

# [C]omputer-[A]ided Ship Design

WS2425

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Chair of Ship Design

# Database

## Definition

In computer term, database refers to multiple facets of definition.

Storage:

Literal meaning of a place where data is stored.



Organization:

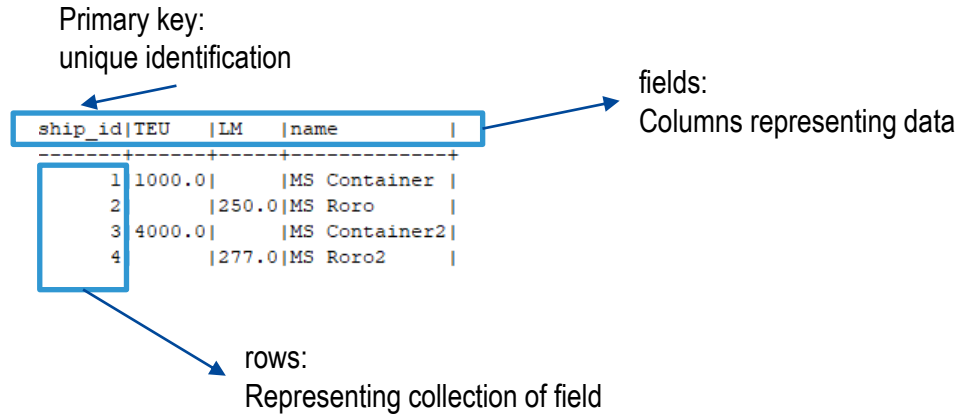
Data are stored in a organized manner



Database is an organized collection of information/data.

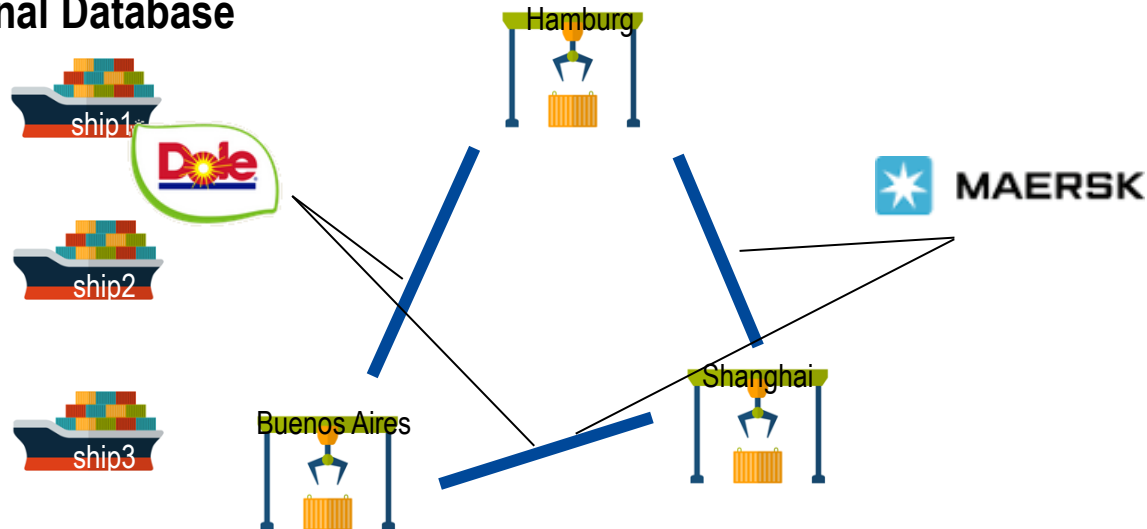
# Database

In practical manner  
Database are tables



# Database

## Relational Database



# Database

## Relational Database

Tables are connected by relations

routes			Shipping companies		Ships			
id	embarkation	destination	id	name	id	name	route_id	TEU
1	Shanghai	Rotterdam	1	Maersk	1	MS Container2	1	4000.0
2	Sydney	Boston	2	Dole	2	MS Roro2		277.0
3	Buenos Aires	Singapore						

- A ship has one route. A route can be served by many ships. Therefore *one to many* relation
- A ship has can has many route. A route can be served by many shipping companies. Therefore *many to many* relation

shippinglineId routeId	
1	2
1	1
2	3

Task1:  
Create Classes  
corresponding to  
the tables

# Database and OOP

## Object-relational mapping - ORM

Mapping data types from OOP into relational database

ship_id	TEU	LM	name
1	1000.0		MS Container
2		250.0	MS Roro
3	4000.0		MS Container2
4		277.0	MS Roro2



```
class Ship(db.Model):
    id = db.Column(
        db.Integer,
        primary_key=True
    )
    name = db.Column(db.String(100))

class Containership(Ship):
    TEU = db.Column(db.Float)

class RoRo(Ship):
    LM = db.Column(db.Float)
```

```
ship1 = Containership(name="MS Container2", TEU=4000)
ship2 = RoRo(name="MS Roro2", LM=277)
```