3NF Example

Condition:
1) It is in 2NF
2) No transitive dependencies for Non prime attributes.
Example : Non prime attributes --> Non prime attributes

A relation is in 3NF iff for each of its non trivial FD atleast one of the following condition holds:
1) LHS is Super key
2) RHS is prime attribute

Example 1:
R(A,B,C,D) and FD = { A --> B, B --> C, C --> D}
Is above relation in 3NF?
Answer:
CK is A.
More Candidate key? No
Prime attribute : A Non Prime : B, C, D
It is in 2NF
For 3NF,
B --> C, C --> D are Transitive Dependencies.
Hence R is not in 3NF.

Example 2:
R(A,B,C,D,E,F) and FD = { AB --> CDEF, BD --> F}
Is above relation in 3NF?
Answer:
AB is a CK.
More Candidate key? No
Prime attribute : A,B Non Prime : C, D, E, F
2NF ?? (Hint: Proper subset of AB are A and B}
3NF ??

Example 3:
R(A,B,C,D,E) and FD = {A --> B, B --> C, C --> D, D --> A}
Is above relation in 3NF?