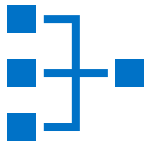
Contoso

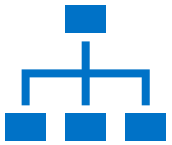
LOW LEVEL DESIGN

INTRO TO SOFTWARE ENGINEER

AGENDA

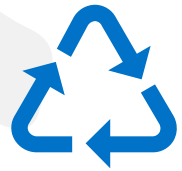


Object oriented Design



Hierarchies Refinement

Generalization



Composition

Database Relation & Design

Keys

Anomalies

Database normalization

WHAT IS LOW LEVEL DESIGN

Low level design is a **process that will fill the gap of high-level design** to guide the developer before coding

High-level is **“What”**

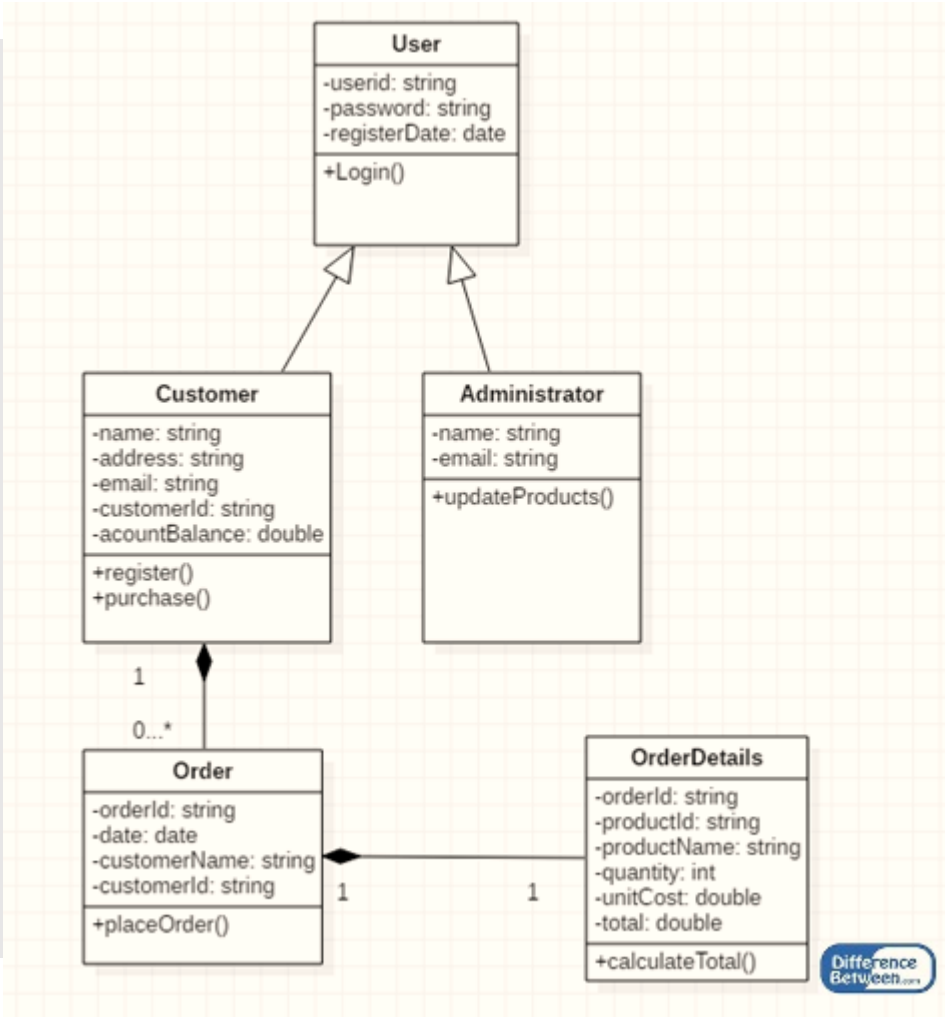
Low-level is **“How”**

OBJECT ORIENT DESIGN

Process that will draw the properties and behavior of the component

AT HIGH LEVEL

At high-level design, top classes that the application will use are defined.



AT LOW LEVEL

Design the refine class by add more properties method event or subclass

INHERITANCE HIERARCHIES & REFINEMENT

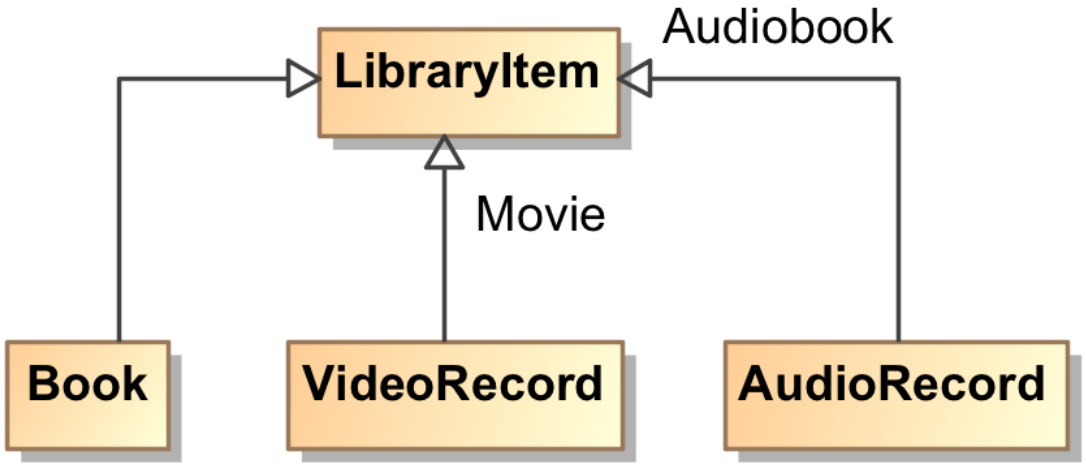
INHERITANCE HIERARCHIES

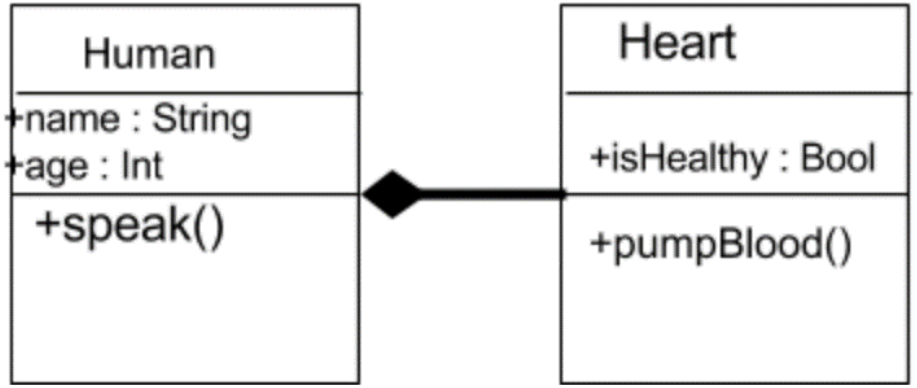
- **Inheritance is the mechanism** by which an object acquires the some/all properties, methods and events of another object.
- It **supports the concept of hierarchical** classification. And provides code reuse

- Refinement is the process of **breaking a parent class into multiple subclasses** to capture some difference between objects in the class
- The hierarchy **focuses on behavioral** differences between classes

REFINEMENT

GENERALIZATION AND COMPOSITION





Generalization

A process that you extract common feature to define a parent class

(let say Book class, VideoRecord class and AudioRecord class they all have the same method named borrow(), so to generalize them you need to create the mother class to contain the borrow method)

Composition

A process that let you include multiple copies of a type object inside other class

(let say you create Human class and Heart class and to make the human perfect, so you as heart type in human as an attribute, now Heart is one of the Human attribute)

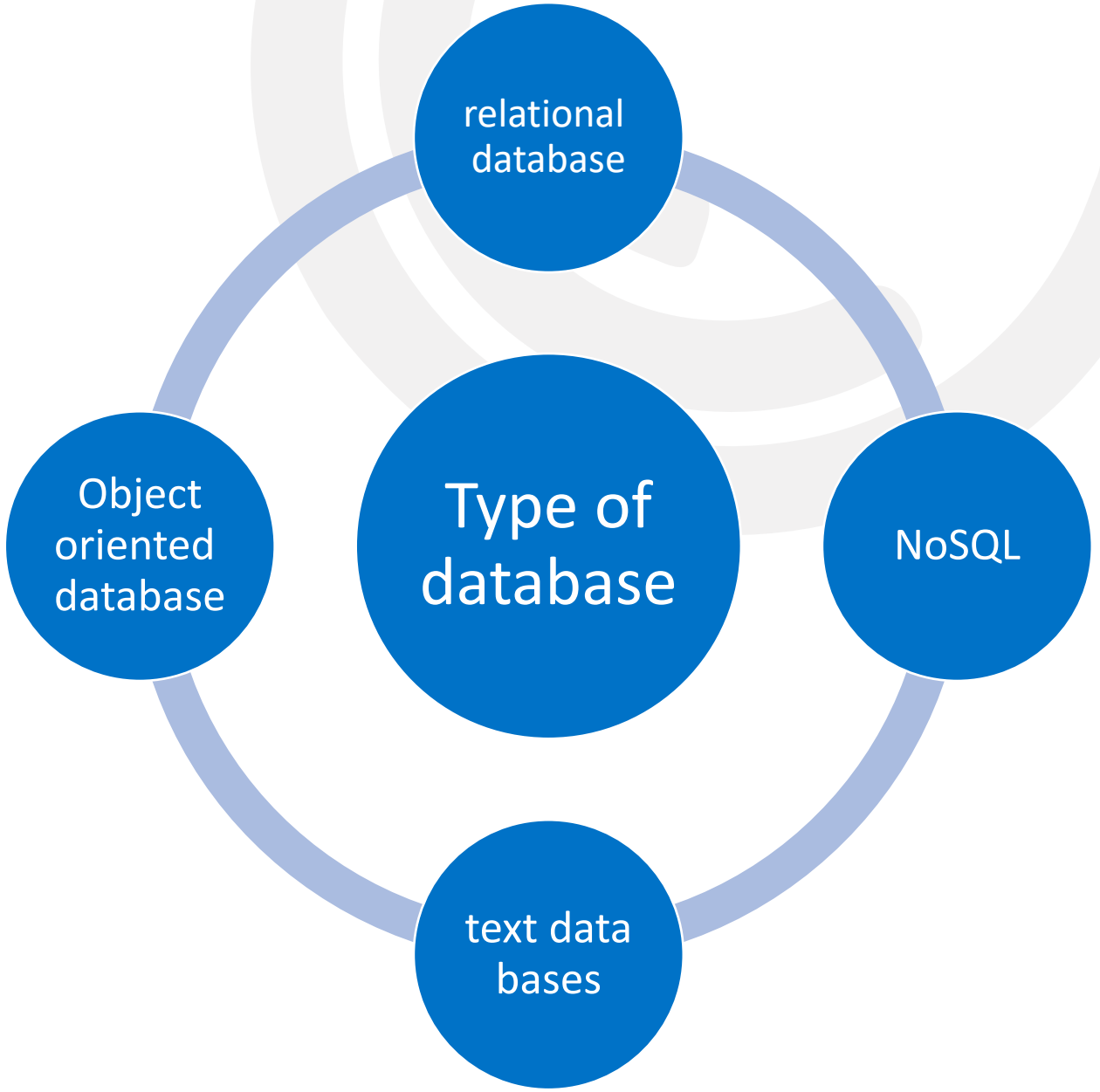
DATABASE

Collection of related information that is organized so it can be easily accessed, managed, update data

Database design

The process of producing a detailed data model of a database

(Data model = logical and physical design of data)

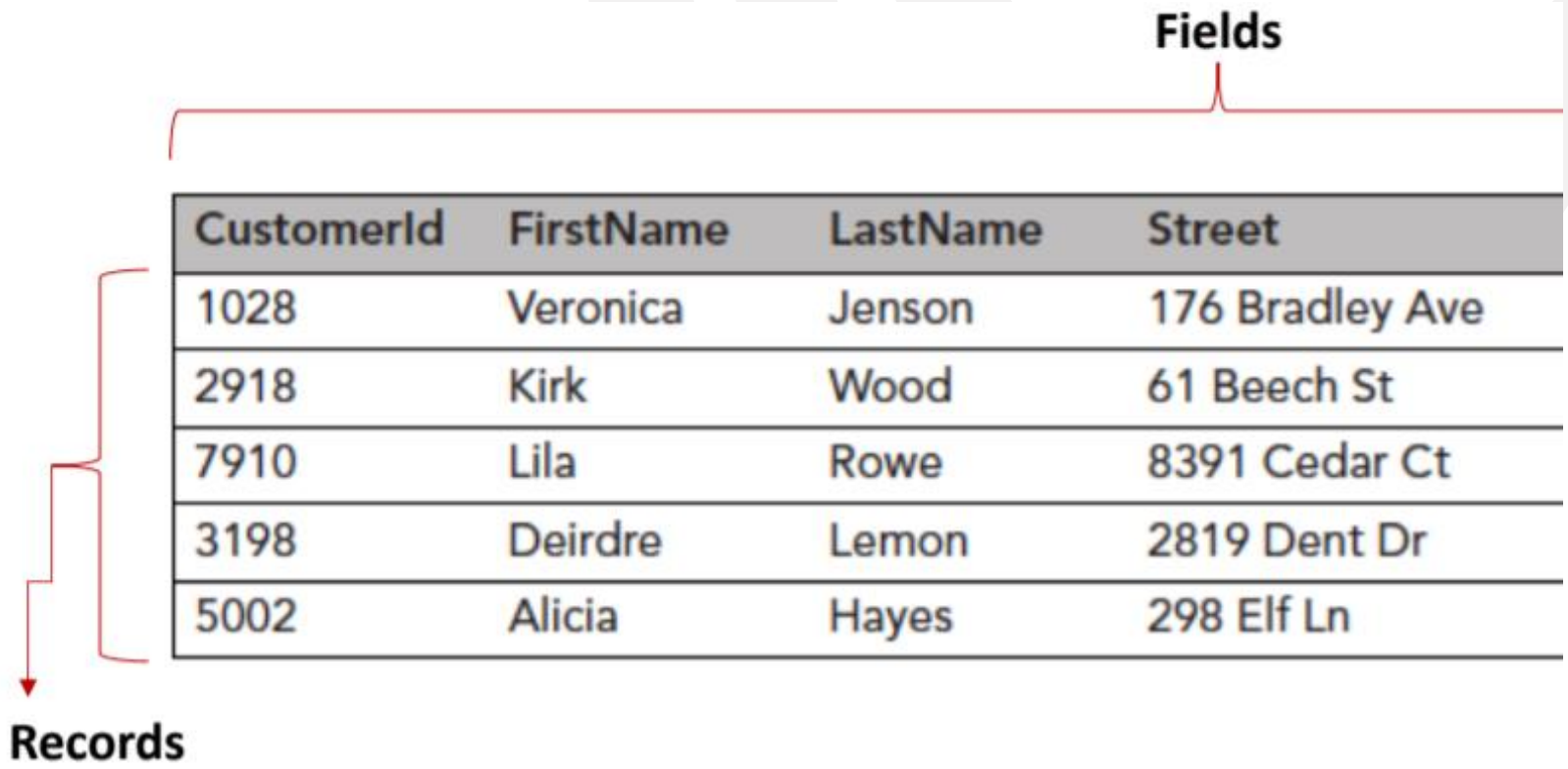


Relational database

- **Simple and easy to use**
- Provide a good set of tools
- A relational database store related data in table

  record : row (entities)

  fields : columns (properties)



CustomerId	FirstName	LastName	Street
1028	Veronica	Jenson	176 Bradley Ave
2918	Kirk	Wood	61 Beech St
7910	Lila	Rowe	8391 Cedar Ct
3198	Deirdre	Lemon	2819 Dent Dr
5002	Alicia	Hayes	298 Elf Ln

DATABASE KEYS

PRIMARY KEY(UNIQUE IDENTIFIER)

Unique specify record in relation

PK

CustomerId	FirstName	LastName	Street
1028	Veronica	Jenson	176 Bradley A
2918	Kirk	Wood	61 Beech St
7910	Lila	Rowe	8391 Cedar C
3198	Deirdre	Lemon	2819 Dent Dr
5002	Alicia	Hayes	298 Elf Ln

`Customer` table

FK PK

CustomerId	OrderId	DateOrdered	DateFilled	D
1028	1298	4/1/2015	4/4/2015	
2918	1982	4/1/2015	4/3/2015	
3198	2917	4/2/2015	4/7/2015	
1028	9201	4/5/2015	4/6/2015	
1028	3010	4/9/2015	4/13/2015	

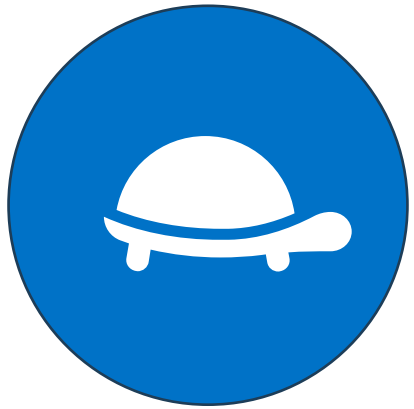
`Order` table

- Field (or collection) in one table that will **identifies a record of another table**
- Refer primary key of another table

FOREIGN KEY

ANOMALIES

Problems may be occurred if the database is not design properly



Duplicate data can **waste space** and make **updating values slow**.

You may be **unable to delete one piece of data without also deleting another** unrelated piece of data.

An otherwise **unnecessary piece of data may need to exist** so that you can represent some other data.

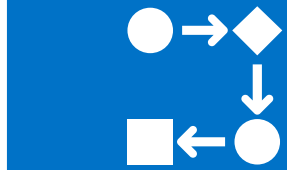
DATABASE NORMALIZATION

1

A process of rearranging a database to put it into a standard (normal) form that prevents these kinds of anomalies.

There are **seven levels of database normalization** that deal with increasingly obscure kinds of anomalies.

2



3

The **first three levels of normalization** (1NF, 2NF and 3NF) **handle the worst kinds** of database problems.

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THANK YOU

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