key(id_cont),
constraint cont_uk1 unique (cod_client, tip_cont),
constraint cont_uk2 unique (nume_cont),
constraint cont_ck check (tip_cont in ('CURENT', 'ECONOMII', 'IMPRUMUT')),
constraint cnt_fk_clnt foreign key (cod_client) references client(id_client));

drop table card cascade constraints;
create table card(
id_card number(10) generated by default on null as identity,
cod_cont number(10) not null,
```

```
tip_card varchar2(10) not null,
data_emitere date default sysdate not null,
data_expirare date,
numar_card varchar2(30),
constraint card_pk primary key(id_card),
constraint card_uk unique(numar_card),
constraint card_ck check (tip_card in ('DEBIT', 'CREDIT')),
constraint card_fk_cont foreign key (cod_cont) references cont(id_cont));


drop table tranzactii cascade constraints;
create table tranzactii(
id_tranzactie number(10) generated by default on null as identity,
suma number(10,2) not null,
cod_cont_debitor number(10) not null,
cod_cont_creditor number(10) not null,
data_initiere date not null,
data_procesare date,
stare varchar2(50) not null,
constraint trn_pk primary key(id_tranzactie),
constraint trn_ck check (stare in ('Initiat', 'Procesat', 'Eroare')),
constraint trn_fk_cont_db foreign key (cod_cont_debitor) references cont(id_cont),
constraint trn_fk_cont_cr foreign key (cod_cont_creditor) references cont(id_cont));

drop table comerciant cascade constraints;
create table comerciant(
id_comerciant number(10) generated by default on null as identity,
cod_client number(10),
nume varchar2(100) not null,
data_inscriere date not null,
data_incetare date,
constraint com_pk primary key(id_comerciant),
constraint com_fk_clnt foreign key (cod_client) references client(id_client)
);
```

```
drop table locatie cascade constraints;

create table locatie (

id_locatie number(10) generated by default on null as identity,

strada varchar2(100),

oras   varchar2(100),

tara varchar2(100),

site varchar2(100),

constraint loc_pk primary key(id_locatie));


drop table canal_plata cascade constraints;

create table canal_plata(

cod_comerciant number(10) not null,

cod_locatie number(10) not null,

tip_echipament varchar2(10) not null,

cod_cont number(10) not null,

data_inceput date not null,

data_incetare date,

constraint cnl_plt_uk unique(cod_comerciant, cod_cont),

constraint cnl_plt_ck check (tip_echipament in ('POS', 'ONLINE')),

constraint cnl_plt_fk_comrt foreign key (cod_comerciant) references
comerciant(id_comerciant),

constraint cnl_plt_fk_cont foreign key (cod_cont) references cont(id_cont),

constraint cnl_plt_fk_loc foreign key (cod_locatie) references locatie(id_locatie));



insert into client(nume, tip_client, data_inscriere, data_incetare) values ('Popescu
Ion', 'PF', sysdate - 10, null);

insert into client(nume, tip_client, data_inscriere, data_incetare) values ('Alexandru
Petre', 'PF', sysdate - 5, null);

insert into client(nume, tip_client, data_inscriere, data_incetare) values ('Auchan',
'PJ', sysdate - 100 , null);

insert into client(nume, tip_client, data_inscriere, data_incetare) values
('Carrefour', 'PJ', sysdate - 200, null);

insert into client(nume, tip_client, data_inscriere, data_incetare) values ('George
Banica', 'PF', sysdate - 1, null);
```

```
insert into client(nume, tip_client, data_inscriere, data_incetare) values ('Mega
Image', 'PJ', sysdate - 300, null);

insert into client(nume, tip_client, data_inscriere, data_incetare) values ('Camil
Ressu', 'PF', sysdate - 300, sysdate);

insert into client(nume, tip_client, data_inscriere, data_incetare) values ('Mihail
Sadoveanu', 'PF', sysdate, null);

insert into client(nume, tip_client, data_inscriere, data_incetare) values ('Alexandru
Vlahuta', 'PF', sysdate-1, null);

insert into client(nume, tip_client, data_inscriere, data_incetare) values ('Penny',
'PJ', sysdate-500, null);

insert into client(nume, tip_client, data_inscriere, data_incetare) values ('Glovo',
'PJ', sysdate-50, null);

commit;


insert into comerciant(nume, cod_client, data_inscriere) values ('Auchan',

(select id_client from client where nume = 'Auchan'), sysdate - 100);

insert into comerciant(nume, cod_client, data_inscriere) values ('Carrefour',

(select id_client from client where nume = 'Carrefour'), sysdate - 200);

insert into comerciant(nume, cod_client, data_inscriere) values ('Mega Image',

(select id_client from client where nume = 'Mega Image'), sysdate - 300);

insert into comerciant(nume, cod_client, data_inscriere) values ('Penny',

(select id_client from client where nume = 'Penny'), sysdate - 500);

insert into comerciant(nume, cod_client, data_inscriere) values ('Glovo',

(select id_client from client where nume = 'Glovo'), sysdate - 50);

commit;


insert into cont(tip_cont, sold, nume_cont, cod_client) values ('CURENT',  25.39,
'RO49POCB1V3100759384', (select id_client from client where nume = 'Popescu Ion'));

insert into cont(tip_cont, sold, nume_cont, cod_client) values ('CURENT', 120.45,
'RO49POCD2X7100869495', (select id_client from client where nume = 'Alexandru
Petre'));

insert into cont(tip_cont, sold, nume_cont, cod_client) values ('CURENT',  67.85,
'RO49POCG5Z4200292728', (select id_client from client where nume = 'George Banica'));

insert into cont(tip_cont, sold, nume_cont, cod_client) values ('CURENT', 143.20,
'RO49POCE6T5300303839', (select id_client from client where nume = 'Camil Ressu'));

insert into cont(tip_cont, sold, nume_cont, cod_client) values ('CURENT',  70.50,
'RO49POCJ5S5300303839', (select id_client from client where nume = 'Mihail
Sadoveanu'));
```

```
insert into cont(tip_cont, sold, nume_cont, cod_client) values ('CURENT',  93.82,
'RO49POCH5K5300303839', (select id_client from client where nume = 'Alexandru
Vlahuta'));

insert into cont(tip_cont, sold, nume_cont, cod_client) values ('CURENT', 398.00,
'RO49POCE3Y8200970506', (select id_client from client where nume = 'Auchan'));

insert into cont(tip_cont, sold, nume_cont, cod_client) values ('CURENT', 450.30,
'RO49POCF4W9300181617', (select id_client from client where nume = 'Carrefour'));

insert into cont(tip_cont, sold, nume_cont, cod_client) values ('CURENT', 750.20,
'RO49POCH5P8400460329', (select id_client from client where nume = 'Mega Image'));

insert into cont(tip_cont, sold, nume_cont, cod_client) values ('CURENT', 556.20,
'RO49POCL6D9500570430', (select id_client from client where nume = 'Penny'));

insert into cont(tip_cont, sold, nume_cont, cod_client) values ('CURENT', 950.80,
'RO49POCU7M4600981541', (select id_client from client where nume = 'Glovo'));

commit;


insert into card(tip_card, cod_cont, data_emitere, numar_card) values

('DEBIT', (select id_cont from cont, client where cod_client = id_client and nume =
'Popescu Ion'),

sysdate - 100, '4012888888881881');

insert into card(tip_card, cod_cont, data_emitere, numar_card) values ('CREDIT',

(select id_cont from cont, client where cod_client = id_client and nume = 'Alexandru
Petre'),

sysdate - 30, '5019717010103742');

insert into card(tip_card, cod_cont, data_emitere, numar_card) values ('DEBIT',

(select id_cont from cont, client where cod_client = id_client and nume = 'George
Banica'),

sysdate - 80, '5610591081018250');

insert into card(tip_card, cod_cont, data_emitere, numar_card) values ('CREDIT',

(select id_cont from cont, client where cod_client = id_client and nume = 'Camil
Ressu'),

sysdate - 60, '6721691081018250');

insert into card(tip_card, cod_cont, data_emitere, numar_card) values ('DEBIT',

(select id_cont from cont, client where cod_client = id_client and nume = 'Mihail
Sadoveanu'),

sysdate - 55, '5721691082019361');

insert into card(tip_card, cod_cont, data_emitere, numar_card) values ('CREDIT',

(select id_cont from cont, client where cod_client = id_client and nume = 'Alexandru
Vlahuta'),

sysdate - 45, '5832701071019361');

commit;
```

```
insert into locatie(tara, oras, strada) values ('Romania', 'Bucuresti', 'Bacovia 12');
-- Auchan

insert into locatie(tara, oras, strada) values ('Romania', 'Constanta', 'Arghezi 20');
-- Carrefour

insert into locatie(tara, oras, strada) values ('Romania', 'Brasov', 'Rebreanu 4'); --
Mega Image

insert into locatie(tara, oras, strada) values ('Romania', 'Timisoara', 'Eminescu
56'); -- Penny

insert into locatie(site) values ('http://glovo.ro'); -- Glovo

commit;



insert into canal_plata(cod_comerciant, tip_echipament, cod_cont, data_inceput,
cod_locatie) values

((select id_comerciant from comerciant where nume = 'Auchan'), 'POS',

(select id_cont from cont, client where cod_client = id_client and nume = 'Auchan'),

sysdate - 30, (select id_locatie from locatie where oras = 'Bucuresti'));

insert into canal_plata(cod_comerciant, tip_echipament, cod_cont, data_inceput,
cod_locatie) values

((select id_comerciant from comerciant where nume = 'Carrefour'), 'POS',

(select id_cont from cont, client where cod_client = id_client and nume =
'Carrefour'),

sysdate - 20, (select id_locatie from locatie where oras = 'Constanta'));

insert into canal_plata(cod_comerciant, tip_echipament, cod_cont, data_inceput,
cod_locatie) values

((select id_comerciant from comerciant where nume = 'Mega Image'), 'POS',

(select id_cont from cont, client where cod_client = id_client and nume = 'Mega
Image'),

sysdate - 10, (select id_locatie from locatie where oras = 'Brasov'));

insert into canal_plata(cod_comerciant, tip_echipament, cod_cont, data_inceput,
cod_locatie) values

((select id_comerciant from comerciant where nume = 'Penny'), 'POS',

(select id_cont from cont, client where cod_client = id_client and nume = 'Penny'),

sysdate - 40, (select id_locatie from locatie where oras = 'Timisoara'));

insert into canal_plata(cod_comerciant, tip_echipament, cod_cont, data_inceput,
cod_locatie) values

((select id_comerciant from comerciant where nume = 'Glovo'), 'ONLINE',
```

```
(select id_cont from cont, client where cod_client = id_client and nume = 'Glovo'),

sysdate - 50, (select id_locatie from locatie where site = 'http://glovo.ro'));

commit;

Insert into CANAL_PLATA
(COD_COMERCIANT,COD_LOCATIE,TIP_ECHIPAMENT,COD_CONT,DATA_INCEPUT,DATA_INCETARE) values
(1,1,'POS',7,to_date('26-DEC-22','DD-MON-RR'),null);

Insert into CANAL_PLATA
(COD_COMERCIANT,COD_LOCATIE,TIP_ECHIPAMENT,COD_CONT,DATA_INCEPUT,DATA_INCETARE) values
(2,2,'POS',8,to_date('05-JAN-23','DD-MON-RR'),null);

Insert into CANAL_PLATA
(COD_COMERCIANT,COD_LOCATIE,TIP_ECHIPAMENT,COD_CONT,DATA_INCEPUT,DATA_INCETARE) values
(3,3,'POS',9,to_date('15-JAN-23','DD-MON-RR'),null);

Insert into CANAL_PLATA
(COD_COMERCIANT,COD_LOCATIE,TIP_ECHIPAMENT,COD_CONT,DATA_INCEPUT,DATA_INCETARE) values
(4,4,'POS',10,to_date('16-DEC-22','DD-MON-RR'),null);

Insert into CANAL_PLATA
(COD_COMERCIANT,COD_LOCATIE,TIP_ECHIPAMENT,COD_CONT,DATA_INCEPUT,DATA_INCETARE) values
(5,5,'ONLINE',11,to_date('06-DEC-22','DD-MON-RR'),null);

Insert into CANAL_PLATA
(COD_COMERCIANT,COD_LOCATIE,TIP_ECHIPAMENT,COD_CONT,DATA_INCEPUT,DATA_INCETARE) values
(4,1,'POS',1,to_date('27-DEC-22','DD-MON-RR'),null);

Insert into CANAL_PLATA
(COD_COMERCIANT,COD_LOCATIE,TIP_ECHIPAMENT,COD_CONT,DATA_INCEPUT,DATA_INCETARE) values
(3,3,'POS',3,to_date('16-JAN-23','DD-MON-RR'),null);

Insert into CANAL_PLATA
(COD_COMERCIANT,COD_LOCATIE,TIP_ECHIPAMENT,COD_CONT,DATA_INCEPUT,DATA_INCETARE) values
(3,4,'POS',4,to_date('17-DEC-22','DD-MON-RR'),null);

Insert into CANAL_PLATA
(COD_COMERCIANT,COD_LOCATIE,TIP_ECHIPAMENT,COD_CONT,DATA_INCEPUT,DATA_INCETARE) values
(1,5,'ONLINE',5,to_date('07-DEC-22','DD-MON-RR'),null);

Insert into CANAL_PLATA
(COD_COMERCIANT,COD_LOCATIE,TIP_ECHIPAMENT,COD_CONT,DATA_INCEPUT,DATA_INCETARE) values
(2,5,'ONLINE',6,to_date('07-DEC-22','DD-MON-RR'),null);

Insert into CANAL_PLATA
(COD_COMERCIANT,COD_LOCATIE,TIP_ECHIPAMENT,COD_CONT,DATA_INCEPUT,DATA_INCETARE) values
(4,1,'POS',2,to_date('27-DEC-22','DD-MON-RR'),null);

commit;


insert into tranzactii(suma, cod_cont_debitor, cod_cont_creditor, data_initiere,
data_procesare, stare) values

(25.43, (select id_cont from cont, client where cod_client = id_client and nume =
'Alexandru Petre'), (select id_cont from cont, client where cod_client = id_client and
nume = 'Auchan'),

sysdate - 30, sysdate -30 + 1/24/60, 'Procesat');
```

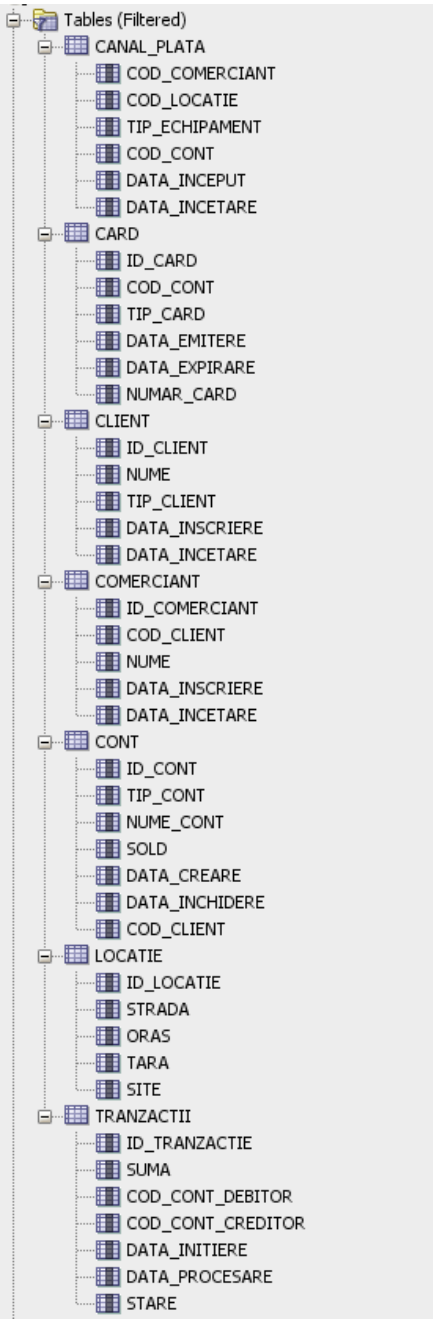
```
insert into tranzactii(suma, cod_cont_debitor, cod_cont_creditor, data_initiere,
data_procesare, stare) values

(125.43, (select id_cont from cont, client where cod_client = id_client and nume =
'George Banica'), (select id_cont from cont, client where cod_client = id_client and
nume = 'Glovo'),

sysdate - 30, sysdate -30 + 2 * 1/24/60, 'Procesat');


insert into tranzactii(suma, cod_cont_debitor, cod_cont_creditor, data_initiere,
data_procesare, stare) values

(125.43, (select id_cont from cont, client where cod_client = id_client and nume =
'Mihail Sadoveanu'), (select id_cont from cont, client where cod_client = id_client
and nume = 'Carrefour'),

sysdate - 30, sysdate -30 + 0.5 * 1/24/60, 'Procesat');


insert into tranzactii(suma, cod_cont_debitor, cod_cont_creditor, data_initiere,
data_procesare, stare) values

(925.43, (select id_cont from cont, client where cod_client = id_client and nume =
'Alexandru Vlahuta'), (select id_cont from cont, client where cod_client = id_client
and nume = 'Penny'),

sysdate - 30, sysdate -30 + 0.25 * 1/24/60, 'Eroare');


insert into tranzactii(suma, cod_cont_debitor, cod_cont_creditor, data_initiere,
data_procesare, stare) values

(325.43, (select id_cont from cont, client where cod_client = id_client and nume =
'Alexandru Vlahuta'), (select id_cont from cont, client where cod_client = id_client
and nume = 'Mega Image'),

sysdate, null, 'Initiat');


insert into tranzactii(suma, cod_cont_debitor, cod_cont_creditor, data_initiere,
data_procesare, stare) values

(325.43, (select id_cont from cont, client where cod_client = id_client and nume =
'Camil Ressu'), (select id_cont from cont, client where cod_client = id_client and
nume = 'Auchan'),

sysdate, null, 'Initiat');


insert into tranzactii(suma, cod_cont_debitor, cod_cont_creditor, data_initiere,
data_procesare, stare) values

(65.13, (select id_cont from cont, client where cod_client = id_client and nume =
'George Banica'), (select id_cont from cont, client where cod_client = id_client and
nume = 'Glovo'),

sysdate, null, 'Initiat');
```

```
insert into tranzactii(suma, cod_cont_debitor, cod_cont_creditor, data_initiere,
data_procesare, stare) values

(1975.33, (select id_cont from cont, client where cod_client = id_client and nume =
'George Banica'), (select id_cont from cont, client where cod_client = id_client and
nume = 'Penny'),

sysdate - 30, sysdate -30 + 0.25 * 1/24/60, 'Eroare');


insert into tranzactii(suma, cod_cont_debitor, cod_cont_creditor, data_initiere,
data_procesare, stare) values

(25.43, (select id_cont from cont, client where cod_client = id_client and nume =
'Popescu Ion'), (select id_cont from cont, client where cod_client = id_client and
nume = 'Penny'),

sysdate - 30, sysdate -30 + 1/24/60, 'Procesat');


insert into tranzactii(suma, cod_cont_debitor, cod_cont_creditor, data_initiere,
data_procesare, stare) values

(125.43, (select id_cont from cont, client where cod_client = id_client and nume =
'Popescu Ion'), (select id_cont from cont, client where cod_client = id_client and
nume = 'Auchan'),

sysdate - 30, sysdate -30 + 2 * 1/24/60, 'Procesat');


commit;




insert into tranzactii(suma, cod_cont_debitor, cod_cont_creditor, data_initiere,
data_procesare, stare) values

(25.43, (select id_cont from cont, client where cod_client = id_client and nume =
'Popescu Ion'), (select id_cont from cont, client where cod_client = id_client and
nume = 'Penny'),

sysdate - 1, sysdate -1 + 1/24/60, 'Procesat');


insert into tranzactii(suma, cod_cont_debitor, cod_cont_creditor, data_initiere,
data_procesare, stare) values

(125.43, (select id_cont from cont, client where cod_client = id_client and nume =
'George Banica'), (select id_cont from cont, client where cod_client = id_client and
nume = 'Carrefour'),

sysdate - 2, sysdate - 2 + 2 * 1/24/60, 'Procesat');


insert into tranzactii(suma, cod_cont_debitor, cod_cont_creditor, data_initiere,
data_procesare, stare) values
```

```
(125.43, (select id_cont from cont, client where cod_client = id_client and nume =
'George Banica'), (select id_cont from cont, client where cod_client = id_client and
nume = 'Mega Image'),

sysdate - 5, sysdate - 5 + 2 * 1/24/60, 'Procesat');


insert into tranzactii(suma, cod_cont_debitor, cod_cont_creditor, data_initiere,
data_procesare, stare) values

(125.43, (select id_cont from cont, client where cod_client = id_client and nume =
'Mihail Sadoveanu'), (select id_cont from cont, client where cod_client = id_client
and nume = 'Glovo'),

sysdate - 7, sysdate - 7 + 2 * 1/24/60, 'Procesat');


insert into tranzactii(suma, cod_cont_debitor, cod_cont_creditor, data_initiere,
data_procesare, stare) values

(15.0, (select id_cont from cont, client where cod_client = id_client and nume =
'George Banica'), (select id_cont from cont, client where cod_client = id_client and
nume = 'Auchan'),

sysdate - 30, sysdate -30 + 1/24/60, 'Procesat');


insert into tranzactii(suma, cod_cont_debitor, cod_cont_creditor, data_initiere,
data_procesare, stare) values

(15.0, (select id_cont from cont, client where cod_client = id_client and nume =
'George Banica'), (select id_cont from cont, client where cod_client = id_client and
nume = 'Glovo'),

sysdate - 30, sysdate -30 + 2 * 1/24/60, 'Procesat');


insert into tranzactii(suma, cod_cont_debitor, cod_cont_creditor, data_initiere,
data_procesare, stare) values

(15.0, (select id_cont from cont, client where cod_client = id_client and nume =
'George Banica'), (select id_cont from cont, client where cod_client = id_client and
nume = 'Carrefour'),

sysdate - 30, sysdate -30 + 0.5 * 1/24/60, 'Procesat');


insert into tranzactii(suma, cod_cont_debitor, cod_cont_creditor, data_initiere,
data_procesare, stare) values

(15.0, (select id_cont from cont, client where cod_client = id_client and nume =
'George Banica'), (select id_cont from cont, client where cod_client = id_client and
nume = 'Penny'),

sysdate - 30, sysdate -30 + 0.5 * 1/24/60, 'Procesat');


insert into tranzactii(suma, cod_cont_debitor, cod_cont_creditor, data_initiere,
data_procesare, stare) values
```

```
(15.0, (select id_cont from cont, client where cod_client = id_client and nume =
'George Banica'), (select id_cont from cont, client where cod_client = id_client and
nume = 'Mega Image'),

sysdate - 30, sysdate -30 + 0.5 * 1/24/60, 'Procesat');


commit;
```

Captura de ecran SQLDeveloper care demonstreaza crearea tabelelor:



Crearea utilizatorilor:

```
CREATE USER DW
    IDENTIFIED BY aSyifijdasfnlsjaJNSc;
GRANT CREATE SESSION TO DW;
GRANT CONNECT, DBA TO DW;
GRANT CREATE DIMENSION TO DW;


CREATE USER DB
    IDENTIFIED BY ufbivgfbdDHASU832fjdl;
GRANT CREATE SESSION TO DB;
GRANT CONNECT, DBA TO DB;
GRANT SELECT ON DB.TRANZACTII TO DW;
GRANT SELECT ON DB.CLIENTI TO DW;
GRANT SELECT ON DB.CARD TO DW;
GRANT SELECT ON DB.CONT TO DW;
GRANT SELECT ON DB.COMERCIANT TO DW;
GRANT SELECT ON DB.CANAL_PLATA TO DW;
GRANT SELECT ON DB.LOCATIE TO DW;
```

Exercitiul 2: Generarea datelor și inserarea acestora în tabele (puteți utiliza ca interfață o aplicație creată anul trecut la celelalte materii)

```
CREATE OR REPLACE PROCEDURE ADD_LOCATION(valoare_tara IN VARCHAR2, valoare_oras IN VARCHAR2,
valoare_strada IN VARCHAR2, valoare_site IN VARCHAR2) IS
BEGIN
    INSERT INTO locatie(tara, oras, strada, site) VALUES (valoare_tara, valoare_oras,
valoare_strada, valoare_site);
    COMMIT;
END;


DROP PROCEDURE ADD_CONT;
CREATE OR REPLACE PROCEDURE ADD_CONT(valoare_tip_cont IN VARCHAR2, valoare_nume_cont IN VARCHAR2,
valoare_sold IN NUMBER, valoare_cod_client IN NUMBER) IS
BEGIN
    INSERT INTO cont(tip_cont, nume_cont, sold, cod_client)
    VALUES (valoare_tip_cont, valoare_nume_cont, valoare_sold, valoare_cod_client);
```

```
    COMMIT;
END;


CREATE OR REPLACE PROCEDURE ADD_COMERCIANT(valoare_cod_client IN NUMBER, valoare_nume IN
VARCHAR2,
valoare_data_inscriere IN DATE, valoare_data_incetare IN DATE) IS
BEGIN
    INSERT INTO comerciant(cod_client, nume, data_inscriere, data_incetare) VALUES
(valoare_cod_client, valoare_nume,
    valoare_data_inscriere, valoare_data_incetare);
    COMMIT;
END;


CREATE OR REPLACE PROCEDURE ADD_CLIENT(valoare_nume IN VARCHAR2, valoare_tip_client IN VARCHAR2,
valoare_data_inscriere IN DATE, valoare_data_incetare IN DATE) IS
BEGIN
    INSERT INTO client(nume, tip_client, data_inscriere, data_incetare) VALUES (valoare_nume,
valoare_tip_client,
    valoare_data_inscriere, valoare_data_incetare);
    COMMIT;
END;


DROP PROCEDURE ADD_CARD;
CREATE OR REPLACE PROCEDURE ADD_CARD(valoare_cod_cont IN NUMBER, valoare_tip_card IN VARCHAR2,
valoare_data_emitere IN DATE, valoare_data_expirare IN DATE, valoare_numar_card IN VARCHAR2) IS
BEGIN
    INSERT INTO card(cod_cont, tip_card, data_emitere, data_expirare, numar_card) VALUES
(valoare_cod_cont, valoare_tip_card,
    valoare_data_emitere, valoare_data_expirare, valoare_numar_card);
    COMMIT;
END;


CREATE OR REPLACE PROCEDURE ADD_CANAL_PLATA(valoare_cod_comerciant IN NUMBER, valoare_cod_locatie
IN NUMBER,
valoare_tip_echipament IN VARCHAR2, valoare_cod_cont IN NUMBER, valoare_data_inceput IN DATE) IS
BEGIN
    INSERT INTO canal_plata(cod_comerciant, cod_locatie, tip_echipament, cod_cont, data_inceput)
VALUES (valoare_cod_comerciant, valoare_cod_locatie,
    valoare_tip_echipament, valoare_cod_cont, valoare_data_inceput);
```

```
    COMMIT;
END;


CREATE OR REPLACE PROCEDURE ADD_TRANZACTIE(valoare_suma IN NUMBER, valoare_cod_cont_debitor IN
NUMBER,
valoare_cod_cont_creditor IN NUMBER, valoare_data_initiere IN DATE, valoare_data_procesare IN
DATE, valoare_stare IN VARCHAR2) IS
BEGIN
    INSERT INTO tranzactii(suma, cod_cont_debitor, cod_cont_creditor, data_initiere,
data_procesare, stare)
    VALUES (valoare_suma, valoare_cod_cont_debitor, valoare_cod_cont_creditor,
valoare_data_initiere, valoare_data_procesare, valoare_stare);
    COMMIT;
END;
```

Exercitiul 3: Crearea bazei de date depozit și a utilizatorilor

Crearea bazei de date depozit :

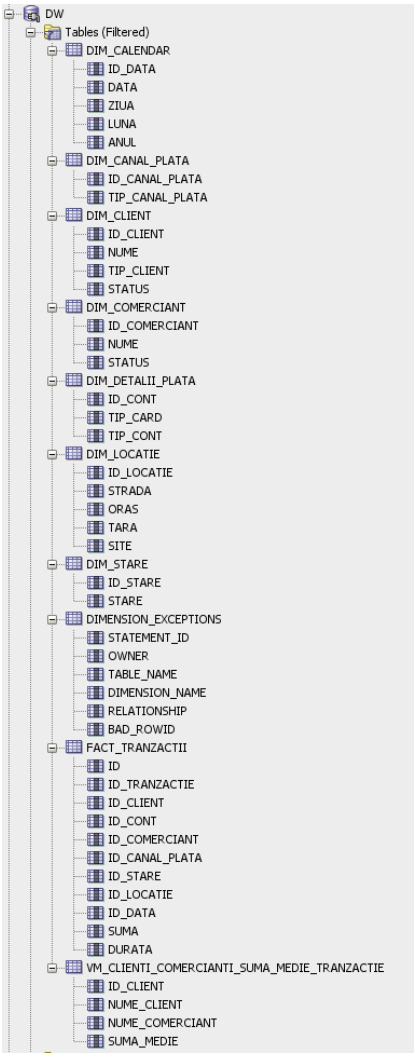
```
-- DROP TABLE FACT_TRANZACTII;
-- DROP TABLE DIM_CALENDAR;
-- DROP TABLE DIM_CANAL_PLATA;
-- DROP TABLE DIM_LOCATIE;
-- DROP TABLE DIM_COMERCIANT;
-- DROP TABLE DIM_DETALII_PLATA;
-- DROP TABLE DIM_CLIENT;
-- DROP TABLE DIM_STARE;


CREATE TABLE DIM_STARE (
    ID_Stare NUMBER(10) NOT NULL PRIMARY KEY,
    Stare VARCHAR2(50 BYTE) NOT NULL
);


CREATE TABLE DIM_LOCATIE (
    ID_Locatie NUMBER(10) PRIMARY KEY,
    Strada VARCHAR(100) DEFAULT NULL,
    Oras VARCHAR(100) DEFAULT NULL,
    Tara VARCHAR(100) DEFAULT NULL,
```

```
    Site VARCHAR(100) DEFAULT NULL
) PARTITION by list (oras) (
    PARTITION TM
    VALUES
        ('Timisoara'),
        PARTITION B
    VALUES
        ('Bucuresti'),
        PARTITION CT
    VALUES
        ('Constanta'),
        PARTITION BV
    VALUES
        ('Brasov'),
        PARTITION nedefinit
    VALUES
        (DEFAULT)
);
drop index tara_idx;
create index tara_idx on dim_locatie (tara) local;

CREATE TABLE DIM_DETALII_PLATA (
    ID_Cont NUMBER(10) PRIMARY KEY,
    Tip_Card VARCHAR(10) NOT NULL,
    Tip_Cont VARCHAR(10) NOT NULL
);

CREATE TABLE DIM_COMERCIANT (
    ID_Comerciant NUMBER(10) PRIMARY KEY,
    Nume VARCHAR(100),
    STATUS VARCHAR(15)
);
```

```
CREATE TABLE DIM_CANAL_PLATA (
    ID_Canal_Plata NUMBER(10) NOT NULL,
    Tip_Canal_Plata VARCHAR(10) NOT NULL
);

DROP TABLE DIM_CALENDAR;

CREATE TABLE DIM_CALENDAR AS
SELECT
    TO_NUMBER(
        TO_CHAR(
            TO_DATE('31/12/2020', 'DD/MM/YYYY') + NUMTODSINTERVAL(n, 'day'),
            'YYYYMMDD'
        )
    ) AS ID_Data,
    TO_DATE('31/12/2020', 'DD/MM/YYYY') + NUMTODSINTERVAL(n, 'day') AS Data,
    TO_CHAR(
        TO_DATE('31/12/2020', 'DD/MM/YYYY') + NUMTODSINTERVAL(n, 'day'),
        'DD'
    ) AS Ziua,
    TO_CHAR(
        TO_DATE('31/12/2020', 'DD/MM/YYYY') + NUMTODSINTERVAL(n, 'day'),
        'Month'
    ) AS Luna,
    TO_CHAR(
        TO_DATE('31/12/2020', 'DD/MM/YYYY') + NUMTODSINTERVAL(n, 'day'),
        'YYYY'
    ) AS Anul
FROM
    (
        SELECT
            LEVEL n
        FROM
            dual connect by LEVEL <= 2000
```

```
    );


drop index calendar_idx;

create index calendar_idx on dim_calendar (luna) global partition by hash(luna)
partitions 12;


DROP TABLE FACT_TRANZACTII;


CREATE TABLE FACT_TRANZACTII (
    ID_Tranzactie NUMBER(10) NOT NULL,
    ID_Client NUMBER(10) NOT NULL,
    ID_Cont NUMBER(10) NOT NULL,
    ID_Comerciant NUMBER(10) NOT NULL,
    ID_Canal_Plata NUMBER(10) NOT NULL,
    ID_Stare NUMBER(10) NOT NULL,
    ID_Locatie NUMBER(10) NOT NULL,
    ID_Data NUMBER(8) NOT NULL,
    Suma NUMBER(10, 2) NOT NULL,
    Durata NUMBER(7, 2) DEFAULT NULL,
    PRIMARY KEY(ID_Tranzactie, ID_Client, ID_Cont)
) PARTITION by RANGE(id_data) INTERVAL(1) (
    PARTITION partitie_initiala
    VALUES
        less than (20220101)
);


  CREATE TABLE DIM_CLIENT
   (
    ID_Client NUMBER(10,0) PRIMARY KEY,
       Nume VARCHAR2(100) NOT NULL,
       Tip_Client VARCHAR2(50) NOT NULL,
       Status VARCHAR2(15) NOT NULL
   );
   CREATE bitmap INDEX dim_client_bmp ON dim_client (tip_client);
```

Captura de ecran care demonstreaza crearea tabelelor din cadrul bazei de date de tip depozit :



Obs : Pentru cearea utilizatorilor -> exercitiul 1

Exercitiul 4: Popularea cu informații a bazei de date depozit folosind ca sursă datele din baza de date OLTP

```
-- DIM_STARE

TRUNCATE TABLE DIM_STARE;

INSERT INTO

    DIM_STARE

SELECT

    DISTINCT CASE
```

```
        WHEN Stare = 'Initiat' THEN 1
        WHEN Stare = 'Procesat' THEN 2
        WHEN Stare = 'Eroare' THEN 3
        ELSE NULL
    END AS ID_Stare,
    Stare
FROM
    db.Tranzactii;

-- DIM_CLIENT
TRUNCATE TABLE DIM_CLIENT;
INSERT INTO
    DIM_CLIENT
SELECT
    ID_Client,
    Nume,
    Tip_Client,
    CASE
        WHEN Data_Incetare IS NOT NULL THEN 'Incetat'
        ELSE 'Inscris'
    END AS STATUS
FROM
    db.client;

-- DIM_COMERCIANT
TRUNCATE TABLE DIM_COMERCIANT;
INSERT INTO
    DIM_COMERCIANT
SELECT
    ID_Comerciant,
    Nume,
    CASE
        WHEN Data_Incetare IS NOT NULL THEN 'Incetat'
        ELSE 'Inscris'
```

```
    END AS STATUS
FROM
    db.comerciant;

-- DIM_DETALII_PLATA
TRUNCATE TABLE DIM_DETALII_PLATA;
INSERT INTO
    DIM_DETALII_PLATA
SELECT
    ID_Cont,
    Tip_Cont,
    Tip_Card
FROM
    db.cont ct
    INNER JOIN db.card cd ON ct.ID_Cont = cd.COD_Cont;

-- DIM_Locatie
TRUNCATE TABLE DIM_LOCATIE;
INSERT INTO
    DIM_LOCATIE
SELECT
    ID_Locatie,
    Strada,
    Oras,
    Tara,
    Site
FROM
    db.locatie;

-- DIM_CANAL_PLATA
TRUNCATE TABLE DIM_CANAL_PLATA;
INSERT INTO
    DIM_CANAL_PLATA
SELECT
```

```
    DISTINCT CASE
        WHEN Tip_Echipament = 'POS' THEN 1
        WHEN Tip_Echipament = 'ONLINE' THEN 2
        ELSE NULL
    END AS ID_Canal_Plata,
    Tip_Echipament AS Tip_Canal_Plata
FROM
    db.canal_plata;

-- FACT_TRANZACTII
INSERT INTO
    FACT_TRANZACTII (
        ID_Tranzactie,
        ID_Client,
        ID_Cont,
        ID_Comerciant,
        ID_Canal_Plata,
        ID_Stare,
        ID_Locatie,
        ID_Data,
        Suma,
        Durata
    )
SELECT
    ID_Tranzactie,
    ID_Client,
    ID_Cont,
    ID_Comerciant,
    CASE
        WHEN Tip_Echipament = 'POS' THEN 1
        WHEN Tip_Echipament = 'ONLINE' THEN 2
        ELSE NULL
    END AS ID_Canal_Plata,
    CASE
```

```
        WHEN Stare = 'Initiat' THEN 1
        WHEN Stare = 'Procesat' THEN 2
        WHEN Stare = 'Eroare' THEN 3
        ELSE NULL
    END AS ID_Stare,
    ID_Locatie,
    TO_CHAR(DATA_INITIERE, 'YYYYMMDD') AS ID_Data,
    - SUMA,
    TO_CHAR(
        (DATA_PROCESARE - DATA_INITIERE) * 1440,
        '99999.99'
    ) AS Durata
FROM
    db.tranzactii t
    LEFT JOIN db.cont co ON t.COD_CONT_DEBITOR = co.ID_CONT
    LEFT JOIN db.client cl ON co.COD_CLIENT = cl.ID_CLIENT
    LEFT JOIN db.canal_plata cp ON co.ID_CONT = cp.COD_CONT
    LEFT JOIN db.locatie loc ON cp.COD_LOCATIE = loc.ID_LOCATIE
    LEFT JOIN db.comerciant cm ON cp.COD_COMERCIANT = cm.ID_COMERCIANT
UNION
ALL
SELECT
    ID_Tranzactie,
    ID_Client,
    ID_Cont,
    ID_Comerciant,
    CASE
        WHEN Tip_Echipament = 'POS' THEN 1
        WHEN Tip_Echipament = 'ONLINE' THEN 2
        ELSE NULL
    END AS ID_Canal_Plata,
    CASE
        WHEN Stare = 'Initiat' THEN 1
        WHEN Stare = 'Procesat' THEN 2
```

```
        WHEN Stare = 'Eroare' THEN 3
        ELSE NULL
    END AS ID_Stare,
    ID_Locatie,
    TO_CHAR(DATA_INITIERE, 'YYYYMMDD') AS ID_Data,
    SUMA,
    TO_CHAR(
        (DATA_PROCESARE - DATA_INITIERE) * 1440,
        '99999.99'
    ) AS Durata
FROM
    db.tranzactii t
    LEFT JOIN db.cont co ON t.COD_CONT_CREDITOR = co.ID_CONT
    LEFT JOIN db.client cl ON co.COD_CLIENT = cl.ID_CLIENT
    LEFT JOIN db.canal_plata cp ON co.ID_CONT = cp.COD_CONT
    LEFT JOIN db.locatie loc ON cp.COD_LOCATIE = loc.ID_LOCATIE
    LEFT JOIN db.comerciant cm ON cp.COD_COMERCIANT = cm.ID_COMERCIANT;
```

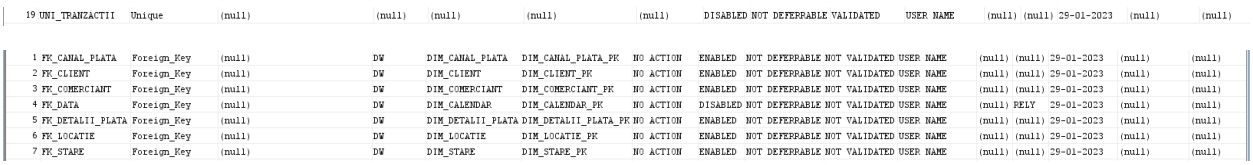
Exercitiul 5: Definirea constrângerilor

```
--(c1)
ALTER TABLE FACT_TRANZACTII
ADD CONSTRAINT uni_tranzactii
UNIQUE(ID_Client, ID_Cont, ID_Comerciant, ID_Canal_Plata, ID_Stare, ID_Locatie,
ID_Data)
DISABLE VALIDATE;


--(c2)
ALTER TABLE DIM_CLIENT RENAME CONSTRAINT SYS_C007748 TO DIM_CLIENT_PK;
ALTER TABLE DIM_CLIENT MODIFY CONSTRAINT DIM_CLIENT_PK RELY NOVALIDATE;


ALTER TABLE FACT_TRANZACTII ADD CONSTRAINT fk_client
FOREIGN KEY (ID_Client)
REFERENCES DIM_CLIENT (ID_Client)
ENABLE NOVALIDATE;
```

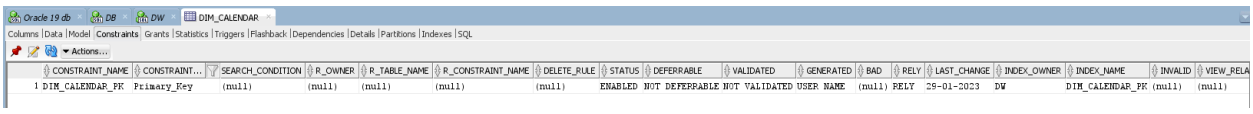
```
--(c3)
ALTER TABLE DIM_DETALII_PLATA RENAME CONSTRAINT SYS_C007751 TO DIM_DETALII_PLATA_PK;
ALTER TABLE DIM_DETALII_PLATA MODIFY CONSTRAINT DIM_DETALII_PLATA_PK RELY NOVALIDATE;

ALTER TABLE FACT_TRANZACTII ADD CONSTRAINT fk_detalii_plata
FOREIGN KEY (ID_Cont)
REFERENCES DIM_DETALII_PLATA (ID_Cont)
ENABLE NOVALIDATE;

--(c4)
ALTER TABLE DIM_COMERCIANT RENAME CONSTRAINT SYS_C007752 TO DIM_COMERCIANT_PK;
ALTER TABLE DIM_COMERCIANT MODIFY CONSTRAINT DIM_COMERCIANT_PK RELY NOVALIDATE;

ALTER TABLE FACT_TRANZACTII ADD CONSTRAINT fk_comerciant
FOREIGN KEY (ID_Comerciant)
REFERENCES DIM_COMERCIANT (ID_Comerciant)
ENABLE NOVALIDATE;

--(c5)
ALTER TABLE DIM_CANAL_PLATA ADD CONSTRAINT DIM_CANAL_PLATA_PK PRIMARY
KEY(ID_CANAL_PLATA) RELY NOVALIDATE;

ALTER TABLE FACT_TRANZACTII ADD CONSTRAINT fk_canal_plata
FOREIGN KEY (ID_Canal_Plata)
REFERENCES DIM_CANAL_PLATA (ID_Canal_Plata)
ENABLE NOVALIDATE;

--(c6)
ALTER TABLE DIM_STARE RENAME CONSTRAINT SYS_C007744 TO DIM_STARE_PK;
ALTER TABLE DIM_STARE MODIFY CONSTRAINT DIM_STARE_PK RELY NOVALIDATE;

ALTER TABLE FACT_TRANZACTII ADD CONSTRAINT fk_stare
FOREIGN KEY (ID_Stare)
```

```
REFERENCES DIM_STARE (ID_Stare)

ENABLE NOVALIDATE;


--(c7)

ALTER TABLE DIM_LOCATIE RENAME CONSTRAINT SYS_C007753 TO DIM_LOCATIE_PK;

ALTER TABLE DIM_LOCATIE MODIFY CONSTRAINT DIM_LOCATIE_PK RELY NOVALIDATE;


ALTER TABLE FACT_TRANZACTII ADD CONSTRAINT fk_locatie

FOREIGN KEY (ID_Locatie)

REFERENCES DIM_LOCATIE (ID_Locatie)

ENABLE NOVALIDATE;


--(c8)

ALTER TABLE DIM_CALENDAR ADD CONSTRAINT DIM_CALENDAR_PK PRIMARY KEY(ID_Data) RELY
NOVALIDATE;


ALTER TABLE FACT_TRANZACTII ADD CONSTRAINT fk_data

FOREIGN KEY (ID_Data)

REFERENCES DIM_CALENDAR (ID_Data)

RELY DISABLE NOVALIDATE;
```

Capturi de ecran care demonstreaza crearea constrangerilor:



19	UNI_TRANZACTII	Unique	(null)		(null)	(null)	(null)		DISABLED	NOT DEFERRABLE	VALIDATED	USER NAME	(null)	(null)	29-01-2023	(null)	(null)
1	FK_CANAL_PLATA	Foreign_Key	(null)		DW	DIM_CANAL_PLATA	DIM_CANAL_PLATA_PK	NO ACTION	ENABLED	NOT DEFERRABLE	NOT VALIDATED	USER NAME	(null)	(null)	29-01-2023	(null)	(null)
2	FK_CLIENT	Foreign_Key	(null)		DW	DIM_CLIENT	DIM_CLIENT_PK	NO ACTION	ENABLED	NOT DEFERRABLE	NOT VALIDATED	USER NAME	(null)	(null)	29-01-2023	(null)	(null)
3	FK_COMERCIANT	Foreign_Key	(null)		DW	DIM_COMERCIANT	DIM_COMERCIANT_PK	NO ACTION	ENABLED	NOT DEFERRABLE	NOT VALIDATED	USER NAME	(null)	(null)	29-01-2023	(null)	(null)
4	FK_DATA	Foreign_Key	(null)		DW	DIM_CALENDAR	DIM_CALENDAR_PK	NO ACTION	DISABLED	NOT DEFERRABLE	NOT VALIDATED	USER NAME	(null)	RELY	29-01-2023	(null)	(null)
5	FK_DETALII_PLATA	Foreign_Key	(null)		DW	DIM_DETALII_PLATA	DIM_DETALII_PLATA_PK	NO ACTION	ENABLED	NOT DEFERRABLE	NOT VALIDATED	USER NAME	(null)	(null)	29-01-2023	(null)	(null)
6	FK_LOCATIE	Foreign_Key	(null)		DW	DIM_LOCATIE	DIM_LOCATIE_PK	NO ACTION	ENABLED	NOT DEFERRABLE	NOT VALIDATED	USER NAME	(null)	(null)	29-01-2023	(null)	(null)
7	FK_STARE	Foreign_Key	(null)		DW	DIM_STARE	DIM_STARE_PK	NO ACTION	ENABLED	NOT DEFERRABLE	NOT VALIDATED	USER NAME	(null)	(null)	29-01-2023	(null)	(null)



Oracle 19 db | DB | DW | DIM_CALENDAR

Columns | Data | Model | Constraints | Grants | Statistics | Triggers | Flashback | Dependencies | Details | Partitions | Indexes | SQL

Actions...

	CONSTRAINT_NAME	CONSTRAINT...	SEARCH_CONDITION	R_OWNER	R_TABLE_NAME	R_CONSTRAINT_NAME	DELETE_RULE	STATUS	DEFERRABLE	VALIDATED	GENERATED	BAD	RELY	LAST_CHANGE	INDEX_OWNER	INDEX_NAME	INVALID	VIEW_RELA
1	DIM_CALENDAR_PK	Primary_Key	(null)	(null)	(null)	(null)	(null)	ENABLED	NOT DEFERRABLE	NOT VALIDATED	USER NAME	(null)	RELY	29-01-2023	DW	DIM_CALENDAR_PK	(null)	(null)

Exercitiul 6: Definirea indecșilor și a cererilor SQL însoțite de planul de execuție al acestora(din care să reiasă ca optimizatorul utilizează eficient indecșii definiți)

Creare index global:

```
drop index calendar_idx;
create index calendar_idx on dim_calendar (luna) global partition by hash(luna) partitions 12;
```

Script Output | Task completed in 0.301 seconds

```
Index CALENDAR_IDX dropped.

Index CALENDAR_IDX created.
```

Consulatare dictionarul datelor pentru verificarea crearii partitiilor pe index:

```
select * from user_ind_partitions where index_name = 'CALENDAR_IDX';
```

Query Result | All Rows Fetched: 12 in 0.11 seconds

INDEX_NAME	COMPOSITE	PARTITION_NAME	SUBPARTITION_COUNT	HIGH_VALUE	HIGH_VALUE_LENGTH	PARTITION_POSITION	STATUS	TABLESPACE_NAME	PCT_FREE	INI_TRANS	MAX_TRANS	INITIAL_EXTENT
1 CALENDAR_IDX	NO	SYS_P609	0	(null)	0	1	USABLE	USERS	10	2	255	65536
2 CALENDAR_IDX	NO	SYS_P610	0	(null)	0	2	USABLE	USERS	10	2	255	65536
3 CALENDAR_IDX	NO	SYS_P611	0	(null)	0	3	USABLE	USERS	10	2	255	65536
4 CALENDAR_IDX	NO	SYS_P612	0	(null)	0	4	USABLE	USERS	10	2	255	65536
5 CALENDAR_IDX	NO	SYS_P613	0	(null)	0	5	USABLE	USERS	10	2	255	65536
6 CALENDAR_IDX	NO	SYS_P614	0	(null)	0	6	USABLE	USERS	10	2	255	65536
7 CALENDAR_IDX	NO	SYS_P615	0	(null)	0	7	USABLE	USERS	10	2	255	65536
8 CALENDAR_IDX	NO	SYS_P616	0	(null)	0	8	USABLE	USERS	10	2	255	65536
9 CALENDAR_IDX	NO	SYS_P617	0	(null)	0	9	USABLE	USERS	10	2	255	65536
10 CALENDAR_IDX	NO	SYS_P618	0	(null)	0	10	USABLE	USERS	10	2	255	65536
11 CALENDAR_IDX	NO	SYS_P619	0	(null)	0	11	USABLE	USERS	10	2	255	65536
12 CALENDAR_IDX	NO	SYS_P620	0	(null)	0	12	USABLE	USERS	10	2	255	65536

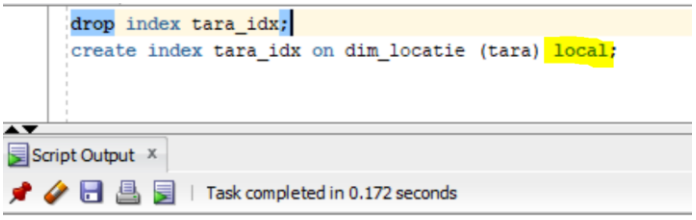
Folosire index :

```
EXPLAIN PLAN

SET STATEMENT_ID = 's1_index_global' FOR

select /*+ index(dim_calendar calendar_idx) */ * from dim_calendar where luna= 'June';


SELECT plan_table_output

FROM

table(dbms_xplan.display('plan_table', 's1_index_global','serial'));
```

Plan hash value: 2382551087

```
-------------------------------------------------------------------------------------------------------------
| Id  | Operation                    | Name        | Rows  | Bytes | Cost (%CPU)| Time     | Pstart| Pstop |
-------------------------------------------------------------------------------------------------------------
|   0 | SELECT STATEMENT             |             |   167 |  5344 |     8   (0)| 00:00:01 |       |       |
|   1 |  PARTITION HASH SINGLE       |             |   167 |  5344 |     8   (0)| 00:00:01 |     7 |     7 |
|   2 |   TABLE ACCESS BY INDEX ROWID BATCHED| DIM_CALENDAR |   167 |  5344 |     8   (0)| 00:00:01 |
|     |
|*  3 |    INDEX RANGE SCAN          | CALENDAR_IDX |   167 |       |     1   (0)| 00:00:01 |     7 |     7 |
-------------------------------------------------------------------------------------------------------------
```

Creare index local :




```
Index TARA_IDX dropped.


Index TARA_IDX created.
```

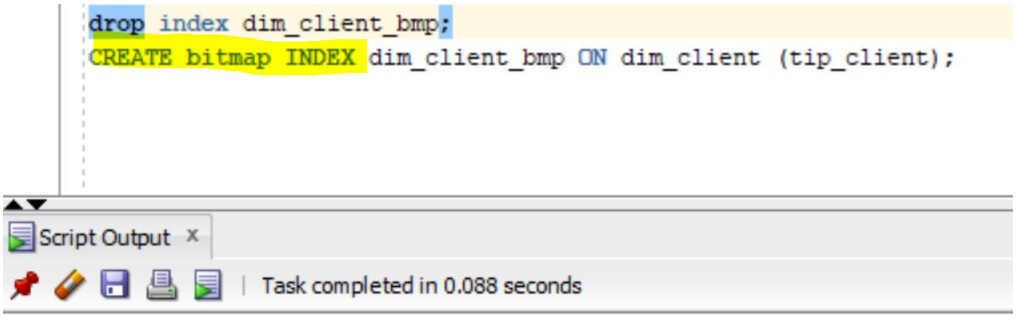
Folosire index:

```
EXPLAIN PLAN
SET STATEMENT_ID = 's1_index_local' FOR
select * from dim_locatie where tara = 'Romania';


SELECT plan_table_output
FROM
table(dbms_xplan.display('plan_table', 's1_index_local','serial'));
```

Plan hash value: 1361974882

```
-------------------------------------------------------------------------------------------------------------------
| Id  | Operation                          | Name       | Rows  | Bytes | Cost (%CPU)| Time     | Pstart| Pstop |
-------------------------------------------------------------------------------------------------------------------
|   0 | SELECT STATEMENT                   |            |     4 |   124 |     8   (0)| 00:00:01 |       |       |
|   1 |  PARTITION LIST ALL                |            |     4 |   124 |     8   (0)| 00:00:01 |     1 |     5 |
|   2 |   TABLE ACCESS BY LOCAL INDEX ROWID BATCHED| DIM_LOCATIE |     4 |   124 |     8   (0)| 00:00:01 |     1 |     5 |
|* 3 |    INDEX RANGE SCAN                | TARA_IDX   |     4 |       |     4   (0)| 00:00:01 |     1 |     5 |
-------------------------------------------------------------------------------------------------------------------
```

Bitmap index:




```
Index DIM_CLIENT_BMP dropped.


INDEX DIM_CLIENT_BMP created.
```

Folosire index:

```
analyze index dim_client_bmp compute statistics;

EXPLAIN PLAN

SET STATEMENT_ID = 's1_index_bmp' FOR

select /*+ index(dim_client dim_client_bmp) */ * from dim_client where tip_client =
'PF';


SELECT plan_table_output

FROM

table(dbms_xplan.display('plan_table', 's1_index_bmp','serial'));
```

Plan hash value: 2457481617

```
-----------------------------------------------------------------------------------------------
| Id  | Operation                     | Name         | Rows  | Bytes | Cost (%CPU)| Time     |
-----------------------------------------------------------------------------------------------
|   0 | SELECT STATEMENT              |              |     6 |   156 |     7   (0)| 00:00:01 |
|   1 |  TABLE ACCESS BY INDEX ROWID BATCHED| DIM_CLIENT    |     6 |   156 |     7   (0)| 00:00:01 |
|   2 |   BITMAP CONVERSION TO ROWIDS      |              |       |       |            |          |
|*  3 |    BITMAP INDEX SINGLE VALUE       | DIM_CLIENT_BMP |       |       |            |          |
```

Bitmap join index:

```
create bitmap index bmp_join_idx on fact_tranzactii (suma) from fact_tranzactii f,
dim_comerciant d
where f.id_comerciant = d.id_comerciant local;


analyze index bmp_join_idx compute statistics;
alter session set star_transformation_enabled = true;
```

Folosire bitmap join index:

```
EXPLAIN PLAN
SET STATEMENT_ID = 's1_index_join_bmp' FOR
select /*+ STAR_TRANSFORMATION */
/*+ FACT(fact_tranzactii) */
f.suma, d.nume
from fact_tranzactii f, dim_comerciant d
where f.id_comerciant = d.id_comerciant
and suma = 50;
```

```
SELECT plan_table_output
FROM
table(dbms_xplan.display('plan_table', 's1_index_join_bmp','serial'));
```

Plan hash value: 3558226070

```
-----------------------------------------------------------------------------------------------------------------------------
| Id  | Operation                          | Name          | Rows  | Bytes | Cost (%CPU)| Time     | Pstart| Pstop |
-----------------------------------------------------------------------------------------------------------------------------
|   0 | SELECT STATEMENT                   |               |     1 |    37 |     1   (0)| 00:00:01 |       |       |
|   1 |  NESTED LOOPS                      |               |     1 |    37 |     1   (0)| 00:00:01 |       |       |
|   2 |   NESTED LOOPS                     |               |     1 |    37 |     1   (0)| 00:00:01 |       |       |
|   3 |    PARTITION RANGE ALL             |               |     1 |    26 |     1   (0)| 00:00:01 |     1 |1048575|
|* 4 |     TABLE ACCESS BY LOCAL INDEX ROWID BATCHED| FACT_TRANZACTII |     1 |    26 |     1   (0)| 00:00:01 |     1 |1048575|
|   5 |      BITMAP CONVERSION TO ROWIDS   |               |       |       |            |          |       |       |
|* 6 |       BITMAP INDEX SINGLE VALUE    | BMP_JOIN_IDX  |       |       |            |          |     1 |1048575|
|* 7 |    INDEX UNIQUE SCAN               | SYS_C008471   |     1 |       |     0   (0)| 00:00:01 |       |       |
|   8 |   TABLE ACCESS BY INDEX ROWID      | DIM_COMERCIANT |     1 |    11 |     0   (0)| 00:00:01 |       |       |
-----------------------------------------------------------------------------------------------------------------------------
```

Exercitiul 7: Definirea obiectelor de tip dimensiune, validarea acestora (din care să reiasă că datele respectă constrângerile impuse prin aceste tipuri de obiecte)

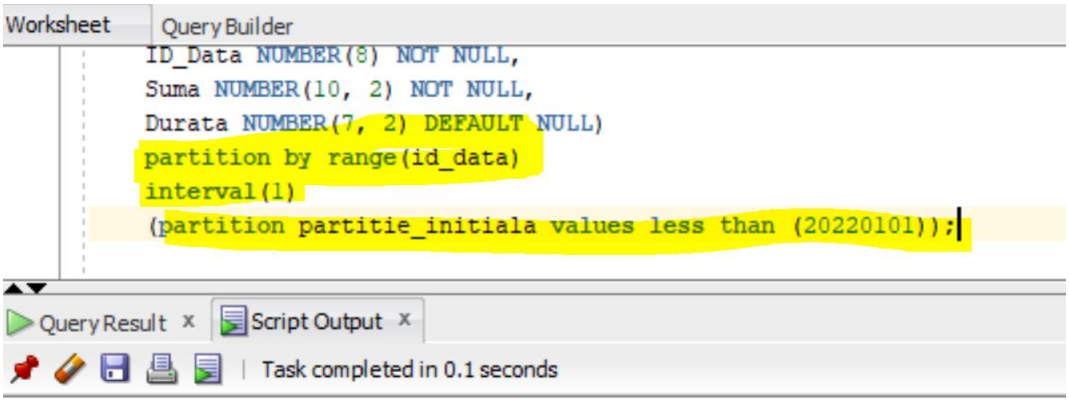
```
-- create dimensions
DROP DIMENSION locatie;
CREATE DIMENSION locatie
LEVEL locatie_id  IS (dim_locatie.id_locatie)
LEVEL strada  IS (dim_locatie.strada)
LEVEL oras  IS (dim_locatie.oras)
```

```
LEVEL tara  IS (dim_locatie.tara)
HIERARCHY ierarhie_locatie (locatie_id CHILD OF strada  CHILD OF oras  CHILD OF tara)
ATTRIBUTE locatie_info LEVEL locatie_id DETERMINES
(dim_locatie.strada, dim_locatie.oras, dim_locatie.tara, dim_locatie.site);


DROP DIMENSION timp;
CREATE DIMENSION timp
LEVEL data_id  IS (dim_calendar.id_data)
LEVEL data  IS (dim_calendar.data)
LEVEL anul  IS (dim_calendar.anul)
HIERARCHY ierarhie_timp (data_id CHILD OF data CHILD OF anul)
ATTRIBUTE timp_id_info LEVEL data_id DETERMINES
(dim_calendar.id_data, dim_calendar.data, dim_calendar.ziua, dim_calendar.luna,
dim_calendar.anul)
ATTRIBUTE timp_data_info LEVEL data DETERMINES
(dim_calendar.id_data, dim_calendar.data, dim_calendar.ziua, dim_calendar.luna,
dim_calendar.anul);


-- display dimensions
SET SERVEROUTPUT ON FORMAT WRAPPED;  --to improve the display of info
EXECUTE DBMS_DIMENSION.DESCRIBE_DIMENSION('locatie');
EXECUTE DBMS_DIMENSION.DESCRIBE_DIMENSION('timp');


-- stergerea exceptiilor vechi (doar daca este necesar)
DELETE (SELECT * FROM dimension_exceptions);


-- validate dimensions
-- used to create dimensions exceptions table
@utldim.sql
EXECUTE DBMS_DIMENSION.VALIDATE_DIMENSION ('locatie', FALSE, TRUE, 'validare
locatie');
EXECUTE DBMS_DIMENSION.VALIDATE_DIMENSION ('timp', FALSE, TRUE, 'validare timp');


-- verificarea exceptiilor
SELECT * FROM dimension_exceptions;
```

```
-- match-uirea exceptiilor in tabela pentru identificarea randurilor cu probleme
SELECT * FROM dim_locatie
WHERE rowid IN (SELECT bad_rowid
                FROM dimension_exceptions
                WHERE statement_id = 'validare locatie');

SELECT * FROM dim_calendar
WHERE rowid IN (SELECT bad_rowid
                FROM dimension_exceptions
                WHERE statement_id = 'validare timp');
```

Exercitiul 8: Definirea partițiilor; definirea cererilor SQL însoțite de planul de execuție al acestora din care să reiasă ca optimizorul utilizează eficient partițiile

Definire partitie pe tabela de fapte :

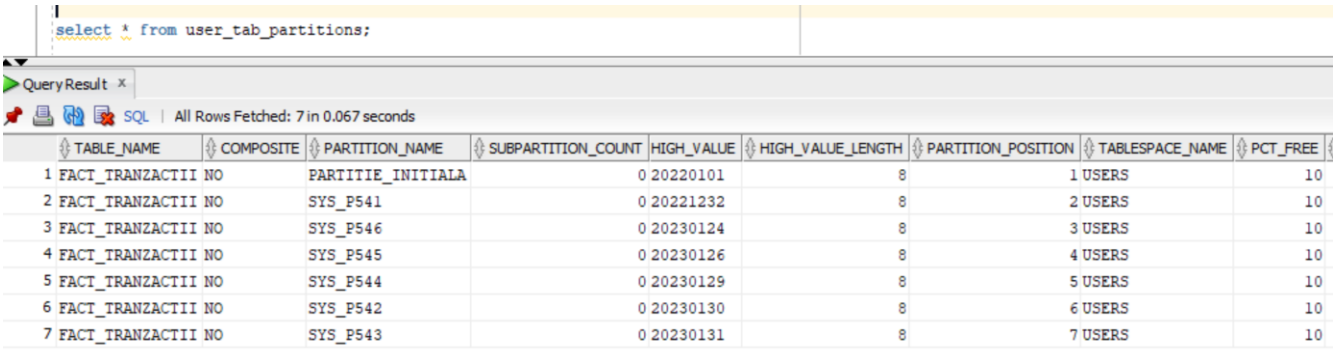



```
Table FACT_TRANZACTII dropped.


Table FACT_TRANZACTII created.
```

Partitionarea te tip interval este o extensie a partitionarii de tip range. Partitiile noi sunt create autmomat de catre SGBD. atunci cand coloana pe care s-a definit regula de partitionare “depaseste” toate valorile. Cel putin o partitie initiala trebuie creata. Valoarea cheii de partitie interval determină valoarea superioara a partitiilor interval, care se numește punct de tranziție, iar serverul de baze de date creează partiții de interval noi pentru datele care au o valoare mai mare decat punctul de tranziție.

Se pot defini pana la 1,048,757 partitii la nivel de tabel. Avand in vedere ca partitionarea este la nivel de zi se pot stoca intr-un tabel 2, 873 de ani.

Verificarea crearii partitiilor prin consultarea dictionarului datelor:



	TABLE_NAME	COMPOSITE	PARTITION_NAME	SUBPARTITION_COUNT	HIGH_VALUE	HIGH_VALUE_LENGTH	PARTITION_POSITION	TABLESPACE_NAME	PCT_FREE
1	FACT_TRANZACTII	NO	PARTITIE_INITIALA	0	20220101	8	1	USERS	10
2	FACT_TRANZACTII	NO	SYS_P541	0	20221232	8	2	USERS	10
3	FACT_TRANZACTII	NO	SYS_P546	0	20230124	8	3	USERS	10
4	FACT_TRANZACTII	NO	SYS_P545	0	20230126	8	4	USERS	10
5	FACT_TRANZACTII	NO	SYS_P544	0	20230129	8	5	USERS	10
6	FACT_TRANZACTII	NO	SYS_P542	0	20230130	8	6	USERS	10
7	FACT_TRANZACTII	NO	SYS_P543	0	20230131	8	7	USERS	10

```
analyze table fact_tranzactii compute statistics;
```

Table FACT_TRANZACTII analyzed.

```
EXPLAIN PLAN
SET STATEMENT_ID = 'st_fact_partition'
FOR
select * from fact_tranzactii where id_data = 20221231;

SELECT plan_table_output
FROM
table(dbms_xplan.display('plan_table','st_fact_partition','serial'));
```

Plan hash value: 3811362893

```
-------------------------------------------------------------------------------------------------------
| Id  | Operation           | Name          | Rows  | Bytes | Cost (%CPU)| Time     | Pstart| Pstop |
-------------------------------------------------------------------------------------------------------
|   0 | SELECT STATEMENT    |               |    24 |   648 |   274   (0)| 00:00:01 |       |       |
|   1 |  PARTITION RANGE SINGLE|             |    24 |   648 |   274   (0)| 00:00:01 |  1132 |  1132 |
|*  2 |   TABLE ACCESS FULL   | FACT_TRANZACTII |    24 |   648 |   274   (0)| 00:00:01 |  1132 |  1132 |
-------------------------------------------------------------------------------------------------------
```

Predicate Information (identified by operation id):

```
---------------------------------------------------

  2 – filter("ID_DATA"=20221231)
```

```
EXPLAIN PLAN
SET STATEMENT_ID = 'st_fact_partition_pruning'
FOR
select * from fact_tranzactii where id_data between 20230123 and 20230128;

SELECT plan_table_output
FROM
table(dbms_xplan.display('plan_table','st_fact_partition_pruning','serial'));
```

Plan hash value: 370717546

```
-------------------------------------------------------------------------------------------------------
| Id  | Operation             | Name          | Rows  | Bytes | Cost (%CPU)| Time     | Pstart| Pstop |
-------------------------------------------------------------------------------------------------------
|   0 | SELECT STATEMENT      |               |     6 |   168 |   820   (1)| 00:00:01 |       |       |
|   1 |  PARTITION RANGE ITERATOR|            |     6 |   168 |   820   (1)| 00:00:01 | 10024 | 10029 |
|*  2 |   TABLE ACCESS FULL     | FACT_TRANZACTII |     6 |   168 |   820   (1)| 00:00:01 | 10024 | 10029 |
-------------------------------------------------------------------------------------------------------
```

Predicate Information (identified by operation id):

```
---------------------------------------------------

   2 - filter("ID_DATA">=20230123 AND "ID_DATA"<=20230128)
```

Definire partitie pe tabela de dimensiune locatie :

```
CREATE TABLE DIM_LOCATIE (
    ID_Locatie NUMBER(10) PRIMARY KEY,
    Strada VARCHAR(100) DEFAULT NULL,
    Oras VARCHAR(100) DEFAULT NULL,
    Tara VARCHAR(100) DEFAULT NULL,
    Site VARCHAR(100) DEFAULT NULL
)
partition by list (oras)
( partition TM values ('Timisoara')
, partition B values ('Bucuresti')
, partition CT values ('Constanta')
, partition BV values ('Brasov')
, partition nedefinit values (default)
);
```

Script Output | Query Result | Explain Plan | Explain Plan 1 | Query Res

Task completed in 0.12 seconds

```
Table DIM_LOCATIE created.
```

Verificarea crearii partitiilor prin consultarea dictionarului datelor.

```
select * from user_tab_partitions;
```

Script Output | Query Result | Explain Plan | Explain Plan 1 | Query Result 1

All Rows Fetched: 15 in 0.024 seconds

	TABLE_NAME	COMPOSITE	PARTITION_NAME	SUBPARTITION_COUNT	HIGH_VALUE	HIGH_VALUE_LENGTH	PARTITION_POSITION	TABLESPACE_NAME	PCT_FREE	PCT_USED	INI_TRANS
5	DIM_LOCATIE	NO	TM	0	'Timisoara'	11	1	USERS	10	(null)	1
6	DIM_LOCATIE	NO	B	0	'Bucuresti'	11	2	USERS	10	(null)	1
7	DIM_LOCATIE	NO	CT	0	'Constanta'	11	3	USERS	10	(null)	1
8	DIM_LOCATIE	NO	BV	0	'Brasov'	8	4	USERS	10	(null)	1
9	DIM_LOCATIE	NO	NEDEFINIT	0	default	7	5	USERS	10	(null)	1

```
analyze table dim_locatie compute statistics;
```

Table DIM_LOCATIE analyzed.

```
EXPLAIN PLAN
SET STATEMENT_ID = 'st_dim_partition'
FOR
```

```
select * from dim_locatie where oras = 'Timisoara'
```

```
SELECT plan_table_output
FROM
table(dbms_xplan.display('plan_table','st_dim_partition','serial'));
```

Plan hash value: 3299633729

Id	Operation	Name	Rows	Bytes	Cost (%CPU)	Time	Pstart	Pstop
0	SELECT STATEMENT		1	36	274 (0)	00:00:01		
1	PARTITION LIST SINGLE		1	36	274 (0)	00:00:01	KEY	KEY
2	TABLE ACCESS FULL	DIM_LOCATIE	1	36	274 (0)	00:00:01	1	1

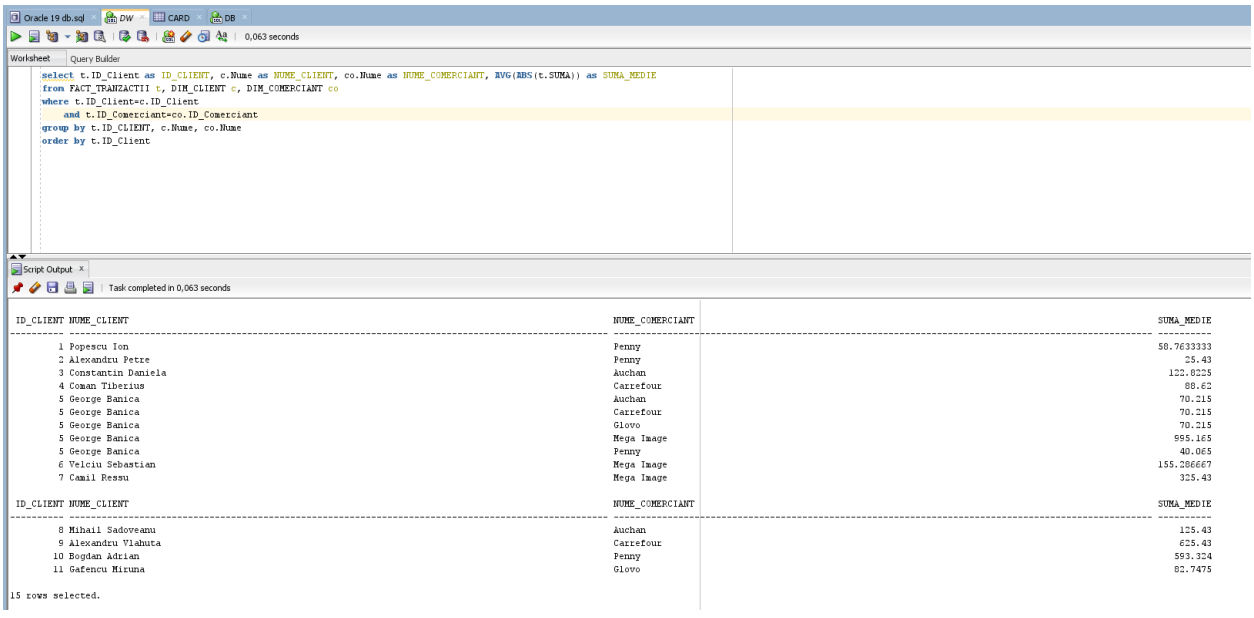
```
EXPLAIN PLAN
SET STATEMENT_ID = 'st_dim_partition_pruning'
FOR
select * from dim_locatie where oras in ('Timisoara', 'Constanta')

SELECT plan_table_output
FROM
table(dbms_xplan.display('plan_table','st_dim_partition_pruning','serial'));
```

Plan hash value: 1889622376

Id	Operation	Name	Rows	Bytes	Cost (%CPU)	Time	Pstart	Pstop
0	SELECT STATEMENT		2	54	547 (0)	00:00:01		
1	PARTITION LIST INLIST		2	54	547 (0)	00:00:01	KEY(I)	KEY(I)
2	TABLE ACCESS FULL	DIM_LOCATIE	2	54	547 (0)	00:00:01	KEY(I)	KEY(I)

Exercitiul 9: Optimizarea cererii SQL propusă în etapa de analiză

```
--9 Formularea în limbaj natural a unei cereri SQL complexe care va fi optimizată în
următoarea  etapă,

--folosind  tehnici  specifice  bazelor  de  date  depozit


--Cerere SQL in limbaj natural:

--"Sa se afiseze pentru fiecare client suma medie a tuturor tranzactiilor efectuate la
fiecare comerciant in parte."


select t.ID_Client as ID_CLIENT, c.Nume as NUME_CLIENT, co.Nume as NUME_COMERCIANT,
AVG(ABS(t.SUMA)) as SUMA_MEDIE

from FACT_TRANZACTII t, DIM_CLIENT c, DIM_COMERCIANT co

where t.ID_Client=c.ID_Client

    and t.ID_Comerciant=co.ID_Comerciant

group by t.ID_CLIENT, c.Nume, co.Nume

order by t.ID_Client
```

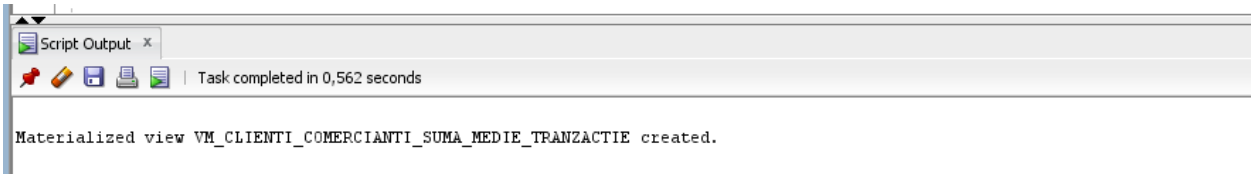


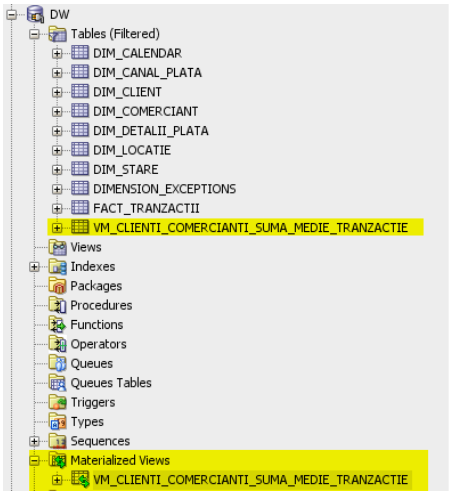
```
select t.ID_Client as ID_CLIENT, c.Nume as NUME_CLIENT, co.Nume as NUME_COMERCIANT, AVG(ABS(t.SUMA)) as SUMA_MEDIE
from FACT_TRANZACTII t, DIM_CLIENT c, DIM_COMERCIANT co
where t.ID_Client=c.ID_Client
    and t.ID_Comerciant=co.ID_Comerciant
group by t.ID_CLIENT, c.Nume, co.Nume
order by t.ID_Client
```

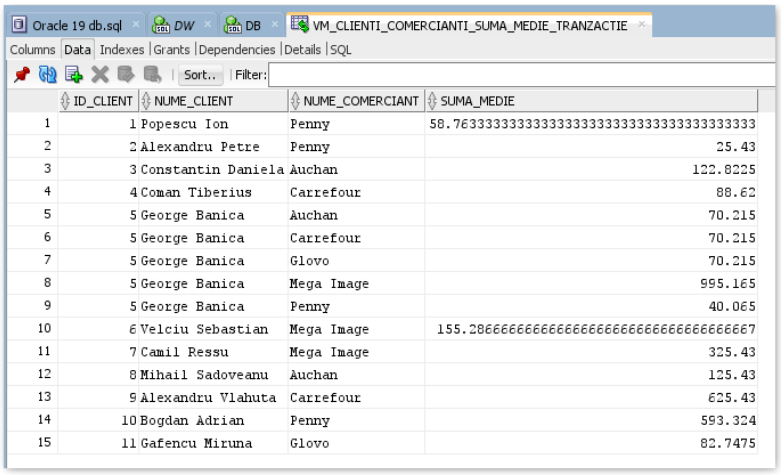
```
Task completed in 0,063 seconds

ID_CLIENT NUME_CLIENT                                NUME_COMERCIANT                                    SUMA_MEDIE
--------- ------------------------------------------ -------------------------------------------------- ----------
        1 Popescu Ion                                Penny                                              58.7633333
        2 Alexandru Petre                            Penny                                                   25.43
        3 Constantin Daniela                         Auchan                                             122.8225
        4 Coman Tiberius                             Carrefour                                             88.62
        5 George Banica                              Auchan                                                70.215
        5 George Banica                              Carrefour                                             70.215
        5 George Banica                              Glovo                                                 70.215
        5 George Banica                              Mega Image                                            995.165
        5 George Banica                              Penny                                                  40.065
        6 Velciu Sebastian                           Mega Image                                        155.286667
        7 Camil Ressu                                Mega Image                                             325.43

ID_CLIENT NUME_CLIENT                                NUME_COMERCIANT                                    SUMA_MEDIE
--------- ------------------------------------------ -------------------------------------------------- ----------
        8 Mihail Sadoveanu                           Auchan                                                 125.43
        9 Alexandru Vlahuta                          Carrefour                                              625.43
       10 Bogdan Adrian                              Penny                                                  593.324
       11 Gafencu Miruna                             Glovo                                                  82.7475

15 rows selected.
```

```
--Crearea vizualizarii materializate
```

```
CREATE MATERIALIZED VIEW vm_clienti_comercianti_suma_medie_tranzactie

BUILD IMMEDIATE

REFRESH COMPLETE

ON DEMAND

ENABLE QUERY REWRITE

AS

select t.ID_Client as ID_CLIENT, c.Nume as NUME_CLIENT, co.Nume as NUME_COMERCIANT,
AVG(ABS(t.SUMA)) as SUMA_MEDIE

from FACT_TRANZACTII t, DIM_CLIENT c, DIM_COMERCIANT co

where t.ID_Client=c.ID_Client

    and t.ID_Comerciant=co.ID_Comerciant

group by t.ID_CLIENT, c.Nume, co.Nume

order by t.ID_Client
```



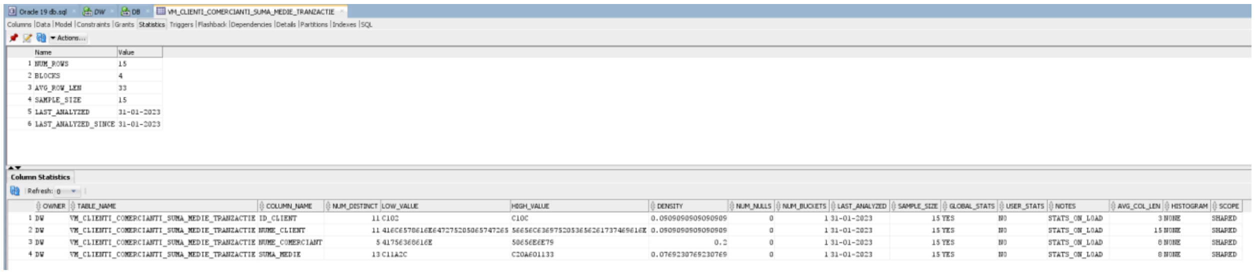




	ID_CLIENT	NUME_CLIENT	NUME_COMERCIANT	SUMA_MEDIE
1	1	Popescu Ion	Penny	58.763333333333333333333333333333333333
2	2	Alexandru Petre	Penny	25.43
3	3	Constantin Daniela	Auchan	122.8225
4	4	Coman Tiberius	Carrefour	88.62
5	5	George Banica	Auchan	70.215
6	5	George Banica	Carrefour	70.215
7	5	George Banica	Glovo	70.215
8	5	George Banica	Mega Image	995.165
9	5	George Banica	Penny	40.065
10	6	Velciu Sebastian	Mega Image	155.28666666666666666666666666666666666667
11	7	Camil Ressu	Mega Image	325.43
12	8	Mihail Sadoveanu	Auchan	125.43
13	9	Alexandru Vlahuta	Carrefour	625.43
14	10	Bogdan Adrian	Penny	593.324
15	11	Gafencu Miruna	Glovo	82.7475

```
--Colectare statistici

ANALYZE TABLE FACT_TRANZACTII COMPUTE STATISTICS;
```

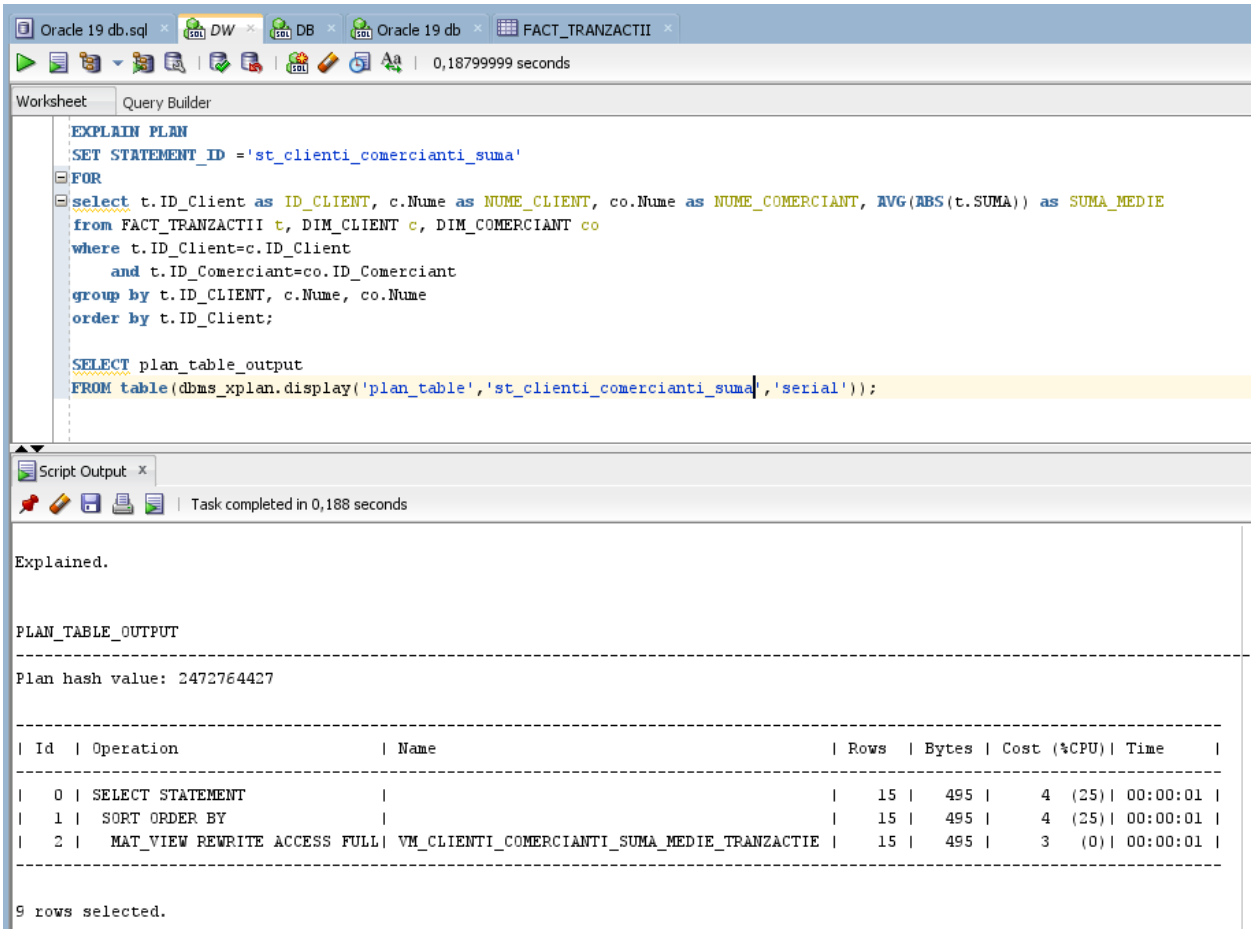
```
BEGIN DBMS_STATS.GATHER_TABLE_STATS
('DW','VM_CLIENTI_COMERCIANTI_SUMA_MEDIE_TRANZACTIE',

       estimate_percent=>20,block_sample=>TRUE,cascade=>TRUE);

END;
```



	Name	Value
1	NUM_ROWS	15
2	BLOCKS	4
3	AVG_ROW_LEN	33
4	SAMPLE_SIZE	15
5	LAST_ANALYZED	31-01-2023
6	LAST_ANALYZED_SINCE	31-01-2023

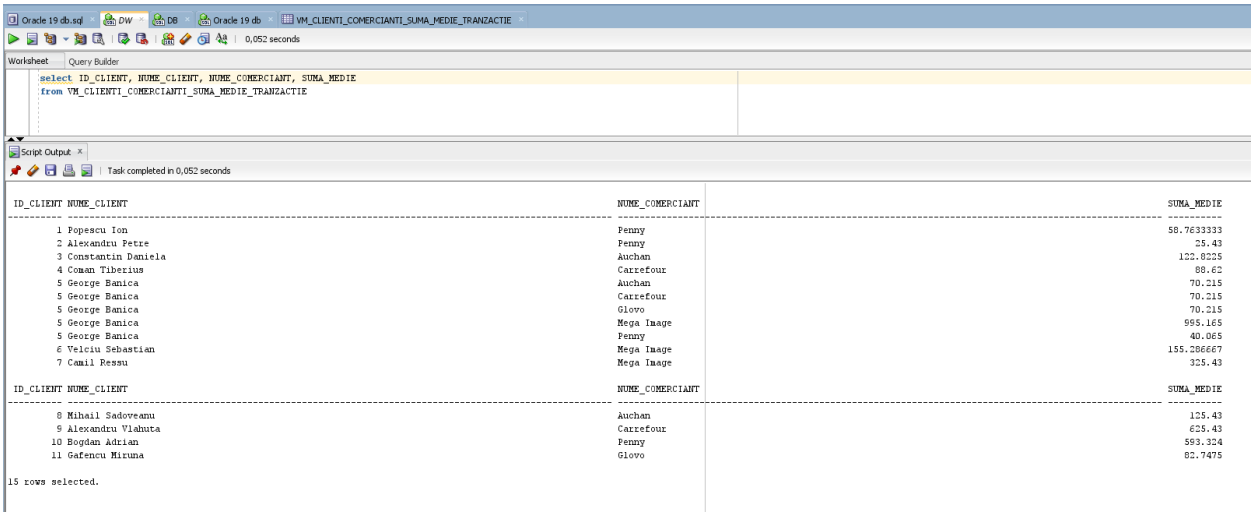
	OWNER	TABLE_NAME	COLUMN_NAME	NUM_DISTINCT	LOW_VALUE	HIGH_VALUE	DENSITY	NUM_NULLS	NUM_BUCKETS	LAST_ANALYZED	SAMPLE_SIZE	GLOBAL_STATS	USER_STATS	NOTES	AVG_COL_LEN	HISTOGRAM	SCOPE
1	DW	VM_CLIENTI_COMERCIANTI_SUMA_MEDIE_TRANZACTIE	ID_CLIENT	11	C102	C10C	0.0909090909090909	0	1	31-01-2023	15	YES	NO	STATS_ON_LOAD	3	NONE	SHARED
2	DW	VM_CLIENTI_COMERCIANTI_SUMA_MEDIE_TRANZACTIE	NUME_CLIENT	11	416C6578616E64727520506574726 5	56656C636975205365626173746961 6E	0.0909090909090909	0	1	31-01-2023	15	YES	NO	STATS_ON_LOAD	15	NONE	SHARED
3	DW	VM_CLIENTI_COMERCIANTI_SUMA_MEDIE_TRANZACTIE	NUME_COMERCIANT	5	41756368616E	50656E6E79	0.2	0	1	31-01-2023	15	YES	NO	STATS_ON_LOAD	8	NONE	SHARED
4	DW	VM_CLIENTI_COMERCIANTI_SUMA_MEDIE_TRANZACTIE	SUMA_MEDIE	13	C11A2C	C20A601133	0.0769230769230769	0	1	31-01-2023	15	YES	NO	STATS_ON_LOAD	8	NONE	SHARED

```
--Setare parametrii pt rescriere

ALTER SESSION SET QUERY_REWRITE_ENABLED = TRUE;

ALTER SESSION SET QUERY_REWRITE_INTEGRITY = enforced;


--Afisare plan executie

EXPLAIN PLAN

SET STATEMENT_ID ='st_clienti_comercianti_suma'

FOR

select t.ID_Client as ID_CLIENT, c.Nume as NUME_CLIENT, co.Nume as NUME_COMERCIANT,
AVG(ABS(t.SUMA)) as SUMA_MEDIE

from FACT_TRANZACTII t, DIM_CLIENT c, DIM_COMERCIANT co

where t.ID_Client=c.ID_Client

    and t.ID_Comerciant=co.ID_Comerciant

group by t.ID_CLIENT, c.Nume, co.Nume

order by t.ID_Client;


SELECT plan_table_output

FROM table(dbms_xplan.display('plan_table','st_clienti_comercianti_suma','serial'));
```



--Rescriere cerere

```
select ID_CLIENT, NUME_CLIENT, NUME_COMERCIANT, SUMA_MEDIE
from VM_CLIENTI_COMERCIANTI_SUMA_MEDIE_TRANZACTIE
```



Exercitiul 10: Crearea rapoartelor cu complexitate diferită(la acest nivel vor fi scripturi SQL, fără reprezentare grafică)

1. Sa se afle care sunt primele 3 luni ale anului 2022, in functie de volumul tranzactiilor(doar debitariile).

```
SELECT dim_calendar.luna, SUM (fact_tranzactii.suma) AS suma_totala

FROM fact_tranzactii

JOIN dim_calendar ON fact_tranzactii.id_data = dim_calendar.id_data

WHERE dim_calendar.anul = 2022 AND fact_tranzactii.suma > 0

GROUP BY dim_calendar.luna

ORDER BY suma_totala DESC

FETCH FIRST 3 ROWS ONLY;
```

2. Sa se afle primele 3 luni si sumele aferente tranzactiilor effectuate dupa numarul de tranzactii efectuate doar cu POS din anul 2022(doar debitariile).

```
SELECT COUNT(*) AS nr_plati, luna, SUM (fact_tranzactii.suma) AS suma_totala

FROM fact_tranzactii

JOIN dim_calendar ON fact_tranzactii.id_data = dim_calendar.id_data

JOIN dim_canal_plata ON fact_tranzactii.id_canal_plata = dim_canal_plata.id_canal_plata

WHERE dim_canal_plata.id_canal_plata = 1 AND fact_tranzactii.suma > 0 AND dim_calendar.anul =
2022

GROUP BY dim_calendar.luna

ORDER BY nr_plati DESC

FETCH FIRST 3 ROWS ONLY;
```

3. Sa se afle tipul canalului de plata a primelor 10 tranzactii dupa suma(doar debitariile).

```
SELECT dim_canal_plata.tip_canal_plata, fact_tranzactii.suma

FROM fact_tranzactii

JOIN dim_canal_plata ON fact_tranzactii.id_canal_plata = dim_canal_plata.id_canal_plata

WHERE fact_tranzactii.suma > 0

ORDER BY fact_tranzactii.suma DESC

FETCH FIRST 10 ROWS ONLY;
```

4. Sa se afle comerciantul cu media cea mai mare a duratei tranzactiilor(doar debitariile).

```
SELECT dim_comerciant.nume, AVG(fact_tranzactii.durata) as medie_durata
```

```
FROM dim_comerciant
JOIN fact_tranzactii ON fact_tranzactii.id_comerciant = dim_comerciant.id_comerciant
WHERE fact_tranzactii.suma > 0
GROUP BY dim_comerciant.nume
ORDER BY medie_durata DESC
FETCH FIRST 3 ROWS ONLY;
```

5. Sa se afle numele clientului care a facut cea mai mare achizitie din toti anii(doar debitariile).

```
SELECT dim_client.nume, MAX(fact_tranzactii.suma) as suma_maxima
FROM fact_tranzactii
JOIN dim_client ON fact_tranzactii.id_client = dim_client.id_client
WHERE fact_tranzactii.suma > 0
GROUP BY dim_client.nume
ORDER BY suma_maxima DESC
FETCH FIRST 3 ROWS ONLY;
```