

An abstract graphic on the left side of the slide, consisting of a network of white lines and small circles on a blue gradient background. The lines are vertical and horizontal, with some diagonal segments, and the circles are of varying sizes, resembling a circuit board or a data network.

# NORMALIZATION

# UNNORMALIZED DATA

PersonID	Name	Pet1	Home1	Pet1Name	Pet2	Home2	Pet2Name	Pet3	Home3	Pet3Name	Pet4	Home4	Pet4Name
1	Kathi	Cat	Bed	Sam	Dog	Dog House	Lady	Bird	Cage	Tweety	Cat	Bed	Tiger
2	Dennis	Dog	Dog House	Rambo	Cat	Bed	Seven						
3	Andy	Dog	Dog House	Elijah Woof	Cat	Bed	Ninja	Cat	Bed	Fluffy			
4	Thomas	Dog	Dog House	Sandy	Fish	Aquarium	Nimo	Cat	Bed	Baby	Cat	Bed	Princess

# ELIMINATE REPEATING GROUPS

PersonID	Name	Pet1	Home1	Pet1Name	Pet2	Home2	Pet2Name	Pet3	Home3	Pet3Name	Pet4	Home4	Pet4Name
1	Kathi	Cat	Bed	Sam	Dog	Dog House	Lady	Bird	Cage	Tweety	Cat	Bed	Tiger
2	Dennis	Dog	Dog House	Rambo	Cat	Bed	Seven						
3	Andy	Dog	Dog House	Elijah Woof	Cat	Bed	Ninja	Cat	Bed	Fluffy			
4	Thomas	Dog	Dog House	Sandy	Fish	Aquarium	Nimo	Cat	Bed	Baby	Cat	Bed	Princess

# FIRST NORMAL FORM

PersonID	Name	Pet	Home	PetName
1	Kathi	Cat	Bed	Sam
1	Kathi	Dog	Dog House	Lady
1	Kathi	Bird	Cage	Tweety
1	Kathi	Cat	Bed	Tiger
2	Dennis	Dog	Dog House	Rambo
2	Dennis	Cat	Bed	Seven
3	Andy	Dog	Dog House	Elijah Woof
3	Andy	Cat	Bed	Ninja
3	Andy	Cat	Bed	Fluffy
4	Thomas	Dog	Dog House	Sandy
4	Thomas	Fish	Aquarium	Nimo
4	Thomas	Cat	Bed	Baby
4	Thomas	Cat	Bed	Princess

# CREATE SEPARATE TABLES FOR SETS OF VALUES THAT APPLY TO MULTIPLE RECORDS. RELATE BY FOREIGN KEY

PersonID	Name	Pet	Home	PetName
1	Kathi	Cat	Bed	Sam
1	Kathi	Dog	Dog House	Lady
1	Kathi	Bird	Cage	Tweety
1	Kathi	Cat	Bed	Tiger
2	Dennis	Dog	Dog House	Rambo
2	Dennis	Cat	Bed	Seven
3	Andy	Dog	Dog House	Elijah Woof
3	Andy	Cat	Bed	Ninja
3	Andy	Cat	Bed	Fluffy
4	Thomas	Dog	Dog House	Sandy
4	Thomas	Fish	Aquarium	Nimo
4	Thomas	Cat	Bed	Baby
4	Thomas	Cat	Bed	Princess

# SECOND NORMAL FORM

PersonID (PK)	Name
1	Kathi
2	Dennis
3	Andy
4	Thomas

PersonID (FK) (PK)	Pet (PK)	Home	PetName (PK)
1	Cat	Bed	Sam
1	Dog	Dog House	Lady
1	Bird	Cage	Tweety
1	Cat	Bed	Tiger
2	Dog	Dog House	Rambo
2	Cat	Bed	Seven
3	Dog	Dog House	Elijah Woof
3	Cat	Bed	Fluffy
4	Dog	Dog House	Sandy
4	Fish	Aquarium	Nimo
4	Cat	Bed	Baby
4	Cat	Bed	Princess

# ELIMINATE FIELDS THAT DO NOT DEPEND ON THE KEY

PersonID (PK)	Name
1	Kathi
2	Dennis
3	Andy
4	Thomas

The key, the whole key,  
and nothing but the key

PersonID (FK) (PK)	Pet (PK)	Home	PetName (PK)
1	Cat	Bed	Sam
1	Dog	Dog House	Lady
1	Bird	Cage	Tweety
1	Cat	Bed	Tiger
2	Dog	Dog House	Rambo
2	Cat	Bed	Seven
3	Dog	Dog House	Elijah Woof
3	Cat	Bed	Fluffy
4	Dog	Dog House	Sandy
4	Fish	Aquarium	Nimo
4	Cat	Bed	Baby
4	Cat	Bed	Princess

# THIRD NORMAL FORM

PersonID (PK)	Name
1	Kathi
2	Dennis
3	Andy
4	Thomas

PetTypeID (PK)	Description	Home
1	Dog	Dog House
2	Cat	Bed
3	Fish	Aquarium
4	Bird	Cage

PersonID (FK) (PK)	PetTypeID (FK) (PK)	Name (PK)
1	2	Sam
1	1	Lady
1	4	Tweety
1	2	Tiger
2	1	Rambo
2	2	Seven
3	1	Elijah Woof
3	2	Ninja
3	2	Fluffy
4	1	Sandy
4	3	Nimo
4	2	Baby
4	2	Princess



# THIRD NORMAL FORM

PersonID (PK)	Name
1	Kathi
2	Dennis
3	Andy
4	Thomas

PetTypeID (PK)	Description	Home
1	Dog	Dog House
2	Cat	Bed
3	Fish	Aquarium
4	Bird	Cage

PersonPetID (PK)	PersonID (FK)	PetTypeID (FK)	Name
1	1	2	Sam
2	1	1	Lady
3	1	4	Tweety
4	1	2	Tiger
5	2	1	Rambo
6	2	2	Seven
7	3	1	Elijah Woof
8	3	2	Ninja
9	3	2	Fluffy
10	4	1	Sandy
11	4	3	Nimo
12	4	2	Baby
13	4	2	Princess

# THIRD NORMAL FORM

PersonID (PK)	Name
1	Kathi
2	Dennis
3	Andy
4	Thomas

BreedID (PK)	PetTypeID (FK)	Name
1	1	German Shepard
2	1	Labradoodle
3	3	Beta
4	3	Goldfish
5	4	Parakeet

PetTypeID (PK)	Description	Home
1	Dog	Dog House
2	Cat	Bed
3	Fish	Aquarium
4	Bird	Cage

PersonPetID (PK)	PersonID (FK)	PetTypeID (FK)	Name
1	1	2	Sam
2	1	1	Lady
3	1	4	Tweety
4	1	2	Tiger
5	2	1	Rambo
6	2	2	Seven
7	3	1	Elijah Woof
8	3	2	Ninja
9	3	2	Fluffy
10	4	1	Sandy
11	4	3	Nimo
12	4	2	Baby
13	4	2	Princess