Domain Modelling

CSIT883 System Analysis and Project Management

UNIVERSITY
OF WOLLONGONG
AUSTRALIA

Outline

Problem Domain and Things

The Brainstorming Technique

The Noun Technique

Classes, Attributions and Associations

Domain Model Class Diagram

This video

Details about Domain Classes

- Attribute—describes one piece of information about each instance of the class
  - E.g., The first name, last name and phone number of a customer
- Identifier or key
  - An attribute that uniquely identifies an instance of the class
  - E.g., customer ID
- Compound attribute
  - Two or more attributes combined into one structure to simplify the model.
  - E.g., an address includes the house number, street, city, state and zip.
  - Sometimes an identifier or key is a compound attribute.
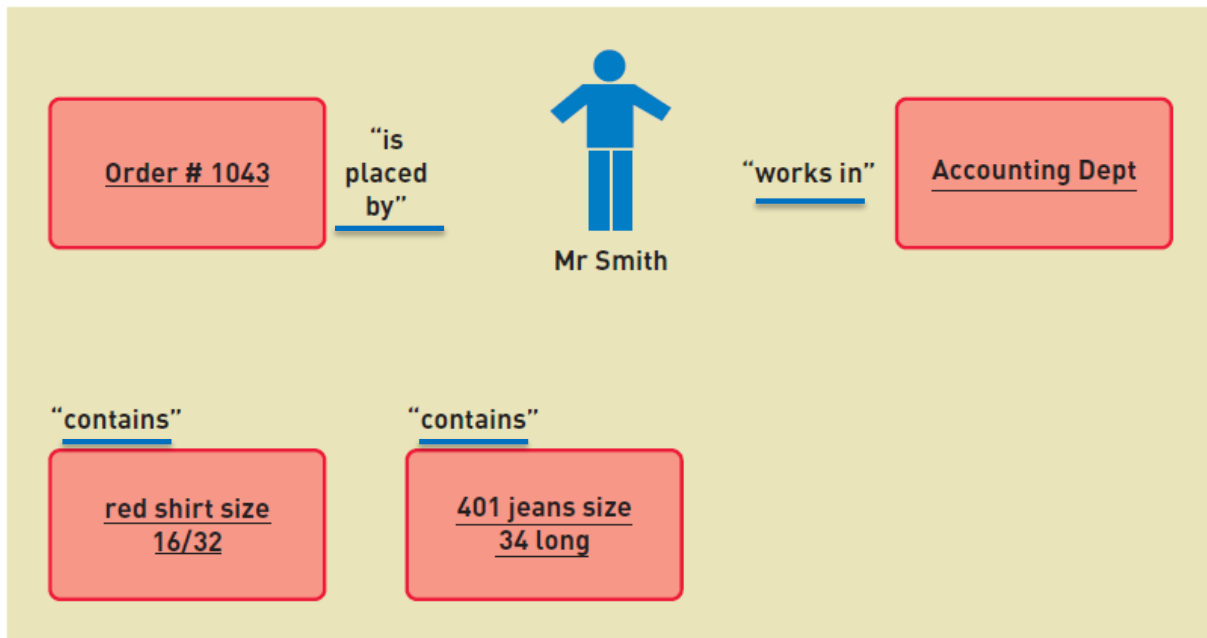
Attributes and Values

- Class is a type of thing. Object is a specific instance of the class. Each instance has its own values for an attribute

All customers have these attributes:	Each customer has a value for each attribute:		
Customer ID	101	102	103
First name	John	Mary	Bill
Last name	Smith	Jones	Casper
Home phone	555-9182	423-1298	874-1297
Work phone	555-3425	423-3419	874-8546

Associations Among Things

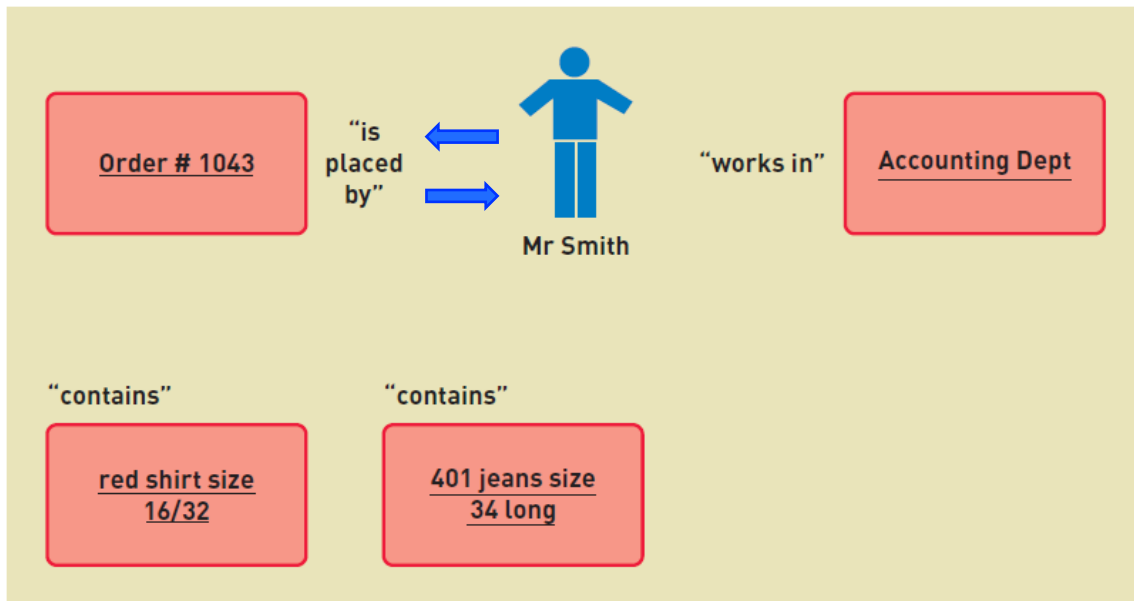- Association—a naturally occurring relationship between classes

Associations Among Things

- Association—a naturally occurring relationship between classes

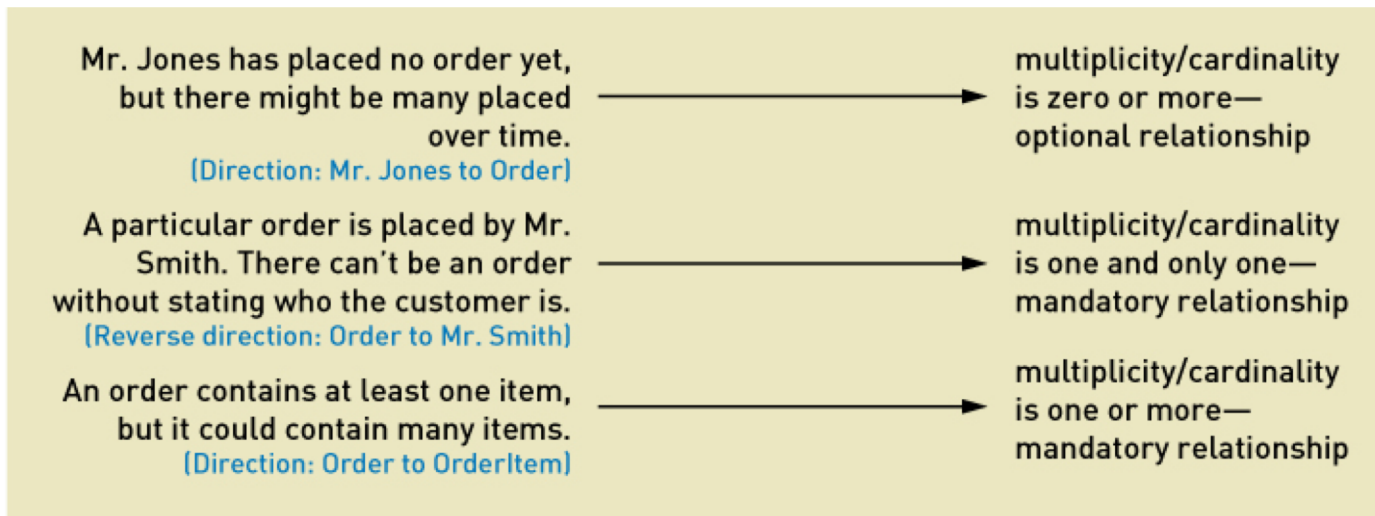- Associations apply in two directions
  - Read them separately each way
  - A customer places an order
  - An order is placed by a customer

Associations Among Things

- Multiplicity is term for the number of associations between classes: 1 to 1 or 1 to many (synonym to cardinality)
  - Minimum and maximum constraints
  - Similar to association: applied to both directions

Mr. Jones has placed no order yet, but there might be many placed over time. (Direction: Mr. Jones to Order)	multiplicity/cardinality is zero or more—optional relationship
A particular order is placed by Mr. Smith. There can't be an order without stating who the customer is. (Reverse direction: Order to Mr. Smith)	multiplicity/cardinality is one and only one—mandatory relationship
An order contains at least one item, but it could contain many items. (Direction: Order to OrderItem)	multiplicity/cardinality is one or more—mandatory relationship

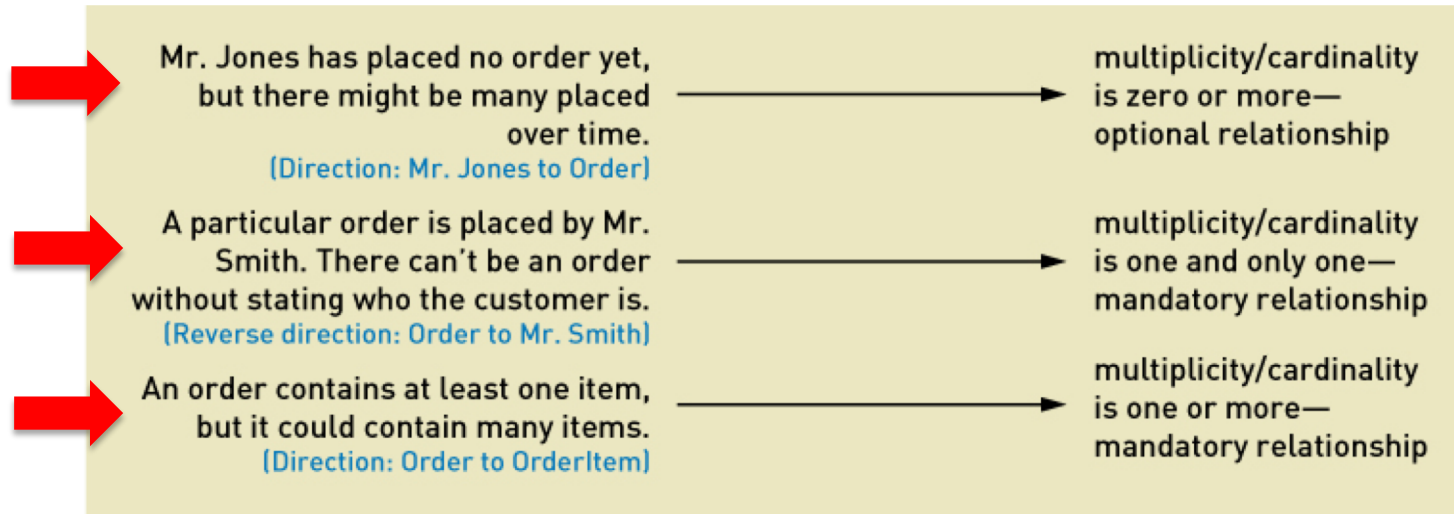# Associations Among Things

- Multiplicity is term for the number of associations between classes: 1 to 1 or 1 to many (synonym to cardinality)
    - Minimum and maximum constraints
    - Similar to association: applied to both directions

Mr. Jones has placed no order yet, but there might be many placed over time.
(Direction: Mr. Jones to Order) → multiplicity/cardinality is zero or more—optional relationship

A particular order is placed by Mr. Smith. There can't be an order without stating who the customer is.
(Reverse direction: Order to Mr. Smith) → multiplicity/cardinality is one and only one—mandatory relationship

An order contains at least one item, but it could contain many items.
(Direction: Order to OrderItem) → multiplicity/cardinality is one or more—mandatory relationship

Types of Associations

- Binary Association
  - Associations between exactly two different classes
    - Course Section includes Students
    - Members join Club

- Unary Association (recursive)
  - Associations between two instances of the same class
    - Person married to person
    - Part is made using parts

- Ternary Association (three)
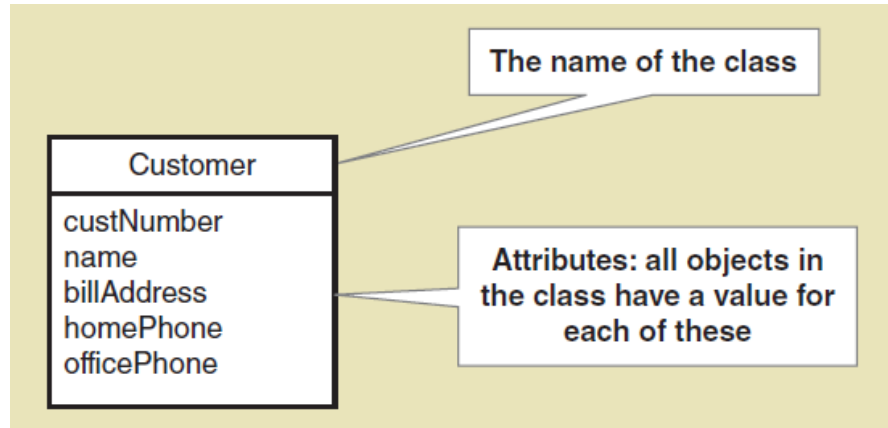
- N-ary Association (between n)

The Domain Model Class Diagram

- **Class**
  - A type of classification used to describe a collection of objects
- **Domain Class**
  - Classes that describe objects in the problem domain
- **Class Diagram**
  - A UML diagram that shows classes with attributes and associations (plus methods if it models software classes)
- **Domain Model Class Diagram**
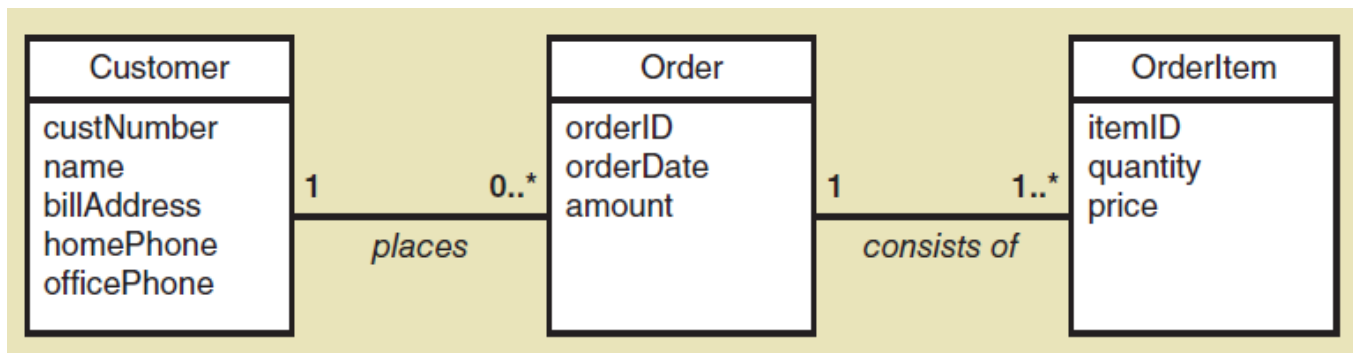 - A class diagram that only includes classes from the problem domain, not software classes so no methods

The Domain Model Class Diagram

- Domain class a name and attributes, but no methods
- Class name is always capitalized
- Attribute names are not capitalized and use **camelback notation** (words run together and second word is capitalized)
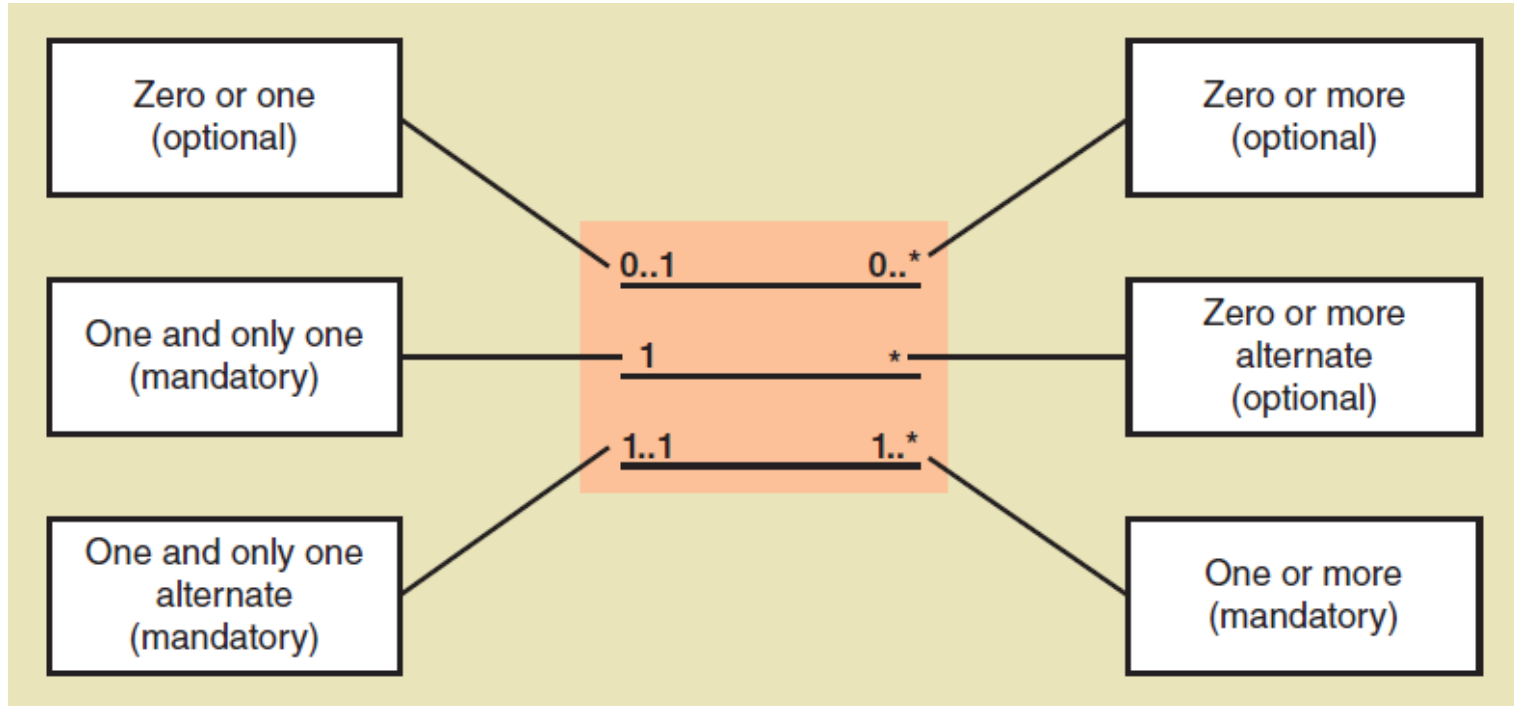- Compound class names also use camelback notation

A Simple Domain Model Class Diagram

- A customer places zero or more orders
- An order is placed by exactly one customer
- An order consists of one or more order items
- An order item is part of exactly one order

UML Notation for Multiplicity

DMCD Example

- Bank with many branches as show previously in ERD
  - Note notation for the key
  - Note the precise notation for the attributes (camelback)
  - Note the multiplicity notation