LAB ACTIVITIES

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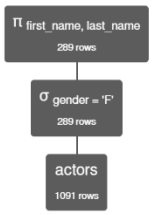
Reg#: Sp20-BCS-044

Course: DATABASE SYSTEM-1

Activity 1:

Write the Relational algebra expressions for the following information needs over IMDB-sample Database:

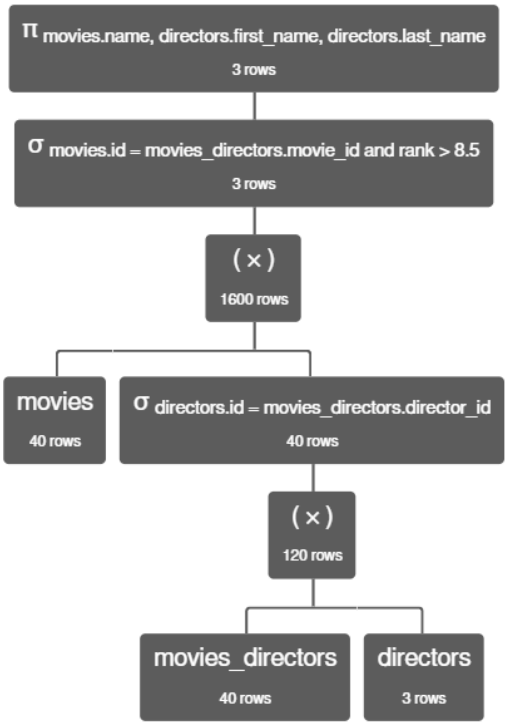
1. list the first and last name of all the female actors.
   π first_name , last_name σ gender = 'F' actors



π first_name, last_name σ gender = 'F' actors

actors.first_name	actors.last_name
'Paula'	'Cross'
'Wendy'	'Gordon'
'Mary Elizabeth'	'Mastrantonio'
'Kimberly (I)'	'Scott'
'Emily'	'Yancy'
'Barbara'	'Coles'
'Valerie'	'Colgan'
'Holly'	'De Jong'
'Jenette'	'Goldstein'
'Carrie'	'Henn'

2. List movie names along with their directors name of all the movies with a rank greater than 8.5.
   π movies.name, directors.first_name , directors.last_name (σ movies.id = movies_directors.movie_id ∧ rank > 8.5 (movies × (σ directors.id = movies_directors.director_id (movies_directors × directors))))



π movies.name, directors.first_name, directors.last_name (σ movies.id = movies_directors.movie_id and rank > 8.5 (movies × (σ directors.id = movies_directors.director_id (movies_directors × directors))))

movies.name	directors.first_name	directors.last_name
'Dr. Strangelove or: How I Learned to Stop Worrying and Love the Bomb'	'Stanley'	'Kubrick'
'Paths of Glory'	'Stanley'	'Kubrick'
'Pulp Fiction'	'Quentin'	'Tarantino'

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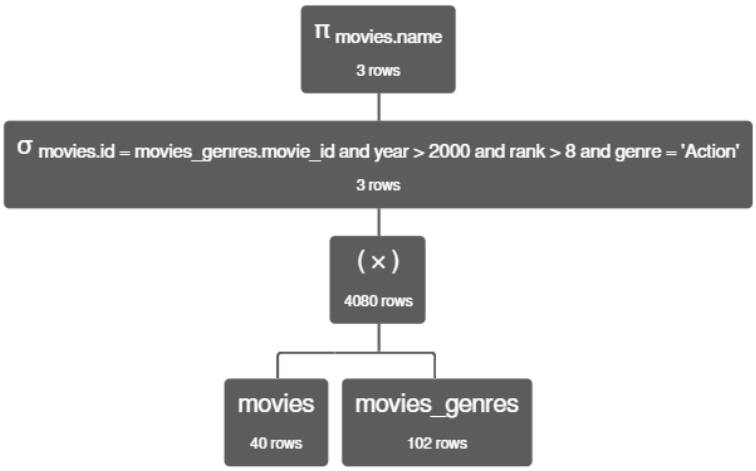
3. List titles of all the movies that are released after 2000, have a rank greater than 8, and that belong to Action genre.
   π movies.name σ movies.id = movies_genres.movie_id ∧ year > 2000 ∧ rank > 8 ∧ genre = 'Action' (movies × movies_genres)



π movies.name σ movies.id = movies_genres.movie_id and year > 2000 and rank > 8 and genre = 'Action' (movies × movies_genres)

movies.name
'Inglorious Bastards'
'Kill Bill: Vol. 1'
'Kill Bill: Vol. 2'

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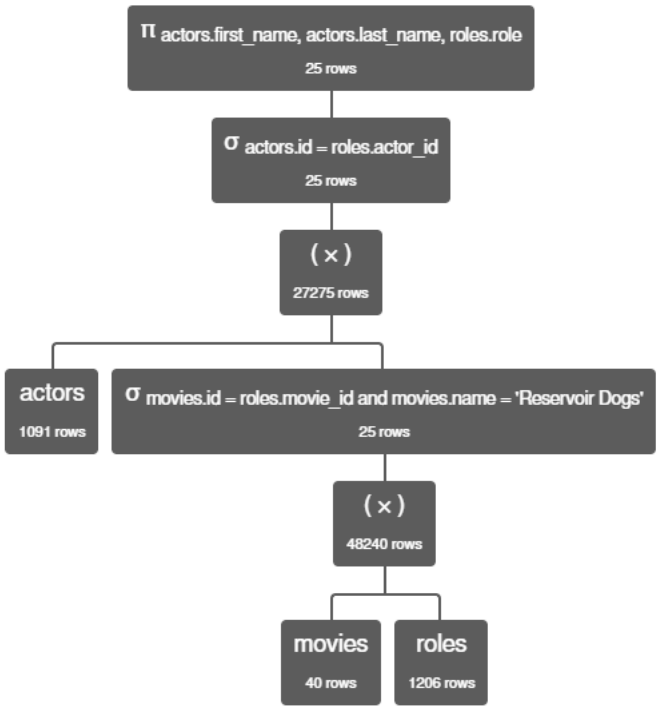
4. List the first and last names of all the actors who played a role in the movie Reservoir Dogs, and the roles they played in it.
   π actors.first_name, actors.last_name, roles.role (σ actors.id = roles.actor_id (actors × (σ movies.id = roles.movie_id ∧ movies.name = 'Reservoir Dogs' (movies × roles))))



$$\pi_{\text{actors.first\_name, actors.last\_name, roles.role}} \left(\sigma_{\text{actors.id = roles.actor\_id}} \left(\text{actors} \times \left(\sigma_{\text{movies.id = roles.movie\_id and movies.name = 'Reservoir Dogs'}} \left(\text{movies} \times \text{roles} \right) \right) \right) \right)$$

actors.first_name	actors.last_name	roles.role
'Lawrence'	'Bender'	'Young cop (also radio play ba'
'Tim'	'Roth'	'Mr. Orange/Freddy Newandyke'
'Quentin'	'Tarantino'	'Mr. Brown'
'Michael (I)'	'Madsen'	'Mr. Blonde/Vic Vega'
'Stevo'	'Polyi'	'Sheriff #4'
'Craig'	'Hamann'	'Radio play background voice'
'Rich'	'Turner'	'Sheriff #1'
'Rowland'	'Wafford'	'Diner patron'
'Linda'	'Kaye'	'Shocked woman'
'Steve'	'Buscemi'	'Mr. Pink'

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5. List the first and last names of all the actors who acted in the movies of the director Quentin Tarantino but not in the movies of director Stanley Kubrick.

π actors.first_name, actors.last_name σ roles.movie_id = movies_directors.movie_id ∧

((directors.first_name = 'Quentin' ∧ directors.last_name = 'Tarantino') ∨ (directors.first_name = 'Stanley' ∧ directors.last_name = 'Kubrick')) ((σ actors.id = roles.actor_id (actors × roles)) × (σ directors.id = movies_directors.director_id (directors × movies_directors)))

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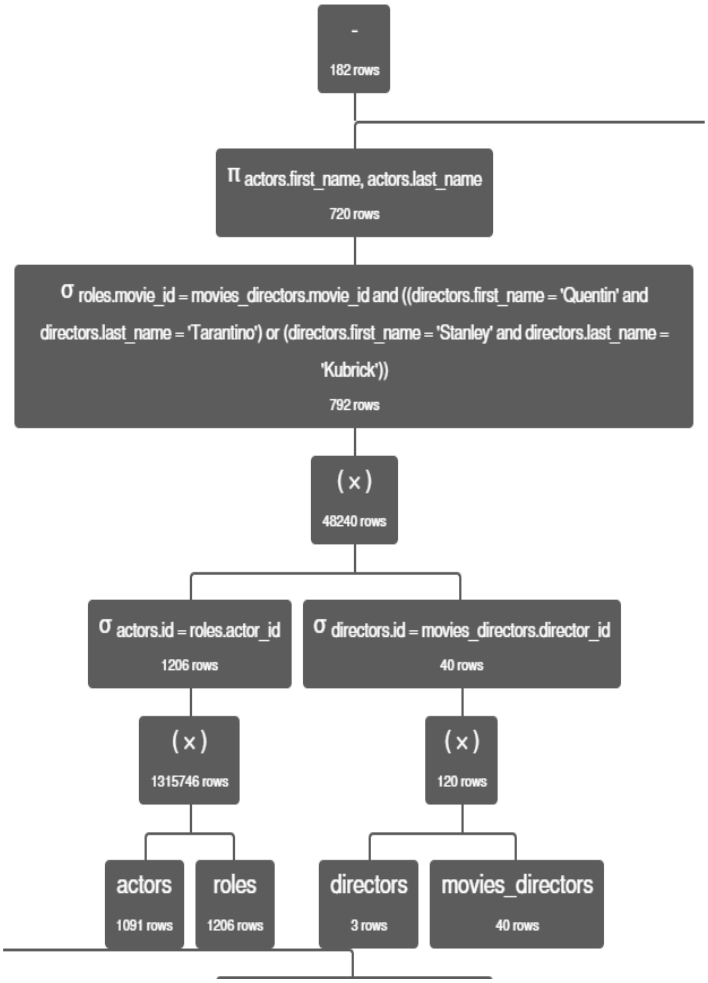
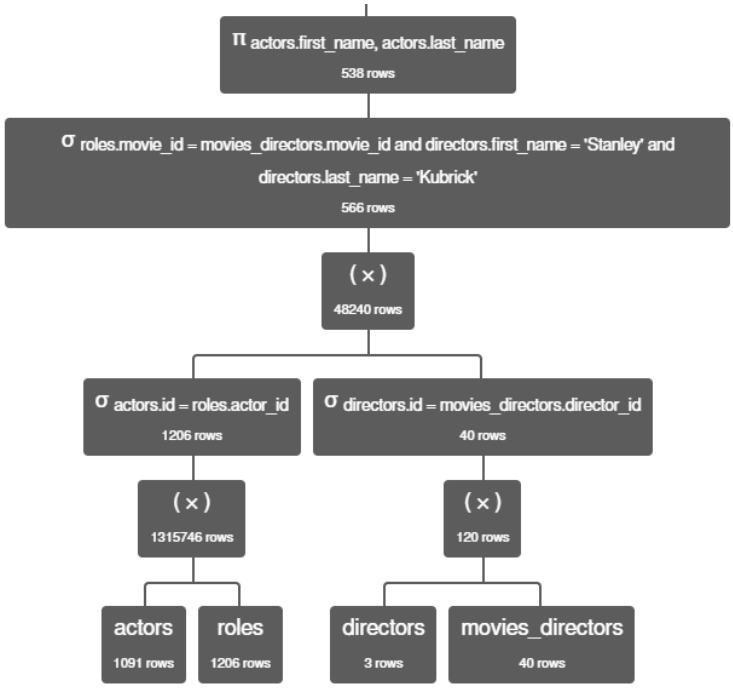
π actors.first_name, actors.last_name σ roles.movie_id = movies_directors.movie_id ∧ directors.first_name = 'Stanley' ∧ directors.last_name = 'Kubrick' ((σ actors.id = roles.actor_id (actors × roles)) × (σ directors.id = movies_directors.director_id (directors × movies_directors)))





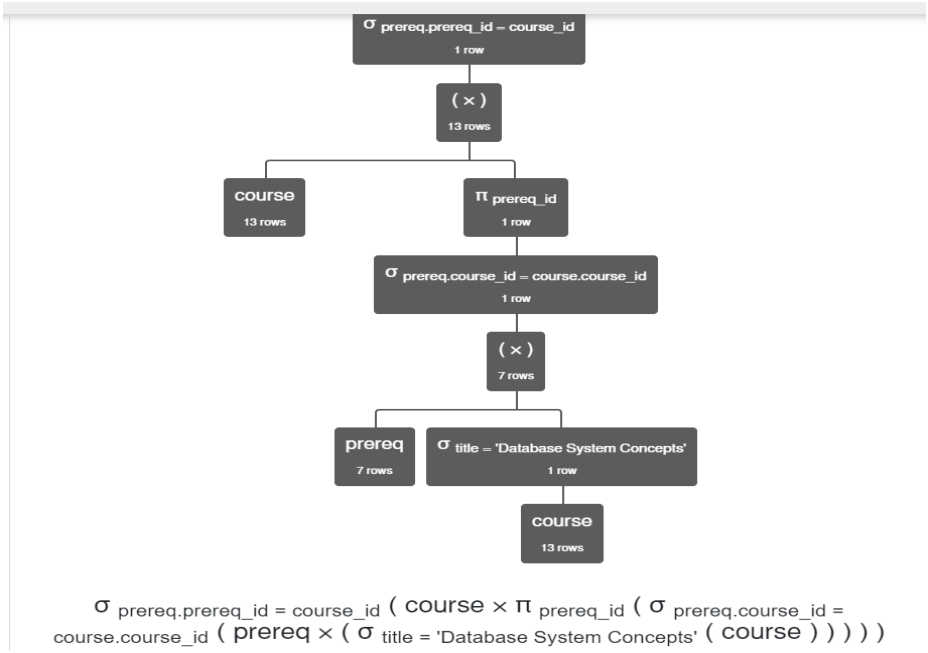
actors.first_name	actors.last_name
'Dick (I)'	'Miller'
'Antonio'	'Banderas'
'Lawrence'	'Bender'
'Paul'	'Calderon'
'Quinn Thomas'	'Kellerman'
'Marc (I)'	'Lawrence'
'David'	'Proval'
'Tim'	'Roth'
'Paul'	'Skemp'
'Quentin'	'Tarantino'

Write the Relational Algebra expressions for the following information needs over University Database:

1. Retrieve the title of the course that is pre-req of 'Database System Concepts'.

   σ prereq.prereq_id = course_id (course x π prereq_id

   (σ prereq.course_id= course.course_id (prereq x (σ title = 'Database System Concepts' (course)))))



σ prereq.prereq_id = course_id (course × π prereq_id (σ prereq.course_id = course.course_id (prereq × (σ title = 'Database System Concepts' (course)))))

course.course_id	course.title	course.dept_name	course.credits	prereq.prereq_id
'CS-101'	'Intro. to Computer Science'	'Comp. Sci.'	4	'CS-101'

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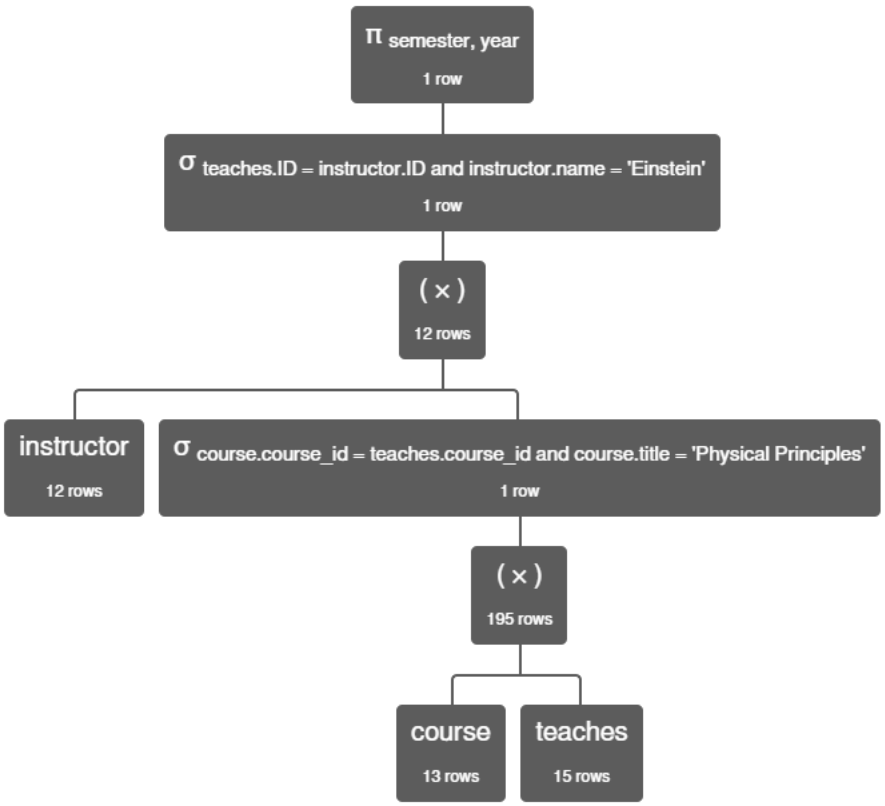
2. Retrieve the semester and the year in which 'Einstein' taught the course 'Physical Principles'.
   π semester , year (σ teaches.ID = instructor.ID ∧ instructor.name = 'Einstein' (instructor × (σ course.course_id = teaches.course_id ∧ course.title = 'Physical Principles' (course × teaches))))



$$\pi_{\text{semester, year}} (\sigma_{\text{teaches.ID = instructor.ID and instructor.name = 'Einstein'}} (\text{instructor} \times (\sigma_{\text{course.course\_id = teaches.course\_id and course.title = 'Physical Principles'}} (\text{course} \times \text{teaches}))))$$

teaches.semester	teaches.year
'Fall'	2009

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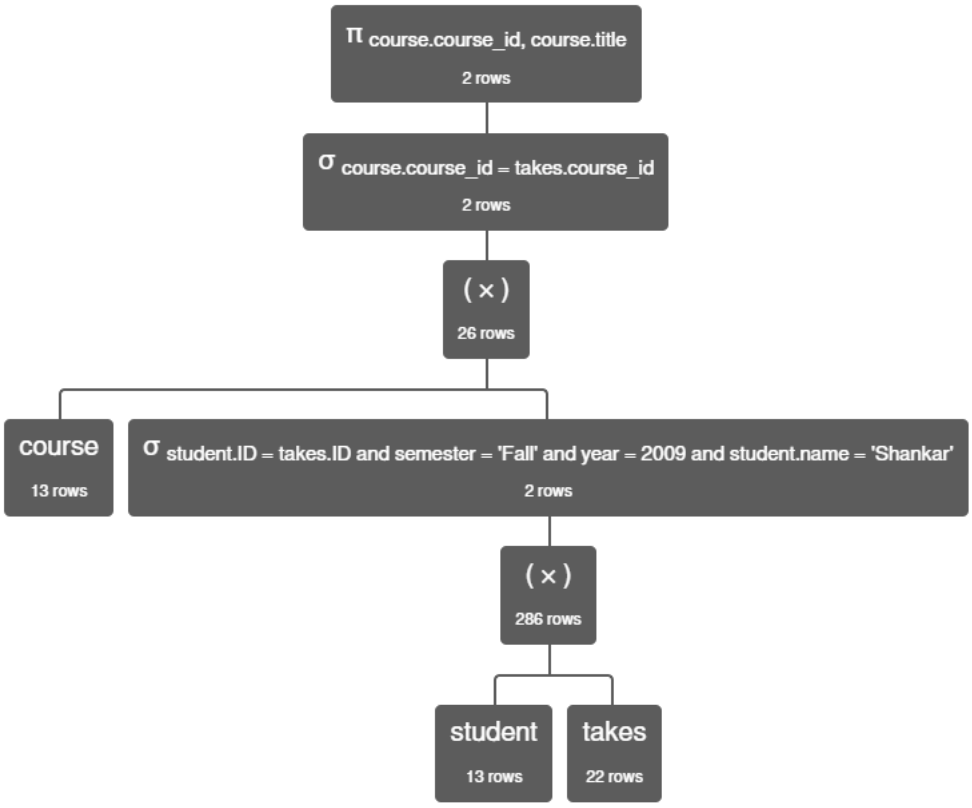
3. Retrieve the ID and the title of all the courses taken by 'Shankar' in 'Fall 2009'.
   π course.course_id, course.title (σ course.course_id = takes.course_id (course × (σ student.ID = takes.ID ∧ semester = 'Fall' ∧ year = 2009 ∧ student.name = 'Shankar' (student × takes))))



$$\pi_{\text{course.course\_id, course.title}} (\sigma_{\text{course.course\_id = takes.course\_id}} (\text{course} \times (\sigma_{\text{student.ID = takes.ID and semester = 'Fall' and year = 2009 and student.name = 'Shankar'}} (\text{student} \times \text{takes}))))$$

course.course_id	course.title
'CS-101'	'Intro. to Computer Science'
'CS-347'	'Database System Concepts'

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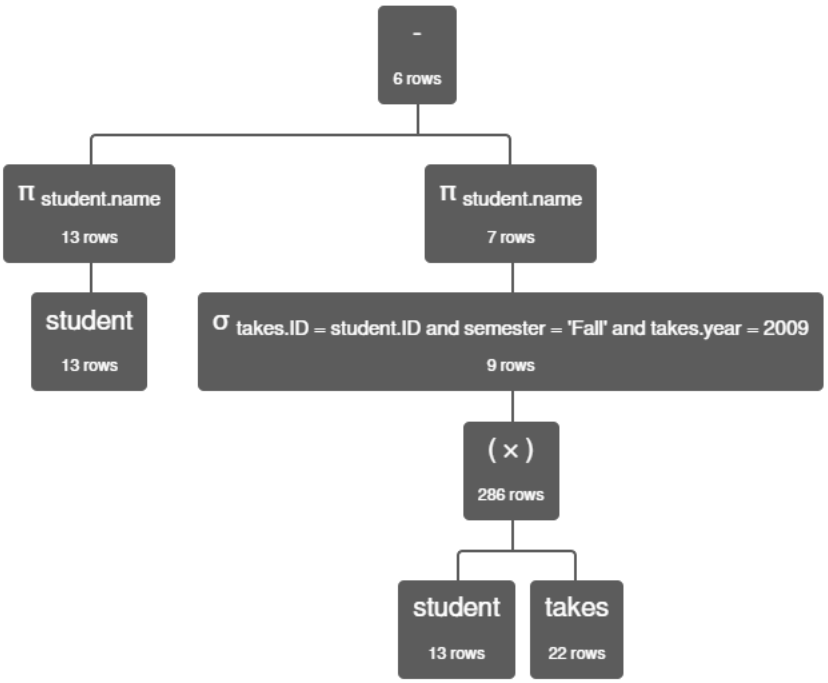
4. List the name of students who did not take any course in 'Fall 2009'.

   π student.name student - (π student.name (σ takes.ID = student.ID ∧ semester = 'Fall' ∧ takes.year = 2009 (student × takes)))



$$\pi_{\text{student.name}} \text{ student} - (\pi_{\text{student.name}} (\sigma_{\text{takes.ID = student.ID and semester = 'Fall' and takes.year = 2009}} (\text{student} \times \text{takes})))$$

student.name
'Brandt'
'Chavez'
'Sanchez'
'Snow'
'Aoi'
'Tanaka'

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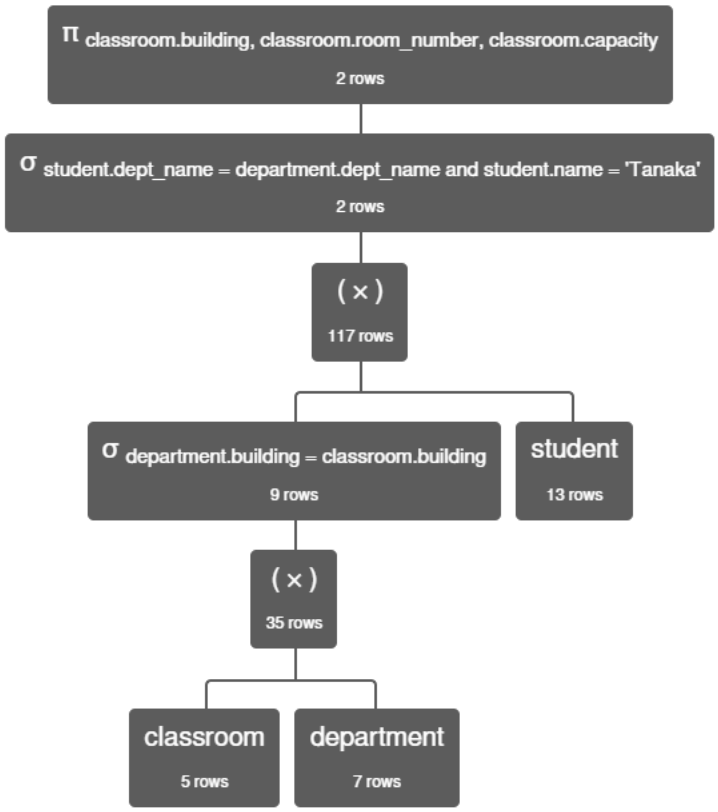
5. Find building, room number, and capacity of all classrooms in which student 'Tanaka' took all his classes.

π classroom.building , classroom.room_number , classroom.capacity σ student.dept_name = department.dept_name ∧ student.name = 'Tanaka' (σ department.building = classroom.building (classroom × department) × student)



classroom.building	classroom.room_number	classroom.capacity
'Watson'	100	30
'Watson'	120	50

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