**CS 7330**

**Homework 10.1 MLO 10.2, 10.3, 10.4**

1. Apply the BCNF decomposition algorithm, showing all steps:

Loans (bank\_name, bank\_city, bank\_limit, custname, loan#, amount)

With dependencies of:   
 bank\_name → bank\_city, bank\_limit  
 loan# → amount, bank\_name

R(A, B, C, D, E, F)

FD(A🡪B,C;E🡪A,F)

DE+ = {A,B,C,D,E,F} -- CK

1. Consider the following relation:

R (Mechanic#, Customer#, Vechicle, Date, Diagnosis, Severity, Charge )

In the above relation, a tuple describes a potential repair by a mechanic. Each diagnosis has a severity (mustfix, shouldfix, okay) and a charge. A customer will always have the same mechanic.

a) Identify a reasonable set of functional dependencies for R.

b) Obviously this is not BCNF, what is the best decomposition?

1. Functional dependencies are determined from the problem domain, but in the case, you must analyze this data to determine the functional dependencies for R(A,B,C,D,E,F,G)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **A** | **B** | **C** | **D** | **E** | **F** | **G** |
| 10 | a | 1 | a | 1 | 50 | a |
| 10 | a | 1 | a | 1 | 25 | c |
| 20 | b | 1 | a | 2 | 50 | a |
| 30 | c | 2 | a | 3 | 50 | a |
| 40 | d | 2 | a | 4 | 50 | a |
| 50 | e | 3 | b | 5 | 75 | b |
| 50 | e | 3 | b | 5 | 25 | c |
| 60 | f | 3 | b | 6 | 25 | c |
| 70 | g | 3 | c | 7 | null | null |
| 80 | h | 4 | e | 8 | 25 | c |
| 90 | i | 4 | f | 9 | 50 | a |
| 100 | j | 4 | g | 10 | 50 | a |

1. Identify at least five functional dependencies that apply to this set of data.
2. Based on your functional dependencies, use the attribute closure algorithm to determine the primary key(s).
3. Show how to find a better structuring of the data stored in R

(END)