

2003 Paper 9 Question 9

Database Theory

Assume a database with one relation `parent` consisting of pairs (a, b) where a is a parent of b .

- (a) Write a Datalog query which gives the set of pairs (x, y) such that x and y have a common ancestor z and are the same number of generations from z .
[4 marks]
- (b) Write a query in Datalog *with stratified negation* which gives the set of pairs (x, y) such that x and y have a common ancestor but not one from which they are the same number of generations distant. You may use the program you defined for part (a).
[5 marks]
- (c) Prove that the query defined in part (b) above cannot be expressed in Datalog without negation.
[7 marks]
- (d) For each of queries in parts (a) and (b), give a bound on the running time to evaluate the query on a database with n entries.
[4 marks]