

Homework 3

Due 3/28/2018

1. Construct an E-R diagram for a hospital with a set of patients and a set of medical doctors. Associate with each patient a log of the various tests and examinations conducted. (10 points)
2. Design a generalization-specialization hierarchy for a motor vehicle sales company. The company sells motorcycles, passenger cars, vans and buses. Justify your placement of attributes at each level of the hierarchy. Explain why they should not be placed at a higher or lower level. (10 points)
3. Normalize the following schema, with given constraints, to 4NF . (10 points)
books(accessionno, isbn, title, author, publisher)
users(userid, name, deptid, deptname)
accessionno \rightarrow isbn
isbn \rightarrow title
isbn \rightarrow publisher
isbn $\rightarrow\rightarrow$ author
userid \rightarrow name
userid \rightarrow deptid
deptid \rightarrow deptname
4. Consider the following set F of functional dependencies on the relation schema $r(A,B,C,D,E,F)$. Give a BCNF decomposition of r using F . (10 points)

A \rightarrow BCD
BC \rightarrow DE
B \rightarrow D
D \rightarrow A
5. Use the definition of functional dependency to argue that each of Armstrong's axioms (reflexivity, augmentation, and transitivity) is sound. (10 points)