

Name: _____ **KEY** _____

CS 589 Principles of Database Systems
Winter 2011
Quiz 2

No books or notes.

Consider the following Datalog program that contains facts of the following forms:

UnivReq(C, D) course C is a university requirement for degree D
MajorReq(C, M) course C is a department requirement for major M
Prereq(C1, C2) course C1 is prerequisite for course C2

CsReq(A) :- UnivReq(A, 'BS').
CsReq(B) :- MajorReq(B, 'CS').

Result(C) :- MajorReq(E, 'CS'), Prereq(C, E), ¬CsReq(C).

UnivReq('Eng101', 'BA').
UnivReq('Hist120', 'BA').
UnivReq('Stat113', 'BS').

MajReq('Math113', 'CS').
MajReq('Math114', 'Math').
MajReq('CS130', 'CS').
MajReq('CS131', 'CS').

Prereq('Math113', 'Math114').
Prereq('Math114', 'CS130').
Prereq('CS130', 'CS132').

2-A. (8 points) Find all the values of C such that Result(C) is true for this program.

Let's start by figuring the CsReq answers:

From the first rule we get

CsReq('Stat113')

From the second rule we get

CsReq('Math113') CsReq('CS130') CsReq('CS131')

Turning to evaluating Result(C), any value of C that will make it true must appear in the first position of Prereq but not be one of the values for CsReq. In this case, there is only one such value, C = 'Math114'. So can we find a value for E that makes the body of the Result rule true? Yes. With E = 'CS130' we have MajorReq('CS130', 'CS') and Prereq('Math114', 'CS130').

Thus Result('Math114') is true, but nothing else.

2-B. (2 points) State in words what Result computes.

Result returns any course C that is a prereq for a required CS course, but C is not itself a CS major requirement or a university BS requirement. (Course C is kind of an implicit requirement for the BS in CS: You have to take it, even though it's not explicitly listed as a requirement.)