ITEC 3335 Database Development
Fall 2019
Suggested Solution to Homework #7

For example:

[1]   Seven superkeys: AB, ABC, ABD, ABCD, CD, ACD and BCD

[2]

(a)   True. The relation R(A,B,C) {A->B, B->C} is in 2NF but not in 3NF.

(b)   True. For example, R(A,B,C,D) may have four CK: AB, AC, AD and BC.

(c)   True. In R(A,B) {A->B}, AB is a superkey but not a candidate key.

[3]

(a)   ShipmentId -> SupplierId, PartId, ShipmentDate, Quantity
        PartId -> PartName
        SupplierId -> SupplierName
        SupplierName -> SupplierId

(b)   ShipmentId

(c)   Non-prime: SupplierId, SuplierName, PartId, ShipmentDate, Quantity

(d)   2NF as PartId -> PartName violates 3NF. PartId is not a superkey and PartName is non-prime.

(e)   Shipment(ShipmentId, SupplierId, PartId, ShipmentDate, Quantity)
        Supplier(SupplierId, SupplierName)
        Parr(PartId, PartName)

(4)   For R(A,B,C,D) with {B->A, BA->C, C->D}

(a)   A+ = A, B+=ABC, C+=CD, D+=D

(b)   CK: B
(c)   2NF, C->D violates 3NF.

(5)

(a)   Student(StudentId, FirstName, lastName, Phone, EMail)
        Class(ClassId, ClassName, hasFee, Fee)
        Enroll(StudentId, ClassId, n_class_attended)

(a)   StudentId -> FirstName, lastName, Phone, EMail
        ClassId -> ClassName, hasFee, Fee
        StudentId, ClassId, n_class_attended

(6)

(a)

[FD1] AId -> ALname, AFName, AInst

[FD2] BNbr -> BName, BPublish, BPrice

[FD3] BPublish -> PubCity (Assume that a publisher is located in a unique city.)

[FD4] AId, BNbr -> AuthBRoyalty

(b)   The relation is not in any normal form as there are non-atomic values in six attributes: BNbr, BName, BPublish, BPrice, PubCity, AuthBRoyalty

(c)

Based on [FD3]: Wall & Vintage has two publisher cities: Chicago and Indianapolis.

The publishers 'Grey Brothers' and 'Gray Brothers' may be the same publisher.

Based on [FD2]: The book 'Quick Mobile Apps' has two prices: $49.95 and $45.00.

The PubCity 'Boston, NH' is likely incorrect. That makes 'Grey Brothers' to be more likely a typo.

(d)

Author(AId, ALname, AFName, AInst), {AId -> ALname, AFName, AInst}
Book(BNbr, BName, BPublish, BPrice), {BNbr -> BName, BPublish, BPrice}
Publisher(BPublish, PubCity), {BPublish -> PubCity}
Royalty(AId, BNbr, AuthBRoyalty), {AId, BNbr -> AuthBRoyalty}