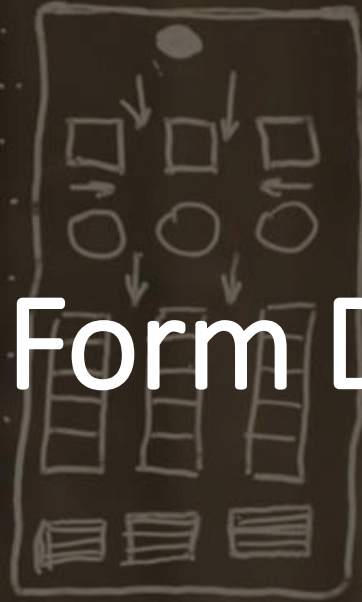



The Third Normal Form Design Review



Transitive Dependency Revealed



The diagram illustrates transitive dependencies in a database table. Red boxes highlight the attributes **CustomerID**, **CustomerCity**, and **Population**. A red arrow points from **CustomerID** to **CustomerCity**, and another red arrow points from **CustomerCity** to **Population**, indicating that **CustomerID** is transitively dependent on **Population** through **CustomerCity**.

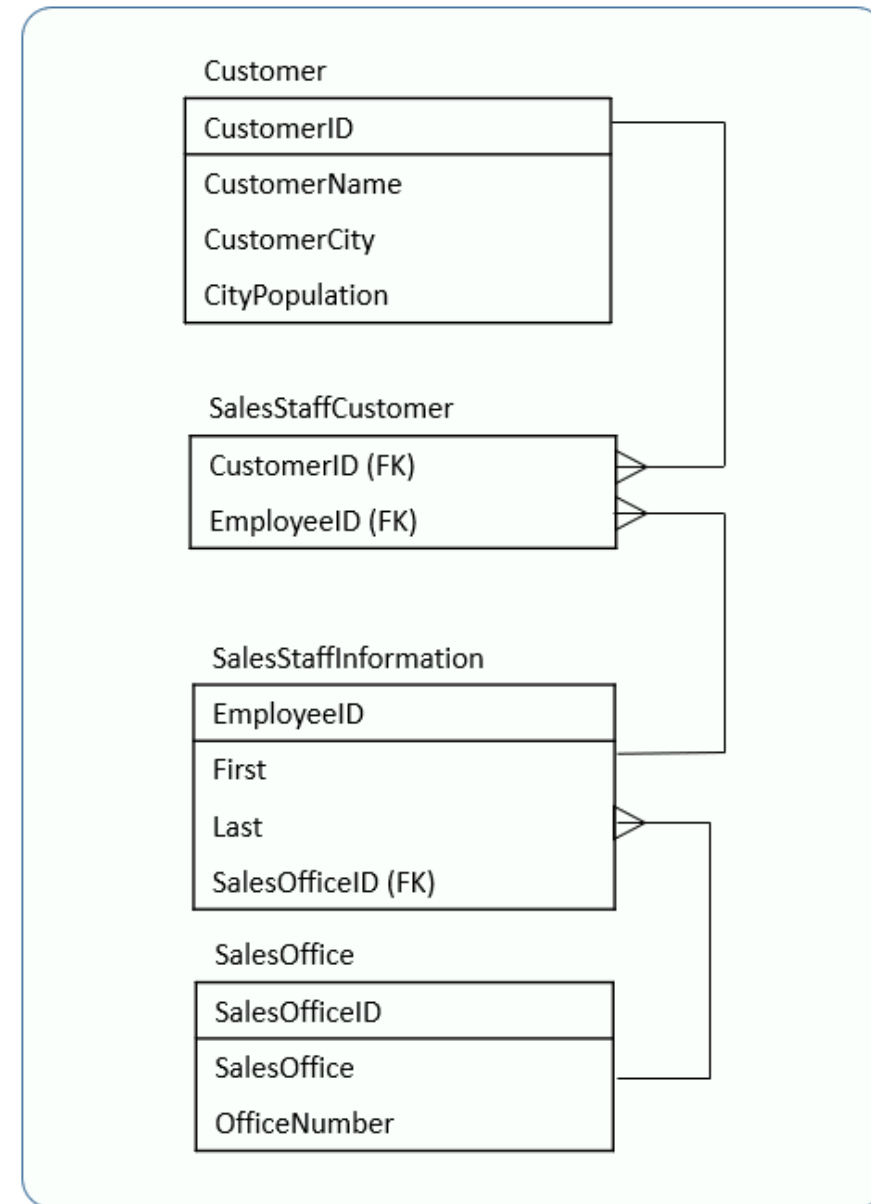
| Customer | | | | |
|-------------------|--|--------------|--------------|------------|
| <u>CustomerID</u> | | CustomerName | CustomerCity | Population |
| C1000 | | Ford | Dearborn | 94000 |
| C1010 | | GM | Detroit | 670000 |
| C1020 | | Dell | Austin | 950000 |
| C1030 | | HP | Palo Alto | 67000 |
| C1040 | | Apple | Cupertino | 60000 |
| C1050 | | Boeing | Chicago | 2700000 |

| Customer | | |
|-------------------|--------------|-------------|
| <u>CustomerID</u> | CustomerName | CityID |
| C1000 | Ford | CI10 |
| C1010 | GM | CI20 |
| C1020 | Dell | CI30 |
| C1030 | HP | CI40 |
| C1040 | Apple | CI50 |
| C1050 | Boeing | CI60 |

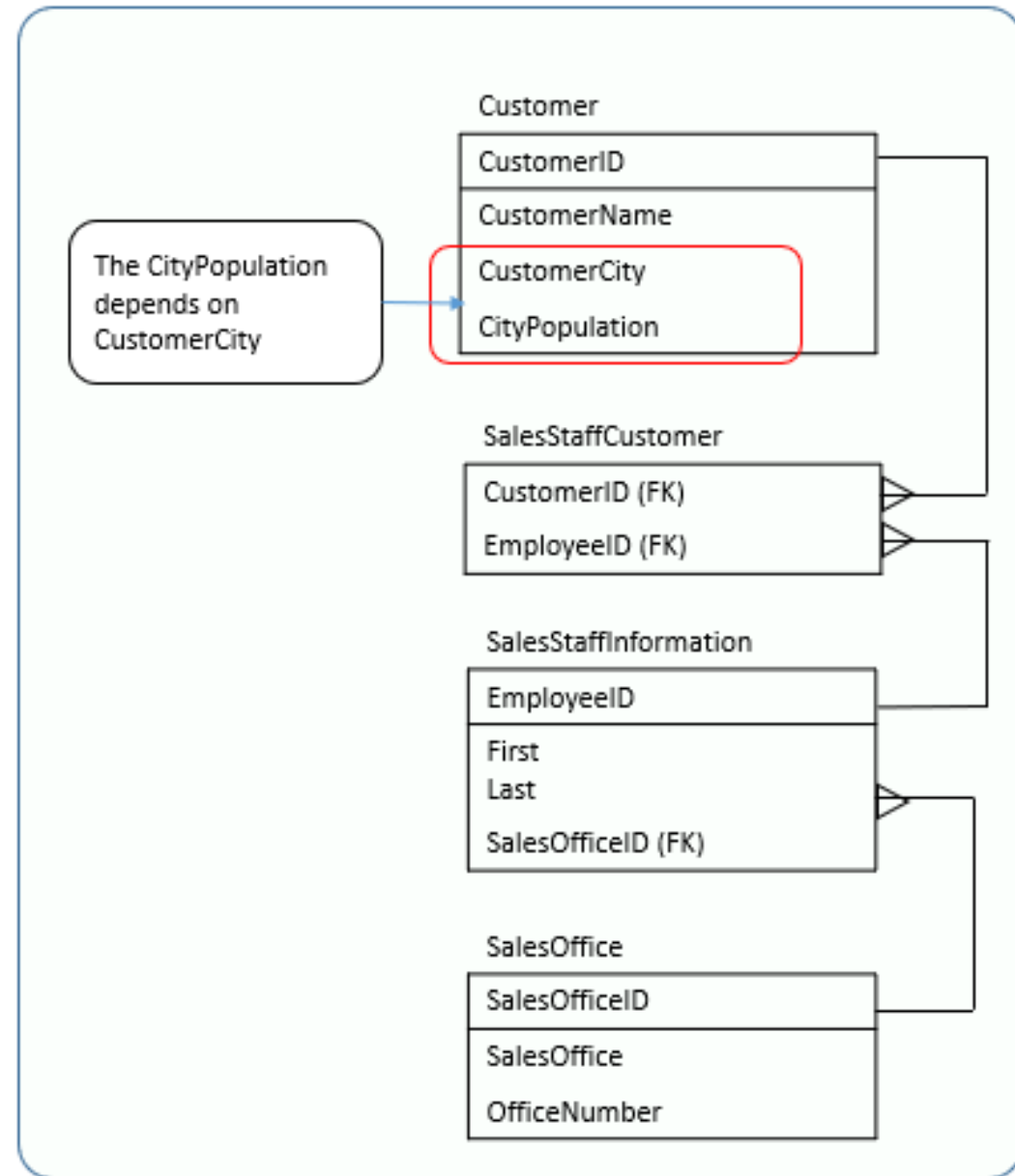
| <u>CityID</u> | CityName | Population |
|---------------|-----------|------------|
| CI10 | Dearborn | 9400 |
| CI20 | Detroit | 670000 |
| CI30 | Austin | 950000 |
| CI40 | Palo Alto | 67000 |
| CI50 | Cupertino | 60000 |
| CI60 | Chicago | 2700000 |

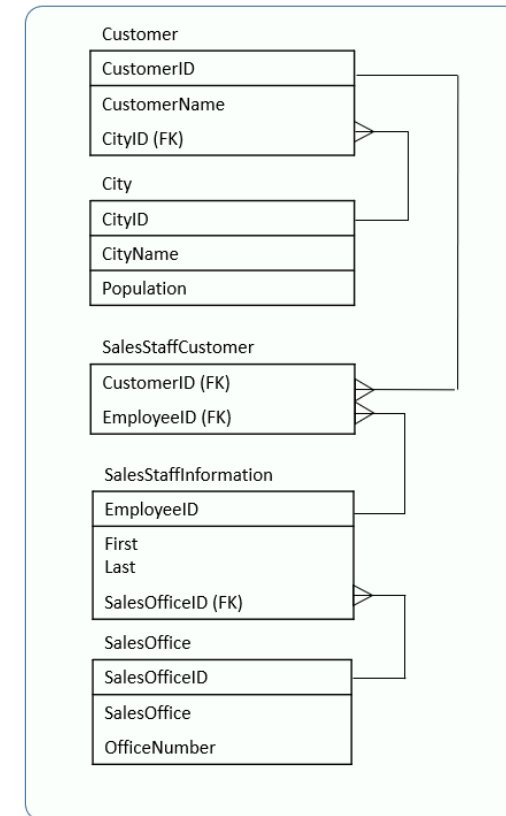
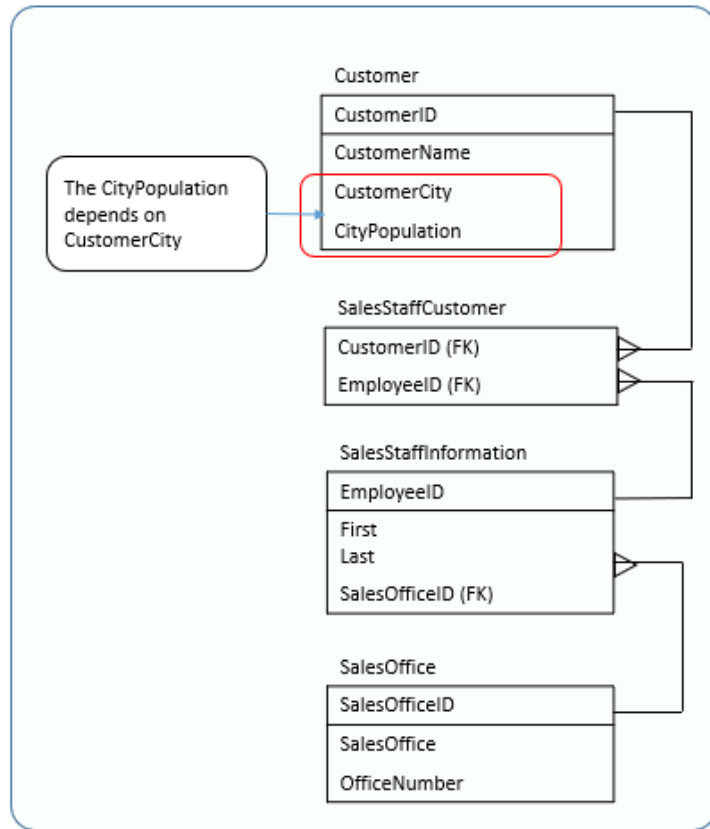
Improved Tables

Second Normal Form Design



Second Normal Form Design Issues





Third Normal Form Design

PROFESSOR BUTTS WALKS IN HIS SLEEP, STROLLS THROUGH A CACTUS FIELD IN HIS BARE FEET, AND SCREAMS OUT AN IDEA FOR A SELF-OPERATING NAPKIN.

AS YOU RAISE SPOON OF SOUP (A) TO YOUR MOUTH IT PULLS STRING (B), THEREBY JERKING LADLE (C) WHICH THROWS CRACKER (D) PAST PARROT (E). PARROT JUMPS AFTER CRACKER AND PERCH (F) TILTS, UPSETTING SEEDS (G) INTO PAIL (H). EXTRA WEIGHT IN PAIL PULLS CORD (I) WHICH OPENS AND LIGHTS AUTOMATIC CIGAR LIGHTER (J), SETTING OFF SKY-ROCKET (K) WHICH CAUSES SICKLE (L) TO CUT STRING (M) AND ALLOW PENDULUM WITH ATTACHED NAPKIN TO SWING BACK AND FORTH THEREBY WIPING OFF YOUR CHIN.

AFTER THE MEAL, SUBSTITUTE A HARMONICA FOR THE NAPKIN AND YOU'LL BE ABLE TO ENTERTAIN THE GUESTS WITH A LITTLE MUSIC.



Ref: [Wikipedia](https://en.wikipedia.org/wiki/Rube_Goldberg)

Can Normalization Get out of Hand?