



北京交通大学

# 面向对象分析与设计

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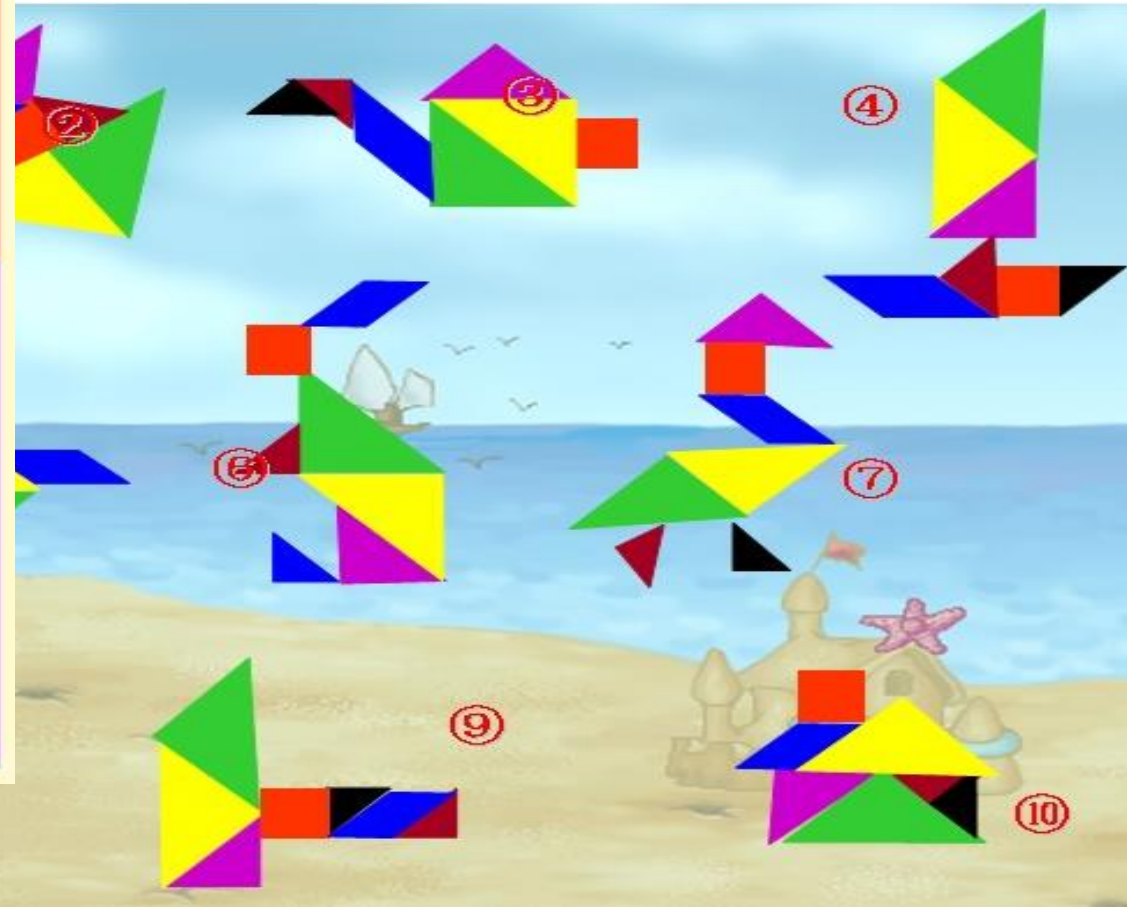
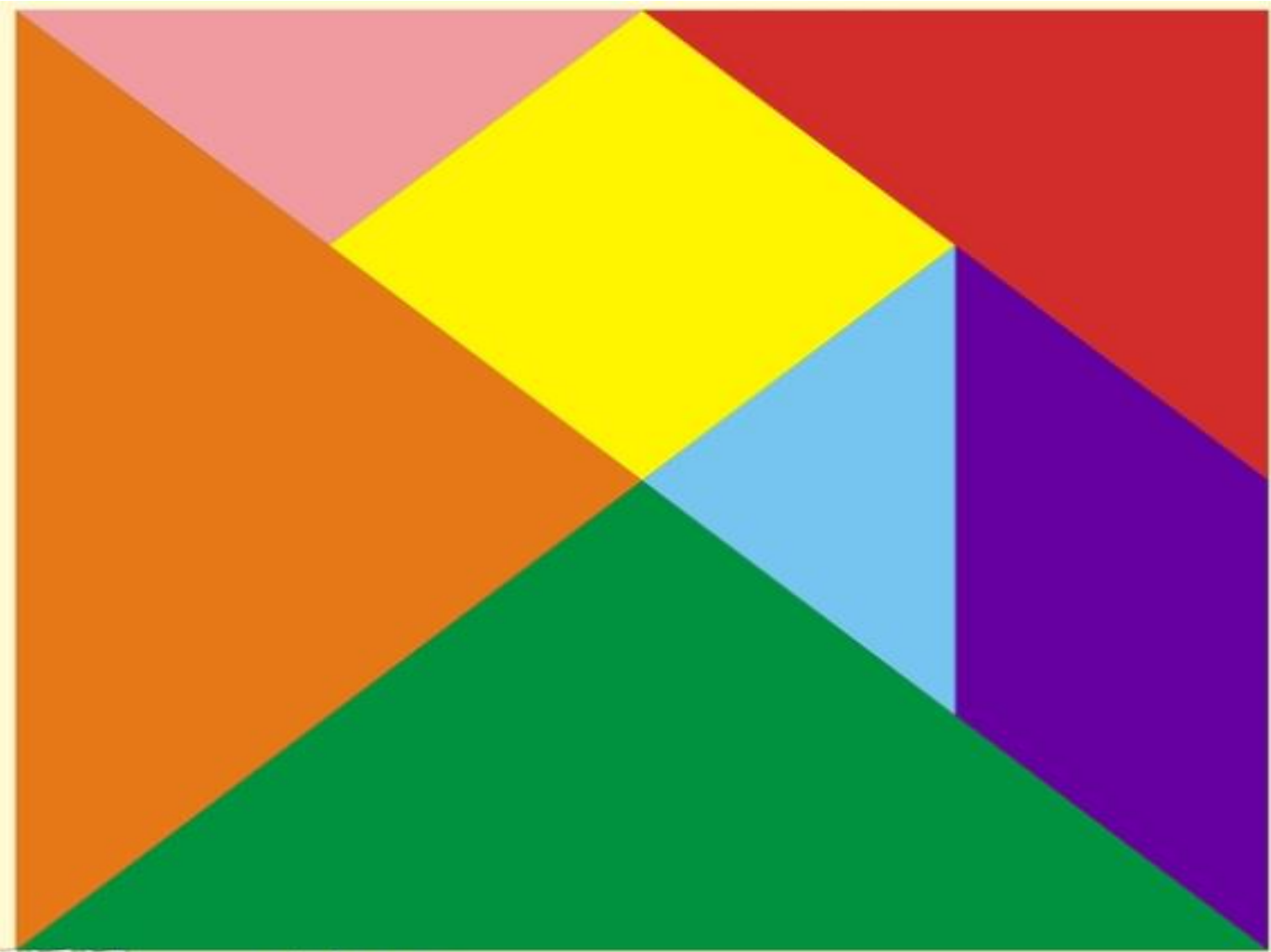


# 目标

1. 理解面向对象分析设计阶段的主要目标与任务
2. 初步掌握面向对象分析与设计的基本过程

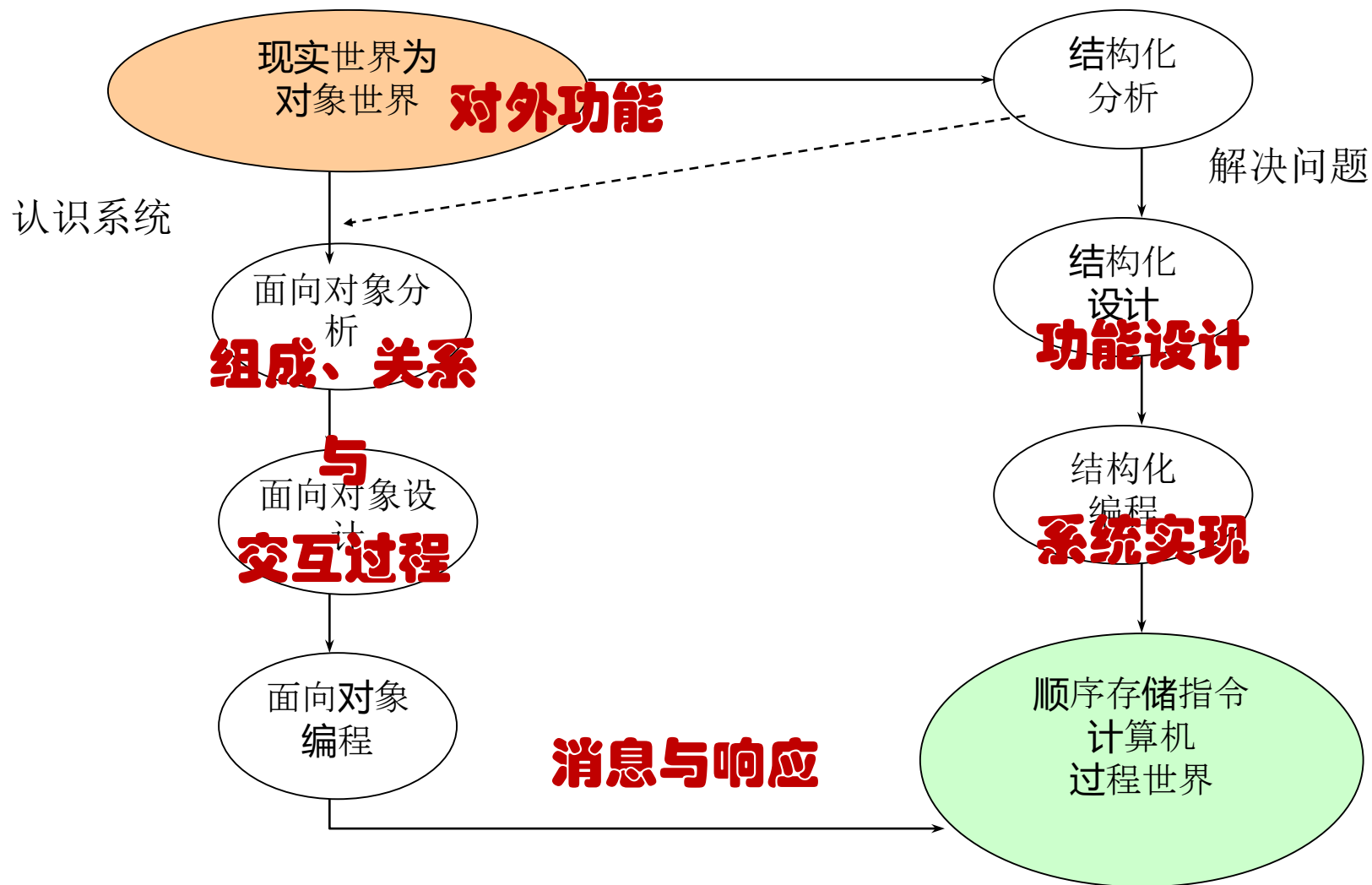


# 分析-设计的任务逻辑？一致的积木块





# 面向对象与结构化方法





## OOAD的简易步骤

- **需求分析**：捕获用户需求，以用例图的方式来表达用户的**功能**需求，辅以用例说明；
- **系统分析与设计**：系统的类分析和功能分析，以类图、顺序图、状态图等描述系统的**结构**和**功能**模型；
- 面向对象分析和设计基于相同的模型，一般认为**没有严格**的阶段性和很明显的界限。



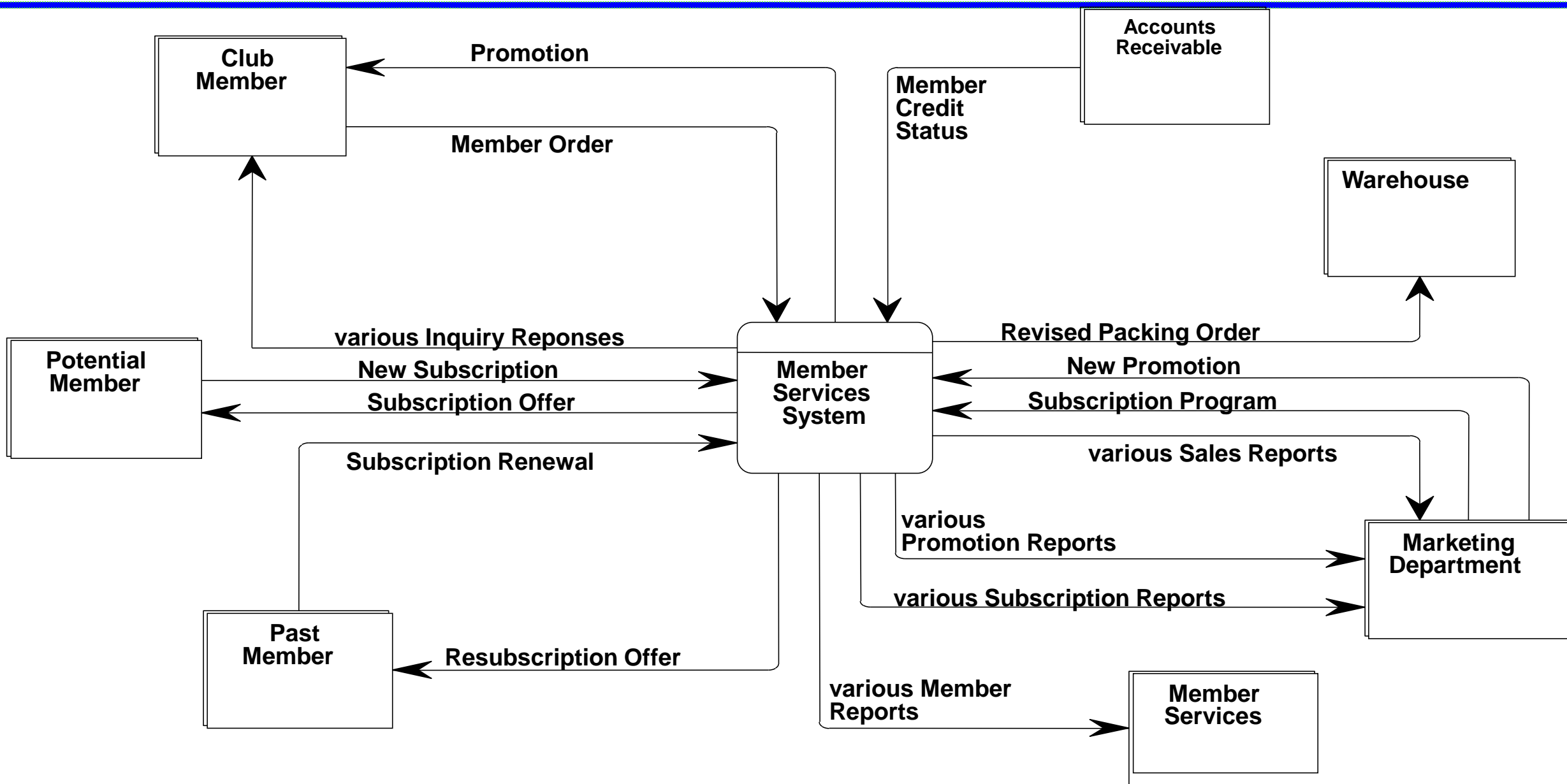
# 玻姆的螺旋开发模型

玻姆(Boehm,1988)提出了一个结合了宏观和微观视角(macro & microview)的螺旋开发模型。

- 宏观上包括3个阶段：
  - 1 分析---发现和识别对象；
  - 2 设计---发明和设计对象；
  - 3 实施---创建和实现对象。
- 每个宏观阶段都包含一些微观迭代活动。



# 会员系统的顶层模型





# 识别参与者、事件和响应要求

ACTOR		USE CASE
Club Member	<i>initiates</i>	Submit Promotion Order Submit Regular Order
Potential Member	<i>initiates</i>	Submit New Subscription
Past Member	<i>initiates</i>	Submit Subscription Renewal
Member Services Department	<i>initiates</i>	Request Membership Rpts.
Marketing Department	<i>initiates</i>	Create New Monthly Promotion Create New Seasonal Promotion Create New Subscription Program Request Promotion Rpts. Request Sales Rpts.
Member Services System	<i>initiates</i>	Send New Subscription Offer Send Club Promotion Send Subscription Renewal Offer





# 描述事件对应的用例过程

## USE CASE

Author: L. Bentley

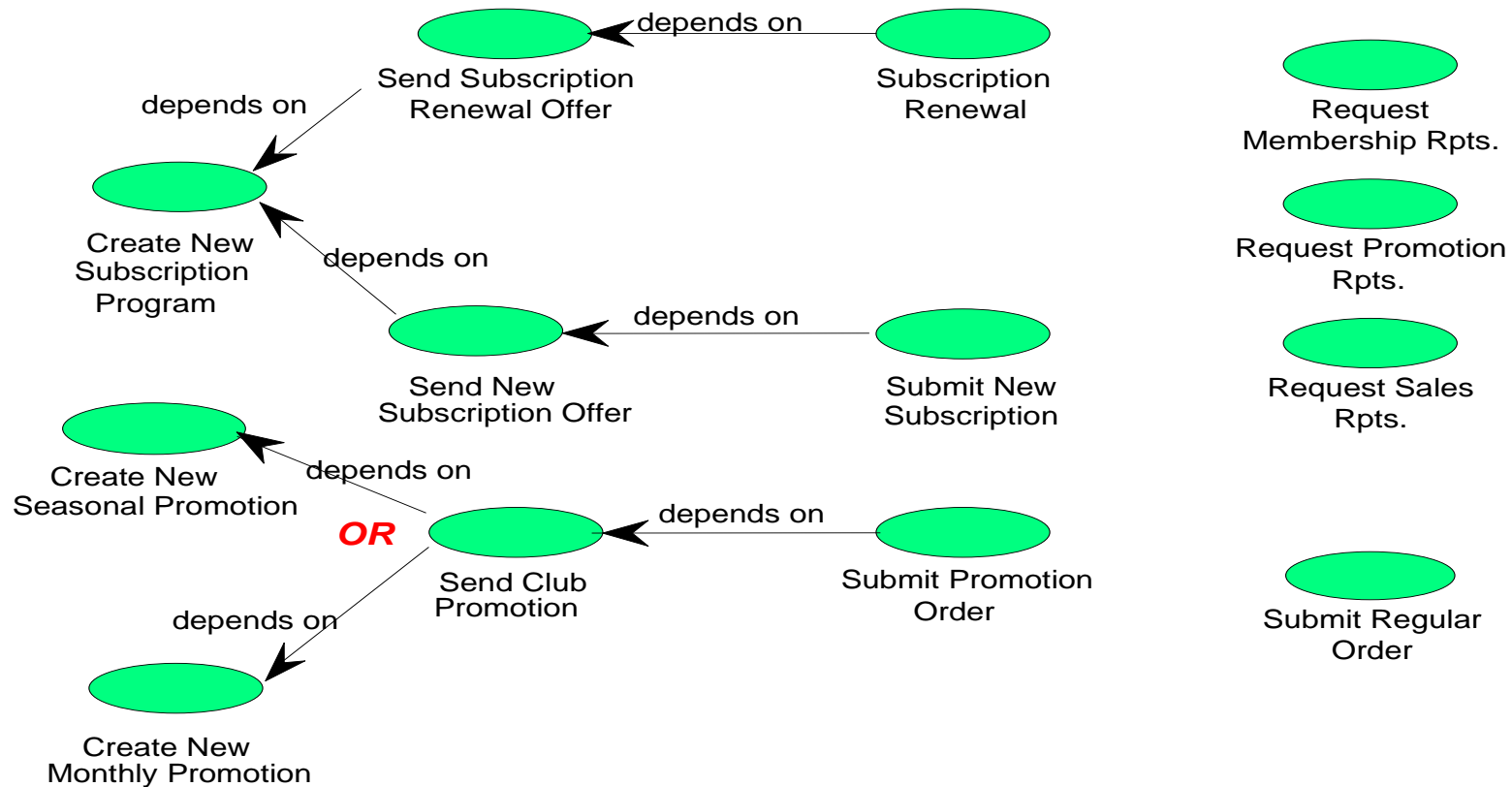
Date: 10/01/96

USE CASE NAME:	Submit Promotion Order
ACTOR:	Club Member
DESCRIPTION:	Describes the process when a club member submits a club promotion order to either indicate the products they are interested in ordering or declining to order during this promotion.
NORMAL COURSE:	<ol style="list-style-type: none"><li>1. This use case is initiated when the club member submits the promotion order to be processed.</li><li>2. The club member's personal information such as address is validated against what is currently recorded in member services.</li><li>3. The promotion order is verified to see if product is being ordered.</li><li>4. The club member's credit status is checked with Accounts Receivable to make sure no payments are outstanding.</li><li>5. For each product being ordered, validate the product number.</li><li>6. For each product being ordered, check the availability in inventory and record the ordered product information which include "quantify being ordered" and give each ordered product a status of "open".</li><li>7. Create a Picking Ticket for the promotion order containing all ordered products which have a status "open".</li><li>8. Route the Picking Ticket to the Warehouse.</li></ol>
PRE-CONDITION:	Use case <i>Send Club Motion</i> has been processed.
POST-CONDITION:	Promotion order has been recorded and the Picking Ticket has been routed to the Warehouse.
ASSUMPTIONS:	



# 分析用例之间的相互关系

## Member Services System Use Case Dependency Diagram





# 基于用例识别类

USE CASE NAME:	Submit <b>Promotion Order</b>
ACTOR:	<b>Club Member</b>
DESCRIPTION:	Describes the process when a club member submits a promotion order to either indicate the <b>products</b> they are interested in ordering or declining to order during this <b>promotion</b> .
NORMAL COURSE:	1. This use case is initiated when the <b>club member</b> submits the <b>promotion order</b> to be processed.
	2. The club member's <b>personal information</b> such as <b>address</b> is validated against what is currently recorded in <b>member services</b> .
	3. The <b>promotion order</b> is verified to see if <b>product</b> is being ordered.
	4. The club member's <b>credit status</b> is checked with <b>Accounts Receivable</b> to make sure no <b>payments</b> are outstanding.
	5. For each product being ordered, validate the <b>product number</b> .
	6. For each product being ordered, check the <b>availability</b> in <b>inventory</b> and record the <b>ordered product information</b> which include “ <b>quantify being ordered</b> ”, and give each <b>ordered product a status</b> of “open”.
	7. Create a <b>Picking Ticket</b> for the promotion order containing all ordered products which have a status “open”.
	8. Route the Picking Ticket to the <b>Warehouse</b> .
ALTERNATE	2. If the club member has indicated an address or <b>telephone number</b> change on



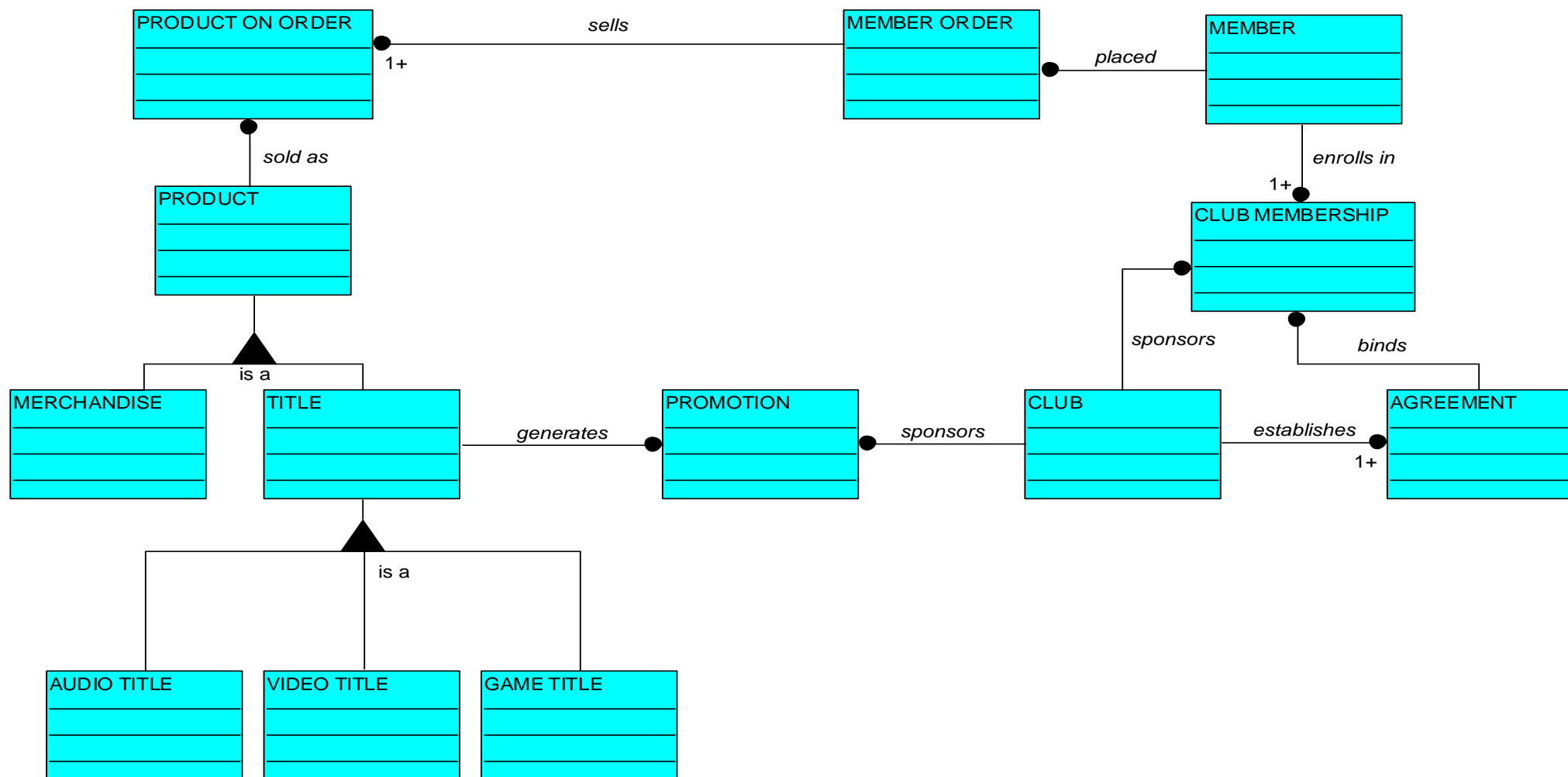
# 类的判别

POTENTIAL OBJECT LIST		REASON
Club Member	✓	Type of “MEMBER”
Potential Member	✓	Type of “MEMBER”
Past Member	✓	Type of “MEMBER”
Member Services Department	⌘	Not relevant for current project
Marketing Department	⌘	Not relevant for current project
Member Services System	⌘	Not relevant for current project
Member Address	⌘	Attribute of “MEMBER”
Promotion order	✓	Result of an event named “PROMOTION”
	✓	Type of “MEMBER ORDER”
Product	✓	“PRODUCT”
Product Inventory	⌘	Attribute of “PRODUCT”
Order Quantity	⌘	Attribute of “MEMBER ORDER”
Ordered Product	✓	“PRODUCT ON ORDER”
Credit Status	⌘	Attribute of “MEMBER”
Payment	⌘	Out of Scope
Ordered Product Status	⌘	Attribute of “PRODUCT ON ORDER”
Picking Ticket	⌘	Potential interface item
Warehouse	⌘	Not relevant for current project
Member Telephone Number	⌘	Attribute of “MEMBER”



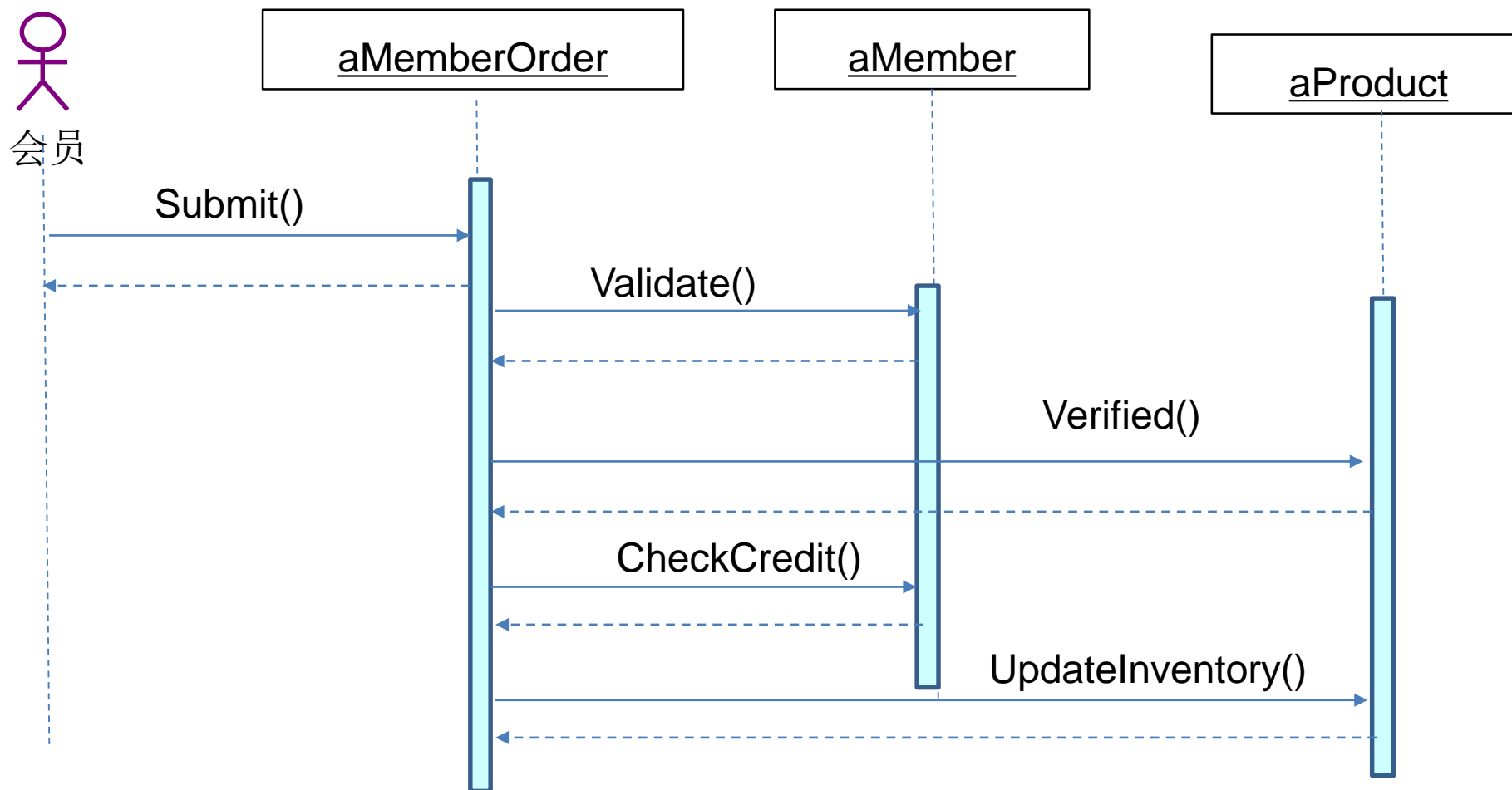
# 识别对象间关系，建立类图

## MEMBER SERVICES INFORMATION SYSTEM HIGH LEVEL OBJECT MODEL



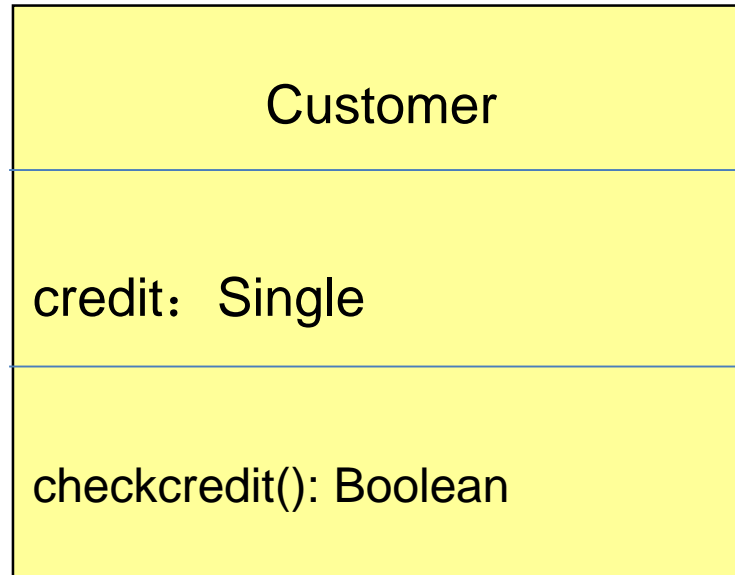


# 基于类图和用例图的序列图绘制





# 丰富设计类图：属性和方法









## 练习、思考题

- 基于面向对象方法，对‘选课系统’进行建模。
- 基于面向对象方法，对‘进销存’进行建模。
- 分小组进行，讨论小组内的分工及后续的集成方法。