DATABASE DESIGN I - 1DL300

Spring 2012

**An Introductory Course on
Database Systems**

http://www.it.uu.se/edu/course/homepage/dbastekn/vt12/

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Normalization Example

Elmasri/Navathe ch 14
Padron-McCarthy/Risch ch 11

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Outline

1. Normalization – Summary

   - Good database design ???
   - Redundancy, Update anomalies, NULL values, spurious tuples
   - Functional dependency (FD), Full functional dependency (FFD)
   - 1 NF
   - 2 NF
   - 3 NF
   - BCNF

2. *Car_sale database* example

3. *Teach database, Street database* – BCNF normalize

4. More exercises on normalization

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1. A car may be sold by multiple salesmen.
2. One salesman can sale only one car per day.
3. The commission (in %) depends on who you buy a car from, i.e. the salesman.
4. The discount (in %) varies from date to date.

Car_sale

| Car	Salesman	Date_sold	Commission	Discount
Saab 9-3	Erik P	2012-01-15	15	5
Saab 9-3	Mia F	2012-01-20	20	8
Saab 9-5	Nina O	2012-01-20	10	8
Volvo C30	Mia F	2012-01-21	20	3
Volvo S80	Erik P	2012-01-15	15	5

Normalization to BCNF

? Is *Teach* in BCNF? Why or why not ?
How would you normalize it?

Teach

department	course	teacher
Informational Technology	Database 1	Sara S
Informational Technology	Database 2	Sara S
Engineering	Signals and Systems	Peter E
Engineering	Database 1	Sven P
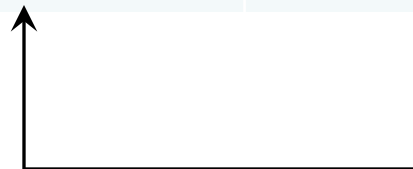
Normalization to BCNF

? Is *Street* in BCNF? Why or why not ?
How would you normalize it?

Street

street	city	length	zipcode
Rydsvägen	Linköping	19	58248
Mårdtorpsgatan	Linköping	0.7	58248
Storgatan	Linköping	1.5	58223
Storgatan	Gnesta	0.014	64631

The Database *Order*

Order

order	customer	o_date	total_amount
1000	Joy	2012-01-15	15
1002	Joy	2012-01-20	20
1050	Spec	2012-01-20	10

Order_item

order	item	price	discount
1000	shirt	400	2
1000	dress	1000	5
1002	shirt	400	7
1050	trousers	600	1

- Each *item* has different discount
- *Price* refers to one item
- *Odate* is the date on which the order was placed
- *Total_amount* is the amount of the order

Summary

- Normalization
- Redundancy
- Functional dependency (FD)
- Full functional dependency (FFD)
- 1 NF
- 2 NF
- 3 NF
- BCNF
- Spurious tuples