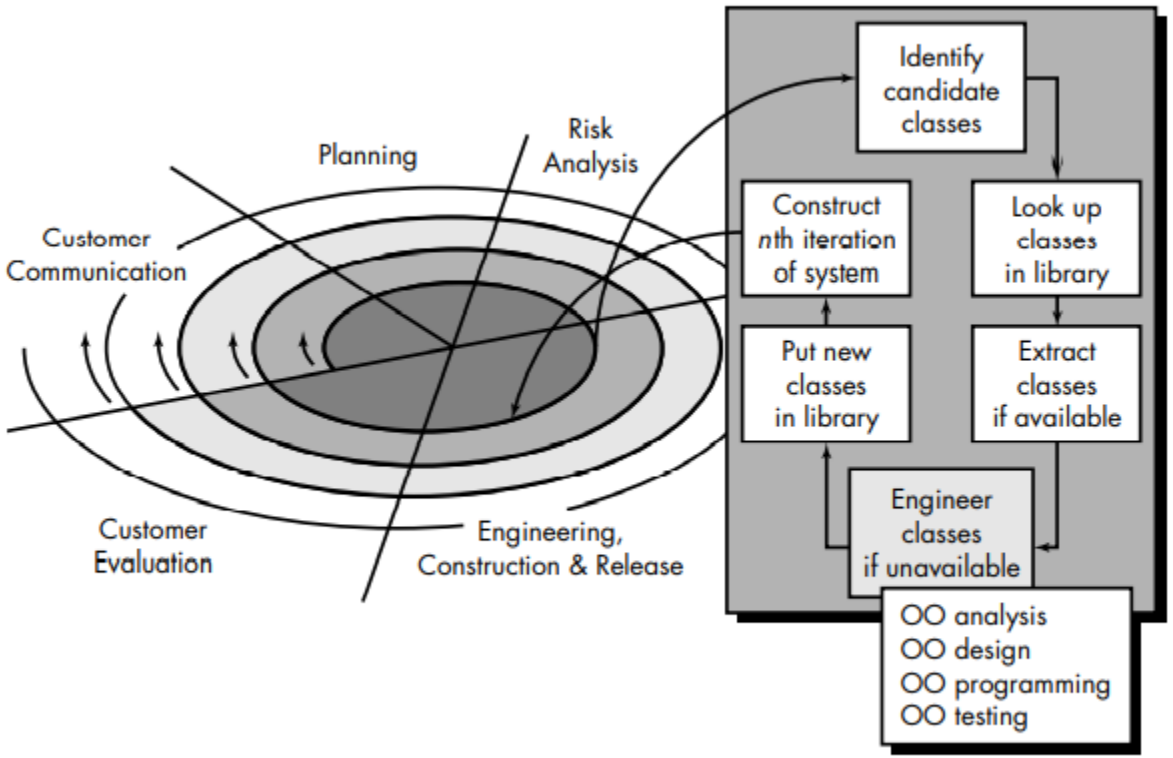
CHAPTER 8

OBJECT-ORIENTED CONCEPTS AND PRINCIPLES

The OO Process model

FIGURE 20.1
The OO process model



OO Process model

- The OO process moves through an **evolutionary spiral** that starts with customer communication.
- .Planning and risk analysis establish a foundation for the OO project plan
- The technical work associated with OO software engineering follows the **iterative path** shown in the shaded box.
- OO software engineering emphasizes reuse.

OO Process model

- Therefore, classes are “looked up” in a library (of existing OO classes) before they are built.
- When a class cannot be found in the library, the software engineer applies object-oriented analysis (OOA), object-oriented design (OOD), object-oriented programming (OOP), and object-oriented testing (OOT) to create the class and the objects derived from the class.
- The new class is then put into the library so that it may be reused in the future

Definition of Object and Class

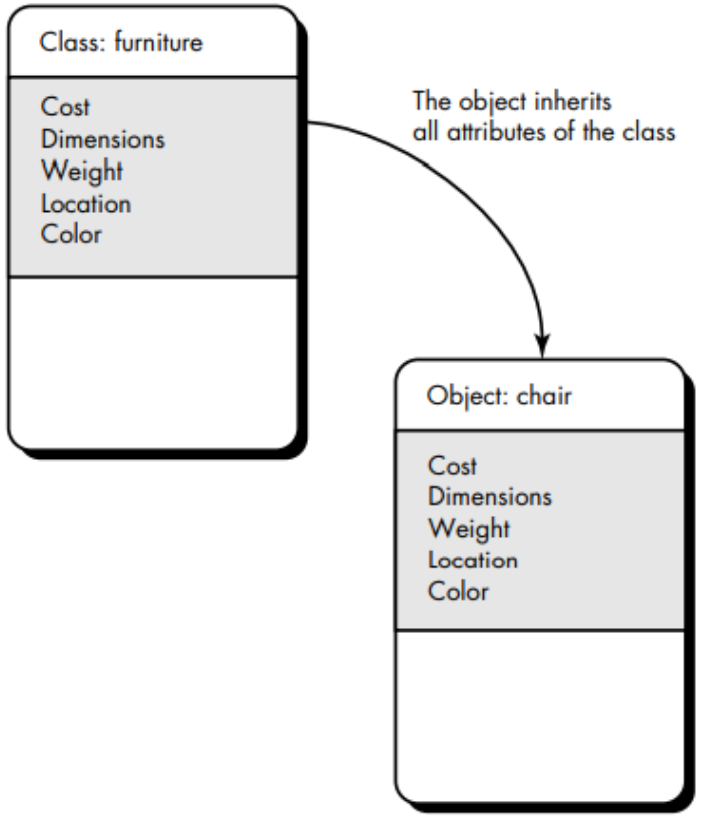
- **Class** : A class is a generalized description that describes a collection of a similar objects.
- **Object** : Instance of Class is called object

- One widely used approach to problem solving takes an **object-oriented viewpoint**

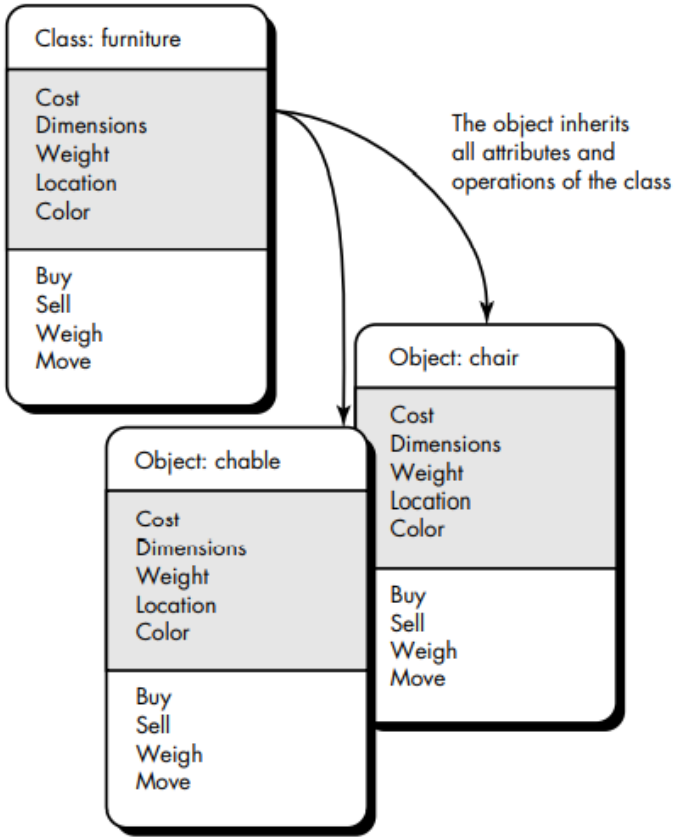
The Object Oriented Paradigm

- For many years, the term object oriented (OO) was used to denote a **software development approach** that used one of a number of object-oriented programming languages Java, C++,
- Today, the OO paradigm encompasses a complete view of software engineering.

Inheritance

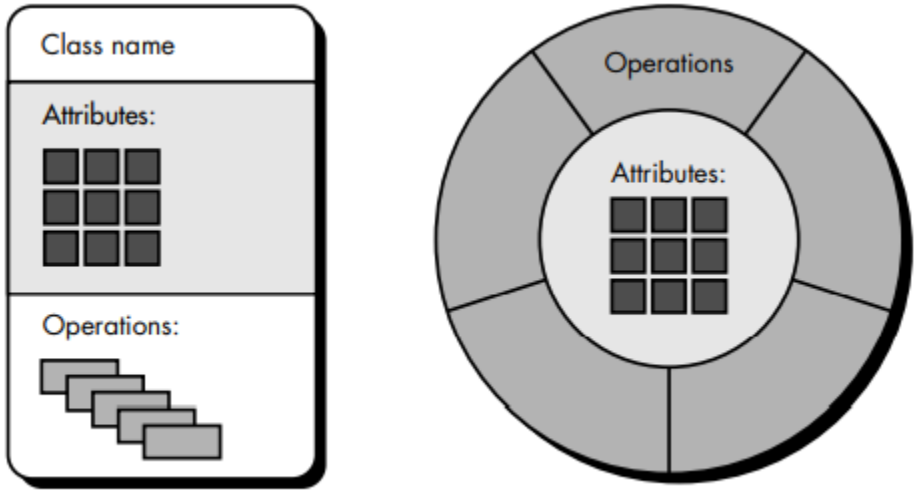


Inheritance

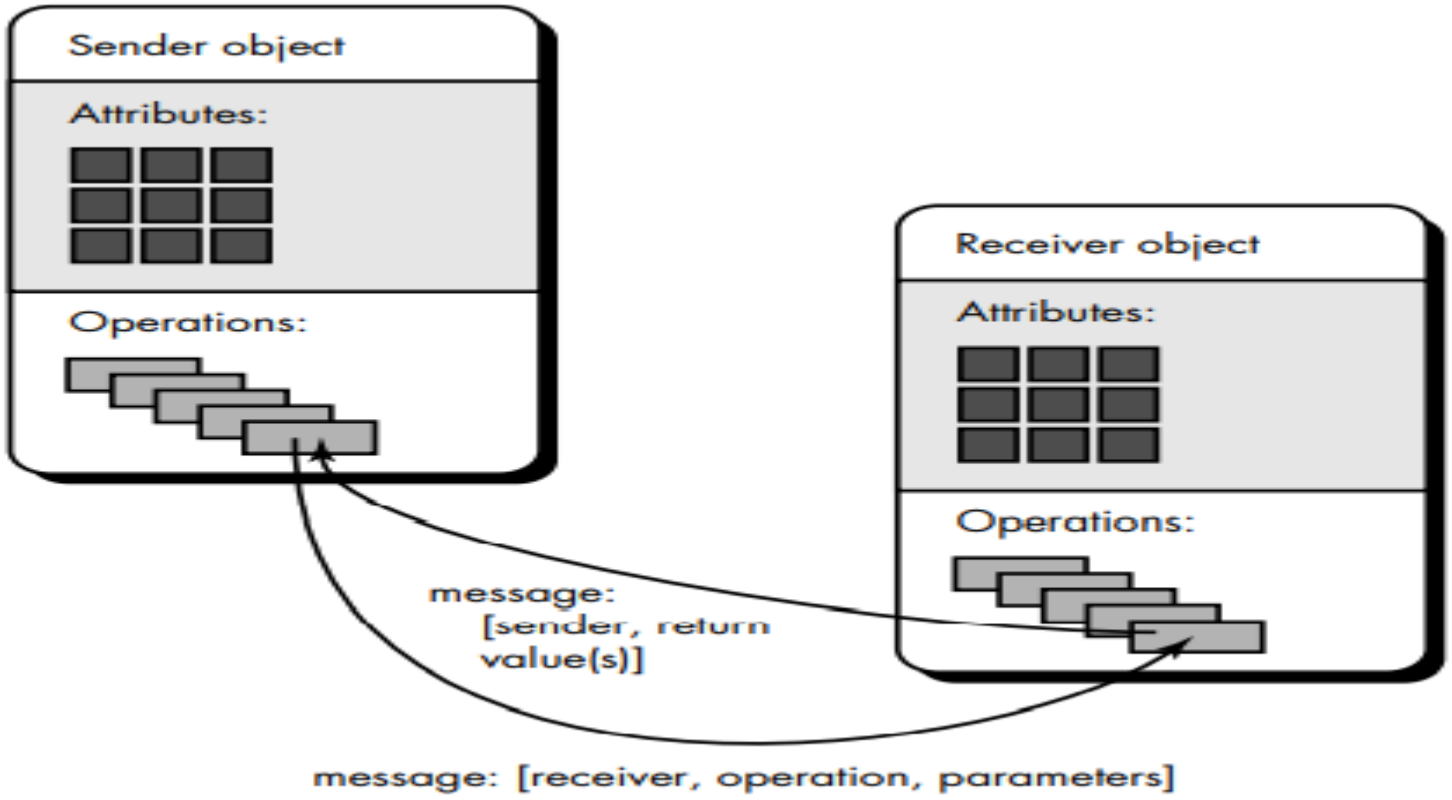


Class and Object

An Alternative way to represent class and object



Message Passing Between Class



IDENTIFYING THE ELEMENTS OF AN OBJECT MODEL

1. **Identifying Classes and Objects**

Objects can be:-

- **External Entities**
- **Things**
- **Occurrences or events**
- **Roles**
- **Organizational units**
- **Places**
- **Structure**

IDENTIFYING THE ELEMENTS OF AN OBJECT MODE

2. Specifying Attributes

- Attributes are chosen by examining the problem statement, looking for things that fully define an object and make it unique.

IDENTIFYING THE ELEMENTS OF AN OBJECT MODE

3. **Defining the operation**

Although many different types of operations exist, they can generally be divided into three broad categories:

(1) operations that manipulate data in some way (e.g., adding, deleting, reformatting, selecting),

(2) operations that perform a computation,

(3) operations that monitor an object for the occurrence of a controlling event

IDENTIFYING THE ELEMENTS OF AN OBJECT MODE

3. Finalizing the Object Definition

The definition of operations is the last step in completing the specification of an object

OO Project Metrics and Estimation

- Conventional software project estimation -- (LOC) and function points (FP)

OOP Project Metrics is based on:

1. **Number of scenario scripts** (initiator, action and participator)
2. **Number of key classes**
3. **Number of support classes**
4. **Average number of support classes per key class**
5. **Number of subsystems.**