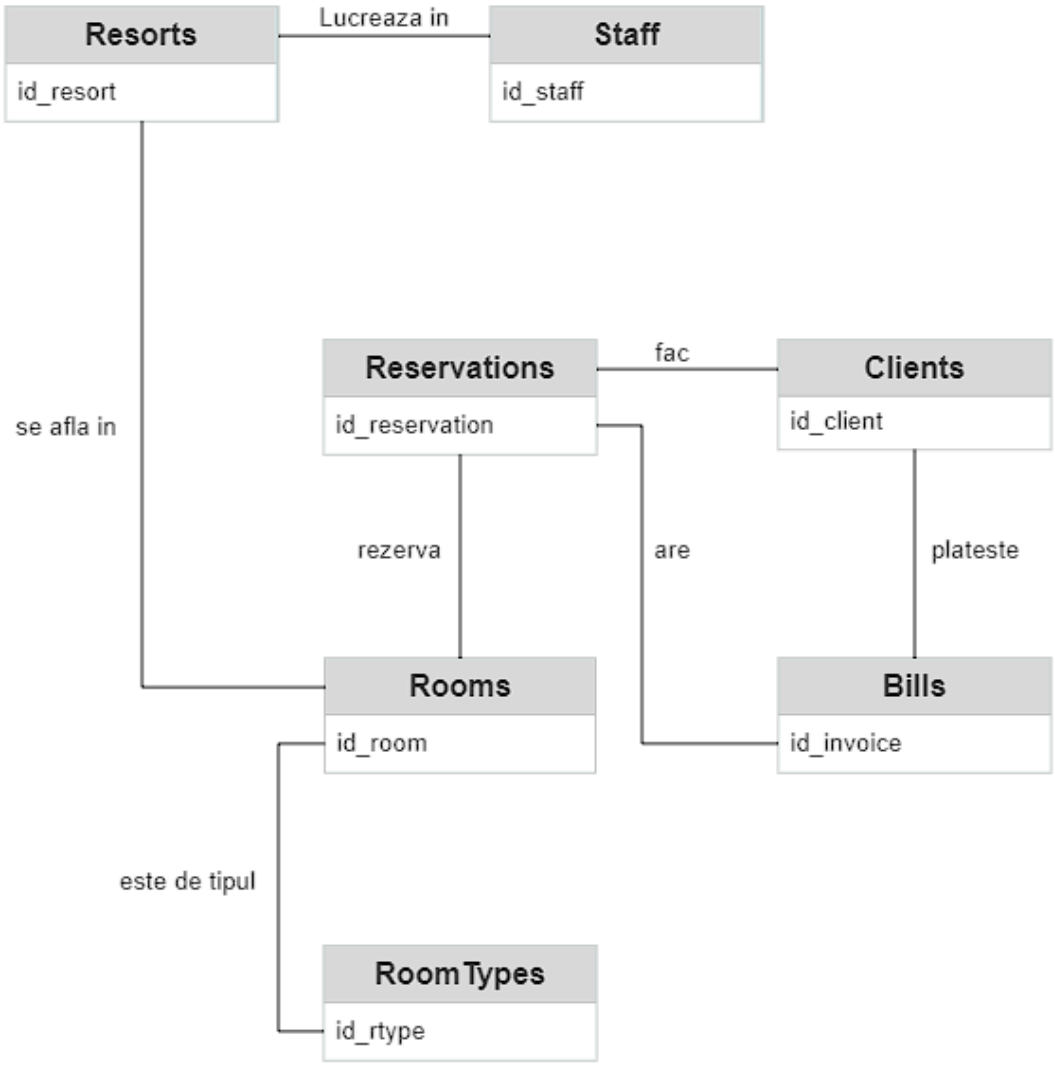
Proiect SGBD
Marius Tillinger
Grupa 243

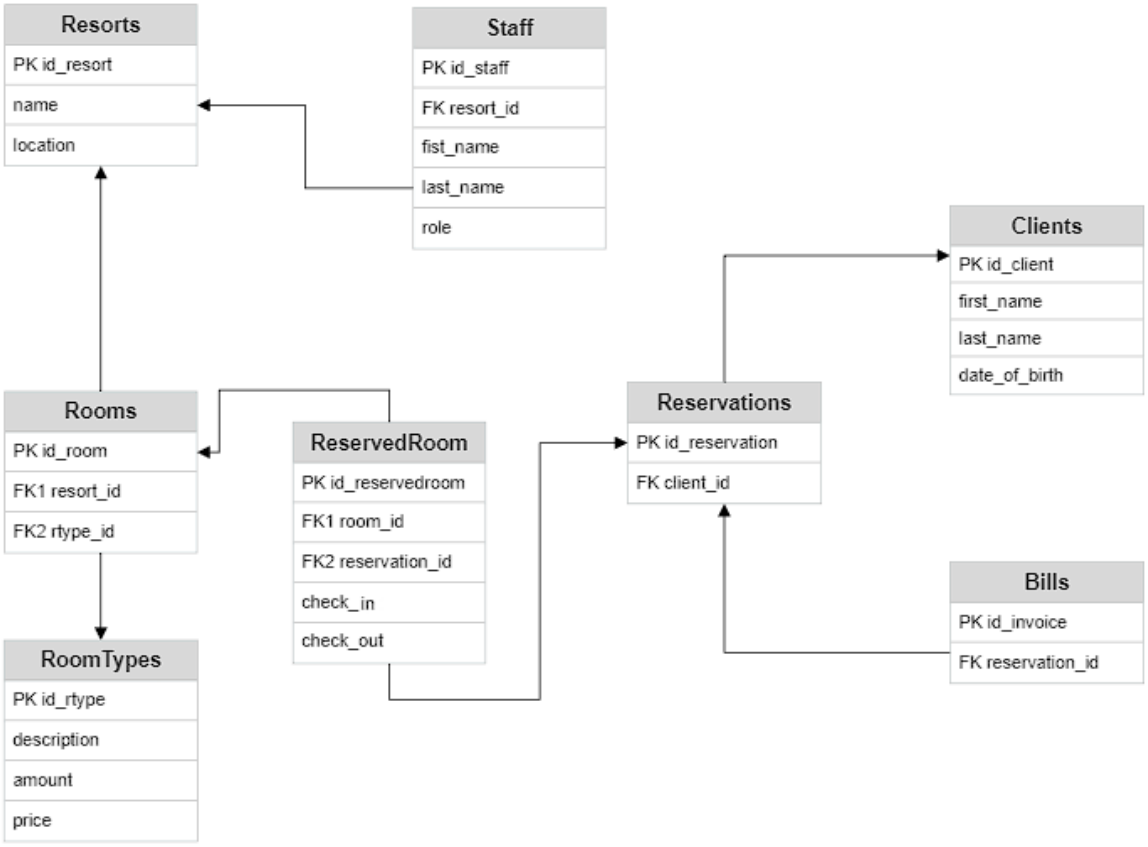
Gestionarea bazei de date A unui complex de resorturi

1. Deoarece cu totii ne dorim sa avem vacante cat mai frumoase, este necesar ca baza de date de care dispune destinatia ta de vacanta sa fie cat mai buna, astfel usurandu-ti procesul de cazare. Am decis astfel sa creez o baza de date pentru un complex de resorturi. Pentru o reprezentare cat mai precisa, voi avea in vedere o evidenta a resorturilor, a staff-ului si a clientilor, a camerelor, a tipurilor de camere, a reservarilor, a camerelor rezervate si a facturilor emise.

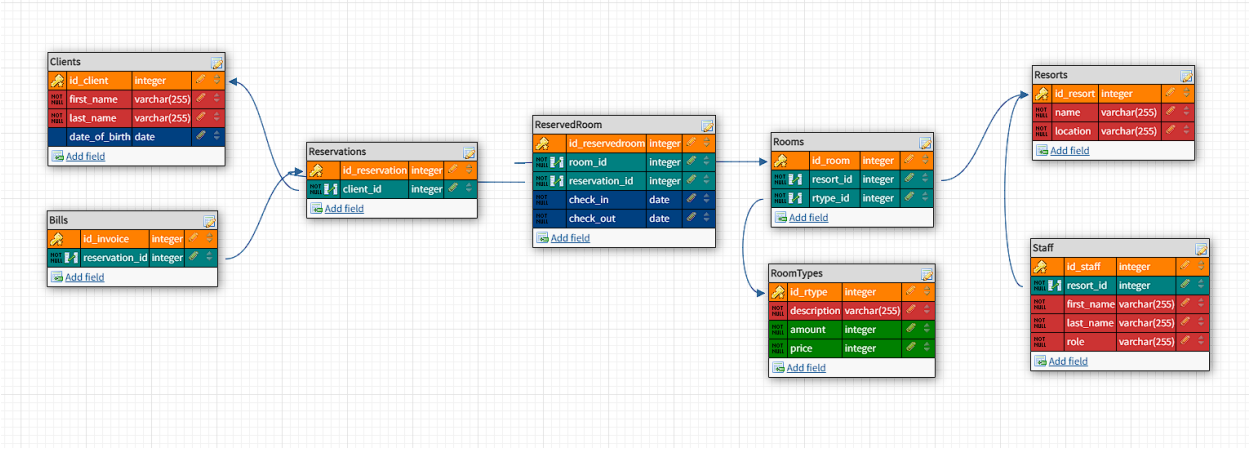
2. Schema ERD:



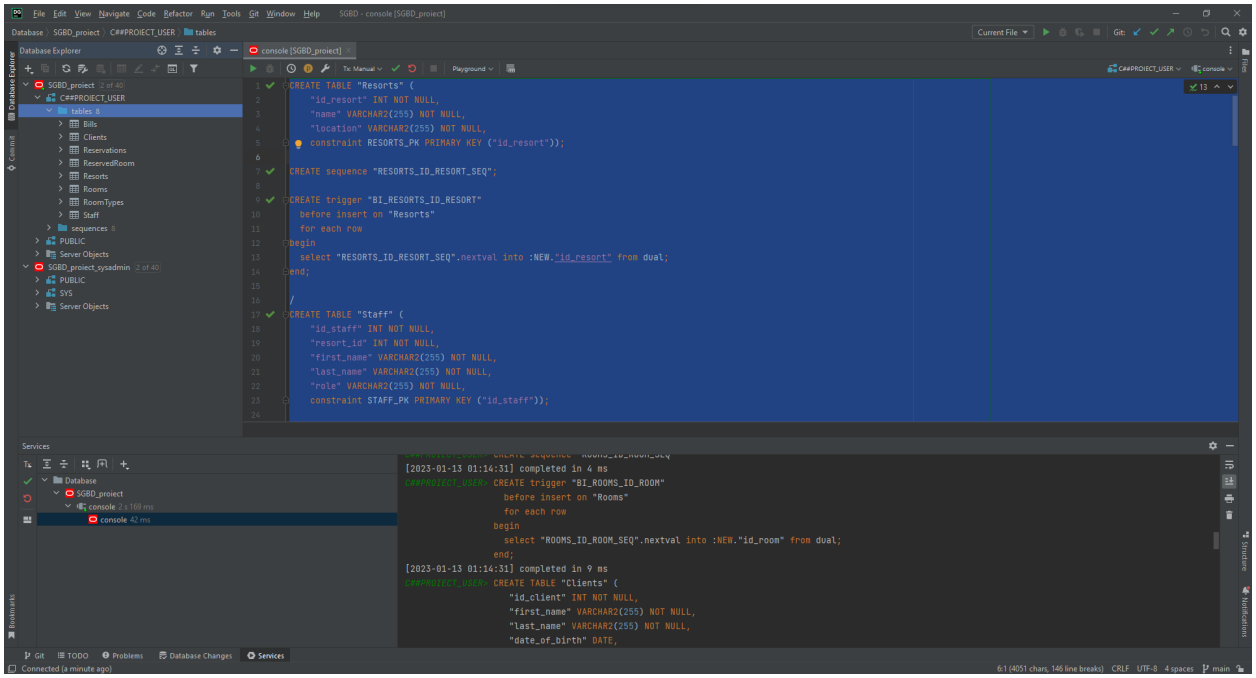
3. Schema Conceptuala:



Folosind un tool online, putem vedea mai detaliat:



4. Implementarea bazei de date in Oracle:



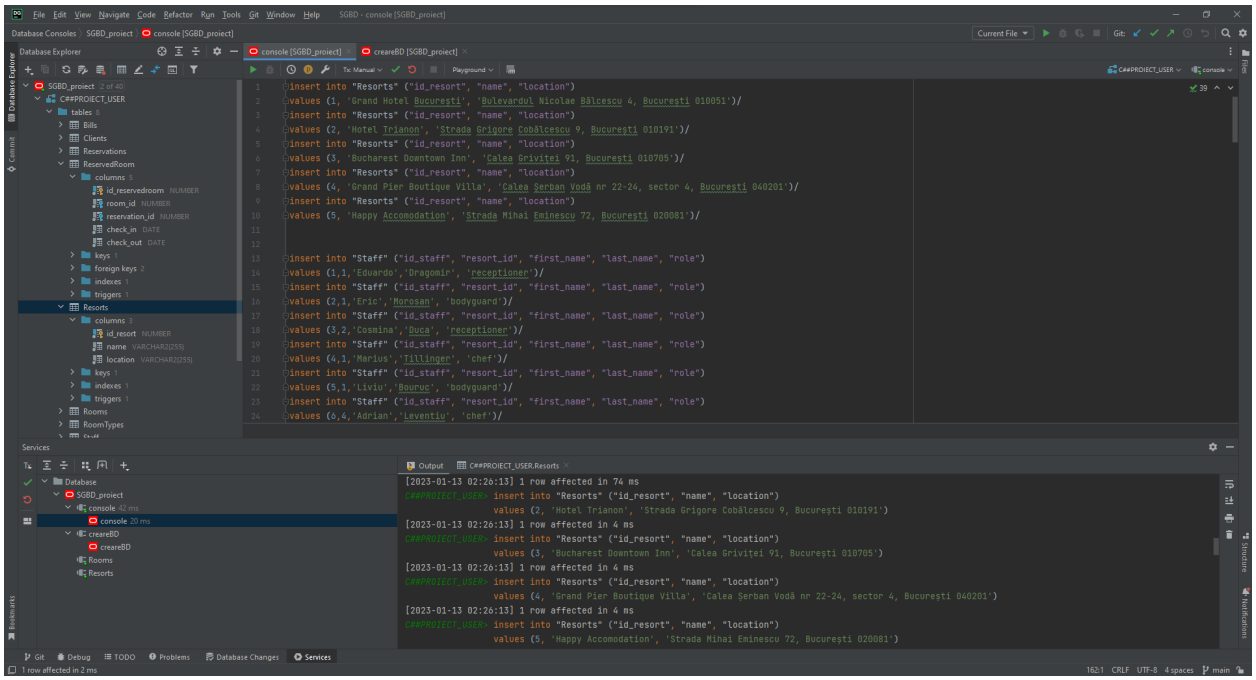
```
CREATE TABLE "Resorts" (
  "id_resort" INT NOT NULL,
  "name" VARCHAR2(255) NOT NULL,
  "location" VARCHAR2(255) NOT NULL,
  constraint RESORTS_PK PRIMARY KEY ("id_resort"));

CREATE sequence "RESORTS_ID_RESORT_SEQ";

CREATE trigger "BI_RESORTS_ID_RESORT"
 before insert on "Resorts"
 for each row
begin
  select  "RESORTS_ID_RESORT_SEQ".nextval  into  :NEW."id_resort"  from
dual;
end;

/
CREATE TABLE "Staff" (
  "id_staff" INT NOT NULL,
  "resort_id" INT NOT NULL,
  "first_name" VARCHAR2(255) NOT NULL,
  "last_name" VARCHAR2(255) NOT NULL,
  "role" VARCHAR2(255) NOT NULL,
  constraint STAFF_PK PRIMARY KEY ("id_staff"));

CREATE sequence "STAFF_ID_STAFF_SEQ";
```

```
CREATE trigger "BI_STAFF_ID_STAFF"
 before insert on "Staff"
 for each row
begin
 select "STAFF_ID_STAFF_SEQ".nextval into :NEW."id_staff" from dual;
end;

/
CREATE TABLE "RoomTypes" (
  "id_rtype" INT NOT NULL,
  "description" VARCHAR2(255) NOT NULL,
  "amount" INT NOT NULL,
  "price" INT NOT NULL,
  constraint ROOMTYPES_PK PRIMARY KEY ("id_rtype"));

CREATE sequence "ROOMTYPES_ID_RTYPE_SEQ";

CREATE trigger "BI_ROOMTYPES_ID_RTYPE"
 before insert on "RoomTypes"
 for each row
begin
  select  "ROOMTYPES_ID_RTYPE_SEQ".nextval  into  :NEW."id_rtype"  from
dual;
end;

/
CREATE TABLE "Rooms" (
  "id_room" INT NOT NULL,
  "resort_id" INT NOT NULL,
  "rtype_id" INT NOT NULL,
  constraint ROOMS_PK PRIMARY KEY ("id_room"));

CREATE sequence "ROOMS_ID_ROOM_SEQ";

CREATE trigger "BI_ROOMS_ID_ROOM"
 before insert on "Rooms"
 for each row
begin
 select "ROOMS_ID_ROOM_SEQ".nextval into :NEW."id_room" from dual;
end;

/
CREATE TABLE "Clients" (
  "id_client" INT NOT NULL,
```

```
  "first_name" VARCHAR2(255) NOT NULL,
  "last_name" VARCHAR2(255) NOT NULL,
  "date_of_birth" DATE,
  constraint CLIENTS_PK PRIMARY KEY ("id_client"));

CREATE sequence "CLIENTS_ID_CLIENT_SEQ";

CREATE trigger "BI_CLIENTS_ID_CLIENT"
 before insert on "Clients"
 for each row
begin
  select  "CLIENTS_ID_CLIENT_SEQ".nextval  into  :NEW."id_client"  from
dual;
end;

/
CREATE TABLE "Reservations" (
  "id_reservation" INT NOT NULL,
  "client_id" INT NOT NULL,
  constraint RESERVATIONS_PK PRIMARY KEY ("id_reservation"));

CREATE sequence "RESERVATIONS_ID_RESERVATION_SEQ";

CREATE trigger "BI_RESERVATIONS_ID_RESERVATION"
 before insert on "Reservations"
 for each row
begin
      select      "RESERVATIONS_ID_RESERVATION_SEQ".nextval      into
:NEW."id_reservation" from dual;
end;

/
CREATE TABLE "Bills" (
  "id_invoice" INT NOT NULL,
  "reservation_id" INT NOT NULL,
  constraint BILLS_PK PRIMARY KEY ("id_invoice"));

CREATE sequence "BILLS_ID_INVOICE_SEQ";

CREATE trigger "BI_BILLS_ID_INVOICE"
 before insert on "Bills"
 for each row
begin
  select  "BILLS_ID_INVOICE_SEQ".nextval  into  :NEW."id_invoice"  from
dual;
```

```
end;

/
CREATE TABLE "ReservedRoom" (
  "id_reservedroom" INT NOT NULL,
  "room_id" INT NOT NULL,
  "reservation_id" INT NOT NULL,
  "check_in" DATE NOT NULL,
  "check_out" DATE NOT NULL,
  constraint RESERVEDROOM_PK PRIMARY KEY ("id_reservedroom"));

CREATE sequence "RESERVEDROOM_ID_RESERVEDROOM_SEQ";

CREATE trigger "BI_RESERVEDROOM_ID_RESERVEDROOM"
 before insert on "ReservedRoom"
 for each row
begin
     select      "RESERVEDROOM_ID_RESERVEDROOM_SEQ".nextval      into
:NEW."id_reservedroom" from dual;
end;

/

ALTER   TABLE   "Staff"   ADD   CONSTRAINT   "Staff_fk0"   FOREIGN   KEY
("resort_id") REFERENCES "Resorts"("id_resort");


ALTER   TABLE   "Rooms"   ADD   CONSTRAINT   "Rooms_fk0"   FOREIGN   KEY
("resort_id") REFERENCES "Resorts"("id_resort");
ALTER   TABLE   "Rooms"   ADD   CONSTRAINT   "Rooms_fk1"   FOREIGN   KEY
("rtype_id") REFERENCES "RoomTypes"("id_rtype");


ALTER TABLE "Reservations" ADD CONSTRAINT "Reservations_fk0" FOREIGN
KEY ("client_id") REFERENCES "Clients"("id_client");

ALTER   TABLE   "Bills"   ADD   CONSTRAINT   "Bills_fk0"   FOREIGN   KEY
("reservation_id") REFERENCES "Reservations"("id_reservation");

ALTER TABLE "ReservedRoom" ADD CONSTRAINT "ReservedRoom_fk0" FOREIGN
KEY ("room_id") REFERENCES "Rooms"("id_room");
ALTER TABLE "ReservedRoom" ADD CONSTRAINT "ReservedRoom_fk1" FOREIGN
KEY ("reservation_id") REFERENCES "Reservations"("id_reservation");
```

5. Popularea bazei de date:



```
insert into "Resorts" ("id_resort", "name", "location")
values (1, 'Grand Hotel București', 'Bulevardul Nicolae Bălcescu 4,
București 010051')/
insert into "Resorts" ("id_resort", "name", "location")
values (2, 'Hotel Trianon', 'Strada Grigore Cobălcescu 9, București
010191')/
insert into "Resorts" ("id_resort", "name", "location")
values (3, 'Bucharest Downtown Inn', 'Calea Griviței 91, București
010705')/
insert into "Resorts" ("id_resort", "name", "location")
values (4, 'Grand Pier Boutique Villa', 'Calea Șerban Vodă nr 22-24,
sector 4, București 040201')/
insert into "Resorts" ("id_resort", "name", "location")
values (5, 'Happy Accomodation', 'Strada Mihai Eminescu 72, București
020081')/


insert into "Staff" ("id_staff", "resort_id", "first_name",
"last_name", "role")
values (1,1,'Eduardo','Dragomir', 'receptioner')/
insert into "Staff" ("id_staff", "resort_id", "first_name",
"last_name", "role")
values (2,1,'Eric','Morosan', 'bodyguard')/
```

```
insert   into   "Staff"   ("id_staff",   "resort_id",   "first_name",
"last_name", "role")
values (3,2,'Cosmina','Duca', 'receptioner')/
insert   into   "Staff"   ("id_staff",   "resort_id",   "first_name",
"last_name", "role")
values (4,1,'Marius','Tillinger', 'chef')/
insert   into   "Staff"   ("id_staff",   "resort_id",   "first_name",
"last_name", "role")
values (5,1,'Liviu','Bouruc', 'bodyguard')/
insert   into   "Staff"   ("id_staff",   "resort_id",   "first_name",
"last_name", "role")
values (6,4,'Adrian','Leventiu', 'chef')/
insert   into   "Staff"   ("id_staff",   "resort_id",   "first_name",
"last_name", "role")
values (7,3,'David','Bejenariu', 'bodyguard')/
insert   into   "Staff"   ("id_staff",   "resort_id",   "first_name",
"last_name", "role")
values (8,5,'David','Patranjel', 'receptioner')/
insert   into   "Staff"   ("id_staff",   "resort_id",   "first_name",
"last_name", "role")
values (9,2,'Diana','Muscalu', 'manager')/


insert   into   "RoomTypes"   ("id_rtype",   "description",   "amount",
"price")
VALUES  (1, 'penthouse', 10, 2000)/
insert   into   "RoomTypes"   ("id_rtype",   "description",   "amount",
"price")
VALUES  (2, 'apartament cu balcon', 10, 1500)/
insert   into   "RoomTypes"   ("id_rtype",   "description",   "amount",
"price")
VALUES  (3, 'apartament fara balcon', 10, 1000)/
insert   into   "RoomTypes"   ("id_rtype",   "description",   "amount",
"price")
VALUES  (4, 'camera single double bed', 10, 500)/
insert   into   "RoomTypes"   ("id_rtype",   "description",   "amount",
"price")
VALUES  (5, 'camera single one-person bed', 10, 100)/


insert into "Rooms" ("id_room", "resort_id", "rtype_id")
VALUES (1,1,1)/
insert into "Rooms" ("id_room", "resort_id", "rtype_id")
VALUES (2,2,1)/
insert into "Rooms" ("id_room", "resort_id", "rtype_id")
```

```
VALUES (3,3,1)/
insert into "Rooms" ("id_room", "resort_id", "rtype_id")
VALUES (4,4,1)/
insert into "Rooms" ("id_room", "resort_id", "rtype_id")
VALUES (5,5,1)/
insert into "Rooms" ("id_room", "resort_id", "rtype_id")
VALUES (6,1,2)/
insert into "Rooms" ("id_room", "resort_id", "rtype_id")
VALUES (7,2,2)/
insert into "Rooms" ("id_room", "resort_id", "rtype_id")
VALUES (8,3,2)/
insert into "Rooms" ("id_room", "resort_id", "rtype_id")
VALUES (9,4,2)/
insert into "Rooms" ("id_room", "resort_id", "rtype_id")
VALUES (10,5,2)/
insert into "Rooms" ("id_room", "resort_id", "rtype_id")
VALUES (11,1,3)/
insert into "Rooms" ("id_room", "resort_id", "rtype_id")
VALUES (12,2,3)/
insert into "Rooms" ("id_room", "resort_id", "rtype_id")
VALUES (13,3,3)/
insert into "Rooms" ("id_room", "resort_id", "rtype_id")
VALUES (14,4,3)/
insert into "Rooms" ("id_room", "resort_id", "rtype_id")
VALUES (15,5,3)/
insert into "Rooms" ("id_room", "resort_id", "rtype_id")
VALUES (16,1,4)/
insert into "Rooms" ("id_room", "resort_id", "rtype_id")
VALUES (17,2,4)/
insert into "Rooms" ("id_room", "resort_id", "rtype_id")
VALUES (18,3,4)/
insert into "Rooms" ("id_room", "resort_id", "rtype_id")
VALUES (19,4,4)/
insert into "Rooms" ("id_room", "resort_id", "rtype_id")
VALUES (20,5,4)/


insert into "Clients" ("id_client", "first_name", "last_name",
"date_of_birth")
VALUES (1,'Marius','Dumitran',null)/
insert into "Clients" ("id_client", "first_name", "last_name",
"date_of_birth")
VALUES (2,'Alexandru','Mihail',null)/
insert into "Clients" ("id_client", "first_name", "last_name",
"date_of_birth")
```

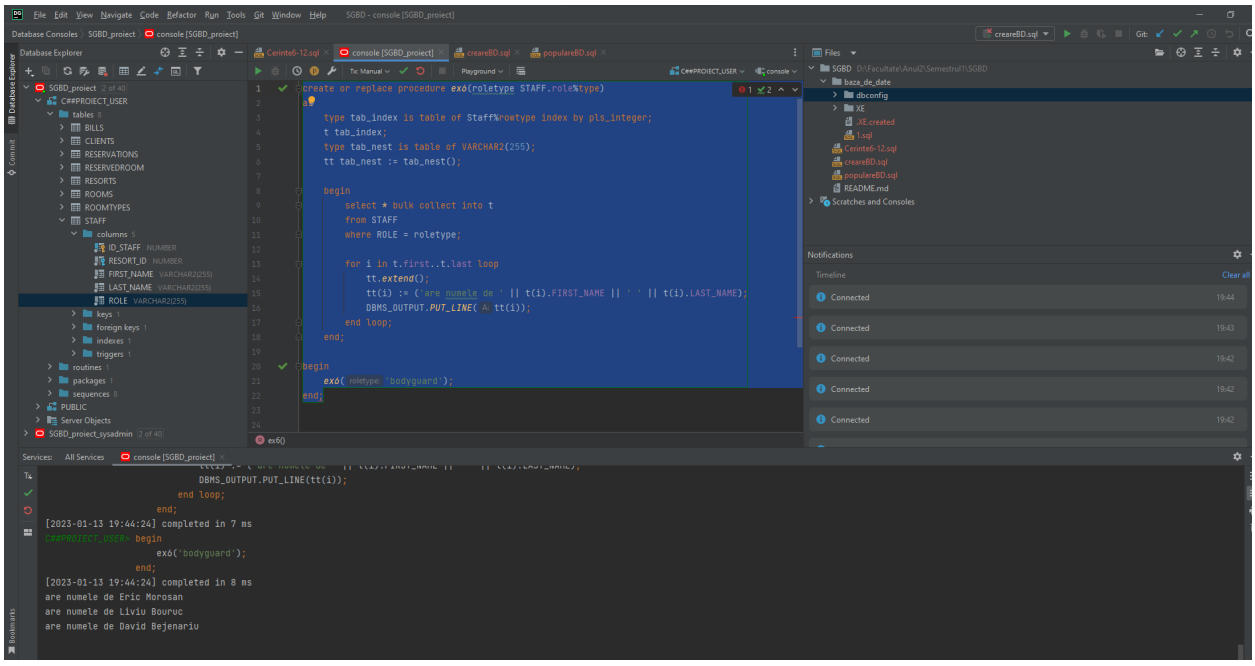
```
VALUES (3,'Stefan','Popescu','10-10-1980')/
insert  into  "Clients"  ("id_client",  "first_name",  "last_name",
"date_of_birth")
VALUES (4,'Andrei','Paun','11-12-1990')/
insert  into  "Clients"  ("id_client",  "first_name",  "last_name",
"date_of_birth")
VALUES (5,'Cristian','Rusu',null)/


insert into "Reservations" ("id_reservation", "client_id")
VALUES (1,1)/
insert into "Reservations" ("id_reservation", "client_id")
VALUES (2,2)/
insert into "Reservations" ("id_reservation", "client_id")
VALUES (3,3)/
insert into "Reservations" ("id_reservation", "client_id")
VALUES (4,4)/
insert into "Reservations" ("id_reservation", "client_id")
VALUES (5,5)/
insert into "Reservations" ("id_reservation", "client_id")
VALUES (6,1)/
insert into "Reservations" ("id_reservation", "client_id")
VALUES (7,2)/
insert into "Reservations" ("id_reservation", "client_id")
VALUES (8,3)/
insert into "Reservations" ("id_reservation", "client_id")
VALUES (9,4)/
insert into "Reservations" ("id_reservation", "client_id")
VALUES (10,5)/
insert into "Reservations" ("id_reservation", "client_id")
VALUES (11,1)/
insert into "Reservations" ("id_reservation", "client_id")
VALUES (12,3)/



insert into "Bills" ("id_invoice", "reservation_id")
values (1,1);
insert into "Bills" ("id_invoice", "reservation_id")
values (2,2);
insert into "Bills" ("id_invoice", "reservation_id")
values (3,3);
insert into "Bills" ("id_invoice", "reservation_id")
values (4,4);
insert into "Bills" ("id_invoice", "reservation_id")
```

```
values (5,5);


insert    into    "ReservedRoom"    ("id_reservedroom",    "room_id",
"reservation_id", "check_in", "check_out")
values (1,12,1,'01-06-2022','09-06-2022');
insert    into    "ReservedRoom"    ("id_reservedroom",    "room_id",
"reservation_id", "check_in", "check_out")
values (2,15,2,'01-07-2022','09-07-2022');
insert    into    "ReservedRoom"    ("id_reservedroom",    "room_id",
"reservation_id", "check_in", "check_out")
values (3,3,3,'01-08-2022','09-08-2022');
insert    into    "ReservedRoom"    ("id_reservedroom",    "room_id",
"reservation_id", "check_in", "check_out")
values (4,20,4,'01-09-2022','09-09-2022');
insert    into    "ReservedRoom"    ("id_reservedroom",    "room_id",
"reservation_id", "check_in", "check_out")
values (5,6,5,'01-06-2022','09-06-2022');
insert    into    "ReservedRoom"    ("id_reservedroom",    "room_id",
"reservation_id", "check_in", "check_out")
values (6,12,6,'01-07-2022','09-07-2022');
insert    into    "ReservedRoom"    ("id_reservedroom",    "room_id",
"reservation_id", "check_in", "check_out")
values (7,20,7,'01-12-2022','09-12-2022');
insert    into    "ReservedRoom"    ("id_reservedroom",    "room_id",
"reservation_id", "check_in", "check_out")
values (8,14,8,'23-11-2022','25-11-2022');
insert    into    "ReservedRoom"    ("id_reservedroom",    "room_id",
"reservation_id", "check_in", "check_out")
values (9,2,9,'10-10-2022','11-10-2022');
insert    into    "ReservedRoom"    ("id_reservedroom",    "room_id",
"reservation_id", "check_in", "check_out")
values (10,7,10,'01-07-2023','09-07-2023');
insert    into    "ReservedRoom"    ("id_reservedroom",    "room_id",
"reservation_id", "check_in", "check_out")
values (11,15,11,'01-06-2023','09-06-2023');
insert    into    "ReservedRoom"    ("id_reservedroom",    "room_id",
"reservation_id", "check_in", "check_out")
values (12,19,12,'01-06-2023','09-06-2023');
```

6. Cateodata este nevoie de o consultatie directa si precisa. Doresc sa creez o procedura prin care sa pot vizualiza exact angajatii care au un anumit post in cadrul resorturilor:

```
create or replace procedure ex6(roletype STAFF.role%type)
```

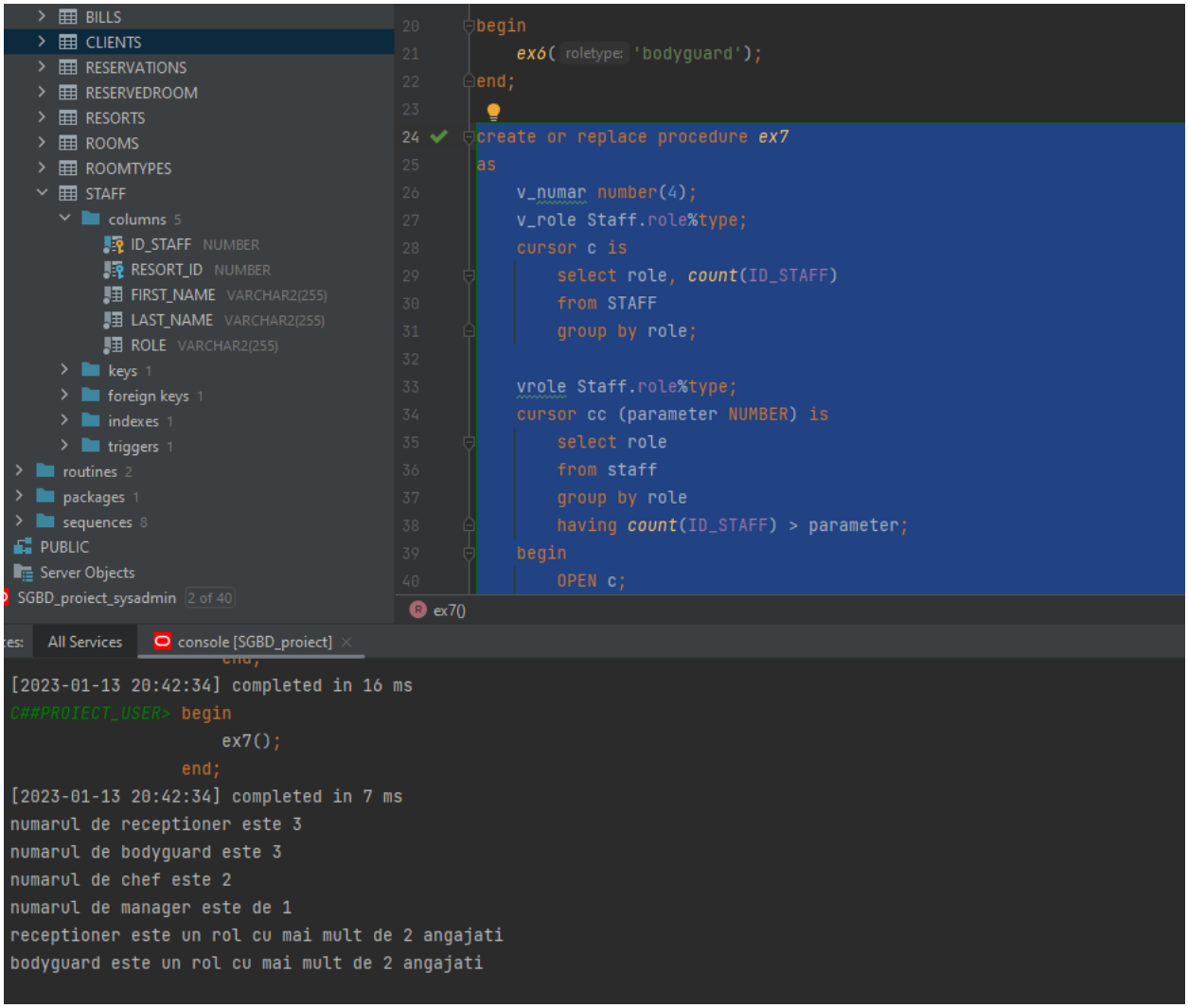
```
as
        type  tab_index  is  table  of  Staff%rowtype  index  by
pls_integer;
    t tab_index;
    type tab_nest is table of VARCHAR2(255);
    tt tab_nest := tab_nest();

    begin
        select * bulk collect into t
        from STAFF
        where ROLE = roletype;

        for i in t.first..t.last loop
            tt.extend();
             tt(i) := ('are numele de ' || t(i).FIRST_NAME || ' '
|| t(i).LAST_NAME);
            DBMS_OUTPUT.PUT_LINE(tt(i));
        end loop;
    end;

begin
    ex6('bodyguard');
end;
```



7. In evidenta interna, trebuie sa observ popularitatea atat a unui anumit job, dar si sa vad care sunt cele mai dorite joburi in cadrul resorturilor. Doresc sa observ numarul de angajati care au un anumit job. Si sa vad care joburi au un numar mai mare de 2 de angajati:

```
create or replace procedure ex7
as
   v_numar number(4);
   v_role Staff.role%type;
   cursor c is
       select role, count(ID_STAFF)
       from STAFF
       group by role;

   vrole Staff.role%type;
   cursor cc (parameter NUMBER) is
       select role
       from staff
       group by role
       having count(ID_STAFF) > parameter;
   begin
       OPEN c;
       LOOP
          FETCH c INTO v_role, v_numar;
          EXIT WHEN c%NOTFOUND;

          IF v_numar = 0 THEN
              DBMS_OUTPUT.PUT_LINE('numarul de  ' || v_role || '
este 0');
          ELSIF v_numar = 1 THEN
               DBMS_OUTPUT.PUT_LINE('numarul de ' || v_role || '
este de 1');
          ELSE
               DBMS_OUTPUT.PUT_LINE('numarul de ' || v_role || '
este '|| v_numar);
           END IF;
       END LOOP;
       CLOSE c;
       open cc(2);
       loop
           fetch cc into vrole ;
           exit when cc%notfound;

             DBMS_OUTPUT.PUT_LINE(vrole || ' este un rol cu mai
mult de 2 angajati');
```

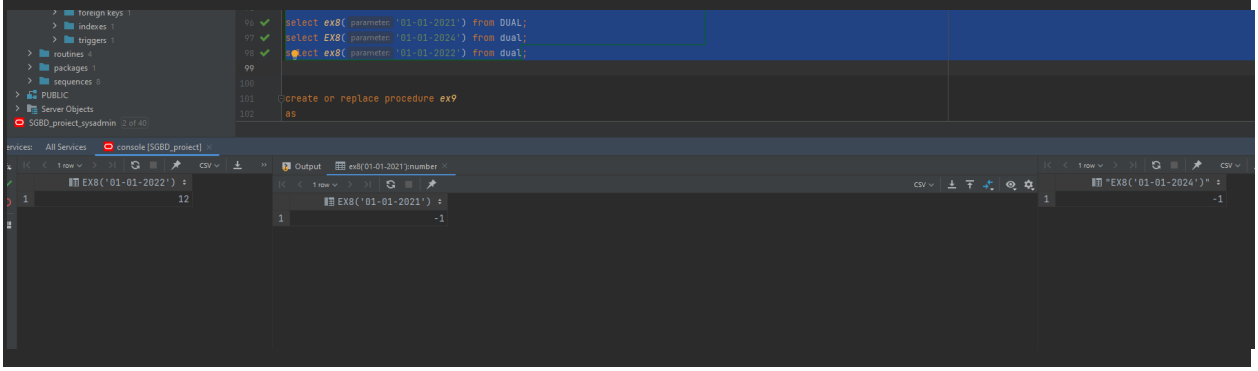
```
        end loop;
    end;

begin
    ex7();
end;
```



8. In diferite investigatii ale datelor, este important sa avem o evidenta a traficului pe care il avem in cadrul resorturilor motiv pentru care trebuie sa stim cand ajunge lumea in incinta resorturilor noastre. Doresc sa vad daca exista check-in uri dupa o anumita data specificata ca parametru:

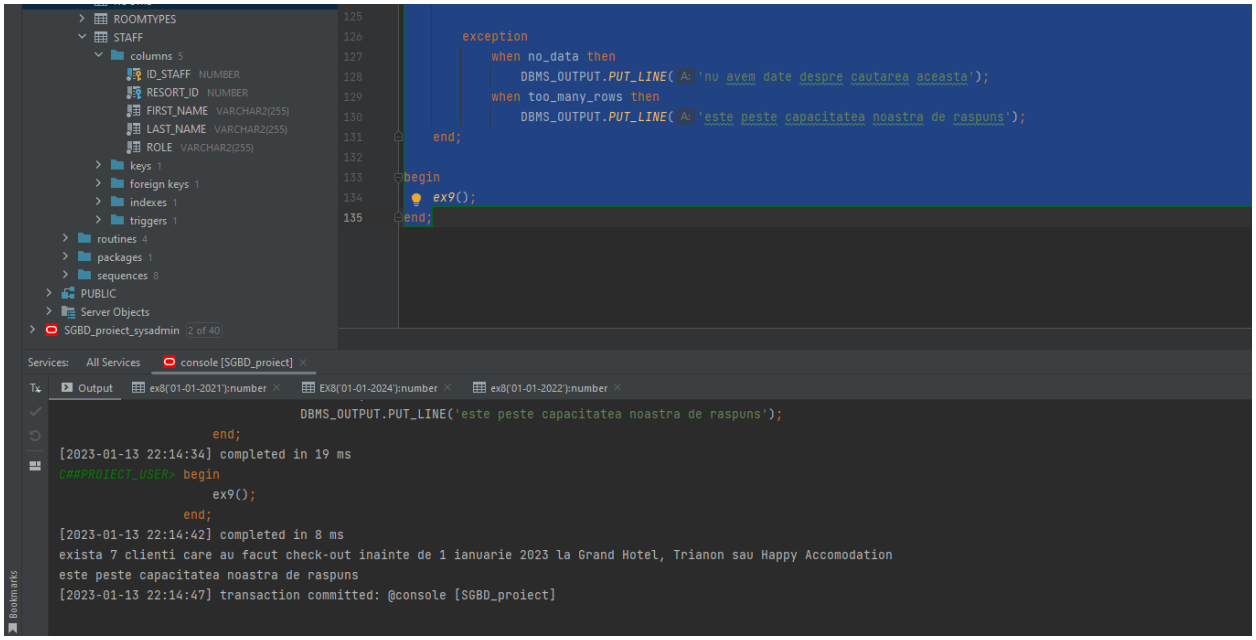
```
create or replace function ex8(parameter date) return number
is
   bad_date exception;
```

```
    no_data exception;
    valreturn number;
    begin
        if (parameter < '01-01-2022') then
            raise bad_date;
        end if;

        select count(ID_CLIENT)
        into valreturn
        from CLIENTS
        join RESERVATIONS R on CLIENTS.ID_CLIENT = R.CLIENT_ID
        join RESERVEDROOM R2 on R.ID_RESERVATION = R2.RESERVATION_ID
        where CHECK_IN > parameter;

        if (valreturn > 0) then return valreturn;
        else raise no_data;
        end if;
    exception
        when bad_date then
            DBMS_OUTPUT.PUT_LINE('nu e buna data');
            return -1;
        when no_data then
                DBMS_OUTPUT.PUT_LINE('nu avem date despre cautarea
aceasta');
            return -1;
    end;

select ex8('01-01-2021') from DUAL;
select EX8('01-01-2024') from dual;
select ex8('01-01-2022') from dual;
```



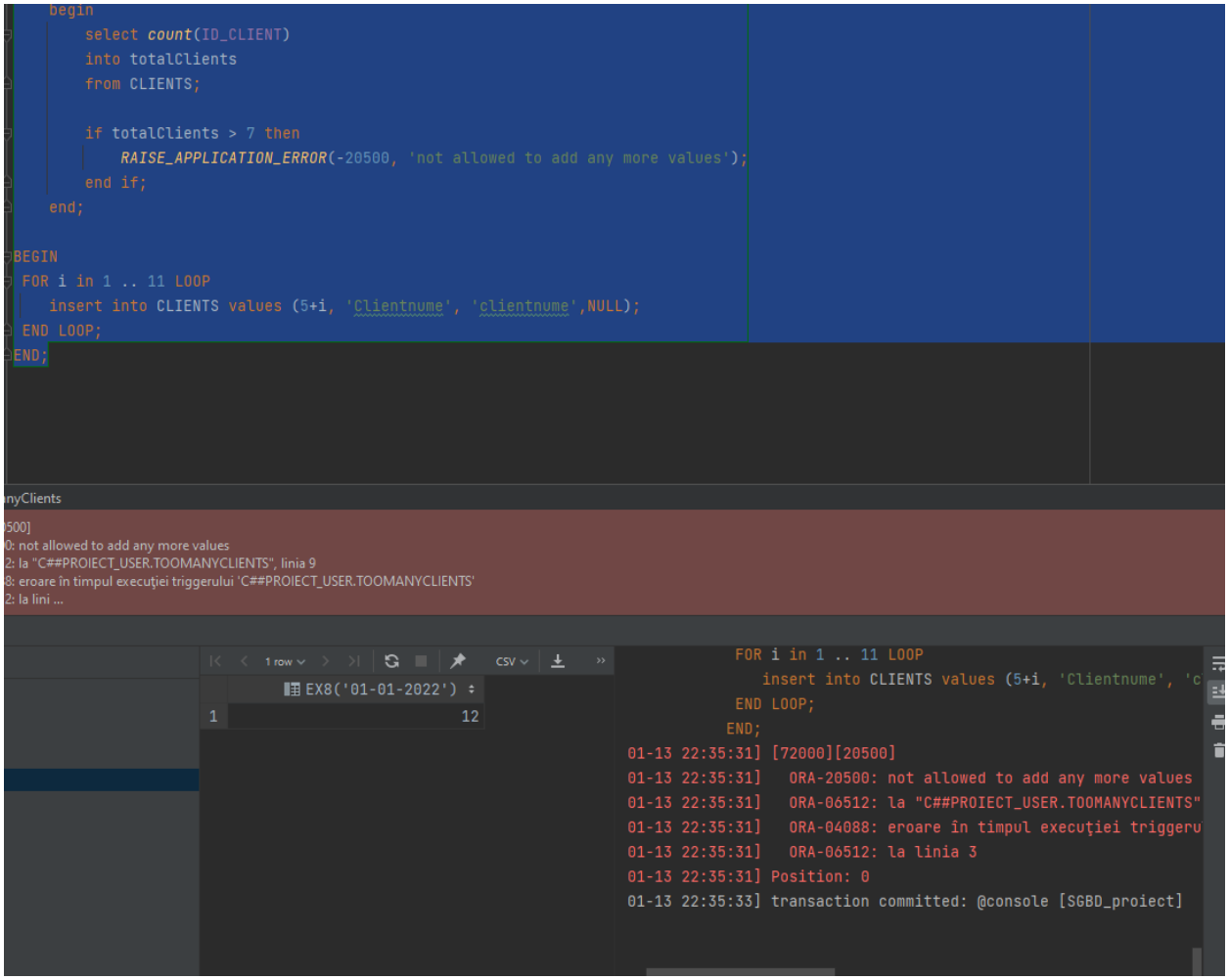
9. Doresc sa vad cati clienti si-au facut check-out ul pana la 1 ianuarie 2023 la Grand Hotel, Trianon sau Happy Accomodations si daca ne permitem sa manageruim asemenea trafic:

```
create or replace procedure ex9
as
   no_data exception;
   too_many_rows exception;
   valfinal number;
   begin
       select count(ID_CLIENT)
       into valfinal
       from CLIENTS
       join RESERVATIONS R on CLIENTS.ID_CLIENT = R.CLIENT_ID
       join RESERVEDROOM R2 on R.ID_RESERVATION = R2.RESERVATION_ID
       join ROOMS R3 on R3.ID_ROOM = R2.ROOM_ID
       join RESORTS R4 on R4.ID_RESORT = R3.RESORT_ID
         where CHECK_OUT < '01-01-2023' and (R4.NAME = 'Grand Hotel
București'  or  R4.NAME  =  'Hotel  Trianon'  or  r4.NAME  =  'Happy
Accomodation');

       if valfinal > 0 then
             DBMS_OUTPUT.PUT_LINE('exista ' || valfinal || ' clienti
care au facut check-out inainte de 1 ianuarie 2023 la Grand Hotel,
Trianon sau Happy Accomodation');
       else
           raise no_data;
       end if;

       if valfinal > 5 then
           raise too_many_rows;
       end if;

       exception
           when no_data then
                   DBMS_OUTPUT.PUT_LINE('nu avem date despre cautarea
aceasta');
           when too_many_rows then
                 DBMS_OUTPUT.PUT_LINE('este peste capacitatea noastra
de raspuns');
   end;

begin
   ex9();
end;
```



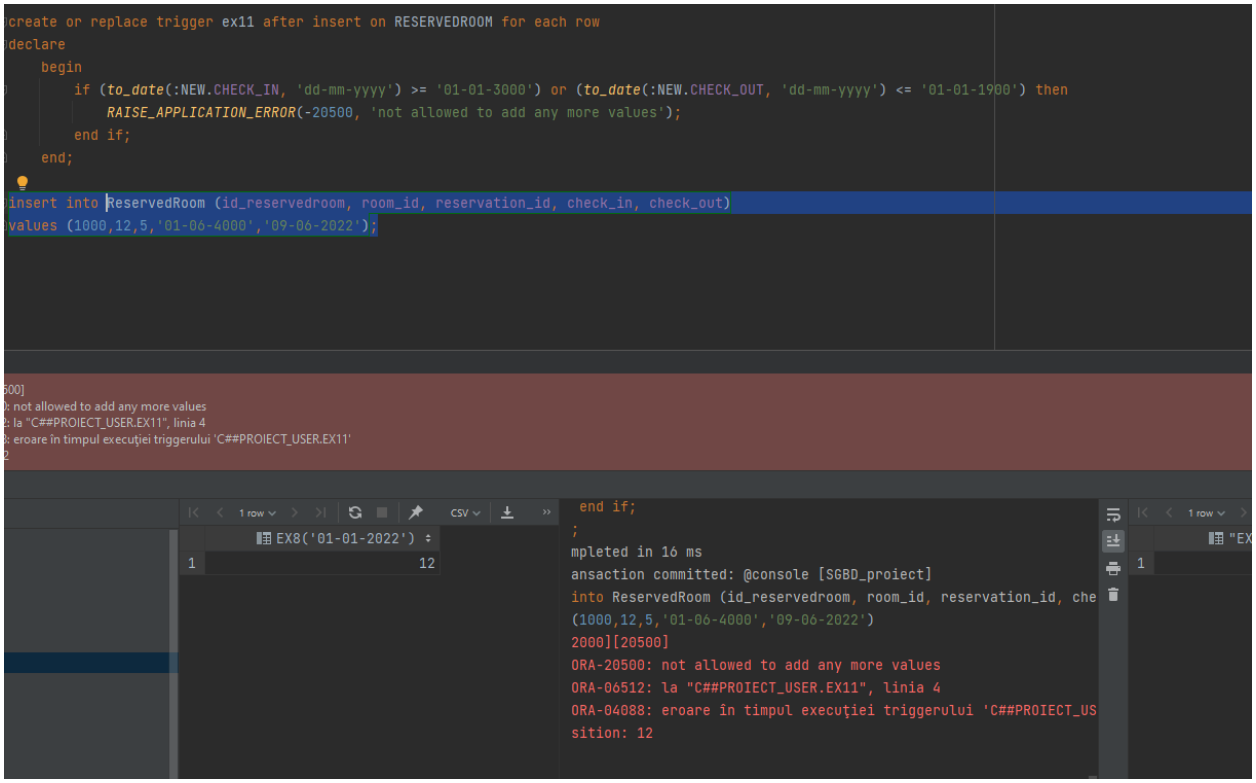
10. Presupunem ca nu ne permitem asigurarea serviciilor pentru mai mult de 7 clienti. Doresc sa blochez inserarea a mai mult de 7 intrari in tabela Clients:

```
create or replace trigger toomanyClients before insert on CLIENTS
declare
   totalClients number;
   begin
        select count(ID_CLIENT)
        into totalClients
        from CLIENTS;

        if totalClients > 7 then
               RAISE_APPLICATION_ERROR(-20500, 'not allowed to add any
more values');
        end if;
   end;

BEGIN
FOR i in 1 .. 11 LOOP
   insert into CLIENTS values (5+i, 'Clientnume', 'clientnume',NULL);
END LOOP;
END;
```



11. Anumite date nu ne sunt de folos motiv pentru care nu le vrem in baza de date. Doresc sa blochez inserarea de date invalide, care depasesc bariera de interes:

```
create or replace trigger ex11 after insert on RESERVEDROOM for each
row
declare
   begin
        if (to_date(:NEW.CHECK_IN, 'dd-mm-yyyy') >= '01-01-3000') or
(to_date(:NEW.CHECK_OUT, 'dd-mm-yyyy') <= '01-01-1900') then
            RAISE_APPLICATION_ERROR(-20500, 'not allowed to add any
more values');
       end if;
   end;

insert into ReservedRoom (id_reservedroom, room_id, reservation_id,
check_in, check_out)
values (1000,12,5,'01-06-4000','09-06-2022');
```



12. Deoarece datele sunt cea mai importanta resursa a noastra, daca cineva ar efectua modificari asupra bazei de date, ne dorim sa fim anuntati de astfel de modificari astfel incat sa putem stii mereu ce se intampla. Am creat astfel acest trigger LDD care sa monitorizeze totul.

```
create or replace trigger ex12 after create or alter or drop on
schema
declare
   begin
                DBMS_OUTPUT.PUT_LINE('utilizatorul cu datele: ' ||
sys.LOGIN_USER() || ' a facut o modificare in baza de date la ora si
data ' || systimestamp);
   end;

create table tableex12 (
   id number
);
alter table tableex12 add nume varchar2(255);

drop table tableex12;
```

```
create or replace trigger ex12 after create or alter or drop on schema
declare
    begin
        DBMS_OUTPUT.PUT_LINE( 'utilizatorul cu datele: ' || sys.LOGIN_USER() || ' a facut o modificare in baza de date la ora si data
    end;

create table tableex12 (
    id number
);
alter table tableex12 add nume varchar2(255);

drop table tableex12;
```

1 row | CSV

	EX8('01-01-2022')
1	12

```
IECT_USER> create table tableex12 (
               id number
           )
01-13 23:11:36] completed in 9 ms
atorul cu datele: C##PROIECT_USER a facut o modificare in baza d
IECT_USER> alter table tableex12 add nume varchar2(255)
01-13 23:11:36] completed in 11 ms
atorul cu datele: C##PROIECT_USER a facut o modificare in baza d
IECT_USER> drop table tableex12
01-13 23:11:36] completed in 12 ms
atorul cu datele: C##PROIECT_USER a facut o modificare in baza d
```