

DMD HOMEWORK 3 (6 сентября 2015 г.)*Tropin Andrew**e-mail: andrewtropin@gmail.com**github: abcdw***Problem 1.** I renamed some attributes for style reason.

- One-to-Many:
 - Employee(EID, address, salary, name)
 - Room(ROID, period)
 - Patient(PID, name, address, ROID, EID)
 - Record(REID, patient_id, appointment)
 - Medicine(CODE, price)
 - Bill(BID, CODE, dosage, indications, PID)
- Many-to-Many:
 - Maintains(EID, REID)
- Generalizations(ISA):
 - Receptionist(EID, address, salary, name)
 - Doctor(EID, address, salary, name, specialty)
 - Nurse(EID, address, salary, name, shift, ROID)
 - Trainee(EID, address, salary, name, specialty)
 - Permanent(EID, address, salary, name, specialty)
 - Visiting(EID, address, salary, name, specialty)

Problem 2.

- $\Pi_{EID, \dots} \sigma_{ROID=107}(Nurse) \cup \Pi_{EID, \dots} (\sigma_{ROID=107}(Patient) \bowtie Doctor)$
- $Nurse - \Pi_{EID, \dots} (Nurse \bowtie Rooms \bowtie Patient \bowtie \sigma_{name=Dr.Alex}(Doctor))$
- $\sigma_{salary > MIN(\Pi_{salary}(Doctor))}(Employee)$
- $\Pi_{ROID}(Patient \bowtie Rooms) \bowtie Rooms$

Problem 3.

- $\sigma_{salary=MAX(\Pi_{salary} \sigma_{e1.salary=MAX(\Pi_{salary}(Employees)) \wedge e1.salary > e2.salary \wedge e2.salary > e3.salary \wedge e1.eid \neq e2.eid \neq e3.eid})}$
Result is $\{(1)\}$.
- $\Pi_{eid} \sigma_{aid=B1100}(Employees \bowtie Certified)$. Result is $\{(3), (4)\}$

- $\Pi_{flight\#}(Flights) - \Pi_{flight\#}((\Pi_{flight\#}(Flights) \times \Pi_{eid}(\sigma_{salary > 70000}(Employees \bowtie Certified))) - \Pi_{flight\#,eid}(\sigma_{range \geq distance}(Aircraft \times Flights) \bowtie Certified)$. Result is $\{(111), (112), (300)\}$

Problem 4. $[0, m * n]$

Problem 5.

- $R(A, B), S(A, B)$
- $R = \{(1, 2)\}$
- $S = \{(1, 3)\}$
- $\Pi_A(R - S) = \{(1)\}, \Pi_A(R) - \Pi_A(S) = \{\}$

Problem 6.

- $R \bowtie S$ and $\sigma_{R.C=S.C}(R \times S)$ near the same, but return relations with different number of attributes. First one returns $\langle A, B, C, D \rangle$ and the second $\langle A, B, R.C, S.C, D \rangle$.
- Same. Both of them returns uniq tuples with one attribute C, where exist at least one tuple in each relation(R, S) with value of attribute C.