Datenbanken II (SS 2018)
Exercise 8

Task 1 Explain the different phases of query execution.

Task 2 Algebraic Optimization

(a) Given the following tables

- Persons(PANR, Name, ZIP, Location, Str)
- Phone(PANR, PhoneNr)
- Employees(PANR, PersonnelNr, Department, Salary, Room)
- Students(PANR, MatrNr, FieldOfStudyId)
- Lecture(LID, LName, CH, FieldOfStudyId, Lecturer)
- Registration(LID, MatrNr, Date)

Additionally, the following views exist:

- Phone directory: SELECT * FROM Persons NATURAL JOIN Phone
- Student data: SELECT PANR, Name, MatrNr FROM Persons NATURAL JOIN Students
- Exam list: SELECT * FROM Registration NATURAL JOIN Students NATURAL JOIN Persons

Convert the following queries into relational algebra and apply algebraic optimization to them:

i. SELECT PhoneNr FROM Persons NATURAL JOIN Phone NATURAL JOIN Employees WHERE Name='Paul Dietrich 'OR Room='G59-311 '

ii. SELECT PhoneNr FROM Student data NATURAL JOIN Phone directory WHERE Name like '%Meier '

iii. SELECT Name FROM Student data NATURAL JOIN Exam list NATURAL JOIN Lecture NATURAL JOIN Employees NATURAL JOIN Phone directory WHERE Name= ‘Gunter Saake’AND Lecturer=PersonnelNr

(b) Given the following, additional optimization rule for algebraic optimization:

\[ \pi_x(r_1 - r_2) \leftrightarrow \pi_x(r_1) - \pi_x(r_2) \]

Discuss this rule: Is it correct? For what basic conditions it is applicable?

Good Luck!