1) SQL Query:

SELECT Career, program, avg (started)

FROM STUDENT

GROUP BY Career, program;

Resulting Table:

|  |  |  |
| --- | --- | --- |
| CAREER | PROGRAM | AVG(STARTED) |
| UGRD | COMP-SCI | 2002 |
| UGRD | INFO-SYS | 2003 |
| GRD | COMP-SCI | 2003 |
| GRD | PHD | 2003 |
| GRD | INFO-SYS | 2005 |
| UGRD | COMP-GPH | 2001 |

2)

a) R(x,y) = R1 U R2 = “x is greater than y and x is less than y. x is not equal to y.”

b) R(x, y) = R4 – R3 = “x is greater than y”

c) R(x, y) = R1 ∩ R2 = its an empty relation. There is no instance where R1 and R2 intersect.

3) R-1(x,y) = “x is older than y”

4) R(x, y) = “x <> y”

anti-reflexive: ¬(R(x,x)) for all x

True: x will be equal to x for all x

anti-symmetric: R(x,y) ^ R(y,x) -> x = y

False: Ex: x = 2, y = 3; 2 <> 3 and 3 <> 2 -> 2 = 3; it is a false statement.

transitive: R(x,y) ^ R(y,z) -> R(x,z)

False: Ex: x = 2, y = 3, z = 2; 2 <> 3 and 3 <> 2 -> 2 <> 2; it is a false statement.

Strict ordering relation: NO

5) Reflexive: True, because the diagonal from top left to bottom right is “1” or “true”. Symmetric: False, because when flipped over that same diagonal the matrix does not mirror itself.

6) Q(x) is “x + 1 > 2x”

a) True. It is true that there exists an x where x+1>2x. (ex: x = -1, -1+1 > 2(-1);0>-2)

b) False. It is false that every x is true for x +1>2x. (ex: x=2, 2+1>2(2); 3>4)

c) True. It is true that there exists an x where x+1<2x. (Ex: x=2, 2+1<2(2); 3<4)

d) False. It is false that every x is true for x+1<2x. (Ex: x=-1, -1+1 > 2(-1);0>-2)

7)

a) If x = 0 then x \* x <> x will be false because 0 \* 0 = 0.

b) If x = the square root of 2 than Square root(2) \* Square root(2) = 2.

c) If x = 0 the absolute value of 0 is 0 which is not greater than 0.

8)

a) False. (ex: y = 3; 1 + 3 = 1 – 3, 4 = -2, it is false for one value of y than the statement “for all y” makes it false.

b) False. Any integer that has 2 added to it will not equal itself with 2 taken away from it.

c) True. The y that exists is 0. Because 0 + or – any x will still leave us with x = x

d) False. (ex: there is no x in existence that makes Q(x,2) true as seen in part b of the question.

9) One thing that was not enjoyable about class was that there was little to no discussion of new sql topics, yet on this homework assignment there is an overly complicated and completely new sql question and concept. I liked how the study guide for the midterm was concise and on point.