

# Database Modeling

Introduction

- 1) Requirement analysis
- 2) Create ER-diagram
- 3) Organizing data into tables
- 4) Normalizing

1

Gather information

List the types of data

People

Things

Locations

Events

②

Visual

Entities

Primary keys

Relations

# Organizing data into tables

③

ER-diagram => tables

Assign datatypes

④

One big => many small

# Relations

customer	
id	int
first_name	varchar
last_name	varchar
email	varchar

order	
id	int
created_at	timestamp
paid_at	timestamp
total_amount	numeric

# Relations



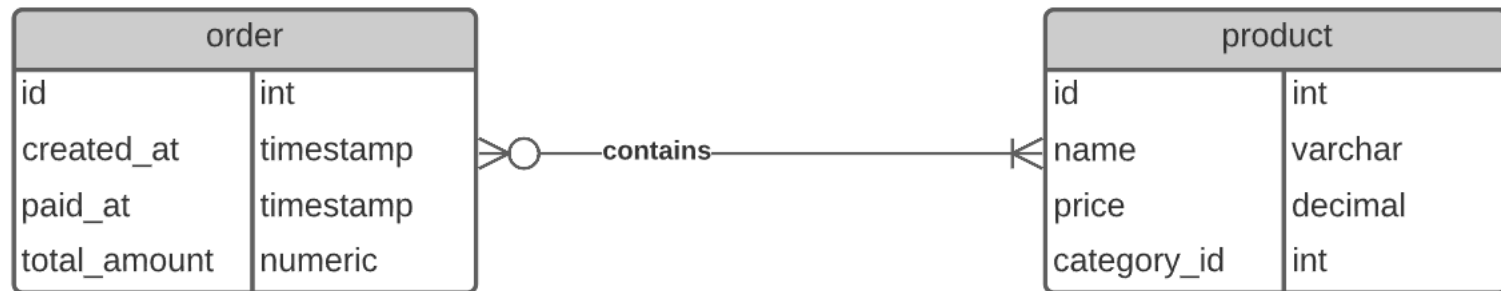


# Relations

order	
id	int
created_at	timestamp
paid_at	timestamp
total_amount	numeric

product	
id	int
name	varchar
price	decimal
category_id	int

# Relations

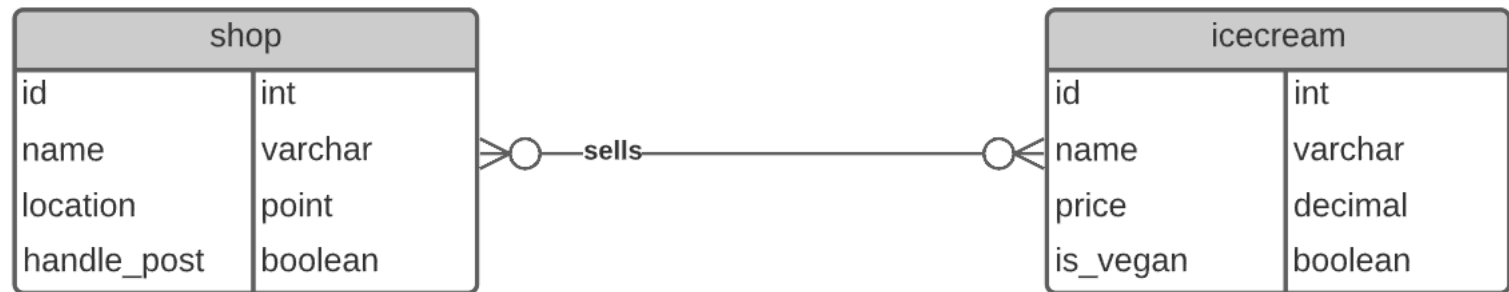


# Relations

shop	
id	int
name	varchar
location	point
handle_post	boolean

icecream	
id	int
name	varchar
price	decimal
is_vegan	boolean

# Relations



# Relations

country	
id	int
name	varchar
population	int
continent_id	int

un_representative	
id	int
first_name	varchar
last_name	varchar
salary	numeric

# Relations



# Relations

Candidate

PoliticalParty

Order

OrderRow

Person

Color

Student

Course

Car

ParkingSlot

Book

Author

Customer

ParkingSlot

Person

Passport

# Relations



One (and only one)



Zero or one



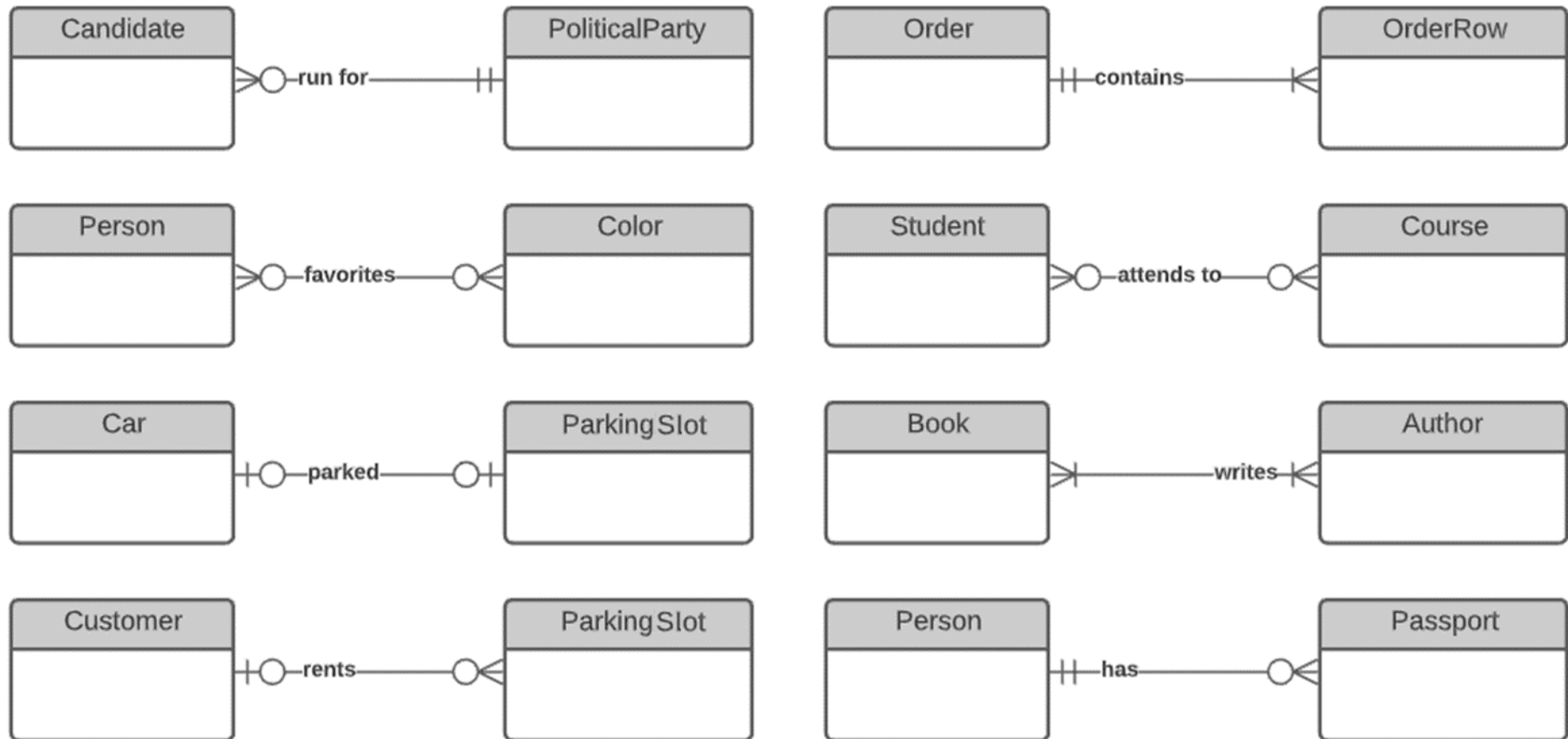
One or many



Zero or many

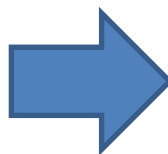


# Relations



# Normalizing

Name	FavoriteColor
Mia	Red
Olivia	Red
James	Green
Liam	Blue
Ava	<i>NULL</i>
<i>NULL</i>	Red



Name	FavoriteColor
Mia	91
Olivia	91
James	92
Liam	93
Ava	NULL
NULL	91

Id	Name
91	Red
92	Green
93	Blue
94	Purple
95	Indigo

# Normalizing

First normal form

Second normal form

Third normal form

# Normalizing

## First normal form

person				
<b>id</b>	<b>name</b>	<b>favorite_colors</b>		
1	Bart	Red, Green, Blue		
2	Lisa	Green, Purple		
person				
<b>id</b>	<b>name</b>	<b>color1</b>	<b>color2</b>	<b>color3</b>
1	Bart	Red	Green	Blue
2	Lisa	Green	Purple	

## First normal form - Solution

person		favorite		color	
id	name	person_id	color_id	id	name
1	Bart	1	500	500	Red
2	Lisa	1	501	501	Green
		1	502	502	Blue
		2	501	503	Purple
		2	503		

## Second normal form

order			
order_number	product_id	product_name	quantity
1	3000	Danish bread	2
1	3001	Gevalia coffee	3
2	3000	Danish bread	10
2	3002	Apple	8

## Second normal form - Solution

order		
order_number	product_id	quantity
1	3000	2
1	3001	3
2	3000	10
2	3002	8
product		
product_id	product_name	
3000	Danish bread	
3001	Gevalia coffee	
3002	Apple	

## Third normal form

product				
id	name	price	vat	total_price
3000	Danish bread	20	5	25
3001	Gevalia coffee	48	12	60
3002	Apple	8	2	19



## Third normal form - solution

product			
id	name	price	vat
3000	Danish bread	20	5
3001	Gevalia coffee	48	12
3002	Apple	8	2