Normalization

Q. 1: Given the relation

Book\_Pub\_Author(Title, PubId, AuId, Price, AuAddress)

The functional dependencies are given below.

* 1. Key 🡪 {Title, PubId, AuId}
  2. {Title, PubId, AuID} 🡪 {Price}
  3. {AuID} 🡪 {AuAddress}

Which normal form is the relation? Normalize it up to 3NF.

Answer: The relation given in 1NF. (No Multivalued Attributes)

3NF:

R1(AuID, AuAddress)

R2(Title,PuID,AuID, Price)

Q. 2: Given the relation

City\_Population(City, Street, HouseNumber, HouseColor, CityPopulation)

* 1. key 🡪 {City, Street, HouseNumber}
  2. {City, Street, HouseNumber} 🡪 {HouseColor}
  3. {City} 🡪 {CityPopulation}

Which normal form is the relation? Normalize it up to 3NF.

Ans: The relation in 1NF.

3NF:

R1(City, CityPopulation)

R2(City, Street, HouseNumber, HouseColor)

Q.3. Given the relation R(A, B, C, D, E, F, G, H)

The functional dependencies are given as follows:

ABC 🡪 DEFGH

So ABC is the primary key. The other functional dependencies are given as follows:

BC 🡪D

ABC 🡪 E

E 🡪 F

E 🡪 G

Answer: The Relation is in 1NF.

R1(B,C,D)

R2-1(E, F, G)

R2-2(A, B, C, E, H)

**Practice problem:** The relation schema and the functional dependencies are given as follows:

R(A, B, C, D, E, F, G, H, I)

ABC → DEFGHI

B → G, B → H, D → E, D → I

Normalize up to 3NF.

Answer: The relation is in 1NF.

3NF:

R1(B,G,H)

R2-1(D,E,I)

R2-2(A,B,C,D, F)