1.
 a. (π Pname, Pnumber (project)) ⋈ Pnumber = Pno (works_on) ⋈ Essn = Ssn (π Fname, Lname, Ssn (employee))

project.Pname	project.Pnumber	works_on.Essn	works_on.Pno	works_on.Hours	employee.Fname	employee.Lname	employee.Ssn
Aveiro Digital	1	183623612	1	20	Paula	Sousa	183623612
Aveiro Digital	1	21312332	1	20	Carlos	Gomes	21312332
Aveiro Digital	1	321233765	1	25	Juliana	Amaral	321233765
Aveiro Digital	1	342343434	1	20	Maria	Pereira	342343434
BD Open Day	2	41124234	2	20	Joao	Costa	41124234
Dicoogle	3	183623612	3	10	Paula	Sousa	183623612
Dicoogle	3	41124234	3	30	Joao	Costa	41124234
GOPACS	4	342343434	4	25	Maria	Pereira	342343434

 b. π employee.Fname, employee.Minit, employee.Lname ((employee) ⋈ employee.Super_ssn=supervisor.Ssn (ρ supervisor π Ssn (σ Fname='Carlos' AND Minit='D' AND Lname='Gomes' (employee))))

employee.Fname	employee.Minit	employee.Lname
Maria	I	Pereira
Joao	G	Costa
Ana	L	Silva

 c. γ Pname; sum(Hours)->Hours ((project) ⋈ Pnumber=Pno (works_on))

project.Pname	Hours
Aveiro Digital	85
BD Open Day	20
Dicoogle	40
GOPACS	25

 d. π Fname, Minit, Lname ((σ Dno=3 (employee)) ⋈ Ssn=Essn (σ Hours>20 (works_on)) ⋈ Pno=Pnumber (σ Pname='Aveiro Digital' (project)))

employee.Fname	employee.Minit	employee.Lname
Juliana	A	Amaral

 e. π Fname, Minit, Lname ((employee) ⋈ Ssn=Essn (σ Pno=null (works_on)))

employee.Fname	employee.Minit	employee.Lname

f. γ Dno, Dname; avg(Salary)->Salary ((σ Sex='F' (employee)) ⋈ Dno=Dnumber

employee.Dno	department.Dname	Salary
3	Logistica	1400
2	Comercial	1325

((department)))

g. π Fname, Minit, Lname (σ no_dependents>2 (γ Fname, Minit, Lname; count(Essn)->no_dependents ((employee)⋈ Ssn=Essn (dependent))))

employee.Fname	employee.Minit	employee.Lname
Carlos	D	Gomes

h. π Fname, Minit, Lname (σ no_dependents=0 (γ Fname, Minit, Lname; count(Essn)->no_dependents (((employee) ⋈ Ssn=Mgr_ssn (department)) ⋈ Ssn=Essn (dependent))))

employee.Fname	employee.Minit	employee.Lname

i. π Fname,Address σ nProjetos>0 (γ Fname,Address;nProjetos←count(Pno) ((employee ⋈ Ssn=Essn works_on) ⋈ (works_on ⋈ Pno=Pnumber σ Plocation='Aveiro' project) ⋈ (employee ⋈ Dno=Dnumber department ⋈ (σ Dlocation!='Aveiro' dept_location))))

employee.Fname	employee.Address
Paula	Rua da FRENTE
Juliana	Rua BZZZZ

2.

a. σ nEncomendas=0 γ nome;nEncomendas←count(fornecedor) (fornecedor ⋈ nif=fornecedor encomenda)

fornecedor.nome	nEncomendas

b. γ nome;media←avg(unidades) π nome,item.unidades (item ⋈ codProd=codigo produto)

produto.nome	media
Bife da Pa	200
Secretos de Porco Preto	300
Laranja Algarve	1200
Pera Rocha	2200
Arroz Agulha	625
Queijo de Cabra da Serra	50
Queijo Fresco do Dia	40
Iogurte Natural	200
Vinho Rose Plus	500
Cerveja Preta Artesanal	10
Agua Natural	1000
Lixivia de Cor	150
Amaciador Neutro	250
Pao de Leite	200

c. γ numEnc;media←avg(c) γ numEnc;c←count(codProd) (item)

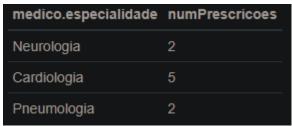| item.numEnc	media
1	2
2	2
3	1
4	3
5	3
6	2
7	1
8	1
9	2
10	1

d. γ nome,codProd;quantidade←count(unidades) ((item ⋈ numEnc=numero encomenda) ⋈ (encomenda ⋈ fornecedor=nif fornecedor))

fornecedor.nome	item.codProd	quantidade
LactoSerrano	10001	1
LactoSerrano	10004	1
FrescoNorte	10002	1
FrescoNorte	10003	2
MaduTex	10013	2
LactoSerrano	10006	1
LactoSerrano	10007	1
LactoSerrano	10014	1
PinkDrinks	10005	1
PinkDrinks	10008	1
PinkDrinks	10011	1
LeviClean	10009	2
LeviClean	10010	2
MaduTex	10012	1

3.
   a. π numUtente, nome (σ numPresc=null ((paciente) ⋈ (prescricao)))

paciente.numUtente	paciente.nome

   b. γ especialidade; count(numPresc)->numPrescricoes (π especialidade, numPresc ((prescricao) ⋈ numSNS=numMedico (medico)))

medico.especialidade	numPrescricoes
Neurologia	2
Cardiologia	5
Pneumologia	2

   c. γ count(numPresc)->numPrescProcessadasFarm (σ farmacia!=null prescricao)

numPrescProcessadasFarm
7

   d. π nome, formula (σ numPresc=null (σ numRegFarm=906 (farmaco) ⋈ nome=nomeFarmaco (presc_farmaco)))

farmaco.nome	farmaco.formula
Gucolan 1000	VFR-750

e. π farmacia.nome, presc_farmaco.numRegFarm, soma (γ farmacia.nome, presc_farmaco.numRegFarm; count(presc_farmaco.numPresc)->soma ((presc_farmaco) ⋈ presc_farmaco.numPresc=prescricao.numPresc (prescricao ⋈ farmacia=nome farmacia)))

farmacia.nome	presc_farmaco.numRegFarm	soma
Farmacia Central	905	2
Farmacia Central	906	3
Farmacia Central	908	2
Farmacia BelaVista	905	1
Farmacia BelaVista	908	1
Farmacia Vitalis	905	1
Farmacia Vitalis	906	2
Farmacia Vitalis	908	1
Farmacia Peixoto	905	1
Farmacia Peixoto	906	1
Farmacia Peixoto	908	1

f. σ medicosDiferentes > 1 π numUtente, medicosDiferentes (γ numUtente; count(numMedico)->medicosDiferentes π numUtente, numMedico (prescricao))

prescricao.numUtente	medicosDiferentes
1	2
3	2