

PARENTS & CHILDREN

Creating a **Relational Database**
by Linking Tables

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A Families Table

Last name	Mother	Father	Child1	Child2
Adams	Ann	Adam	Ava	
Beck	Barbara	Bob	Ben	Beverly

A “Flat File” Database

A Simple table — May also include address

What about the Cruz family?

- Parents:
 - Carol and Carl
- Children
 - Charles
 - Carly
 - Carlotta

Have to Redesign Table

Last name	Mother	Father	Child1	Child2	Child3
Adams	Ann	Adam	Ava		
Beck	Barbara	Bob	Ben	Beverly	
Cruz	Carol	Carl	Charles	Carly	Carlotta

Question: What about families with 10+ children?



Problems with Flat File DBs

Last name	Mother	Father	Child1	Child2	Child3
Adams	Ann	Adam	Ava		
Beck	Barbara	Bob	Ben	Beverly	
Cruz	Carol	Carl	Charles	Carly	Carlotta

- Inflexible design
- Wasted space for **blank fields**

One Solution: Children Table

Last name	Mother	Father	Child
Adams	Ann	Adam	Ava
Beck	Barbara	Bob	Ben
Beck	Barbara	Bob	Beverly
Cruz	Carol	Carl	Charles
Cruz	Carol	Carl	Carly
Cruz	Carol	Carl	Carlotta

One record for each child

Problem

Last name	Mother	Father	Child
Adams	Ann	Adam	Ava
Beck	Barbara	Bob	Ben
Beck	Barbara	Bob	Beverly
Cruz	Carol	Carl	Charles
Cruz	Carol	Carl	Carly
Cruz	Carol	Carl	Carlotta

Redundant Duplicate Data

The Problems with Redundancy

- It lowers productivity
 - Have to type same data over and over
- It increases risk of errors
 - The more your type, the more errors
- Redundant files are harder to maintain
 - E.g., if family changes last name, change must be made in several records

Solution: Separate Tables

Children

Child ID	First Name	Last Name
1	Ava	Adams
2	Ben	Beck
3	Beverly	Beck
4	Charles	Cruz
5	Carly	Cruz

Parents

Last Name	Mother	Father
Adams	Ann	Adam
Beck	Barbara	Bob
Cruz	Carol	Carl

Note the
common field

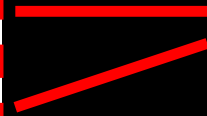
Records Can Be Linked

Children

Child ID	First Name	Last Name
1	Ava	Adams
2	Ben	Beck
3	Beverly	Beck
4	Charles	Cruz
5	Carly	Cruz

Parents

Last Name	Mother	Father
Adams	Ann	Adam
Beck	Barbara	Bob
Cruz	Carol	Carl



Note the
**common field
values**

Note: The One-to-Many Link

Children

Child ID	First Name	Last Name
1	Ava	Adams
2	Ben	Beck
3	Beverly	Beck
4	Charles	Cruz
5	Carly	Cruz

“Many”

Parents

Last Name	Mother	Father
Adams	Ann	Adam
Beck	Barbara	Bob
Cruz	Carol	Carl

“One”

One Parent
Many Children

Primary Keys

Children

Child ID	First Name	Last Name
1	Ava	Adams
2	Ben	Beck
3	Beverly	Beck
4	Charles	Cruz
5	Carly	Cruz

Parents

Last Name	Mother	Father
Adams	Ann	Adam
Beck	Barbara	Bob
Cruz	Carol	Carl

Uniquely identify records in each table

Foreign Key

Children

Child ID	First Name	Last Name
1	Ava	Adams
2	Ben	Beck
3	Beverly	Beck
4	Charles	Cruz
5	Carly	Cruz

Parents

Last Name	Mother	Father
Adams	Ann	Adam
Beck	Barbara	Bob
Cruz	Carol	Carl

Links to a
Primary Key in a
Parent table

Advantages of Linked Tables

Children

Child ID	First Name	Last Name
1	Ava	Adams
2	Ben	Beck
3	Beverly	Beck
4	Charles	Cruz
5	Carly	Cruz

Parents

Last Name	Mother	Father
Adams	Ann	Adam
Beck	Barbara	Bob
Cruz	Carol	Carl

- Flexible structure
- Little redundancy
- Less Wasted Space

Problem: Orphan Records

Children

Child ID	First Name	Last Name
1	Ava	Adams
2	Ben	Beck
3	Beverly	Beck
4	Charles	Cruz
5	Carly	Cruz

Parents

Last Name	Mother	Father
Adams	Ann	Adam
Cruz	Carol	Carl

If you delete parent
w/o deleting
children

Relationships

- Linked tables called **Related** tables
- Databases with linked tables called **Relational Databases**
- Most commercial database programs are Relational
- MS Access and Oracle are relational

Planning a Database

- Requires careful thought
- How many tables?
- Which data fields in which table?
- Sketch out with pencil & paper

Question:

How would you divide up this table?

Emp ID	Employer	City	ST	Zip
2040	Beantown Tours	Malden	MA	03456
2045	Rose's Diner	Malden	MA	03456
2050	Eddie's Cycles	Malden	MA	03456
2066	Rose Inn	Groton	CT	02467

Answer

Employers

Emp ID	Employer	Zip
2040	Beantown Tours	03456
2045	Rose's Diner	03456
2050	Eddie's Cycles	03456
2066	Rose Inn	02467

Zip Codes

Zip	City	ST
03456	Malden	MA
02467	Groton	CT

Zip code is now
the **common field**

Answer

Employers

Emp ID	Employer	Zip
2040	Beantown Tours	03456
2045	Rose's Diner	03456
2050	Eddie's Cycles	03456
2066	Rose Inn	02467

Primary Key

Foreign Key

Zip Codes

Zip	City	ST
03456	Malden	MA
02467	Groton	CT

Primary Key