

Domain Modelling: Complex Issue

CSIT883 System Analysis and Project Management



UNIVERSITY
OF WOLLONGONG
AUSTRALIA

Outline



Association Class



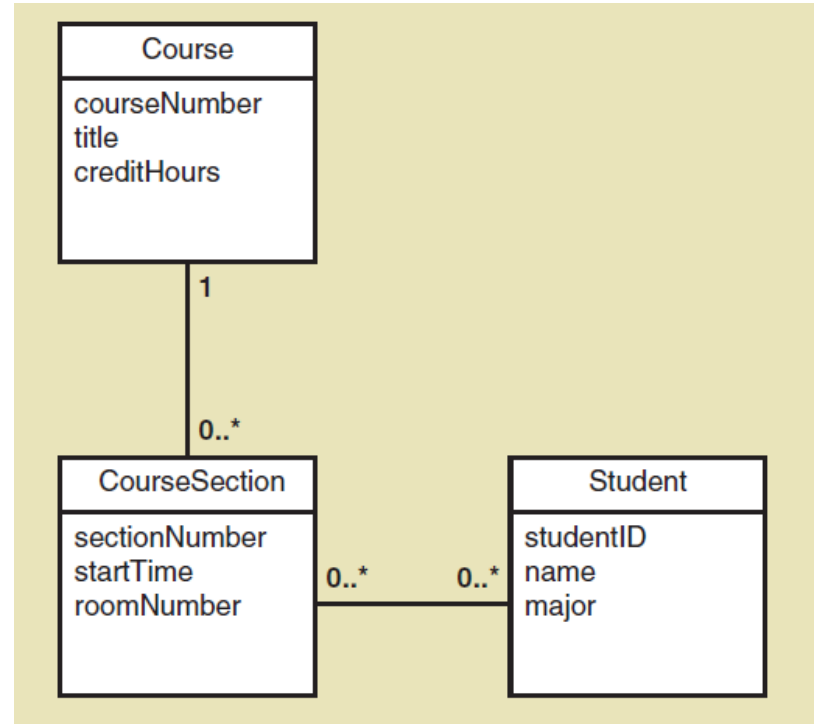
More UML Relationships



Domain Modelling for the RMO CSMS Case

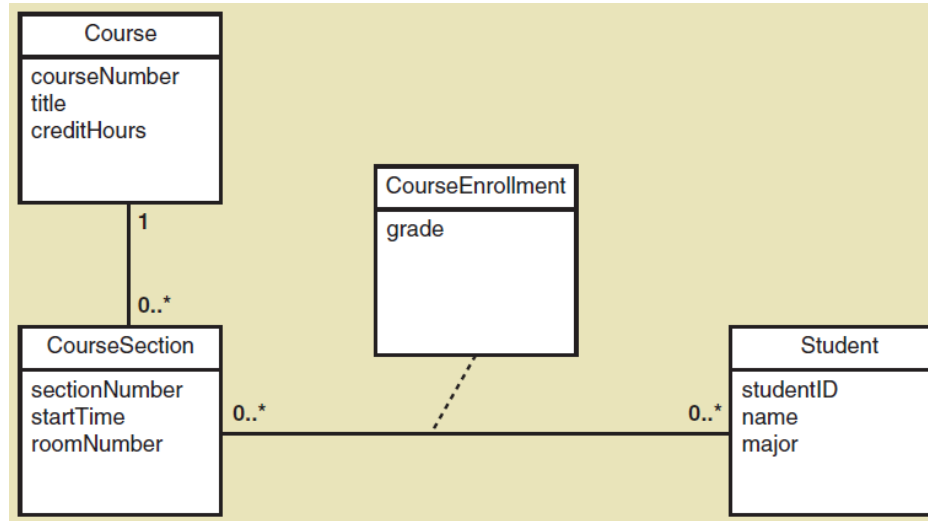
Domain Model Class Diagram

- Course Enrolment at a University
- A Course has many CourseSections
- A CourseSection has many Students and a Student is registered in many CourseSections
- **Question:**
 - *How/where to capture student grades?*



Domain Model Class Diagram

- **Association class**—an association that is treated as a class in a many to many association because it has attributes that need to be remembered (such as grade)
- Refined Course Enrolment Model with an Association Class CourseEnrollment



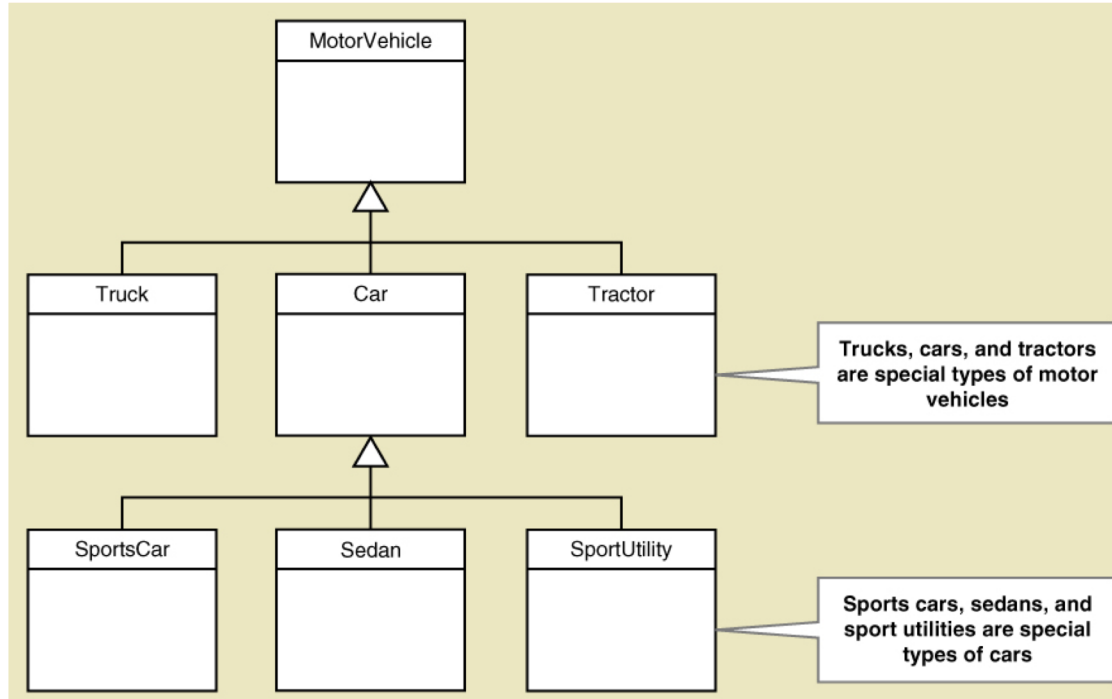
Association Class Properties

- The association class **is** the same “thing” as the association itself
- The unique identifier (key) for the association class is the concatenation of the keys of the attached classes
- In the previous example, suppose the key for CourseSection is CourseNumber+SectionNumber, then the key for CourseEnrolment is CourseNumber+SectionNumber+StudentID
 - Note: If more information is required to uniquely identify instances of the association class, then the model is incorrect, i.e., if the key cannot be formed by the concatenation of the endpoint keys, it is in error.

More about Classes:

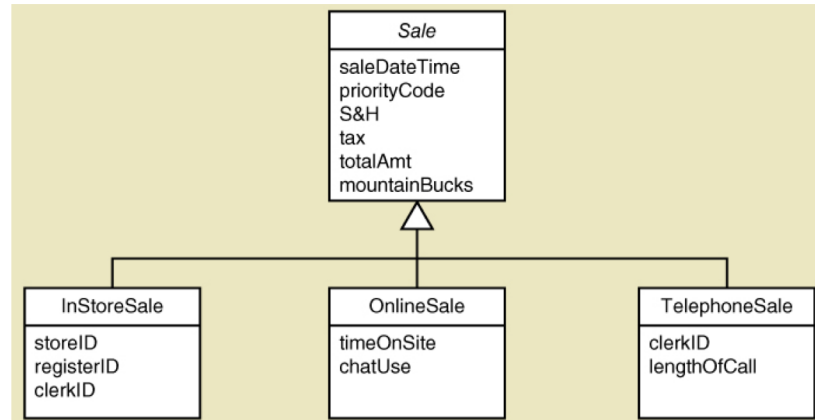
- Generalization/Specialization
 - A hierarchical relationship where subordinate classes are special types of the superior classes.
 - Often called an Inheritance Hierarchy
- Superclass
 - the superior or more general class in a generalization/specialization hierarchy
- Subclass
 - the subordinate or more specialized class in a generalization/specialization hierarchy
- Inheritance
 - the concept that subclasses classes inherit characteristics of the more general superclass

Generalization/Specialization



Generalization/Specialization

- Abstract class—a class that allow subclasses to inherit characteristics but never gets instantiated. Class names are in *italics*.
- Concrete class—a class that can have instances
- Inheritance—Attributes of OnlineSale are:
 - timeOnSite, chatUse, saleDateTime, priorityCode, S&H, tax, totalAmt...

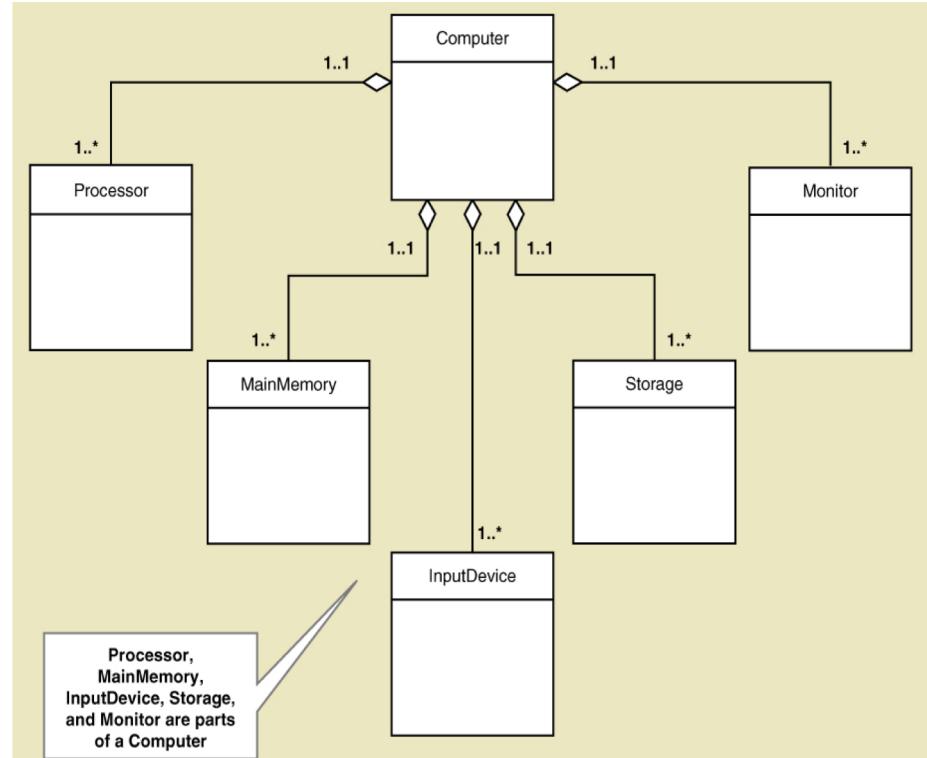


Whole-Part Relationship

- Whole-part relationship—a relationship between classes where one class is part of or a component portion of another class
- Aggregation—a whole part relationship where the component part exists separately and can be removed and replaced (UML diamond symbol on next slide)
 - Computer has disk storage devices (storage devices exist apart from computer)
 - Car has wheels (wheels can be removed and still be wheels)
- Composition—a whole part relationship where the parts cannot be removed (filled in diamond symbol)
 - OrderItem on an Order (without the Order, there are no OrderItems)
 - Chip has circuits (without a chip, there are no circuits)

Whole Part Relationships

- Computer and its Parts
- Note: this is composition, with diamond symbol.
- Whole-part relationships can have multiplicity symbols too

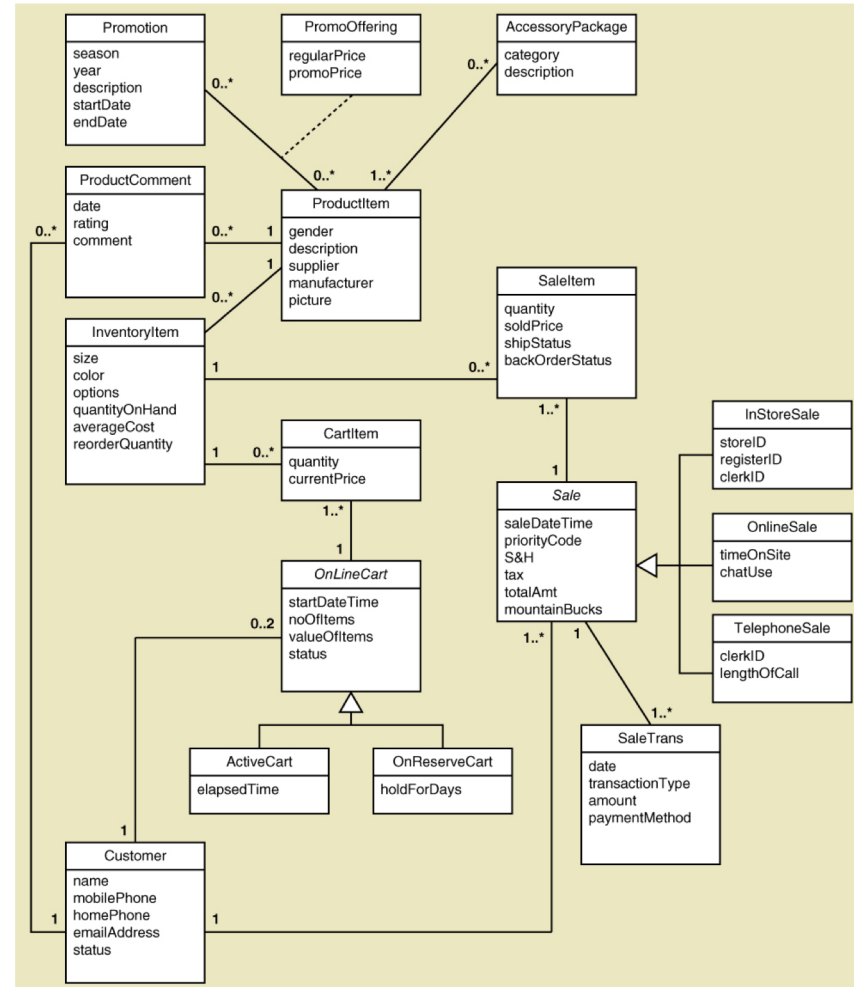


Domain Modelling for RMO CSMS

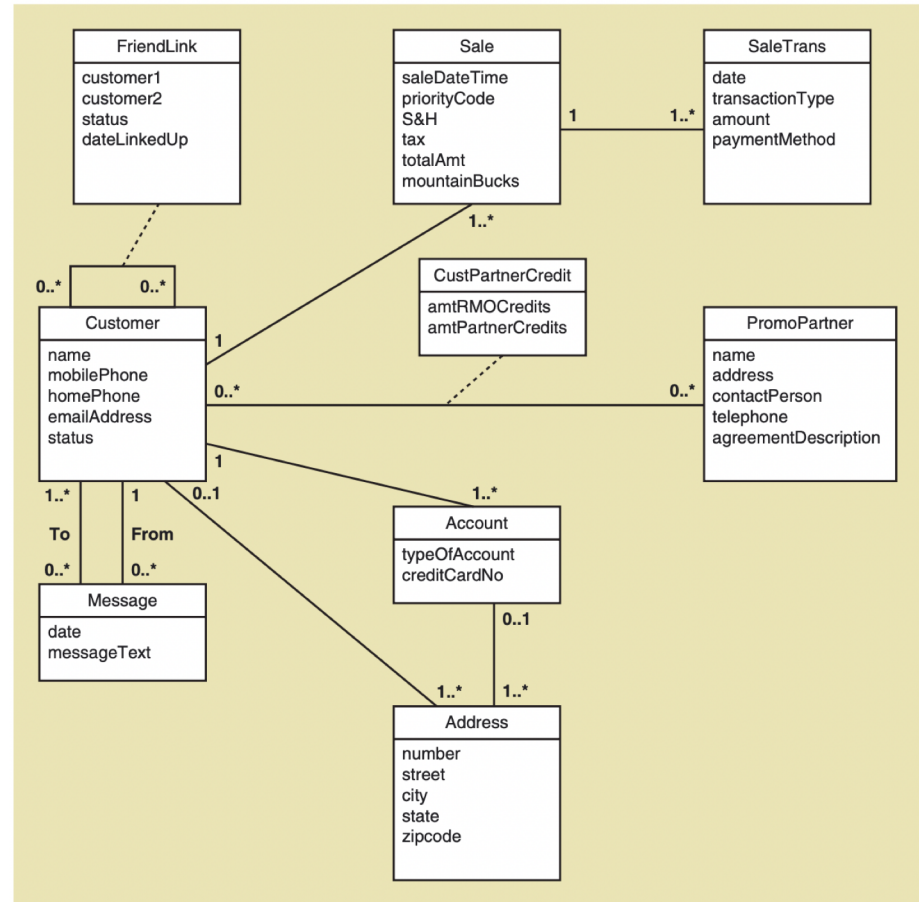
- There is usually one Domain Model Class Diagram for each system.
 - Providing an overview of the whole system
 - Including rich and detailed information about domain classes.
- The RMO CSMS domain model is complex
 - It includes 27 domains classes, most of which are identified in the initial list of nouns for the system.
- In practice, systems analyst can create one domain model for each subsystem at a time to reduce the complexity and eventually combine them into one system-wise domain model.

Identified noun	Notes on including noun as a thing to store
Accounting	We know who they are. No need to store it.
Back order	A special type of order? Or a value of order status? Research.
Back-order information	An output that can be produced from other information.
Bank	Only one of them. No need to store.
Catalog	Yes, need to recall them, for different seasons and years. Include.
Catalog activity reports	An output that can be produced from other information. Not stored.
Catalog details	Same as catalog? Or the same as product items in the catalog? Research.
Change request	An input resulting in remembering changes to an order.
Charge adjustment	An input resulting in a transaction.
Color	One piece of information about a product item.
Confirmation	An output produced from other information. Not stored.
Credit card information	Part of an order? Or part of customer information? Research.
Customer	Yes, a key thing with lots of details required. Include.
Customer account	Possibly required if an RMO payment plan is included. Research.
Fulfillment reports	An output produced from information about shipments. Not stored.
Inventory quantity	One piece of information about a product item. Research.
Management	We know who they are. No need to store.
Marketing	We know who they are. No need to store.
Merchandising	We know who they are. No need to store.

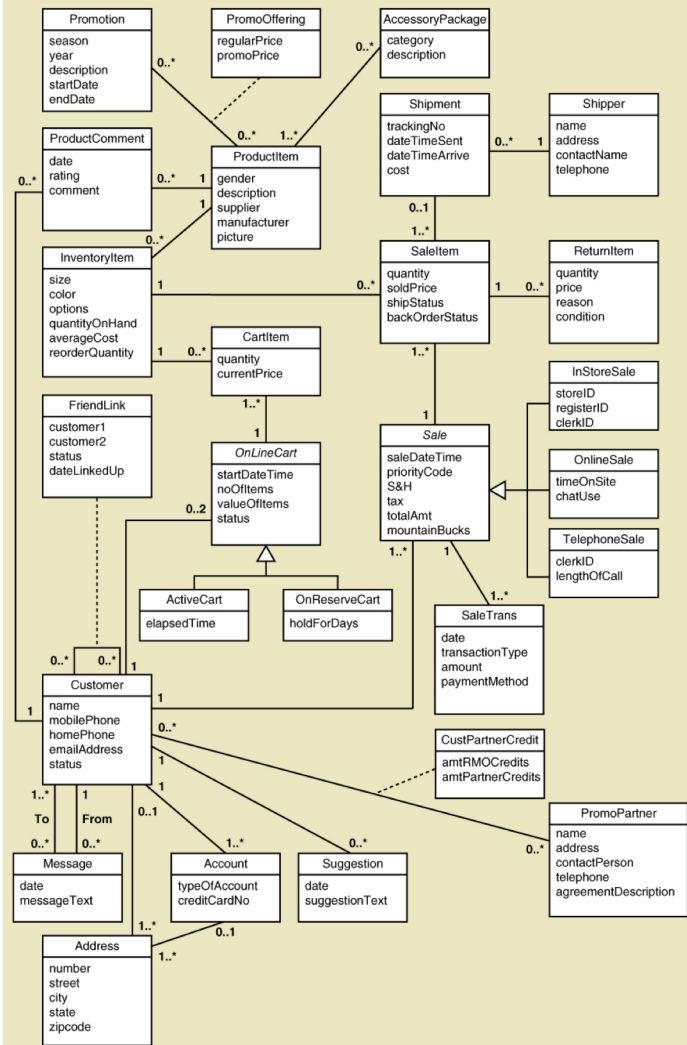
The Domain Model Class Diagram for CSMS Sales Subsystem



The Domain Model Class Diagram for CSMS Customer Account Subsystem



The Complete Domain Model Class Diagram for CSMS



Summary

- Association class – an association treated as a class; often required in order to capture attributes for the association
- Generalization/specialization relationships – a type of hierarchical relationship in which subordinate classes are subsets of objects of the superior classes; an inheritance hierarchy
- Whole-part relationship – relationships between classes in which one class is a part or a component portion of another class; aggregation and composition
- There is one domain model class diagram (DMCD) for each system, but development of the DMCD can be increment (e.g., a partial DMCD for each subsystem)