BCNF Examples

Condition:
1) It is in 3NF
2) For each Non trivial FD X --> Y, X must be a Super key.

Example 1:
R (A, B, C) and FD = {A --> B, B --> C, C --> D, D --> A}
Is relation R in BCNF?
Answer:
CK are A, B and C
The relation is in 2NF as well as in 3NF
For BCNF, LHS of all FD are Super keys.
Hence it is in BCNF

Example 2:
R(A,B,C,D,E) and FD = { A --> BCDE , BC --> ACE , D -->E}
What is the highest Normal Form?
Answer:

CK are A and BC
Prime Attribute : A, B, C Non prime attribute : D and E
Check for BCNF, A --> BCDE , BC --> ACE are satisfying BCNF condition but D -->E is not satisfying. Hence it is not in BCNF.

Check for 3NF, D -->E is violating the condition hence it is not 3NF.

Check for 2NF, No partial dependencies, Hence it is in 2NF.

Example 3:
R(A,B,C,D,E) and FD = { AB --> CDE , D -->A}
What is the highest Normal Form?
Answer:
CK are AB and BD

Prime Attribute : A, B, D Non prime attribute : E

Check for BCNF, D -->A is violating the candidate key, hence it is not in BCNF.

Check for 3NF, Non prime --> non prime are not there, Hence it is in 3NF.