Introduction to C++ (Season 1)

Unit 4: Objects and Classes

第4单元：物以类聚－对象和类

Section 7 : Data Field Encapsulation

第7节： 数据域封装

Data Field Encapsulation (数据域封装)

```
class Circle {
public:
  double radius;
  //......
};
// main
  circle1.radius=5;
```

client program

This is bad!

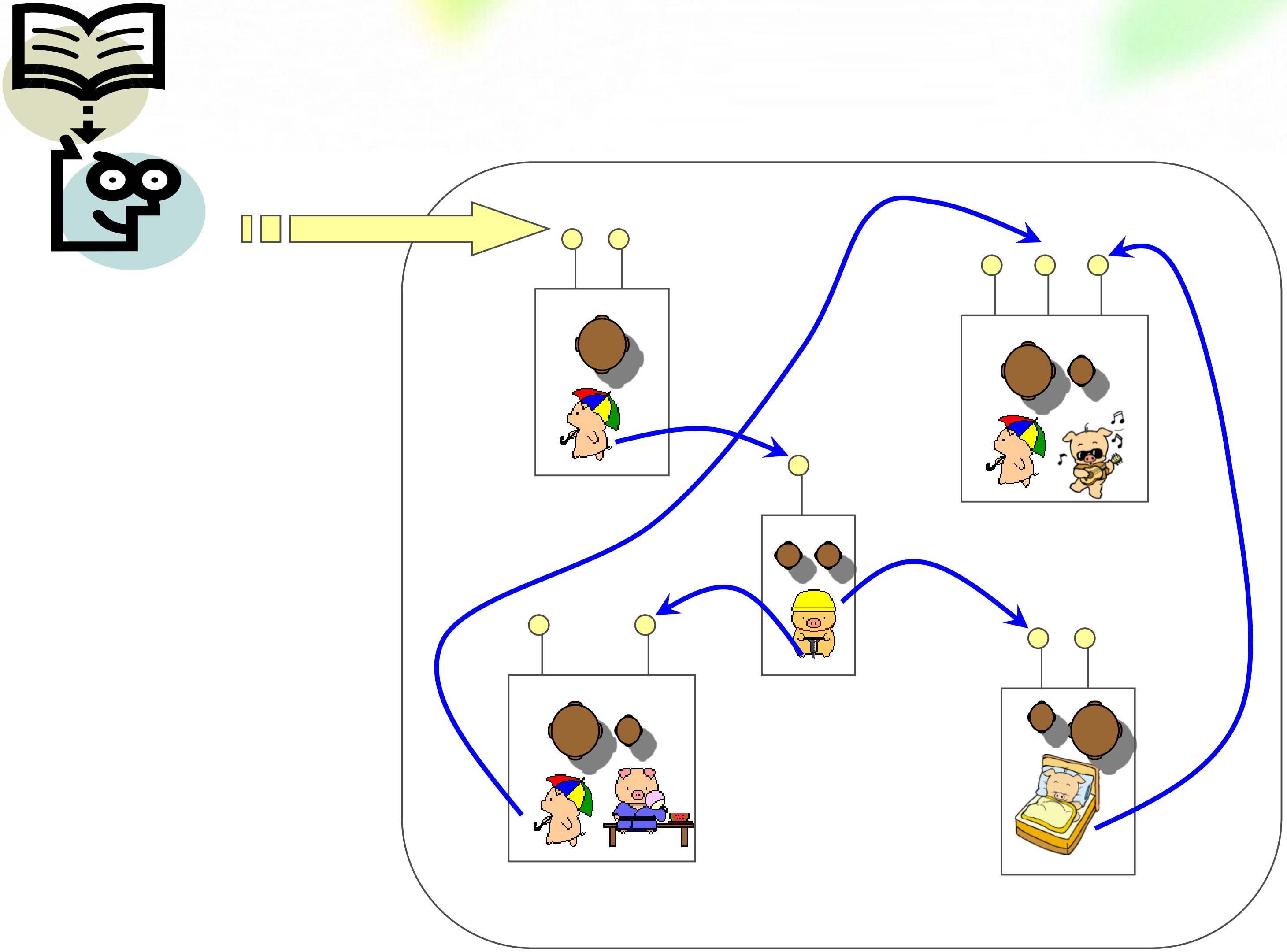
- 数据域采用public的形式有2个问题
  - First, data may be tampered. (数据会被类外的方法篡改)
  - Second, it makes the class difficult to maintain and vulnerable to bugs. (使得类难于维护，易出现bug)

如果想要将radius修改为非负值，怎么办?

1. 改getArea()，判断radius是否非负
2. client也要改，避免 circle1.radius = -5 这种代码

```
class Circle {
private:
  double radius;
public:
  Circle();
  //......
};
```

OOP: Data encapsulation



Accessor and Mutator (访问器与更改器)

- To read/write private data, we need get/set function (为读写私有数据，需要get/set函数)
  - get function is referred to as a ***getter*** (获取器， or *accessor*),
  - set function is referred to as a ***setter*** (设置器， or *mutator*).

- Signature of get function (General form) (get函数的一般原型)
  - **returnType**   get*PropertyName*()

- Signature of get function (Bool type) (布尔型get函数的原型)
  - **bool**   is*PropertyName*()

- Signature of set function (set函数的原型)
  - **void**   set*PropertyName(dataType propertyValue)*

📢 Note 📢

getter/setter should be placed within "***public***" scope

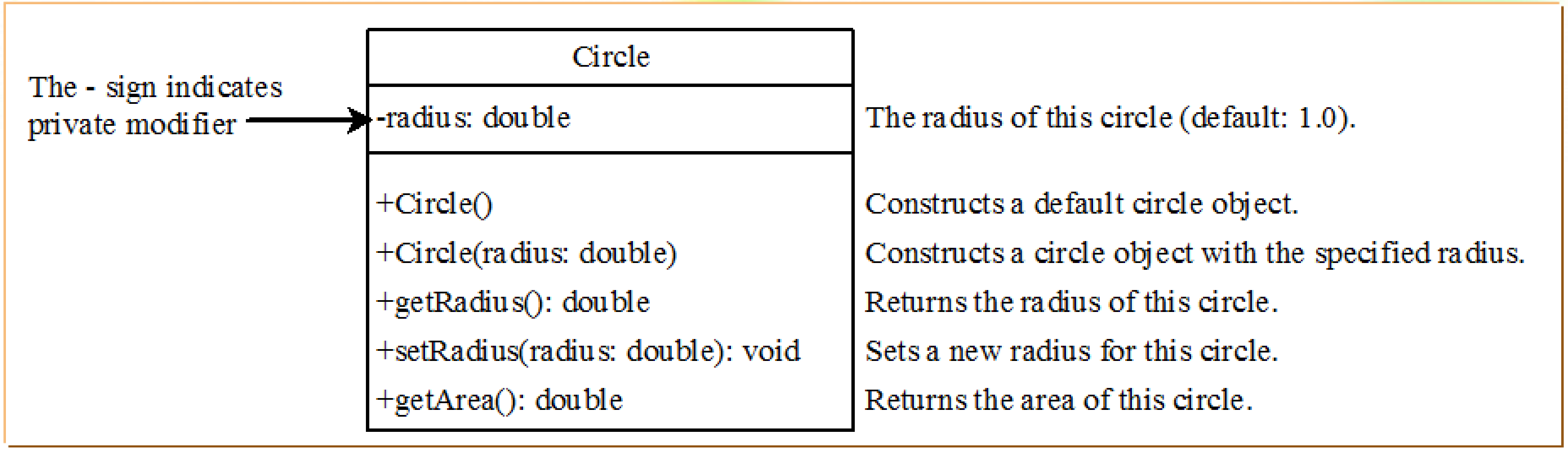
26. 布尔变量/函数的命名应使用前缀 “is”

There are a few alternatives to the *is* prefix that fit better in some situations. These are the ***has***, ***can*** and ***should*** prefixes:

"is"前缀有时会有更好的替换，包括has, can和should

例如： bool hasLicense(); bool canEvaluate(); bool shouldSort();

Example: New Circle Class



The - sign indicates private modifier

Circle	
-radius: double	The radius of this circle (default: 1.0).
+Circle()	Constructs a default circle object.
+Circle(radius: double)	Constructs a circle object with the specified radius.
+getRadius(): double	Returns the radius of this circle.
+setRadius(radius: double): void	Sets a new radius for this circle.
+getArea(): double	Returns the area of this circle.

→TestCircle2