



西安电子科技大学
XIDIAN UNIVERSITY



计算机科学与技术学院
SCHOOL OF COMPUTER SCIENCE AND TECHNOLOGY
国家示范性软件学院
NATIONAL PILOT SCHOOL OF SOFTWARE ENGINEERING

软件体系结构

—课程总结

软件体系结构课程组



1

知识点串讲

2

体系结构设计案例讲解

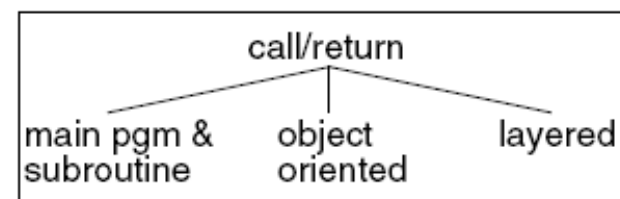
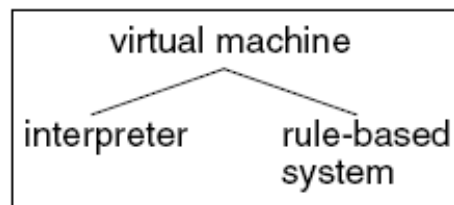
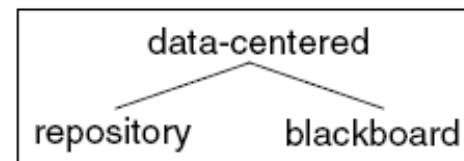
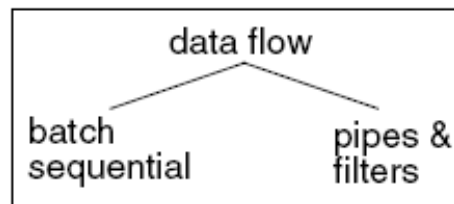
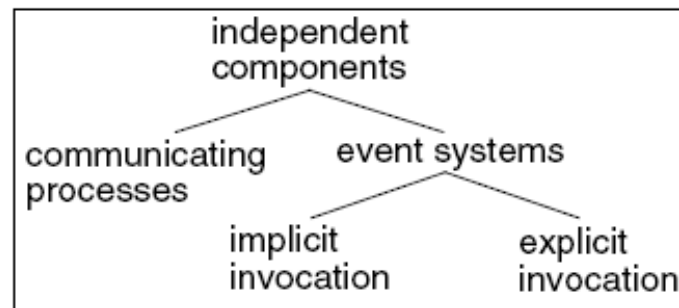
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架构师思维

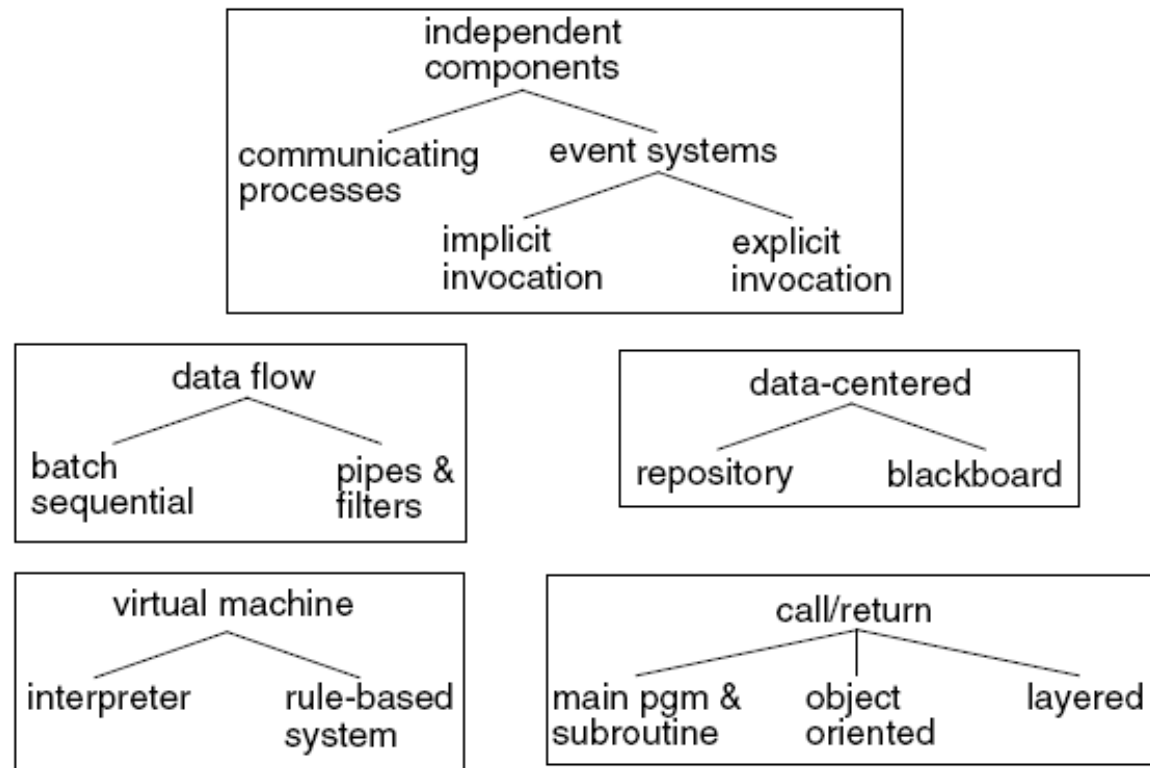


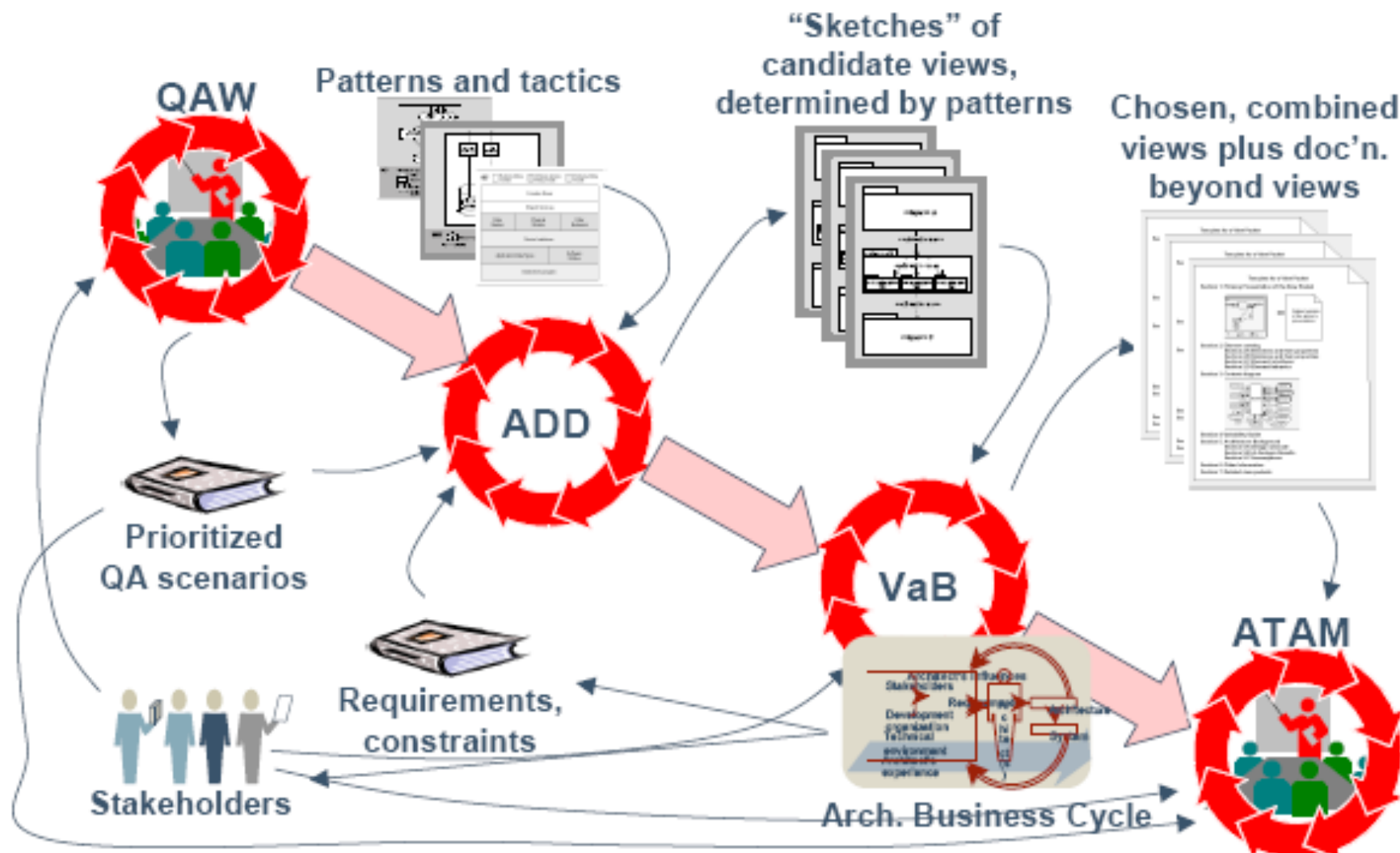
- 软件体系结构定义
 - 不存在一个统一的定义
 - 各个流派对软件体系结构的定义
 - 重点关注
 - Garlan and Shaw的定义：
体系结构 = 组件 + 连接件 + 约束
Software Architecture =
Components + Connectors + Constrains

- 软件体系结构风格定义
- 软件体系结构风格的描述
- 常见的软件体系结构风格
 - 数据流
 - 顺序的批处理
 - 管道过滤器
 - 控制环路
 - 调用/返回
 - 主程序/子程序
 - 面向对象
 - 层次结构
 - 客户端/服务器



- 以数据为中心（数据共享）
 - 数据存储（编译器的演化）
 - 黑板
- 虚拟机
 - 解释器
 - 基于规则的系统
 - 其它
- 独立组件
 - 通信进程
 - 事件（隐式调用）
 - 其它
- 其它风格
 - C2
 - HMB
 - DSSA







- 软件质量属性定义
- 软件质量属性与功能、非功能性需求的关系
- 软件质量属性情景
 - 定义
 - 如何描述
- 常见的质量属性
 - 可用性 (Availability)
 - 可修改性 (Modifiability)
 - 性能 (Performance)
 - 安全性 (Security)
 - 可测试性 (Testability)
 - 易用性 (Usability)
- 其它质量属性



- 架构模式的应用
- 常见质量属性的设计
 - 可用性 (Availability)
 - 可修改性 (Modifiability)
 - 性能 (Performance)
 - 安全性 (Security)
 - 可测试性 (Testability)
 - 易用性 (Usability)



- 常见的体系结构评估方法
 - 重点掌握ATAM
 - ATAM的过程
- 质量属性评估效用树（Utility Tree）
- 风险/非风险、敏感点和权衡点的理解与应用



- A company wants to develop a software system used in its intranet (局域网). The function of this systems is same as Weibo and Twitter. Each department (部门) can publish information about the department using this system, and Employees in the company can follow (关注) one or more departments to receive information published by these departments. When one department publishes a piece of new information, the system will send the information to all the followers (关注者) of this department. After one employee unfollows one department, he/she will not receive information published by this department in future
- Following are some detailed requirements of this system.



- One employee can follow one or more departments, and can unfollow one department at any time.
- The total unavailable time of the systems should be less than 10 hours in a year. The average recovery time of each system fault should be less than one hour.
- The system copies the interface (界面) of Weibo, so it's easy to use.
- Every minor update of this system should be accomplished by 2 developer within 1 days.
- A hardware firewall is used to separate the system from the Internet.
- One employee can send private messages to another employee using this system.
- The loading time from an employee's login to displaying his/her homepage should be less than 0.1s.
- The system provides special interfaces to do automated (自动的) testing.



- Please analyze the requirements and complete following 4 questions:
 - a) Identify and name the related quality attributes according to the requirements.
 - b) For each quality attribute, give the corresponding quality attribute scenario.
 - c) For each quality attribute, list at least 2 solutions for archiving the corresponding quality attribute.
 - d) According to the requirements, which software architecture style is better for this system? Describe the reason and list the advantages and disadvantages of architecture style you choose for the system.

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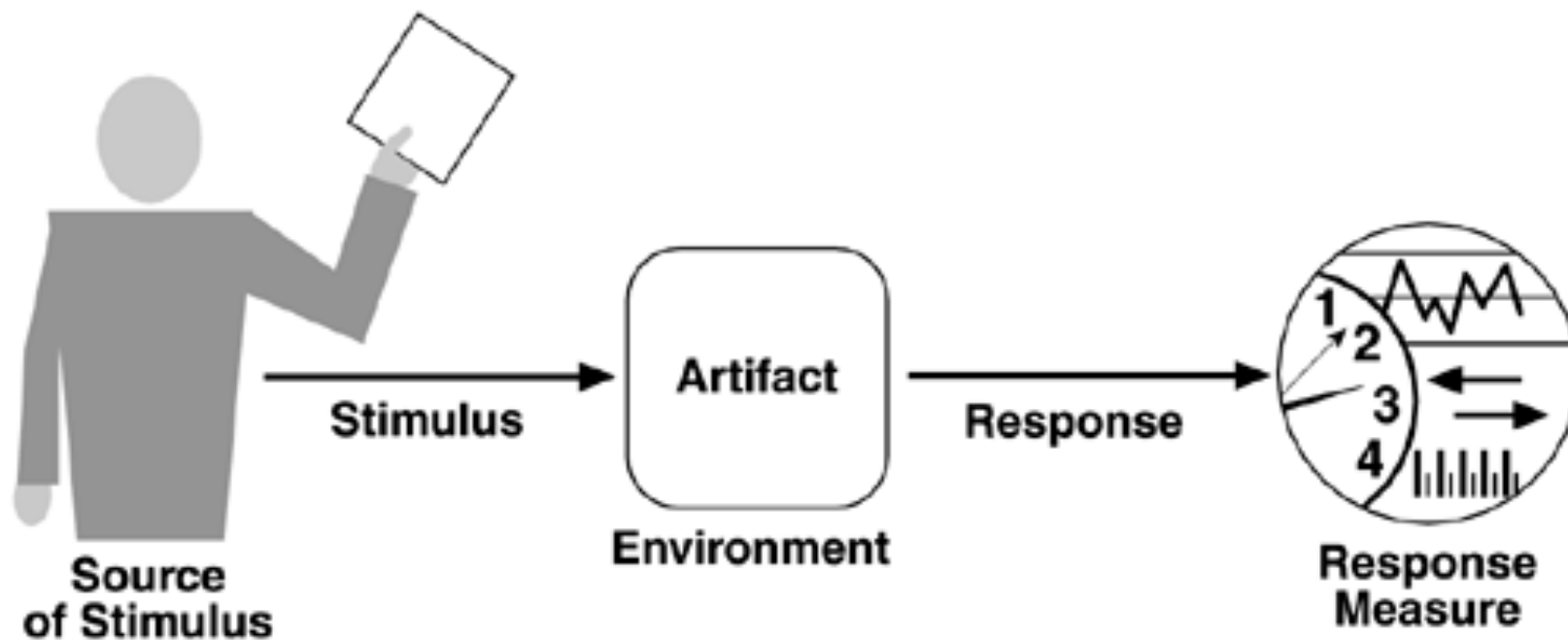


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- Every minor update of this system should be accomplished by 2 developer within 1 days. （可修改性）
- A hardware firewall is used to separate the system from the Internet. （安全性）
- The loading time from an employee's login to displaying his/her homepage should be less than 0.1s. （性能）
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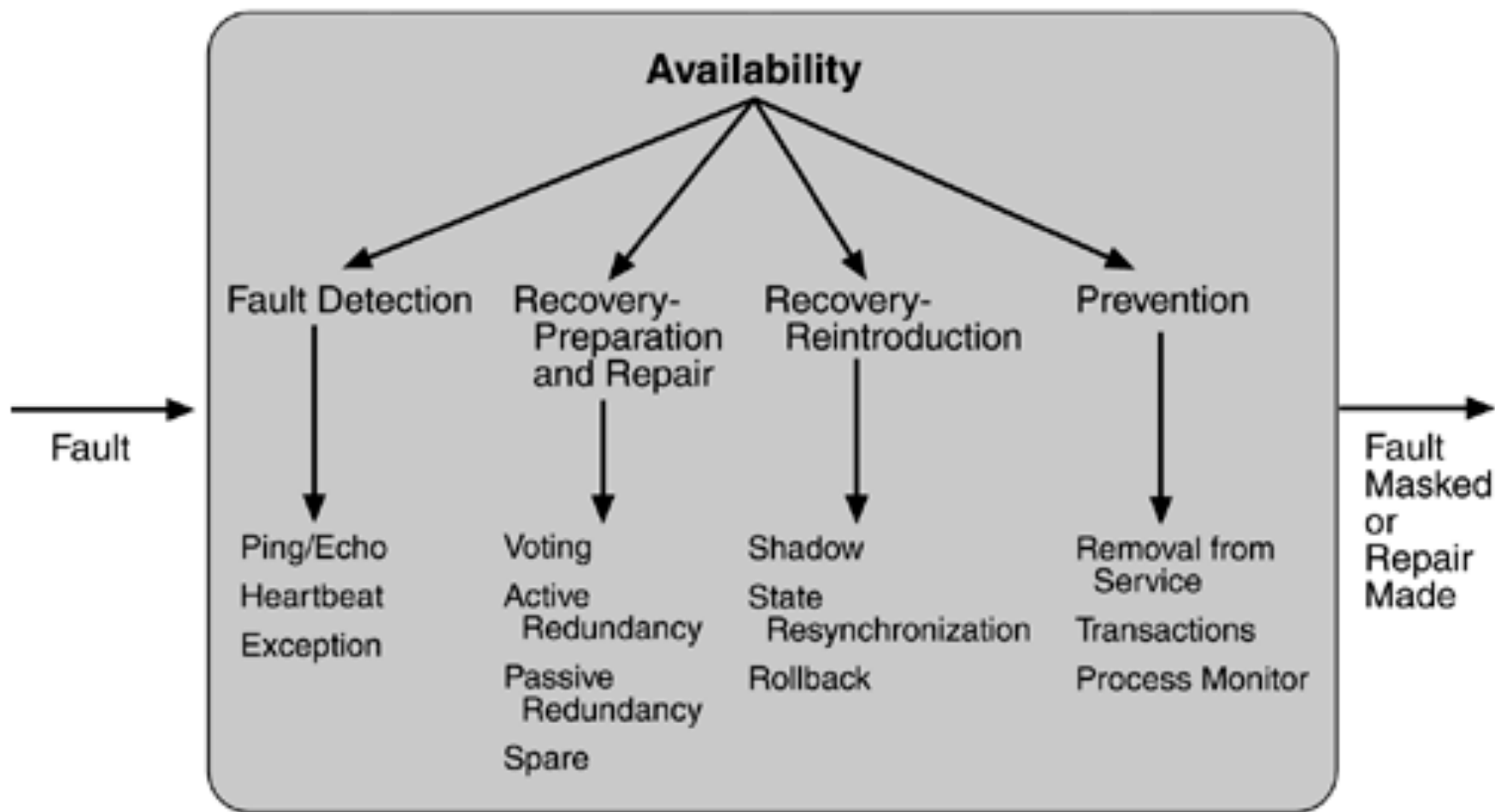
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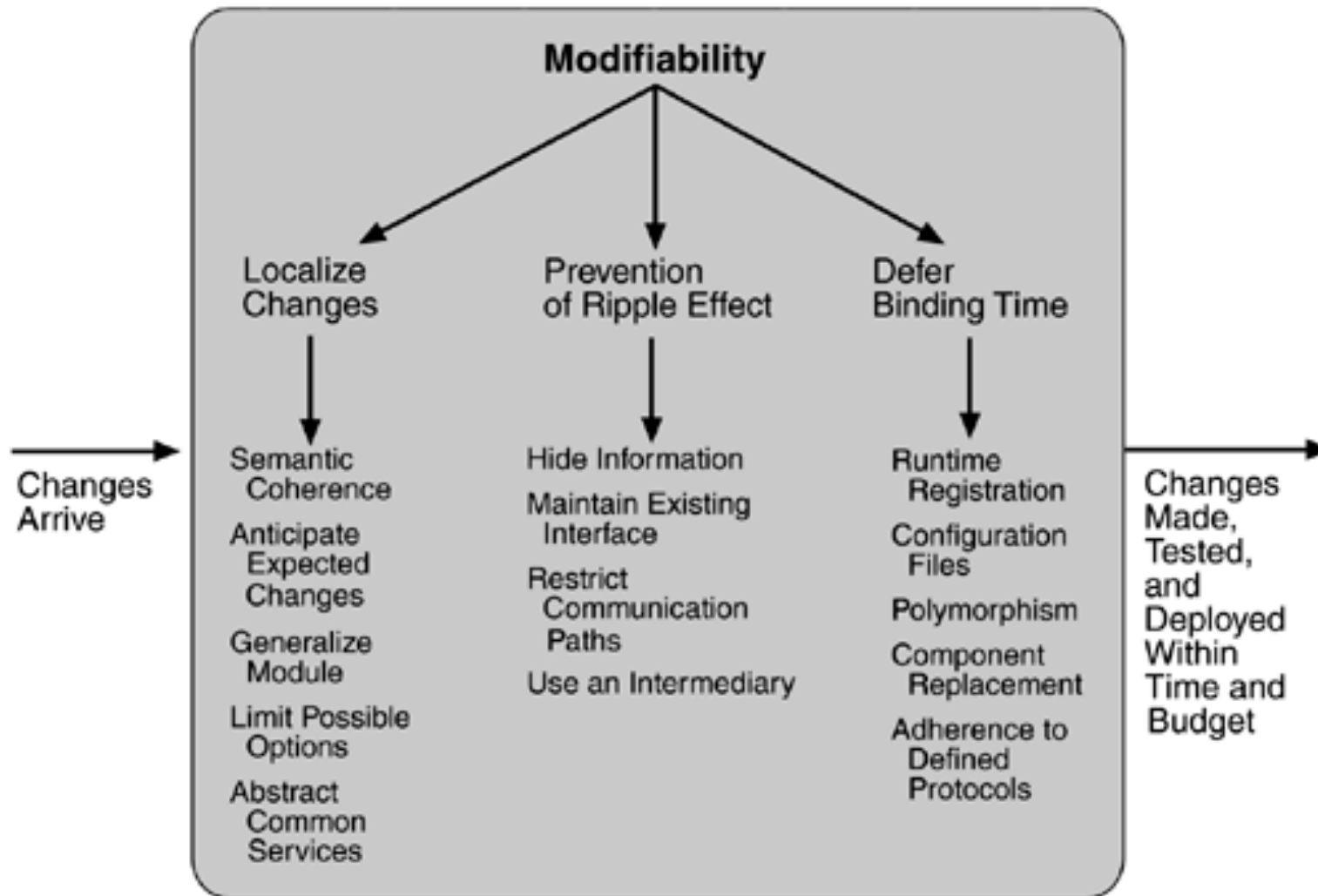
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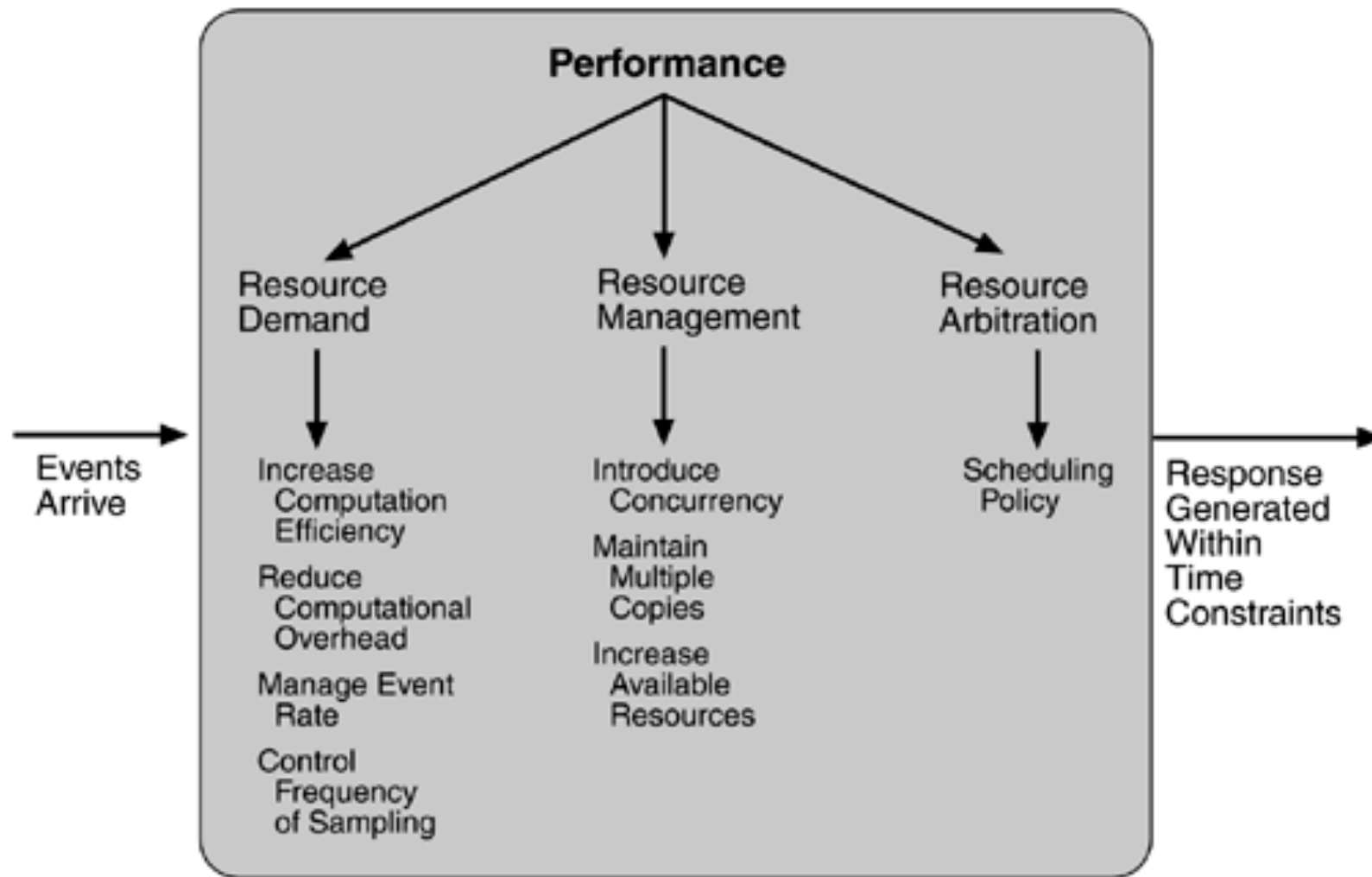


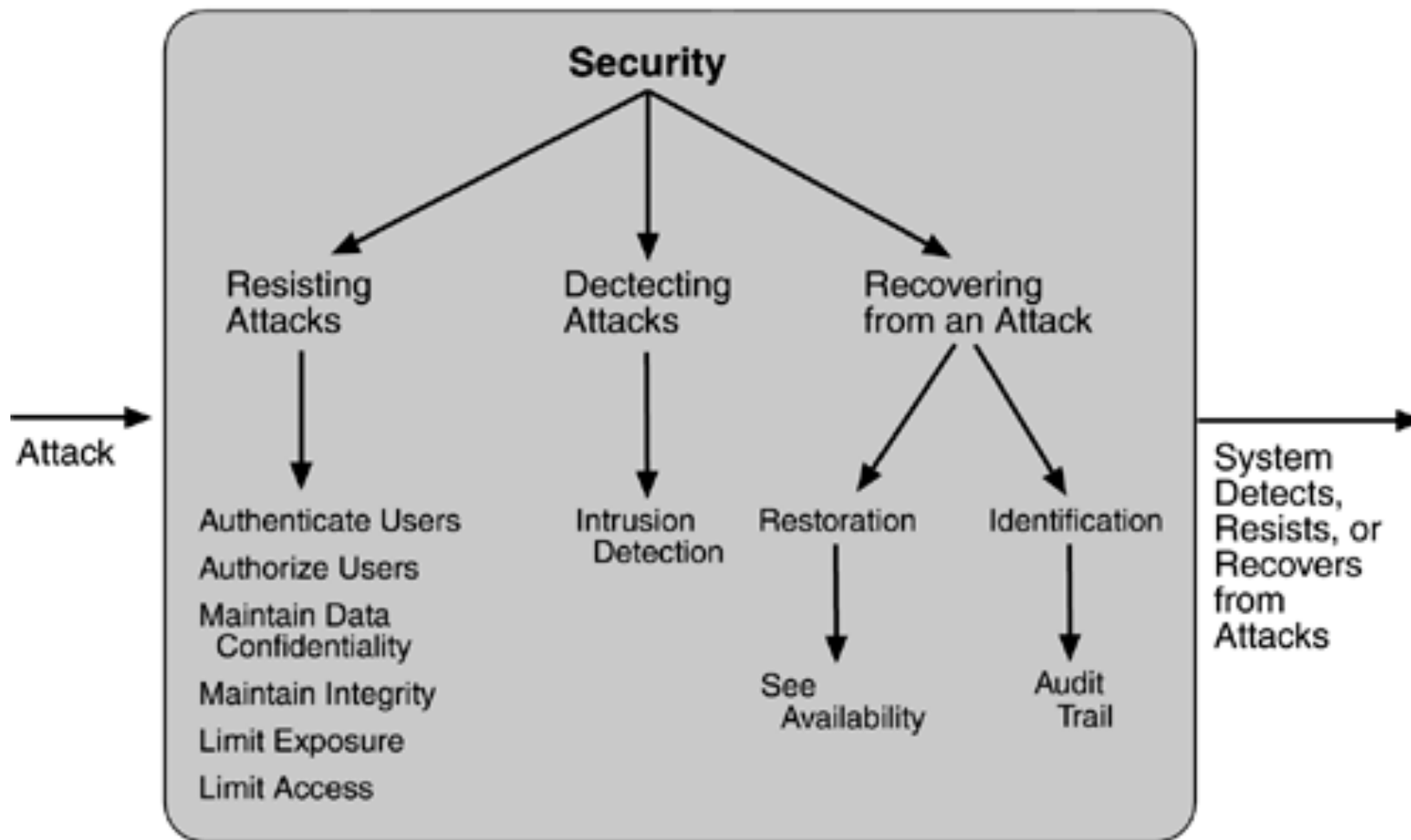


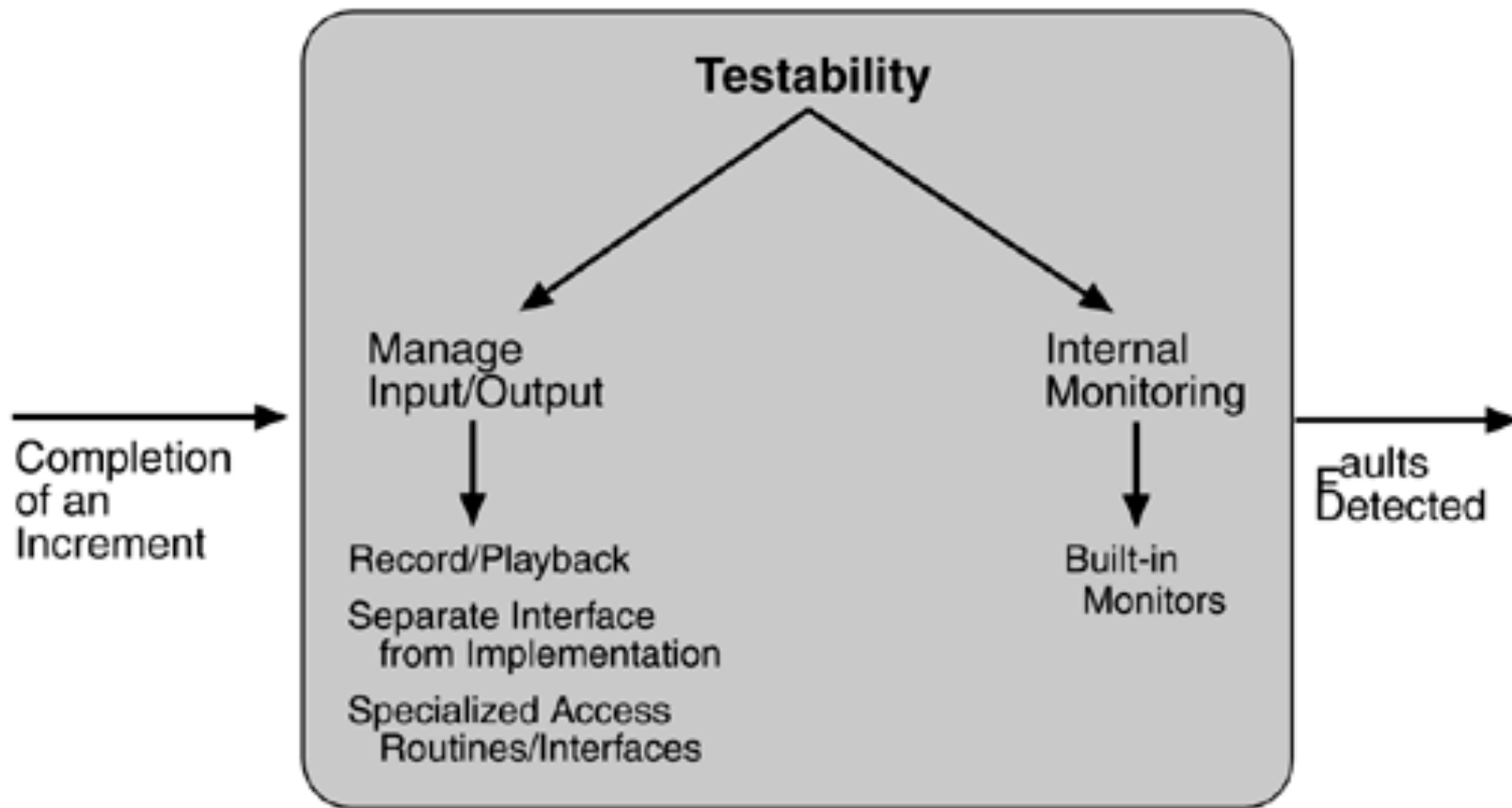
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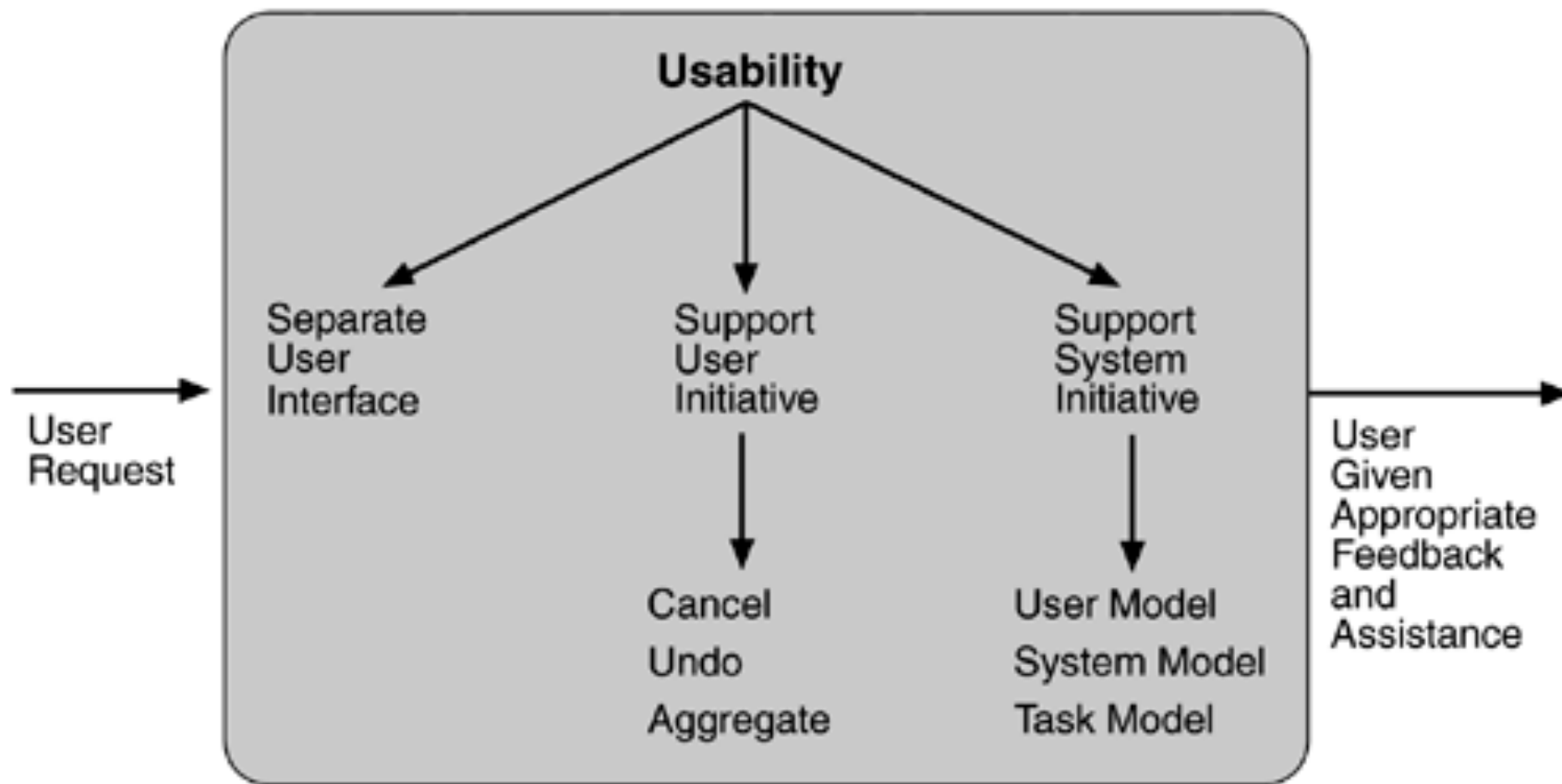














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- **Implicit Invocation !**
- **Why?**



- 图式思维能力
 - 擅长用图而非文字表达自己的设计理念
 - 一图胜千言
- 经验驱动的设计能力
 - 针对每个新问题，在自己的知识库中寻找类似的成功/失败案例，借鉴设计经验/避免设计问题
 - 千万不要自己重头开始一个全新的“设计”
- 定量描述问题的能力
 - 软件架构与软件的质量属性高度相关
 - 要学会采用量化、精确的方式表达对质量属性的要求



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谢谢大家！

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课程讨论群

