Tutorial 6 (Week 9): Functional dependencies.

1. Is the following rule correct? Prove your answer.
   ∀ X∈R ∀Y∈R (if X→Y, then Y⊆X)

2. The following rule is called Pseudo-transitivity.
   ∀ X∈R ∀Y∈R ∀Z∈R ∀V∈R (if X→Y and Z→V and Z⊆Y, then X→V)
   a. Prove it using the Armstrong axioms.
   b. Argue that if we replace transitivity with pseudo-transitivity in the Armstrong's axioms we still have a set of axioms that is complete.

3. Consider the set of functional dependencies F={ {A}→{B},{C}→{D}, {B,D}→{E}, {D}→{A,D}, {A,C}→{E,B} } on the relation scheme R= {A,B,C,D,E}.
   a. Give an example instance of R that complies with the functional dependencies.
   b. Give an example instance of R that violates the functional dependencies.
   c. Compute F+ the closure of F.
   d. Give an example of a trivial functional dependency in F+
   e. Give an example of a completely non trivial functional dependency in F+
   f. Give an example of a non-completely non-trivial and non-trivial functional dependency in F+
   g. Compute {C}+ the closure of the set of attributes {C}.
   h. Compute a minimal cover of F