

CSC 343 – Introduction to Databases

Tutorial #4 – Relational Algebra – Question Sheet

patients (pnum, pname, age)
doctors (dnum, dname, rank)
visits (pnum, dnum, date, diagnosis)

1. Simple selection and projection

- i. Who are the patients 10 years old or younger?
- ii. Who are the surgeons
- iii. What are the phone numbers of doctors
- iv. What are the phone numbers of surgeons

2. Set Operations

- i. Re-state the expression $S_{age \leq 10 \vee age \geq 60}(\textit{patients})$ using set operations.
- ii. Re-state the expression $S_{rank \neq surgeon \wedge rank \neq oculist}(\textit{doctors})$ using set operations without \neq and \wedge
- iii. Find all the patients who saw doctor 801 but not 802 (i.e. dnum=801, dnum \neq 802)

3. Cartesian Product and Join

- i. Form peer groups for patients, where a peer group is a pair of patients where age difference is less than 10 years (can use the rename operator $r_A(R)$).
- ii. Who are the surgeons who visited the patient 101 (i.e. pnum = 101)?
- iii. Who has seen a surgeon in the past two years?
- iv. Is there any non-surgeon doctors who performed a surgeon (a doctor performed a surgeon if the visit record shows diagnosis="operation" for him)?

4. Divison

- i. Who has seen **all** the surgeons in the past two months?
- ii. Find all patients excepts for the youngest ones.