**Proiect Baze de Date**

-*FirmadeSalubrizare* –

1. **Modelul ER entitate – legatura. Prezentarea entitatilor si a legaturilor dintre acestea, impreuna cu cardinaliatea lor.**

A picture containing indoor

Description automatically generatedPentru realizarea proiectului am creat 7 tabele: angajatii, angajatii\_clientii, clientii, locatii, locatii\_utilaj,utilaj,departament.

**2.Schema relationala (stabilirea relatiilor, atributelor, cheilor primare, constrangerilor, legaturilor dintre relatii - chei externe)**

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**3*.*Implementarea modelului relational folosind SQL – crearea tabelelor, constrangerilor + Operatii de manipulare a relatiilor/tabelelor – inserare, modificare, stergere.**

create table Departament

(

ID\_Dep INT,

DenumireDep VARCHAR(50),

ManagerDep VARCHAR(50)

);

-- adaugam constrangerea de cheie primara asupra atributului ID\_Dep

alter table Departament add constraint ID\_Dep\_PK primary key (ID\_Dep);

create table Angajatii

(

ID\_Angajat INT,

Nume VARCHAR(50),

Prenume VARCHAR(50),

Adresa VARCHAR(50),

Salariu INT

);

-- adaugam constrangerea de cheie primara asupra atributului ID\_Angajat

alter table Angajatii add constraint ID\_Angajat\_PK primary key (ID\_Angajat);

alter table Angajatii add constraint ID\_Dep2\_PK foreign key (ID\_Dep) references Departament(ID\_Dep);

alter table Angajatii ADD ID\_Dep INT;

create table Clientii

(

ID\_Clientii INT,

Nume VARCHAR(50),

Adresa VARCHAR(50),

Telefon VARCHAR(20)

);

-- adaugam constrangerea de cheie primara asupra atributului ID\_Clientii

alter table Clientii add constraint ID\_Clientii\_PK primary key (ID\_Clientii);

create table Locatii

(

ID\_Locatie INT,

Oras VARCHAR(50)

);

-- adaugam constrangerea de cheie primara asupra atributului ID\_Locatie

alter table Locatii add constraint ID\_Locatie\_PK primary key (ID\_Locatie);

alter table Locatii ADD ID\_Dep INT;

alter table Locatii add constraint ID\_Locatie2\_PK foreign key (ID\_Dep) references Departament(ID\_Dep);

create table Utilaj

(

ID\_Utilaj INT,

DenumireUtilaj VARCHAR(50)

);

-- adaugam constrangerea de cheie primara asupra atributului ID\_Locatie

alter table Utilaj add constraint ID\_Utilaj\_PK primary key (ID\_Utilaj);

create table Angajatii\_Clientii

(

ID\_Angajat INT,

ID\_Clientii INT,

NrOreLucrate INT

);

-- constrângerile de fk pentru ID\_Angajatii și ID\_Clientii

alter table Angajatii\_Clientii add constraint ID\_Angajat2\_FK foreign key (ID\_Angajat) references Angajatii (ID\_Angajat);

alter table Angajatii\_Clientii add constraint ID\_Clientii2\_FK foreign key (ID\_Clientii) references Clientii (ID\_Clientii);

create table Locatii\_Utilaj

(

ID\_Locatie INT,

ID\_Utilaj INT

);

-- constrângerile de fk pentru ID\_Locatie și ID\_Utilaj

alter table Locatii\_Utilaj add constraint ID\_Locatie2\_FK foreign key (ID\_Locatie) references Locatii (ID\_Locatie);

alter table Locatii\_Utilaj add constraint ID\_Utilaj2\_FK foreign key (ID\_Utilaj)

**a.Fiecare tabel va contine cel putin 10 inregistrari**

insert into Departament(ID\_Dep, DenumireDep, ManagerDep) values

(

1,

'Serviciul de colectare si transport deseuri',

'Codrin Bogza'

)

insert into Departament values

(

2,

'Serviciul de salubrizare stradala',

'Adi Stoica'

);

insert into Departament(ID\_Dep, DenumireDep, ManagerDep) values

(

3,

'Serviciul de semnalizare rutiera',

'Filip Neacsu'

)

insert into Departament(ID\_Dep, DenumireDep, ManagerDep) values

(

4,

'Serviciul de intretinere partiei',

'Gabriel Tanase'

)

insert into Departament(ID\_Dep, DenumireDep, ManagerDep) values

(

5,

'Serviciul de deszapezire',

'Alex Diaconescu'

)

insert into Departament(ID\_Dep, DenumireDep, ManagerDep) values

(

6,

'Serviciul de vidanjare',

'Marin Rusu'

)

insert into Departament(ID\_Dep, DenumireDep, ManagerDep) values

(

7,

'Serviciul de dezinsectie si deratizare',

'Martin Vulcan'

)

insert into Departament(ID\_Dep, DenumireDep, ManagerDep) values

(

8,

'Serviciul de ecarisaj',

'Doru Vladu'

)

insert into Departament(ID\_Dep, DenumireDep, ManagerDep) values

(

9,

'Serviciul de colectare deseuri din constructii',

'Sorin Ianculescu'

)

insert into Departament(ID\_Dep, DenumireDep, ManagerDep) values

(

10,

'Serviciul de salubrizare piete',

'Jan Iliescu'

)

Table

Description automatically generated with medium confidence

insert into Angajatii(ID\_Angajat, Nume, Prenume, Adresa, Salariu, ID\_Dep)

values

(

1,

'Nicusor',

'Zamfir',

'Intrare Vladaia 26,Craiova',

2500,

1

)

insert into Angajatii(ID\_Angajat, Nume, Prenume, Adresa, Salariu, ID\_Dep)

values

(

2,

'Danut',

'Suciu',

'Alee Râmnicu Vâlcea 12,Craiova',

2300,

2

)

insert into Angajatii(ID\_Angajat, Nume, Prenume, Adresa, Salariu, ID\_Dep)

values

(

3,

'Rares',

'Lupul',

'Strada Straoani 1,Craiova',

2600,

3

)

insert into Angajatii(ID\_Angajat, Nume, Prenume, Adresa, Salariu, ID\_Dep)

values

(

4,

'Costi',

'Minea',

'Strada Parfumului 20,Craiova',

2890,

4

)

insert into Angajatii(ID\_Angajat, Nume, Prenume, Adresa, Salariu, ID\_Dep)

values

(

5,

'Soare',

'Cojocaru',

'Strada Plugarilor 1,Craiova',

2900,

5

)

insert into Angajatii(ID\_Angajat, Nume, Prenume, Adresa, Salariu, ID\_Dep)

values

(

6,

'Danus',

'Puiu',

'Strada Aviatiei 23,Craiova',

2450,

6

)

insert into Angajatii(ID\_Angajat, Nume, Prenume, Adresa, Salariu, ID\_Dep)

values

(

7,

'Dragomir',

'Ionut',

'Strada Petru Rares 35,Craiova',

2670,

7

)

insert into Angajatii(ID\_Angajat, Nume, Prenume, Adresa, Salariu, ID\_Dep)

values

(

8,

'Chitu',

'Alin',

'Bulevard Carol I 9,Craiova',

2700,

8

)

insert into Angajatii(ID\_Angajat, Nume, Prenume, Adresa, Salariu, ID\_Dep)

values

(

9,

'Enescu',

'Emilian',

'Strada Doinei 16,Craiova',

2800,

9

)

insert into Angajatii(ID\_Angajat, Nume, Prenume, Adresa, Salariu, ID\_Dep)

values

(

10,

'Cardei',

'Stefan',

'Strada Cluceru Sandu 13,Craiova',

3100,

10

)

insert into Angajatii(ID\_Angajat, Nume, Prenume, Adresa, Salariu, ID\_Dep)

values

(

11,

'Horatiu',

'Prunea',

'Strada Vidraru 19,Craiova',

3200,

10

)

insert into Angajatii(ID\_Angajat, Nume, Prenume, Adresa, Salariu, ID\_Dep)

values

(

12,

'Zamfir',

'Ioan',

'Strada Alecsandri Vasile 25,Craiova',

3300,

9

)

Graphical user interface

Description automatically generated

insert into Clientii(ID\_Clientii, Nume, Adresa, Telefon)

values

(

1,

'Ionut Craciun',

'Strada Digului 15,Craiova',

'0737932877'

)

insert into Clientii(ID\_Clientii, Nume, Adresa, Telefon)

values

(

2,

'Denis Mihalache',

'Strada Alpinistilor 4,Craiova',

'0737932446'

)

insert into Clientii(ID\_Clientii, Nume, Adresa, Telefon)

values

(

3,

'Codrin Bunea',

'Strada Darmanesti 23,Craiova',

'0732932876'

)

insert into Clientii(ID\_Clientii, Nume, Adresa, Telefon)

values

(

4,

'Horea Cojoc',

'Strada Lamark 1,Craiova',

'0737912876'

)

insert into Clientii(ID\_Clientii, Nume, Adresa, Telefon)

values

(

5,

'Marin Mocanu',

'Strada Ciacova 23,Craiova',

'0737932876'

)

insert into Clientii(ID\_Clientii, Nume, Adresa, Telefon)

values

(

6,

'Gavril Ene',

'Alee Pacii 9,Craiova',

'0748882326'

)

insert into Clientii(ID\_Clientii, Nume, Adresa, Telefon)

values

(

7,

'Silviu Gherea',

'Strada Privighetorii 24,Craiova',

'0745178705'

)

insert into Clientii(ID\_Clientii, Nume, Adresa, Telefon)

values

(

8,

'Laurentiu Rusu',

'Strada Valcelei 4,Craiova',

'0723587392'

)

insert into Clientii(ID\_Clientii, Nume, Adresa, Telefon)

values

(

9,

'Dorin Lupei',

'Strada Ciucas 2,Craiova',

'0724541597'

)

insert into Clientii(ID\_Clientii, Nume, Adresa, Telefon)

values

(

10,

'Alin Sala',

'Strada Modestiei 3,Craiova',

'0721508958'

)

Graphical user interface

Description automatically generated with medium confidence

insert into Angajatii\_Clientii(ID\_Angajat, ID\_Clientii, NrOreLucrate)

values

(

1,

1,

3

)

insert into Angajatii\_Clientii(ID\_Angajat, ID\_Clientii, NrOreLucrate)

values

(

2,

2,

5

)

insert into Angajatii\_Clientii(ID\_Angajat, ID\_Clientii, NrOreLucrate)

values

(

3,

3,

2

)

insert into Angajatii\_Clientii(ID\_Angajat, ID\_Clientii, NrOreLucrate)

values

(

4,

4,

3

)

insert into Angajatii\_Clientii(ID\_Angajat, ID\_Clientii, NrOreLucrate)

values

(

5,

5,

6

)

insert into Angajatii\_Clientii(ID\_Angajat, ID\_Clientii, NrOreLucrate)

values

(

6,

6,

5

)

insert into Angajatii\_Clientii(ID\_Angajat, ID\_Clientii, NrOreLucrate)

values

(

7,

7,

8

)

insert into Angajatii\_Clientii(ID\_Angajat, ID\_Clientii, NrOreLucrate)

values

(

8,

8,

6

)

insert into Angajatii\_Clientii(ID\_Angajat, ID\_Clientii, NrOreLucrate)

values

(

9,

9,

2

)

insert into Angajatii\_Clientii(ID\_Angajat, ID\_Clientii, NrOreLucrate)

values

(

10,

10,

1

)

A picture containing table

Description automatically generated

insert into Locatii(ID\_Locatie, Oras, ID\_Dep)

values

(

1,

'Craiova',

1

)

insert into Locatii(ID\_Locatie, Oras, ID\_Dep)

values

(

2,

'Craiova',

2

)

insert into Locatii(ID\_Locatie, Oras, ID\_Dep)

values

(

3,

'Craiova',

3

)

insert into Locatii(ID\_Locatie, Oras, ID\_Dep)

values

(

4,

'Brasov',

4

)

insert into Locatii(ID\_Locatie, Oras, ID\_Dep)

values

(

5,

'Bucuresti',

5

)

insert into Locatii(ID\_Locatie, Oras, ID\_Dep)

values

(

6,

'Bucuresti',

6

)

insert into Locatii(ID\_Locatie, Oras, ID\_Dep)

values

(

7,

'Pitesti',

7

)

insert into Locatii(ID\_Locatie, Oras, ID\_Dep)

values

(

8,

'Pitesti',

8

)

insert into Locatii(ID\_Locatie, Oras, ID\_Dep)

values

(

9,

'Slatina',

9

)

insert into Locatii(ID\_Locatie, Oras, ID\_Dep)

values

(

10,

'Slatina',

10

)

Table

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insert into Utilaj(ID\_Utilaj, DenumireUtilaj)

values

(

1,

'autogunoiere'

)

insert into Utilaj(ID\_Utilaj, DenumireUtilaj)

values

(

2,

'autobasculante'

)

insert into Utilaj(ID\_Utilaj, DenumireUtilaj)

values

(

3,

'automaturatori stradale'

)

insert into Utilaj(ID\_Utilaj, DenumireUtilaj)

values

(

4,

'utilaje desapezire'

)

insert into Utilaj(ID\_Utilaj, DenumireUtilaj)

values

(

5,

'echipamente dezinsectie'

)

insert into Utilaj(ID\_Utilaj, DenumireUtilaj)

values

(

6,

'echipamente curatare urbana'

)

insert into Utilaj(ID\_Utilaj, DenumireUtilaj)

values

(

7,

'excavator'

)

insert into Utilaj(ID\_Utilaj, DenumireUtilaj)

values

(

8,

'multihog'

)

insert into Utilaj(ID\_Utilaj, DenumireUtilaj)

values

(

9,

'energreen'

)

insert into Utilaj(ID\_Utilaj, DenumireUtilaj)

values

(

10,

'placa compactoare'

)

Table

Description automatically generated

insert into Locatii\_Utilaj(ID\_Locatie, ID\_Utilaj)

values

(

1,

1

)

insert into Locatii\_Utilaj(ID\_Locatie, ID\_Utilaj)

values

(

2,

2

)

insert into Locatii\_Utilaj(ID\_Locatie, ID\_Utilaj)

values

(

3,

3

)

insert into Locatii\_Utilaj(ID\_Locatie, ID\_Utilaj)

values

(

4,

4

)

insert into Locatii\_Utilaj(ID\_Locatie, ID\_Utilaj)

values

(

5,

5

)

insert into Locatii\_Utilaj(ID\_Locatie, ID\_Utilaj)

values

(

6,

6

)

insert into Locatii\_Utilaj(ID\_Locatie, ID\_Utilaj)

values

(

7,

7

)

insert into Locatii\_Utilaj(ID\_Locatie, ID\_Utilaj)

values

(

8,

8

)

insert into Locatii\_Utilaj(ID\_Locatie, ID\_Utilaj)

values

(

9,

9

)

insert into Locatii\_Utilaj(ID\_Locatie, ID\_Utilaj)

values

(

10,

10

)

A screenshot of a graph

Description automatically generated with low confidence

**b.Se vor da 4 exemple de operatii de update si si 4 operatii delete**

--operatii de modificare

--1

UPDATE Angajatii

SET Salariu=2700

WHERE ID\_Angajat=7;

--2

UPDATE Angajatii

SET Prenume='Andrei'

WHERE ID\_Angajat=9;

--3

UPDATE Locatii

SET Oras='Constanta'

WHERE ID\_Locatie=10;

--4

UPDATE Clientii

SET Telefon='0749932877'

WHERE ID\_Clientii=5;

--operatii de stergere

--1

DELETE FROM Angajatii

WHERE ID\_Angajat = 11;

--2

DELETE FROM Angajatii

WHERE ID\_Angajat = 12;

Graphical user interface

Description automatically generated with low confidence

Graphical user interface, table

Description automatically generated with medium confidence

**4.Interogari –Se vor da exemple cu minim 20 de interogari**

**a.Minim 5 interogari cu operatii de jonctiune (inner join+outer join)**

***1***.***Să se afișeze numele,prenumele si adresa angajaților care lucrează la departamentul 'Serviciul de deszapezire'.***

SELECT Angajatii.Nume, Angajatii.Prenume,Angajatii.Adresa

FROM Angajatii INNER JOIN Departament ON Angajatii.ID\_Dep = Departament.ID\_Dep AND DenumireDep='Serviciul de deszapezire';

*Graphical user interface, text, application

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***2.Sa se afiseze toate departamentele impreuna cu angajatii pe care ii au***

select Departament.DenumireDep, Angajatii.Nume, Angajatii.Prenume

from Departament

left join Angajatii on Departament.ID\_Dep = Angajatii.ID\_Dep

Graphical user interface

Description automatically generated

***3.Sa se afiseze toate locatiile impreuna cu utilajele pe care le au***

select Locatii.ID\_Locatie, Utilaj.DenumireUtilaj

from ((Locatii

right join Locatii\_Utilaj on Locatii.ID\_Locatie = Locatii\_Utilaj.ID\_Locatie)

inner join Utilaj on Locatii\_Utilaj.ID\_Utilaj = Utilaj.ID\_Utilaj);

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***4.Sa se afiseze angajatii care au lucrat pentru clientul cu id-ul 3***

select Angajatii.Nume, Angajatii.Prenume

from Angajatii

inner join Angajatii\_Clientii on Angajatii.ID\_Angajat = Angajatii\_Clientii.ID\_Angajat

and Angajatii\_Clientii.ID\_Clientii = 3;

Graphical user interface, text, application

Description automatically generated

***5.Sa se afiseze toate departamentele impreuna cu locatiile lor***

select Departament.DenumireDep,Locatii.Oras

from Departament left join Locatii on Departament.ID\_Dep= Locatii.ID\_Dep;

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**b.Minim 5 interogari care sa contina functii de agregare si Group by**

***6.Sa se afiseze angajatul cu cel mai mare salariu***

select Nume,Prenume,Salariu

from Angajatii

where (select MAX(Salariu) from Angajatii)=Salariu;

Table

Description automatically generated with medium confidence

***7.Sa se afiseze pentru fiecare locatie numarul de utilaje***

select Locatii.ID\_Locatie, count(\*) as NumarUtilaje

from Locatii, Locatii\_Utilaj

where Locatii.ID\_Locatie = Locatii\_Utilaj.ID\_Locatie

group by Locatii.ID\_Locatie;

A picture containing text, furniture, cabinet

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***8.Sa se afiseze angajatul cu cel mai mic nr de ore lucrate***

select Angajatii.Nume, Angajatii.Prenume, Angajatii\_Clientii.NrOreLucrate

from Angajatii, Angajatii\_Clientii

where Angajatii.ID\_Angajat = Angajatii\_Clientii.ID\_Angajat

and (select min(NrOreLucrate) from Angajatii\_Clientii) = Angajatii\_Clientii.NrOreLucrate;

Graphical user interface, application, table

Description automatically generated

***9.Sa se afiseze numarul de ore lucrat de fiecare angajat***

select Angajatii.Nume, Angajatii.Prenume, sum(NrOreLucrate)

from Angajatii, Angajatii\_Clientii

where Angajatii.ID\_Angajat = Angajatii\_Clientii.ID\_Angajat

group by Angajatii.Nume, Angajatii.Prenume;

Table

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***10.Sa se afiseze media salariilor in functie de Departament***

select Departament.DenumireDep, avg(Salariu) as medie

from Departament, Angajatii

where Departament.ID\_Dep = Angajatii.ID\_Dep

group by Departament.DenumireDep;

Table

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**c.Minim 7 exemple de subinterogari (IN , ANY, Exists, etc)**

***11.Sa se afiseze angajatii care au nr de ore lucrate mai mare de 6***

select Nume,Prenume

from Angajatii

where ID\_Angajat=ANY

(select ID\_Angajat

from Angajatii\_Clientii

where NrOreLucrate > 6);

Graphical user interface, application

Description automatically generated

***12.Sa se afiseze angajatii care lucreaza in departamente cu locatia in Craiova sau Bucuresti***

select Angajatii.Nume, Angajatii.Prenume

from Angajatii

where exists (select \* from Departament where Departament.ID\_Dep = Angajatii.ID\_Dep and

exists (select \* from Locatii where Departament.ID\_Dep = Locatii.ID\_Dep and

Oras in ('Craiova', 'Bucuresti')));

Graphical user interface, application, table

Description automatically generated

***13.Sa se afiseze toate departamentele la care lucreaza angajati care au salariu mai mare ca 2000***

select Departament.DenumireDep

from Departament

where Departament.ID\_Dep = any (select Angajatii.ID\_Dep

from Angajatii

where Angajatii.Salariu >= 2000);

Graphical user interface, application

Description automatically generated with medium confidence

***14.Sa se afiseze toti angajatii care pot sa lucreze pe excavator***

select Angajatii.Nume, Angajatii.Prenume

from Angajatii

where exists (select \* from Departament where Departament.ID\_Dep = Angajatii.ID\_Dep

and exists (select \* from Locatii where Departament.ID\_Dep = Locatii.ID\_Dep

and exists (select \* from Locatii\_Utilaj where Locatii.ID\_Locatie =Locatii\_Utilaj.ID\_Locatie

and exists (select \* from Utilaj where Utilaj.ID\_Utilaj = Locatii\_Utilaj.ID\_Utilaj

and Utilaj.DenumireUtilaj = 'excavator'))));

Table

Description automatically generated with medium confidence

***15.Sa se afiseze angajatii care nu lucreaza in departamentul 4***

select Angajatii.Nume, Angajatii.Prenume

from Angajatii

where exists (select \* from Departament where Departament.ID\_Dep = Angajatii.ID\_Dep

and Departament.ID\_Dep != 4);

Table

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***16.Sa se afiseze fie angajatii care lucreaza la departamentul de semnalizare rutiera, fie cei cu care lucreaza intr-un departament cu locatia in Craiova***

(select Angajatii.Nume, Angajatii.Prenume

from Angajatii

where exists (select \* from Departament where Departament.ID\_Dep = Angajatii.ID\_Dep

and Departament.DenumireDep like '%semnalizare rutiera%'))

union

(select Angajatii.Nume, Angajatii.Prenume

from Angajatii

where exists (select \* from Departament where Departament.ID\_Dep = Angajatii.ID\_Dep

and exists (select \* from Locatii where Departament.ID\_Dep = Locatii.ID\_Dep

and Locatii.Oras = 'Craiova')));

Graphical user interface, application

Description automatically generated

***17.Sa se afiseze angajatii care nu au lucrat pentru niciun client***

select Angajatii.Nume, Angajatii.Prenume

from Angajatii

where not exists (select \* from Angajatii\_Clientii

where Angajatii.ID\_Angajat = Angajatii\_Clientii.ID\_Angajat);

Graphical user interface, text, application, chat or text message

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**d.Minim 3 vederi**

***18.Vedere formata din numele angajatiilor, numele departamentului si nr de ore lucrate***

create view Vedere1 as

select Angajatii.Nume, Angajatii.Prenume, Departament.DenumireDep, sum(NrOreLucrate) as NrOreLucrate

from Angajatii, Departament, Angajatii\_Clientii

where Departament.ID\_Dep = Angajatii.ID\_Dep and Angajatii.ID\_Angajat = Angajatii\_Clientii.ID\_Angajat

group by Angajatii.Nume, Angajatii.Prenume, Departament.DenumireDep

order by NrOreLucrate desc;

Graphical user interface

Description automatically generated with medium confidence

***19.Vedere formata din clientii si angajatii care au prestat servicii***

create view Vedere2 as

select Clientii.Nume as NumeClient,

Angajatii.Nume as NumeAngajat, Angajatii.Prenume as PrenumeAngajat

from ((Angajatii\_Clientii

inner join Angajatii on Angajatii.ID\_Angajat = Angajatii\_Clientii.ID\_Angajat)

inner join Clientii on Clientii.ID\_Clientii = Angajatii\_Clientii.ID\_Clientii);

Table

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***20.Vedere formata din salariul mediu al unui angajat in functie de locatie***

create view Vedere3 as

select Locatii.Oras, avg(Angajatii.Salariu)

from Locatii, Angajatii

where exists (select \* from Departament where Departament.ID\_Dep = Angajatii.ID\_Dep

and Departament.ID\_Dep = Locatii.ID\_Dep)

group by Locatii.Oras;

Graphical user interface, application, table

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