Fall 2022 B561 Assignment 1 Relational Databases, Expressing Constraints and Queries in SQL, Python, and in Safe Tuple Relational Calculus (safe TRC)*

Nikhil Vemula

September 7, 2022

1 Formulating queries in the safe Tuple Relational Calculus

20.a (Problem 2)

Find each pair (d,m) where d is the name of a department and m is a major of a student who is employed by that department and who earns a salary of at least 20000.

$$\{(e.deptName, sm.major) \mid employedBy(e) \wedge studentmajor(m) \wedge e.sid = m.sid \wedge e.salary >= 20000\}$$

20.b (Problem 3)

Find each pair (s1 , s2) of sids of different students who have the same (set of) friends who work for the CS department. $\{(s_1.sid, s_2.sid) \mid student(s_1) \wedge student(s_2) \wedge s_1.sid \neq s_2.sid \wedge \forall s_3 \in student(hasFriend(s1_sid, s_3.sid) \rightarrow hasFriend(s2_sid, s_3.sid) \wedge employedBy(e_1) \wedge e_1.sid = s_3.sid \wedge e_1.deptName = \texttt{CS}) \wedge \forall s_4 \in student(hasFriend(s2_sid, s_4.sid) \rightarrow hasFriend(s1_sid, s_4.sid) \wedge employedBy(e_2) \wedge e_2.sid = s_4.sid \wedge e_2.deptName = \texttt{CS})\}$

*This assignment covers lectures 1 through 4