Example 1: 3NF and Fc

Let's do this together

Given R(A,B,C,D,E)

FDs = { A → B, AB → D, B → BDE, C → D, D → D }

Compute Fc and convert the relation into 3NF

Example 2: 3NF and Fc

Let's do this together

Given R(A,B,C)

FDs = { A → BC, B → C, A → B, AB → C }

Compute Fc and convert the relation into 3NF

Example: BCNF and F+

Let's do this together

Given R(A,B,C,D,E)
FDs = { A → B, AB → D, B → BDE, C → D, D → D }

Compute F+ and convert the relation into BCNF

Practice 1: Decomposition

Given R (A, B, C)
FDs = { A → B, B → C }

Supposed R is decomposed in two different ways :

1. R1(A, B), R2(B, C)
   - Does this satisfy lossless-join decomposition?
   - Does this satisfy dependency preserving?
2. R1(A, B), R2(A, C)
   - Does this satisfy lossless-join decomposition?
   - Does this satisfy dependency preserving?

Practice 2: 3NF and BCNF

Given R (A, B, C, D, E)
FDs = { A → C, C → DE, D → B, A → D }

Decompose table R using 3NF

Decompose table R using BCNF

Practice 3: 3NF

Does the Customer_order table satisfy 3NF requirements?
If not, convert the table into 3NF

Customer_order

OrderId	CustomerID	Date	Store	Address
1	2	10/1/2019	South	11 Sorth Str
2	1	9/25/2019	West	22 West Str
3	3	8/12/2019	East	33 East Str
4	4	10/23/2019	West	22 West Str
5	8	5/11/2019	North	44 North Str
6	6	5/11/2019	South	11 Sorth Str
7	5	7/31/2019	East	33 East Str
8	7	10/17/2019	West	22 West Str
9	6	9/19/2019	North	44 North Str
10	4	10/23/2019	North	44 North Str
…	…	…	…	…

Practice 4: BCNF

Does the Student_Major_Advisor table satisfy BCNF requirements?
If not, convert the table into BCNF

Student_Major_Advisor

ComputingID	Major	Advisor
ht1y	Computer Science	someone1
dt2y	Physics	someone2
dt2y	Engineering	somoone3
md3y	Computer Science	someone4
mn4e	Math	someone5
md3y	Computer Science	someone1

computingID, Major → Advisor
Advisor → Major

Assume:
(semantic/business rules)

- Each Student may major in several subjects.
- For each Major, a given Student has only one Advisor.
- Each Major has several Advisors.
- Each Advisor advises only one Major.
- Each Advisor advises several Students in one Major.