

# Data Modeling and Databases: Assignment 7

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## 1 1NF Exercise

1.
  - **select** c.custname, c.custcity, c.custstate, c.custzip  
**from** customers c, rentals r  
**where** c.custid=r.custid **and** (r.title1="Die\_Hard"  
**or** r.title2="Die\_Hard" **or** r.title3="Die  
Hard")
  - Tripple "title" query does. We have three different columns for titles  
and film we are looking for can be into any of it.
  - Yes, it is, but it could be easier. The number of tuples returned  
from query determines it, but it isn't possible to make an aggregate  
function to count it from the source table - we have to make complex  
query to do it
2. I can add domain "title4" which will be filled by nulls or I can redesign  
table and do table(RentalID, CustID, CheckOutDate Title)
3. primary key is RentalID, Title
4. **create table** Rentals 2(  
RentalID SERIAL,  
CustID integer null,  
CheckOutDate timestamp not null,  
Title char(50) not null,  
**primary key** (RentalID, Title),  
**foreign key** (CustID) references Customers(CustID)  
**on delete no action on update cascade**  
);

5. **insert into** Rentals 2  
 (select distinct RentalID , CustID , CheckOutDate , title1 as title  
 from rentals );  
  
**insert into** Rentals 2  
 (select distinct r.RentalID , r.CustID , r.CheckOutDate , title2 as title  
 from rentals r , rentals 2 r2  
 where (r.RentalId=r2.RentalID and r.title2=r2.title) or r.rentalID not in(r.  
  
**insert into** Rentals 2  
 (select distinct r.RentalID , r.CustID , r.CheckOutDate , title3 as title  
 from rentals r , rentals 2 r2  
 where (r.RentalId=r2.RentalID and r.title3=r2.title) or r.rentalID not in(r.  
  
 6. **select** c.custname , c.custcity , c.custstate , c.custzip  
 from customers c , rentals 2 r  
 where c.custid=r.custid and r.title = "Die\_Hard"

## 2 Boyce-Codd Normal Form (BCNF)

7. RentalID  $\rightarrow$  CustID;  
 RentalID  $\rightarrow$  CheckOutDate;  
 Title  $\rightarrow$  Director;  
 Title  $\rightarrow$  ReleaseType;  
 ReleaseType  $\rightarrow$  Price;
8. No, because we have attributes which does not depend the whole key (actually we have no attributes depend the whole key) and we even have an attribute Price which does not depend key directly.
9. **insertion anomalies example:** as we have two both RentalID and Title in primary key, we cannot add a new film to our database without creating a new Rental, so if Bubba has bought a new film for his store, but nobody has ordered it yet - it's nessesary to create a fake Rental with fake attributes for this film, and then change it after someone will decide to take a tape with this film.  
**deletion anomalies example:** if we will have delete some Rental we can lose data about film, if it was rented only once.  
**modification anomalies example:** if Bubba wants to change new Releases' price - he'll have to do it in every Rental manually.
10. RentedBy { RentalId , CustID , CheckOutDate};  
 FilmRented{RentalId , Title};  
 Film{Title ,Director , ReleaseType};

Release{ReleaseType,Price};

### 3 4NF

11. Multivalued dependency  $A \twoheadrightarrow B$  is a dependency where each value of A determines some specific collection of B
12. No, because it has multivalued dependencies.
13. CourseTeacher { Course, Teacher };  
CourseBook { Course, Book };

### 4 Normalization: yes or no?

14. No, it isn't, because city and state are not a key of a table.
15. Yes, I'd I would decompose it into Customer { CustID, CustName, CustCity, CustState } and Zip { CustCity, CustState, zip }, because if business would grow I'd have a large base of zips and be able to insert it just knowing where does customer from. It can cause a bit more computations, but it can help if customer forgets his zip. The chance that someone would forget what city is he from is much less.