

HD EDUCATION

FIT 2001

TUTOR: Ming

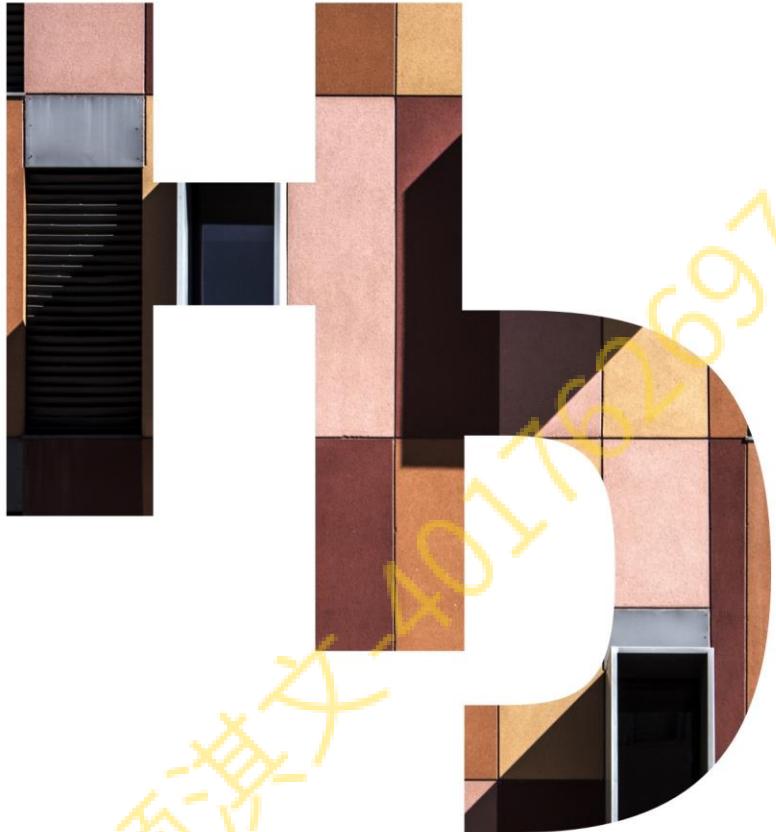




全球累计服务用户超十万



•让海外学习更轻松•



关于 **HD EDUCATION**

HD · EDUCATION (简称HD·EDU) 成立于2018年1月，拥有学业辅导和职业规划两大核心业务。从创办伊始就秉承着“让年轻人成为知识的生产者、传播者、受惠者”的使命，坚持从留学生的角度出发，为他们量身制定属于他们的课程。“成为最受年轻人喜爱的教育品牌”一直是我们的不懈追求。

截止2020年，我们的Tutor人数已达1300人，业务范围涵盖了澳大利亚、新西兰、美国、英国4个国家的40多所高校，为15万留学生提供了优质的学习辅导服务，成为澳大利亚华人留学生覆盖人数最多的在线教育学习平台。

HD·EDU的成长有你陪伴

课后，如果您有任何建议和意见，我们都非常欢迎您联系小助手分享您的想法，给予我们改进和提高的机会！

感谢您参与HD Education的辅导课程！



TUTOR

Self-Introduction

自我介绍

#

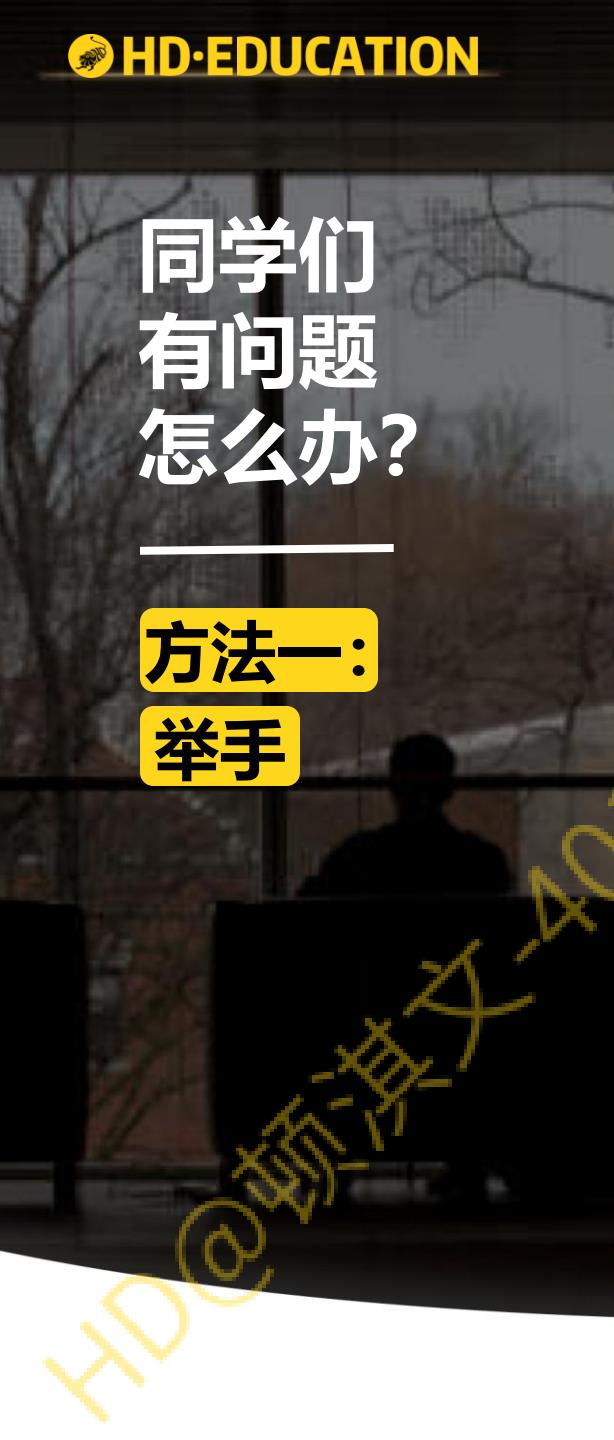
1. 🏫 Monash University
2. 📚 Bachelor of Information Technology
Master of Information Technology 在读
3. 两年Local公司工作经验
4. 📸 善于举例，将抽象的概念简单化
5. ❤️ 搞猫 旅行 听歌+去各种展/演唱会

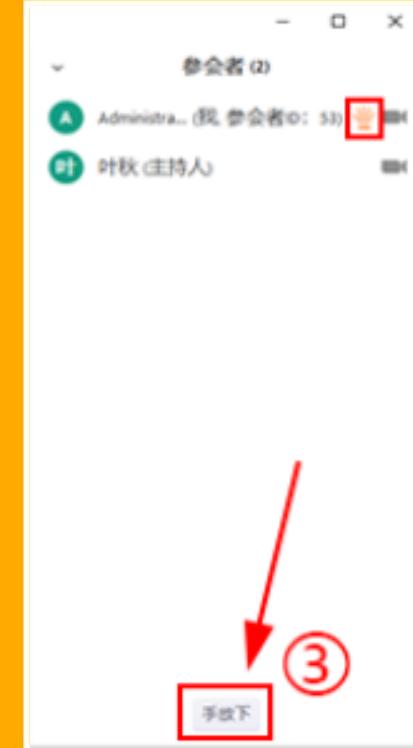
TUTOR: Ming



同学们
有问题
怎么办?

方法一：
举手

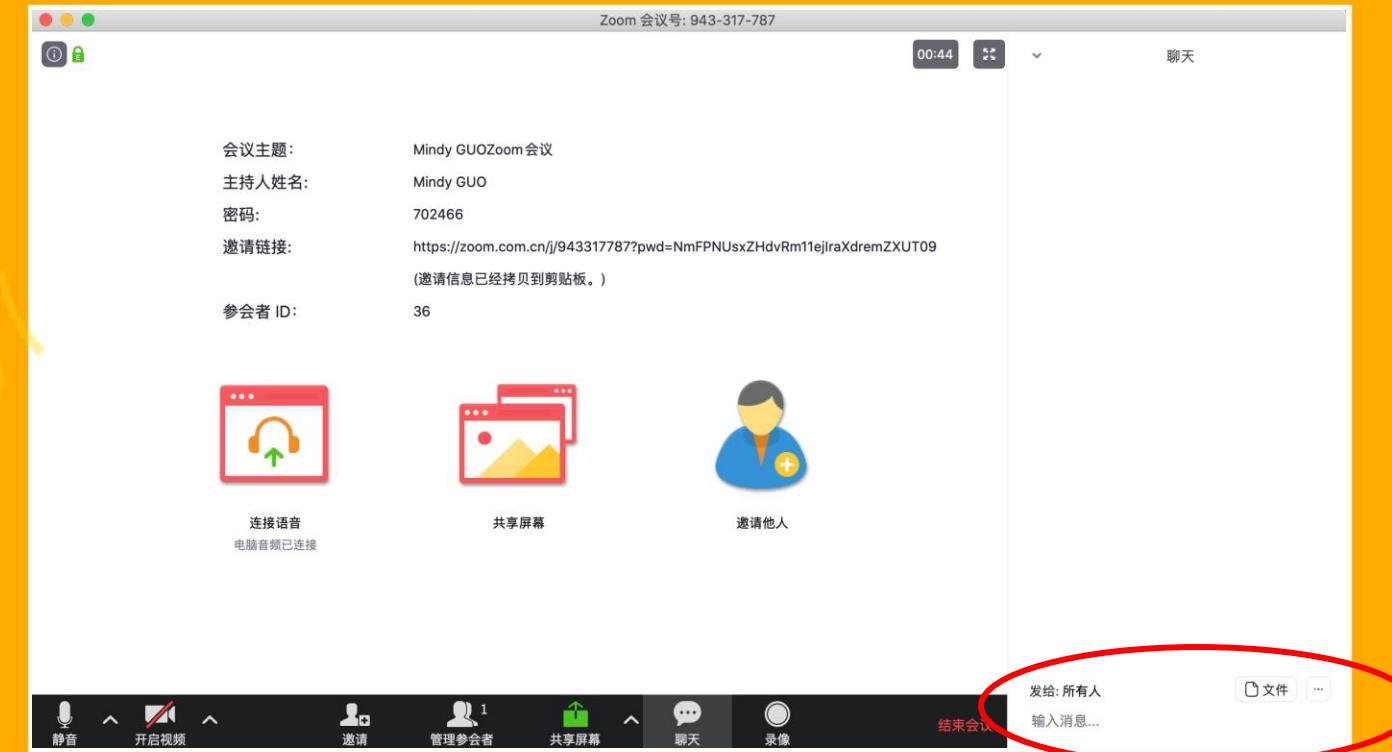
- 
- HD@教育
1. 点【参会者】
 2. 点【举手】即可与老师实时互动
 3. 问题被解答了还可以【手放下】



同学们
有问题
怎么办?

方法二：
文字提问

HD@鲸鱼



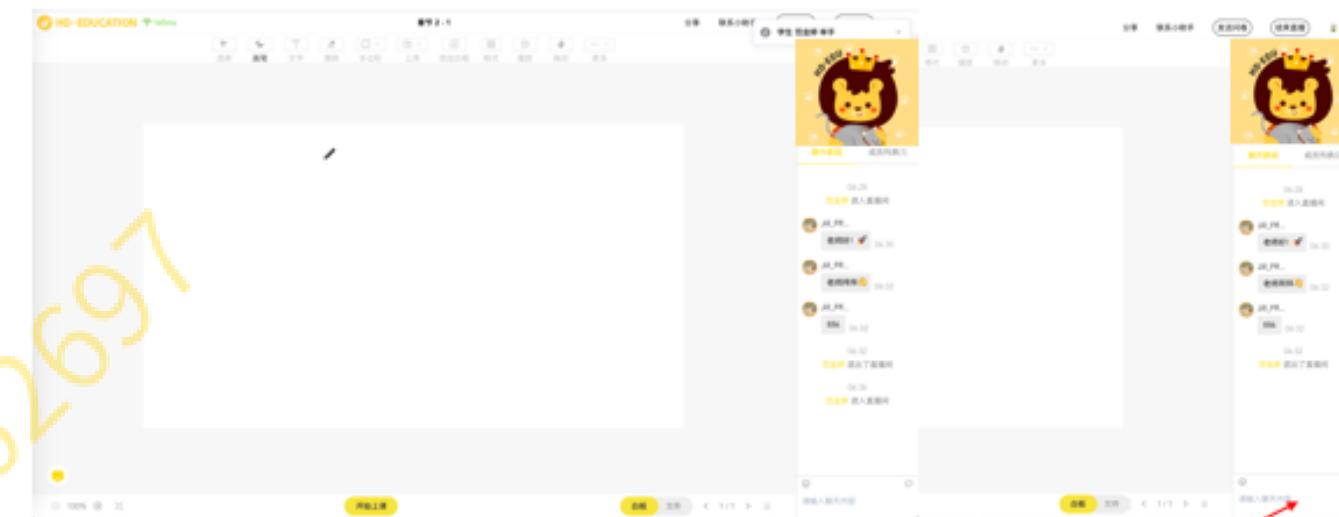
红圈处输入问题提问

同学们
有问题
怎么办?

直播平台

互动方法

直播平台：举手+聊天室提问



点【参会者】再点【举手】，即可与老师实时互动！在此输入你想问的问题

问题被解答了还可以【手放下】

CONTENT

课程目录

- 
- 1** Introduction to Systems Development
 - 2** Approaches to systems development
 - 3** Investigating System Requirements
 - 4** Object-Oriented Design and Modelling with UML
 - 5** System Design Fundamentals
 - 6** Securing and Maintaining the System



期末问题占比

Scheduled Final Exam (Weight: 50%)

- 3 sections - 24 Questions

| Sections | Questions | Marks |
|--------------|---------------------------------------|----------|
| A: Q 1 - 15 | 15 Multiple choice questions | 15 marks |
| B: Q 16 - 21 | 6 Discussion and Evaluation questions | 59 marks |
| C: Q 22 - 24 | 3 Practical questions | 26 marks |

知识点归纳



知识点讲解

Week 1

H



考点1. What is Information System

Integrated set of components for collecting, storing and processing data(收集, 存储, 处理数据) for delivery of Information (传递信息)

Main component of an info systems

- People
- Procedures
- Hardware and software
- Databases
- Data warehouses
- Telecommunications



What is SDLC(System Develop Life Cycle) ?

The systems development life cycle (SDLC) is the overall process for developing information systems from **planning(计划)** and **analysis(分析)** through **implementation(执行)** and **maintenance(维护)**.

Activities include determining **budgets**, **gathering system requirements**, and **writing detailed user documentation**.

The SDLC begins with a **business need**, followed by an assessment of the functions a system must have to **satisfy the need**, and ends when **the benefits of the system no longer outweigh its maintenance costs**. This is why it is referred to as a 'lifecycle'.

- SDLC是一套由计划，分析，执行，维护模块所组成的系统开发流程
- 它有很多具体的操作方式，其中包含了：预算规划，收集系统信息，写详尽的用户文档。

• Cycle : 起始于商务需求，满足商务需求，直到系统报废（维护费用 > 系统收益）

考点1. SDLC five phases

重要程度: 
难易程度: 

1. System initiation : Feasibility 可行性分析

2. System Analysis 需求评估

3. Systems Design 系统设计

4. Implement: Build/Develop - Construct & Test 编码或者实现以及测试, 部署、执行

5. Support: Maintenance, Extension-

评估系统是否符合需求, 增强系统、观测系统表现

Activities

1. Budget/Schedule/Resources/requirements
2. Find stakeholders/identify task/Prioritize task
3. Design software system, database, and user interfaces
4. Build, Test, Validate
5. Maintain it, Extend it

知识点讲解

Week 2

H



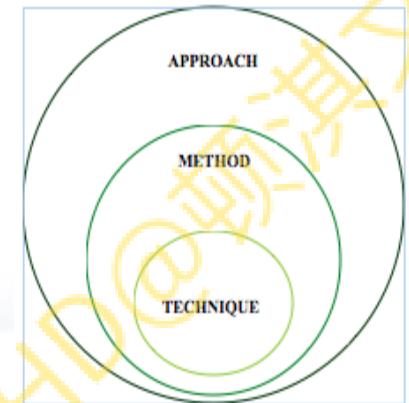
System Development Approaches – Adaptive and Predictive

DESCRIPTION OF APPROACH

The approach is a route that you are going to reach a project. The method is a process or steps that you use to complete the project.

System Development Approaches: how we reach system development?

What theory can help us to approach system development



Newer Adaptive (适应性) thinking

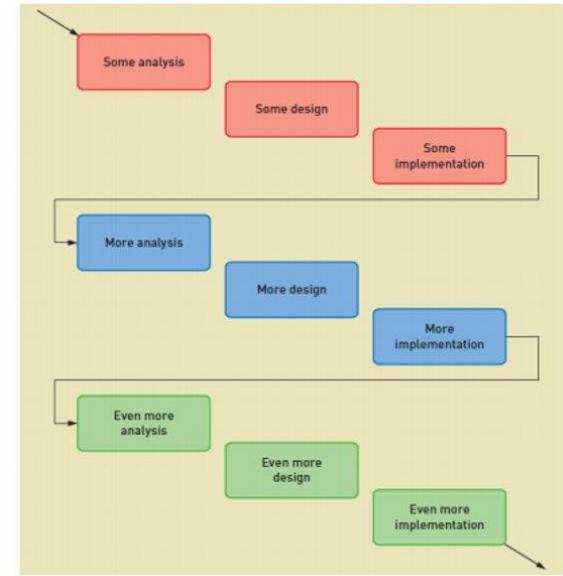
Eg: AGILE

- Flexible and adapt to changing needs (灵活多变)

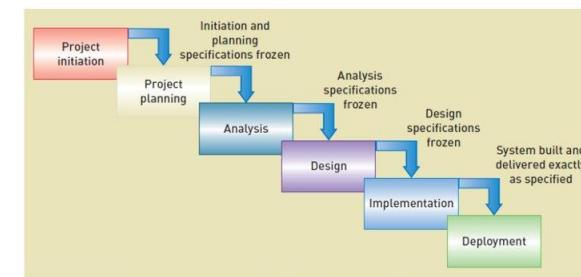
Traditional Predictive (可预测的) thinking

Eg: Waterfall

- Stable/predictive & Low risk
- Sequential stages(顺序执行) – no overlap or iteration



Systems Analysis and Design in a Changing World, 6th Edition – Figure 8.6.



Systems Analysis and Design in a Changing World, 6th Edition - Figure 8-3, p229



System Development Approaches – Agile Vs Waterfall

Agile

Pros

- You can maximize your **customer satisfaction** through over and over iteration :D(客户满意度++++)
- Project broke down to small task and prioritize them (todo list, 安排！)
- Face to face communication bring every one in the same page(大家都知道, 目前为止做了什么)

Cons

- Lack of Documents (大多通过口头描述/简单需求进行改动)
- Rely on team commitments (靠谱队友的重要性)
- Every team member should be highly experience on what they are doing

Waterfall

Pros

- Everything **planed** and map before you start working, so you know the time and cost (工欲善其事必先利其器)
- Process are made to be simple and strigthfoward(什么阶段干什么事)

Cons

- **Cannot make changes**, anything wrong you need to start again.
- Takes longer time **until the client see the result**(客户:我的钱呢?)
- Cost too much if you change requirments



Agile 知识点

Project consists of small iterations

Each iteration cope with a part of well-defined scope of whole system (一部分需求)

At the end of each Iteration, a potentially shippable product increment is delivered.

Every iteration sees new features added to the product, which results in the gradual project growth.

The features being validated early and regularly, the chances not delivering what the clients wants reduces.



Continuous Attention To Technical Excellence

The 4 Agile Values



HYGGER



Scrum 知识点

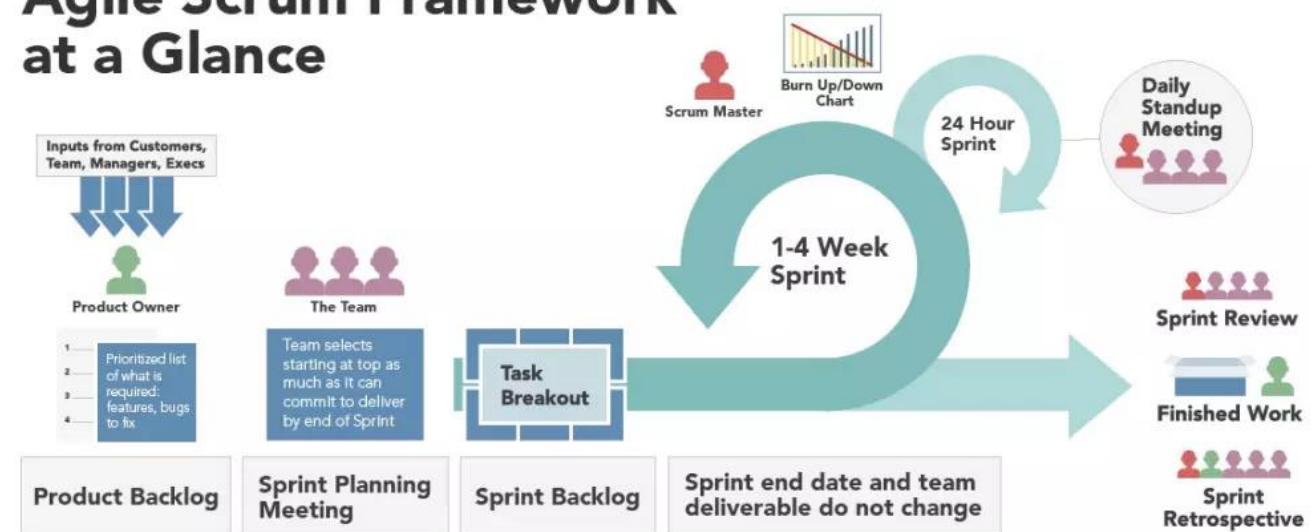
Scrum是用于开发、交付和维持错综复杂产品 (complex products) 的敏捷开发框架 (framework)

A scrum project is a series of iterations called **Sprints** – typically **2-4 weeks long**, based on an inspect and adapt cycle

Produces outputs iteratively and incrementally, thus reducing risk and enhancing visibility
他们以迭代 (iterative) 与增量 (incremental) 式的方式交付工作, 每个迭代称作 Sprint。



Agile Scrum Framework at a Glance



Scrum知识点

Scrum Role



Product owner
Client's representative(客户的化身)
)
defines and prioritises product
features, accept or reject work
items (决定做什么, 什么先做, 什
么不做)

Scrum Master (leader)

Coach for scrum team,
applying agile principles, ensures
team's productivity, builds
a successful team
确保每件事按照计划进行

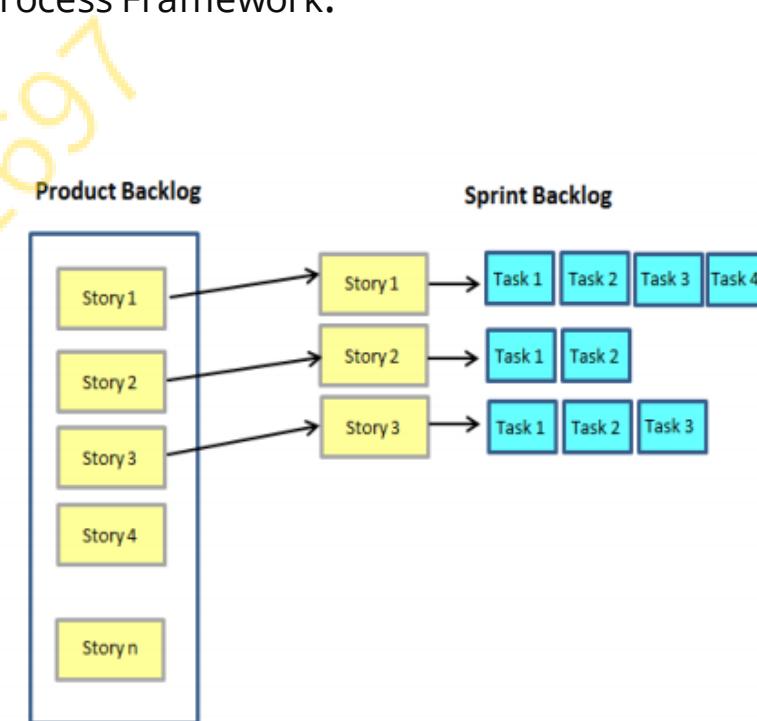
Development Team (干活的)

5-9 members in a self-organizing,
high performance, cross-functional
team (Developer, Tester, BA)

Scrum Artifacts

Scrum Artifacts provide **key information** that the Scrum Team and the stakeholders need to be aware of for understanding the **product under development**, (**onProgress**) the **activities being planned(Todo**, and the **activities done in the project(Done)**. The following artifacts are defined in Scrum Process Framework.

Based on User story
Feature,enhacement,bugfix,documents requirements
prioritised

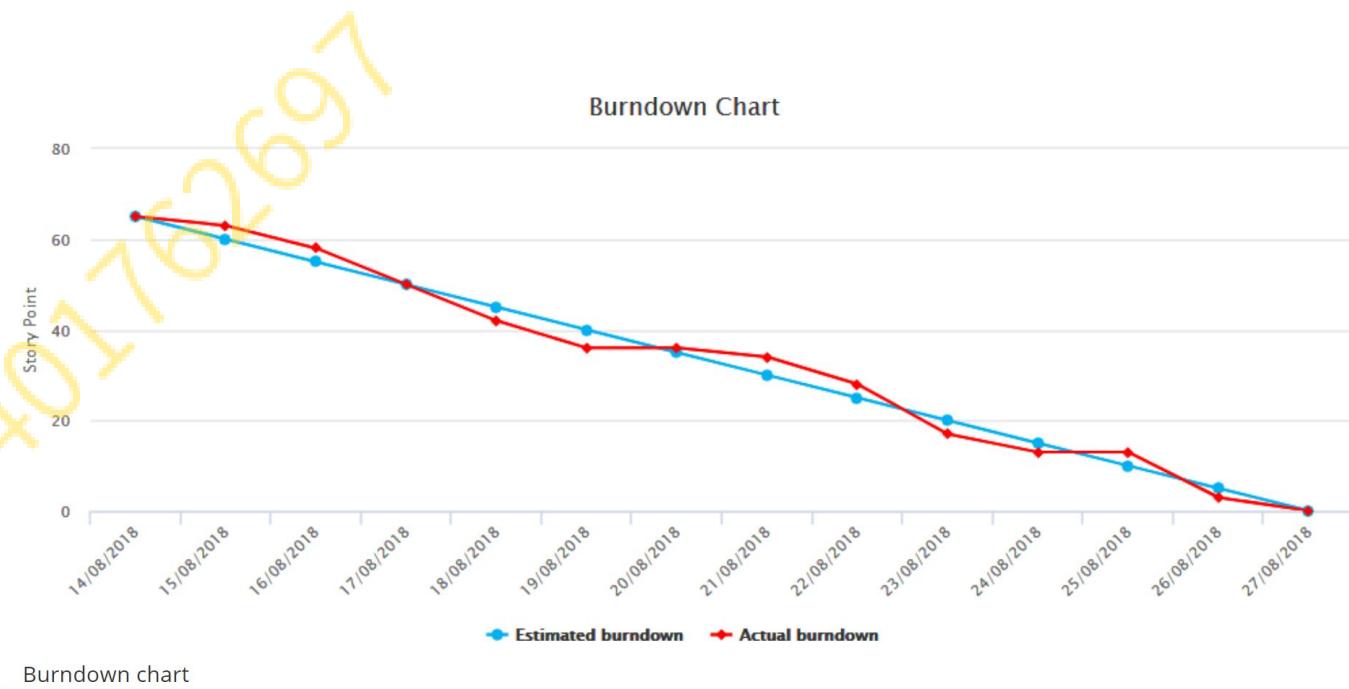


List of tasks necessary to complete each user story

| USER STORY | TASKS | DAY 1 | DAY 2 | DAY 3 | DAY 4 | DAY 5 | ... |
|---|---|------------------------------|------------------------------|------------------------------|-----------------------------|-------|-----|
| As a member, I can read profiles of other members so that I can find someone to date. | Code the... Design the... Meet with Mary about... Design the UI Automate test... Code the other... | 8 16 8 12 4 8 | 4 12 16 6 4 8 | 8 10 16 0 1 8 | 0 4 11 0 0 8 | | |
| As a member, I can update my billing information | Update security tests Design a solution to... Write a test plan Automate tests... Code the... | 6 12 8 12 8 | 6 6 4 12 8 | 4 0 0 10 8 | 0 0 0 6 4 | | |

Scrum Artifacts

Burndown charts are graphs that give an overview of progress over time while completing a project
(可视化的任务完成量)



Stakeholder management

谁从这一发展中受益，谁可能遭受损失？

谁控制流程的变更管理？

谁来做决定？

谁采购 IT 系统，谁决定购买什么？

谁控制资源？

谁拥有项目所需的专业技能？

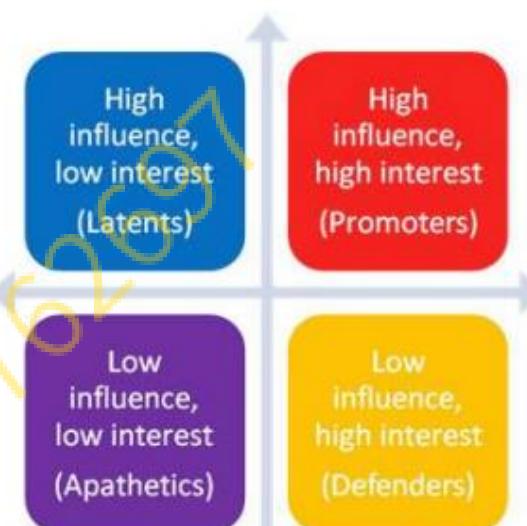
谁具有影响力？

项目所有者（促进进度）

项目发起人（销售转变成用户）

—两者都非常重要—可以对项目成功产生重大影响

核心：判断谁更重要



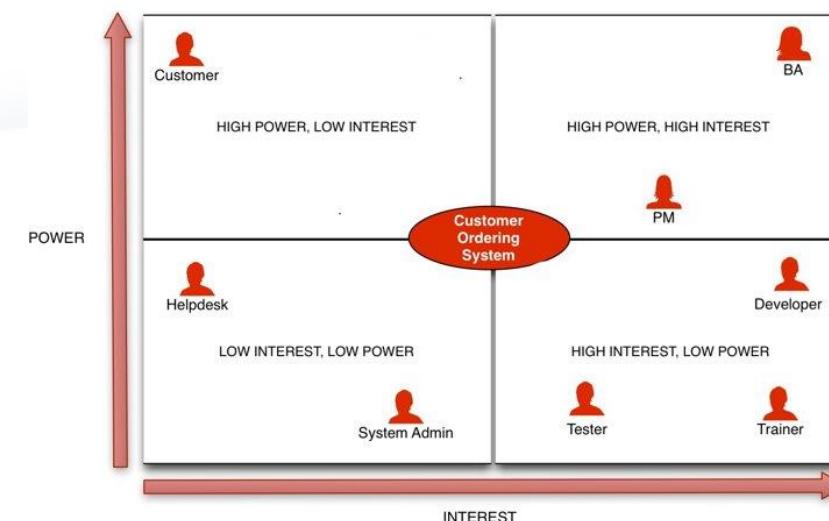
Jinken is an Australia Company saleing organic products from their own farm in NSW. Since the COVID-19 impact their business, they decide to doing e-commerce shops and create a Customer Ordering System to manage customer orders.

The Business Analysis(BA) and Project Manager(PM) starts to work with this project, they are writing a detailed scope based on company sales logic. They deliver to you(Developer) to review it. The scope included this two feature:

- Customer can order online and sent email to Helpdesk if they got any issues during purchasing.
- System Admin can log in system and manage/check all the orders

After review the scope you ask your project manager to assign two Tester and two developer for building this system

When the project finished, your manager also ask you if this system need a training for internal users, your answer is yes. So she assigned a trainer from your team to arrange training



知识点讲解

Week 3



Investigating system requirements

什么是需求分析/需求收集

Investigating system requirement by using information techniques.

To Understand business domain/logic deeply

为什么要分析，收集需求？

To find a solution for business problems

To improve business process

To brings some benefits



Ref: <https://reqtest.com/requirements-blog/what-is-requirements-gathering/>

Functional and Non-functional requirements

重要程度: ★★

Functional Requirements: able to do ?

if the functional requirements are not met, the system will not work. (功能性需求出错, 系统就无法满足用户的商务需求)

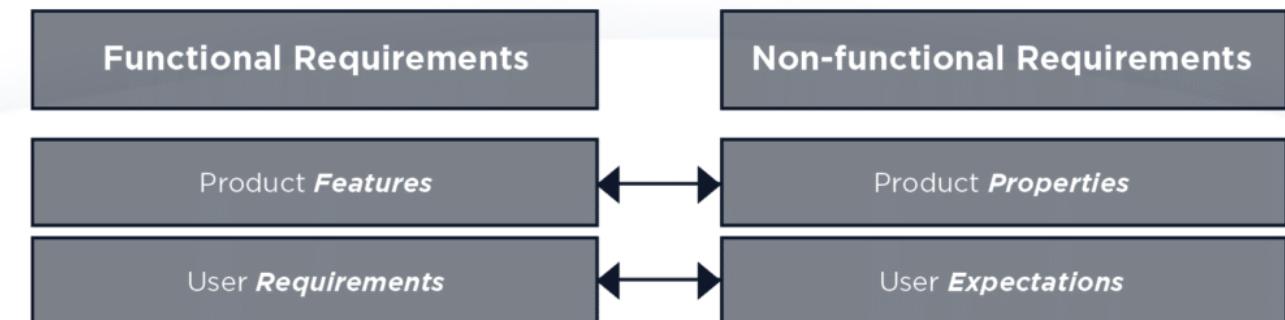
Non-Functional Requirements: How system will perform?

Eg: system usability, user interface, system Latency, security.....

| Parameters | Functional Requirement | Non-Functional Requirements |
|----------------|--|---|
| Requirement | It is mandatory | It is non-mandatory |
| Capturing type | It is captured in use case | It is captured as a quality attribute |
| End-result | Product feature | Product properties |
| Capturing | Easy to capture | Hard to capture |
| Objective | Helps you verify the functionality of the software | Helps you to verify the performance of the software |
| Area of focus | Focuses on user requirement | Concentrates on the user's expectation and experience |
| Documentation | Describe what the product does | Describes how the product works |
| Product Info | Product features | Product properties |

Database should backup every 2 months

Database should backup every 2 months automatically

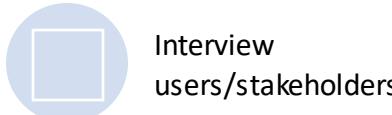


Ref:<https://qracorp.com/functional-vs-non-functional-requirements/>

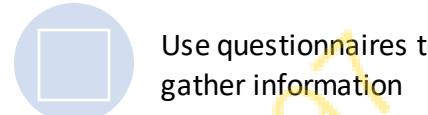


Information gathering technique

优点:面对面交流，客户满意度，信息掌握情况++
缺点：耗时耗力

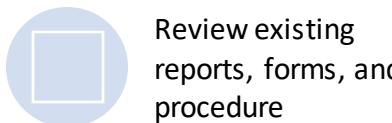


优点:节省时间
缺点：信息不一定有效



Observe business processes

实地考察：优点 更加了解整个商务流程 缺点：容易引起工作人员的紧张：D



descriptions

Research vendor/competitor solutions

优点:直观展示
缺点：不一定是客户想要的、
给客户错觉：这就是以后的成品



Story-writing workshops

USER STORIE!

知识点讲解

Week 4

4-16-2021

H



Modelling

What is Modelling

simplest form, the model serves as an abstraction -an approximate representation of the real item that is being built

It is a simplified picture of complex reality

Why using modelling?

Reducing complexity of systems to be built by abstraction

Communication with other development team members

Communication with stakeholders/users
Learning from the modelling process

Documenting all the details of requirements for future maintenance/enhancement - represents some key aspects of the system being built

Some examples: Activity diagrams, Class diagrams, Use Case diagrams, Sequence diagrams

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A-401-6263

What is User Stories?

a user story is an informal, natural language description of features of a software system.

They are written from the perspective of an **end user** or **user of a system**, and may be recorded on index cards, Post-it notes, or digitally in project management software.

用户故事 (user story) 是从用户的角度来描述用户渴望得到的功能。一个好的用户故事包括三个要素：

1. 角色: 谁要使用这个功能。
2. 活动: 需要完成什么样的功能或目标。
3. 价值: 为什么需要这个功能, 这个功能带来什么样的价值。

As a <user role>
I want <goal>
so that <benefit>.

User stories : INVEST principle

INVEST

Independent

独立性 stories can be worked on in any order.

Negotiable

可协商性 the result of collaborative negotiation between the customer, product owner, developer and tester

Valuable

有价值 includes internal value

Estimable

可估算 be able to be estimated or sized so it can be properly prioritized

Small

精简 small chunks of work

Testable

可测试 acceptance criteria can be written immediately.

Acceptance Criteria

Acceptance criteria refers to a set of predefined requirements that must be met in order to mark a user story complete.

Acceptance criteria are also sometimes called the “definition of done”

验收标准一系列可以接受的操作规则，与功能或 feature 相互匹配和满足，同时也能被产品负责人和相关人接受。

| Title: | Priority: | Estimate: |
|--|-----------|-----------|
| As a <type of user> | | |
| I want to <perform some task> | | |
| so that I can <achieve some goal> | | |
| Acceptance criteria | | |
| Given <some context> | | |
| When <some action is carried out> | | |
| Then <a set of observable outcomes should occur> | | |

THE GIVEN/WHEN/THEN ACCEPTANCE CRITERIA: EXAMPLE 2

User story: As a user, I want to be able to request the cash from my account at an ATM so that I will be able to receive the money from my account quickly and in different places.

| | |
|------------|---|
| Scenario 1 | Requesting the cash from a creditworthy account |
| Given | The account is creditworthy |
| And | The card is valid |
| And | The dispenser contains cash |
| When | The customer requests the cash |
| Then | Ensure the account is debited |
| And | Ensure cash is dispensed |
| And | Ensure the card is returned |

Activities Diagram

Activity diagrams are a technique to describe procedural logic, business processes, and work flows

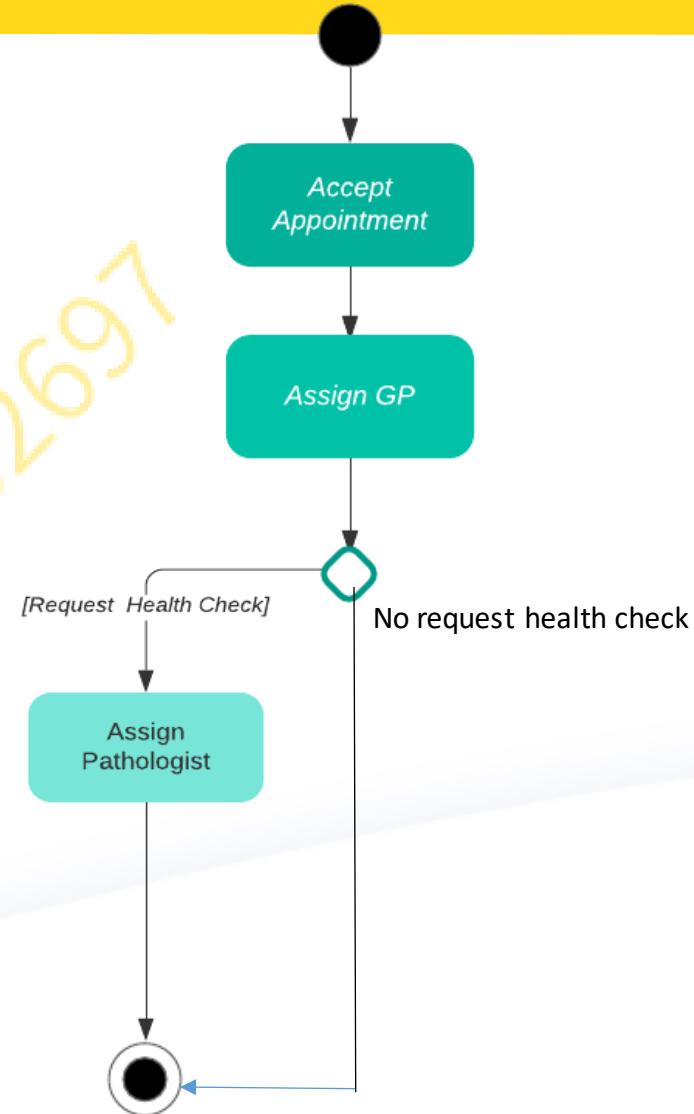
活动图：描述用户商务逻辑，工作流程

更好理解系统的操作流程

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| Sr. No | Name | Symbol |
|--------|---------------|--------|
| 1. | Start Node | |
| 2. | Action State | |
| 3. | Control Flow | |
| 4. | Decision Node | |
| 5. | Fork | |
| 6. | Join | |
| 7. | End State | |

Activity Diagram



HD@蜻蜓 A.401762691

知识点讲解

Week 5

4-16-2021

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Use Case知识点 - what is use case

A Use Case is a description for describing **how an end user "use" a system.**

Use Cases capture all the possible ways the user and system can interact that result in the user achieving the goal.

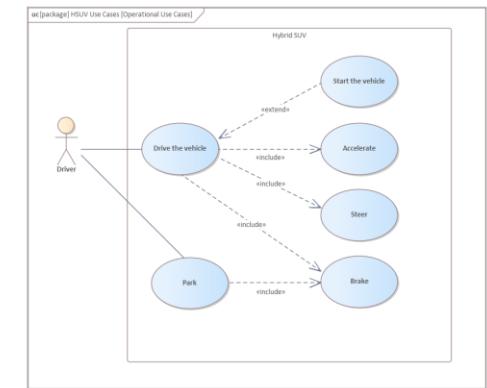
They also capture all the things that can go wrong along the way that prevent the user from achieving the goal.

跟user stories相比, use case 要更详细 更具体, 更加注重于系统和用户的交互和表现形式

User stories 更注重给用户带来的结果/好处

具体表现工具:

1. Use Case Diagram
2. Use Case Description



用例分析是为了更好的描述系统的功能

用例是用来描述用户如何使用这个系统的

囊括了所有用户交互的活动

也包括了会出错的交互结果

| Use Case Name | Login | |
|----------------------|--|--|
| Use case Description | A user login to System to access the functionality of the system. | |
| Actors | Parents, Students, Teacher, Admin | |
| Pre-Condition | System must be connected to the network. | |
| Post -Condition | After a successful login a notification mail is sent to the User mail id | |
| Main Scenarios | Serial No | Steps |
| Actors/Users | 1 | Enter username Enter Password |
| | 2 | Validate Username and Password |
| | 3 | Allow access to System |
| Extensions | 1a | Invalid Username System shows an error message |
| | 2b | Invalid Password System shows an error message |
| | 3c | Invalid Password for 4 times Application closed |

Use Case Diagram - Elements

Use Case: 用例 An interaction between user and system to achieve result

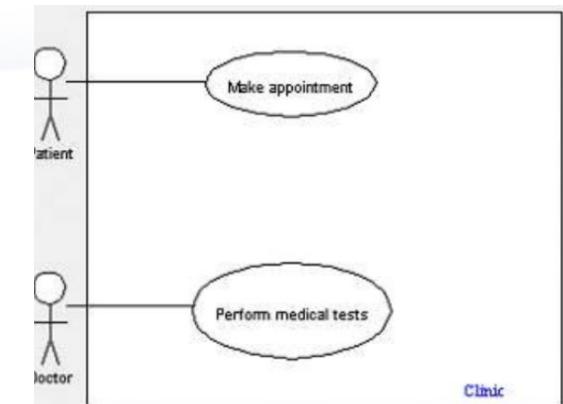
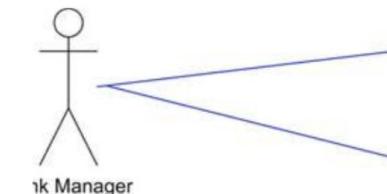
Association 系关系

a particular Actor makes use of the functionality provided by a particular Use Case.

System Boundary - 系统边界

Defines the scope of what the system will be. 系统范围

Verb-Noun



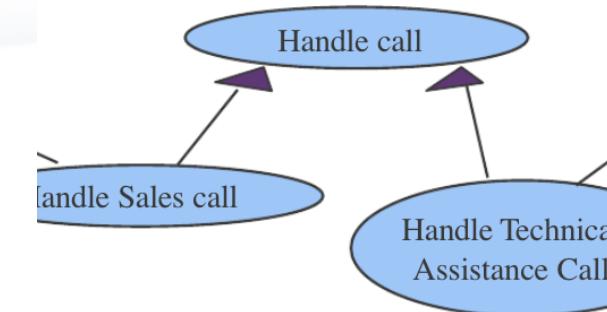
Use Case Diagram Elements - Relationship

用例之间也是有关系的

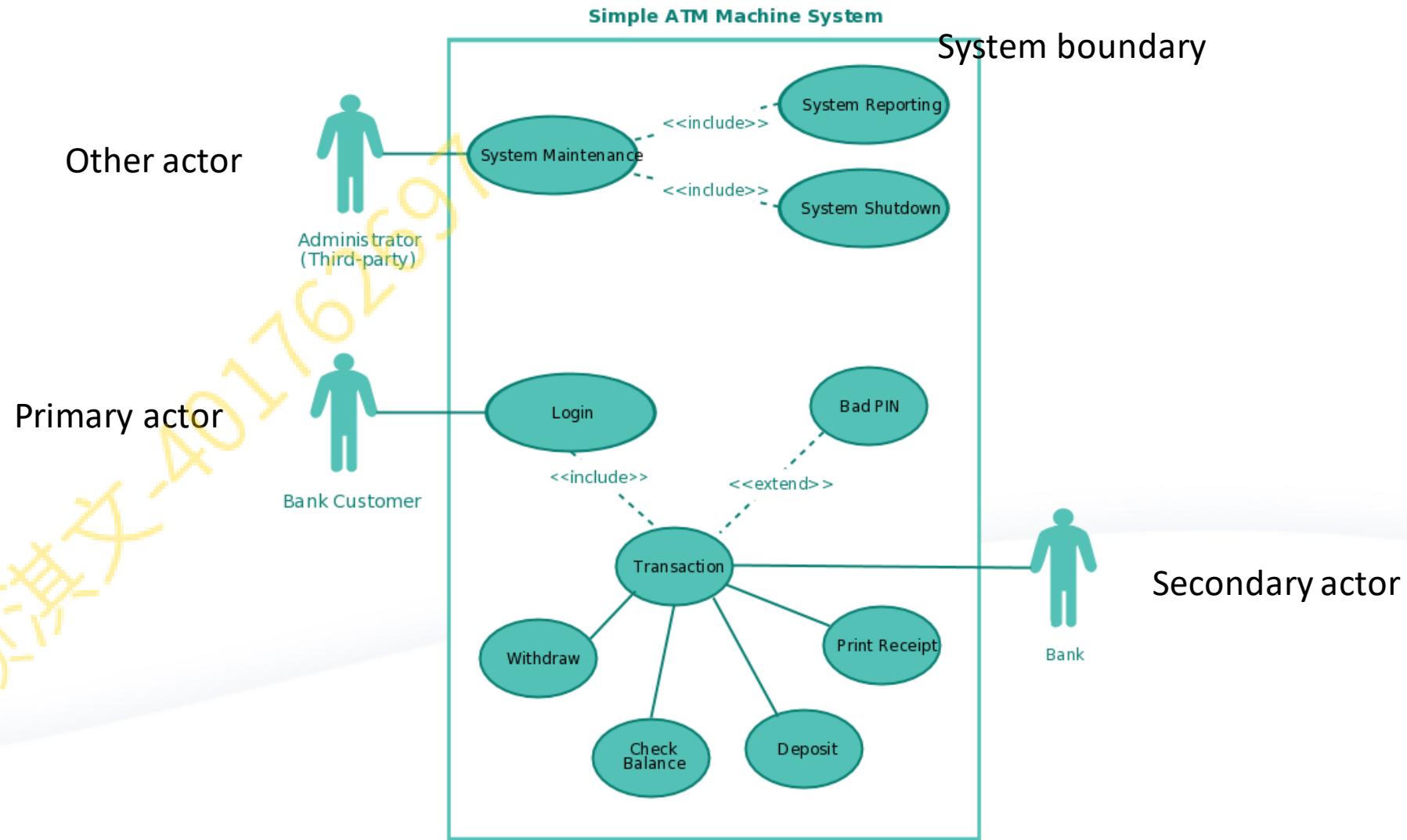
1. 包含 Includes : an use case includes a child use case that can be re-used every time
2. 扩充 extend : an use case extends a child use case that is additional options for parent use case
3. 概括 Generalisation : Two or three use case abstract to one use case, child use case inherit this generalisation model but behave differently

<< include >>

<< extend >>



Use Case Diagram - Example



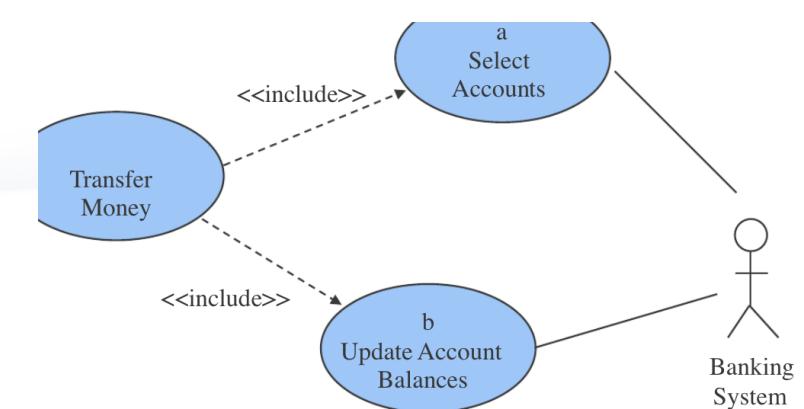
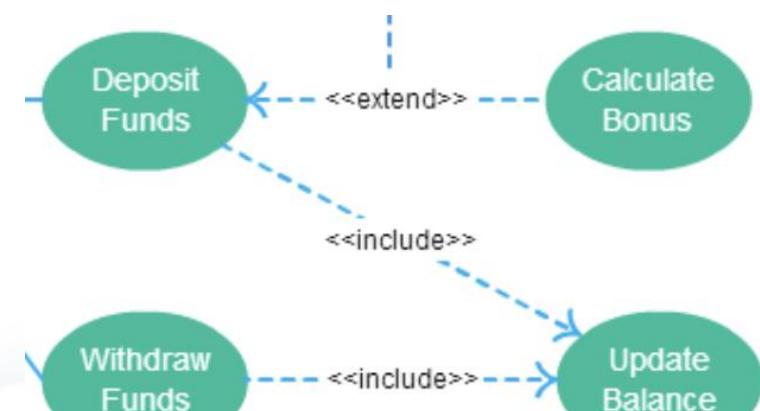
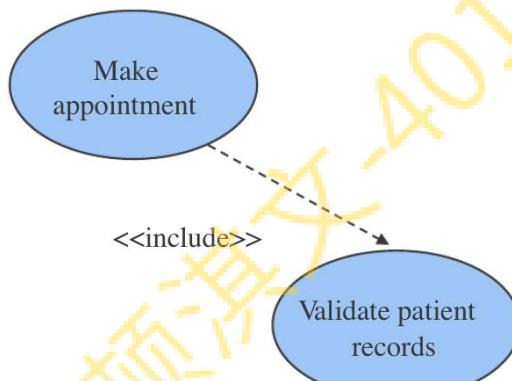
Use Case Diagram Elements - Relationship

Includes 包含 <<includs>>

虚线, 箭头指向child case

描述了use case之间的一些共性

特征: child case 往往不可避免, 是重要的一环



HD@
A-401762691

Use Case Diagram Elements - Relationship

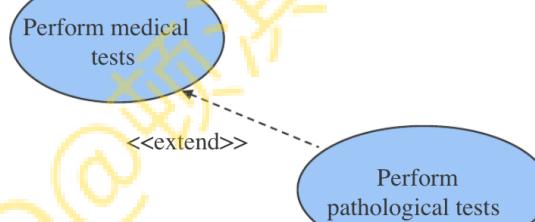
Extends 扩充 <<extend>>

虚线, 箭头指向parent case

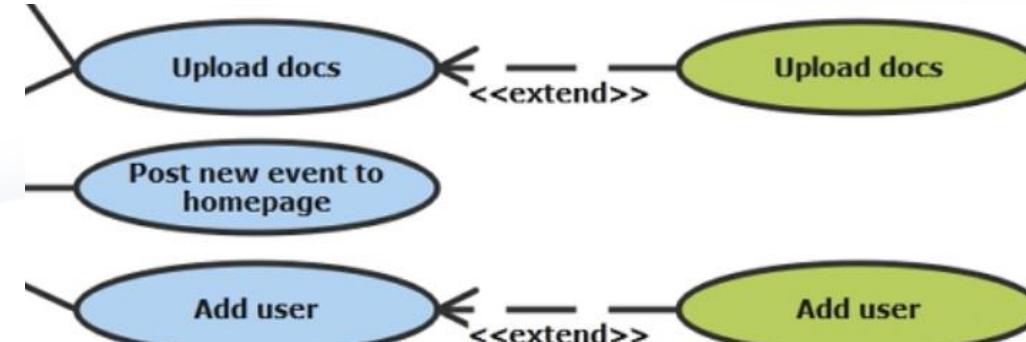
扩充的案例

The child use case adds to the existing functionality and characteristics of the parent use case (optional/exception behaviour)

特征: child case 是 optional 的, 作为 parent case 补充



FIT2001 - 5.26



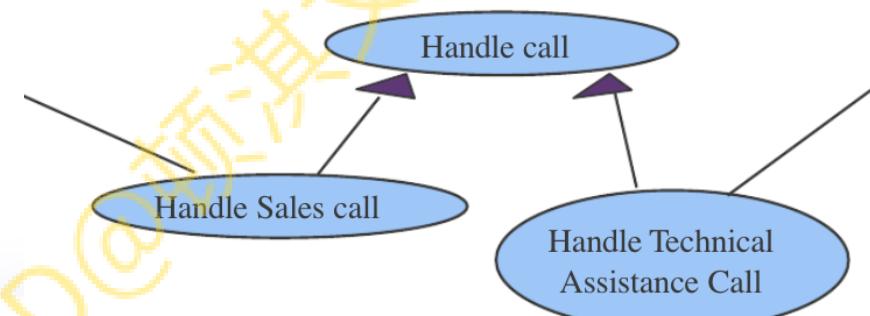
Use Case Diagram Elements - Relationship

Generalisation 概括, 用例图的优化

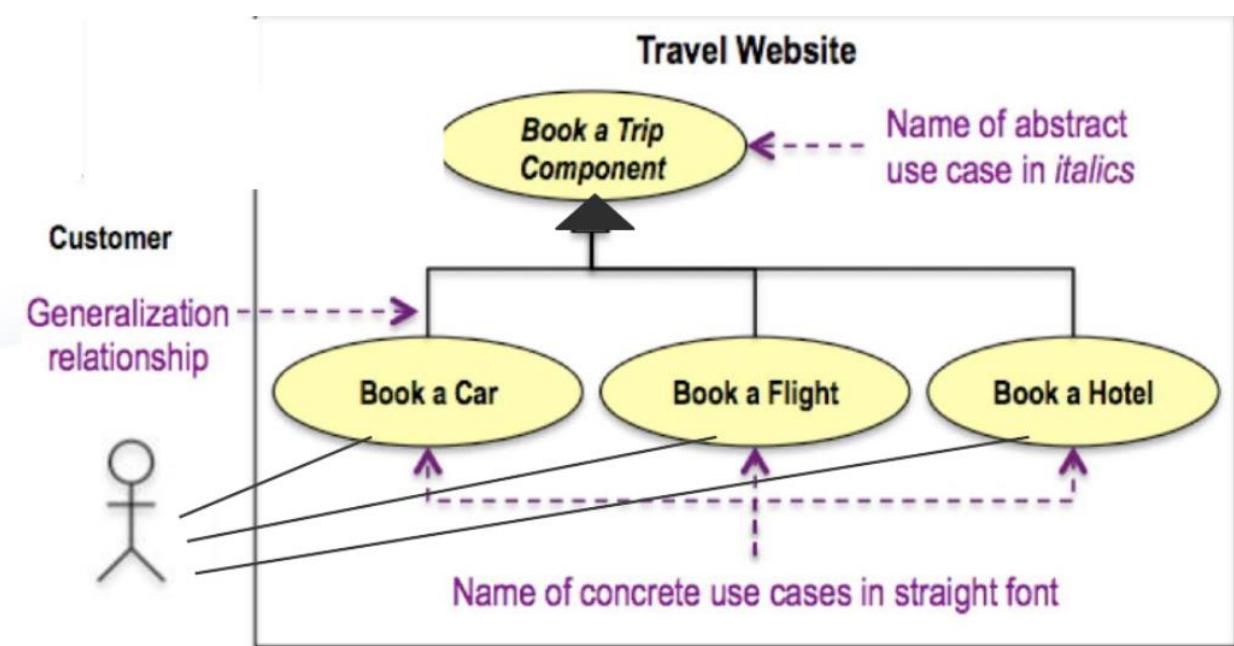
实线, 箭头指向generalisation case

如果用例具有共同的行为、结构和相似性, 它们的共同部分可以被分解到父用例中以优化模型

“提取公因式”



特征: parent case 永远不会被用户直接调取



User description

The use case description provides the details of the functionality that the system will support/perform

Describes how the actors will use the system in order to obtain a specific result of value

用例描述提供了系统将支持/表现的功能的详细信息，并描述了参与者将如何使用系统以获得特定的价值结果

| Use Case Template | | 'Create Order' Use Case |
|----------------------|--|-------------------------|
| Use Case Name | Create order | |
| Use Case Description | Create order is the ability to request the purchase of a product | |
| Actor | Order Creator | |
| Pre-conditions | <ul style="list-style-type: none"> Order Creator has been identified | |
| Basic Flow | <ol style="list-style-type: none"> Order Creator selects 'order product' action System requests customer/product identification information Order Creator provides customer/product identification information System requests mailing information Order Creator provides mailing information System verifies mailing information System requests order be submitted Order Creator submits order System submits product order for processing System confirms product order | |
| Post-conditions | <ul style="list-style-type: none"> Product order has been created | |
| Alternate Flows | <ul style="list-style-type: none"> Product is not in stock Product has been discontinued A customer's initial order is over \$200 | |

知识点讲解

Week 6

H



What is Domain Class Diagram and Why we need it

A domain model is a representation of real-world conceptual classes, not of software components.

真实世界关系的展示

Domain modeling is a technique used to understand the project problem description and to translate the requirements of that project into software components of a solution.

用于理解项目问题描述并将该项目的需求转换为解决方案的软件组件的技术

The software components are commonly implemented in an object oriented programming language. (面向对象设计)

HD@精英教育

Identify classes("things"/"object")

A thing can be seen as a class initially

分析师可以通过识别**事物**来了解系统需求

人们在工作时要处理的问题?
需要存储哪些信息?

How to analysis "things?"

1. brainstorming
2. lists of noun

Things: 事物
Object: 对象



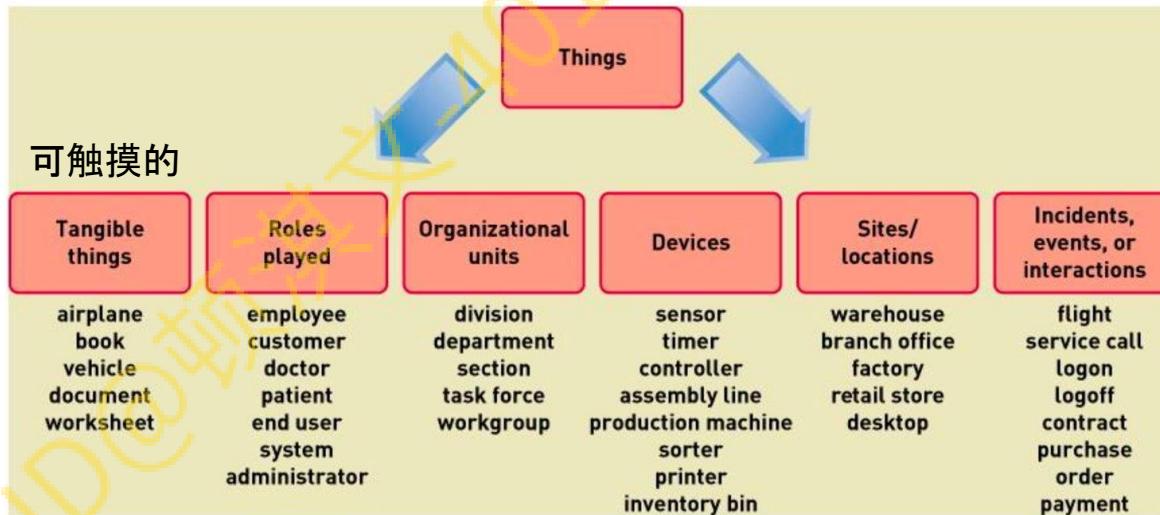
Identify classes("things"/"object")

List of nouns

Collect from user stories and interview

Nouns : can be a people, location, or thing

细化事物清单，并记录要探索的假设或问题



A **student** is identified by a unique student ID. He/she can be reached by address and phone

Students must also apply for multiple **units** when enrolling First semester. The number of units will be whether he/she is a full-time student or a part-time student.

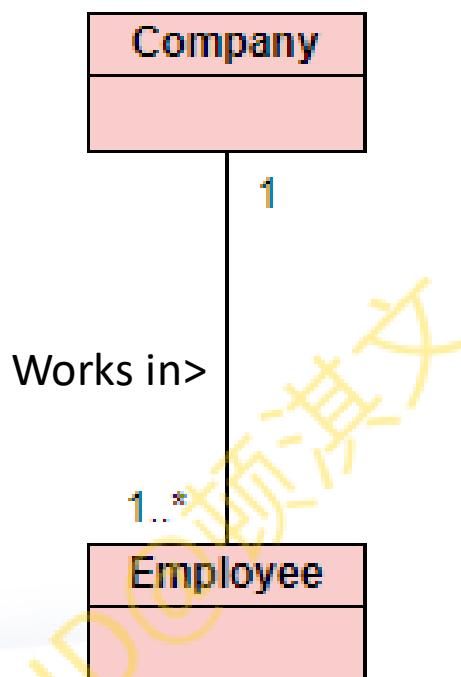
Each unit has a unit code and a unit name.

可以分析出两个大的主体
-学生
-单元

3. Identify multiplicity of associations

Find the number of associations between classes - Multiplicity of Associations

Multiplicity – 事物之间的数量关系



Multiplicities examples:

1

Exactly one, no more and no less

0..1

Zero or one

*

Many

2 – only 2

0..*

Zero or many

2...5 - 2~5

1..*

One or many

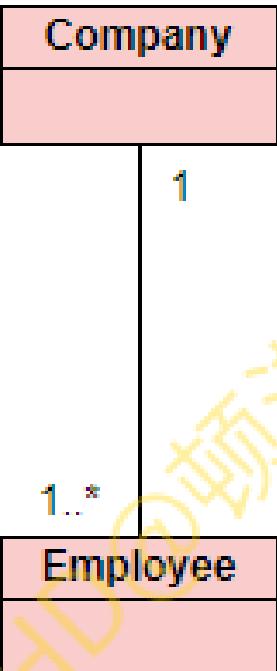
Identify association classes - many to many associations

Find the number of associations between classes - Multiplicity of Associations

Association Class: 关联/连接类

Multiplicity – 事物之间的数量关系

Multiplicities examples:



Exactly one, no more and no less

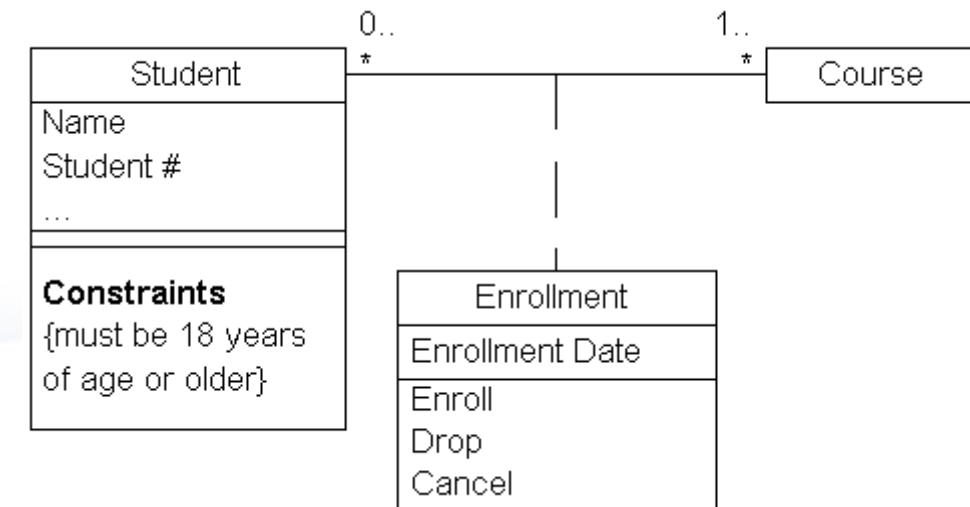
Zero or one

Many

Zero or many

One or many

出现于多对多关系中, 用来简化两个类的关系



5. Identify characteristics (attributes) of ‘things’

分析object/things 的属性

Attribute – a specific piece of information about a THING
(一件事物的表现/信息)

包括它独一无二的身份信息 (identity/key)

Simple attributes

Compound attribute – contain a set of related simple attribute

Eg: Name – Firstname, middlename, lastname
Address – state, postcode, unit number, city....



猫咪的属性？

1. 品种
2. 颜色
3. 名字
4. 花纹
5. DNA (key) / 芯片

6. Identify complex relationships

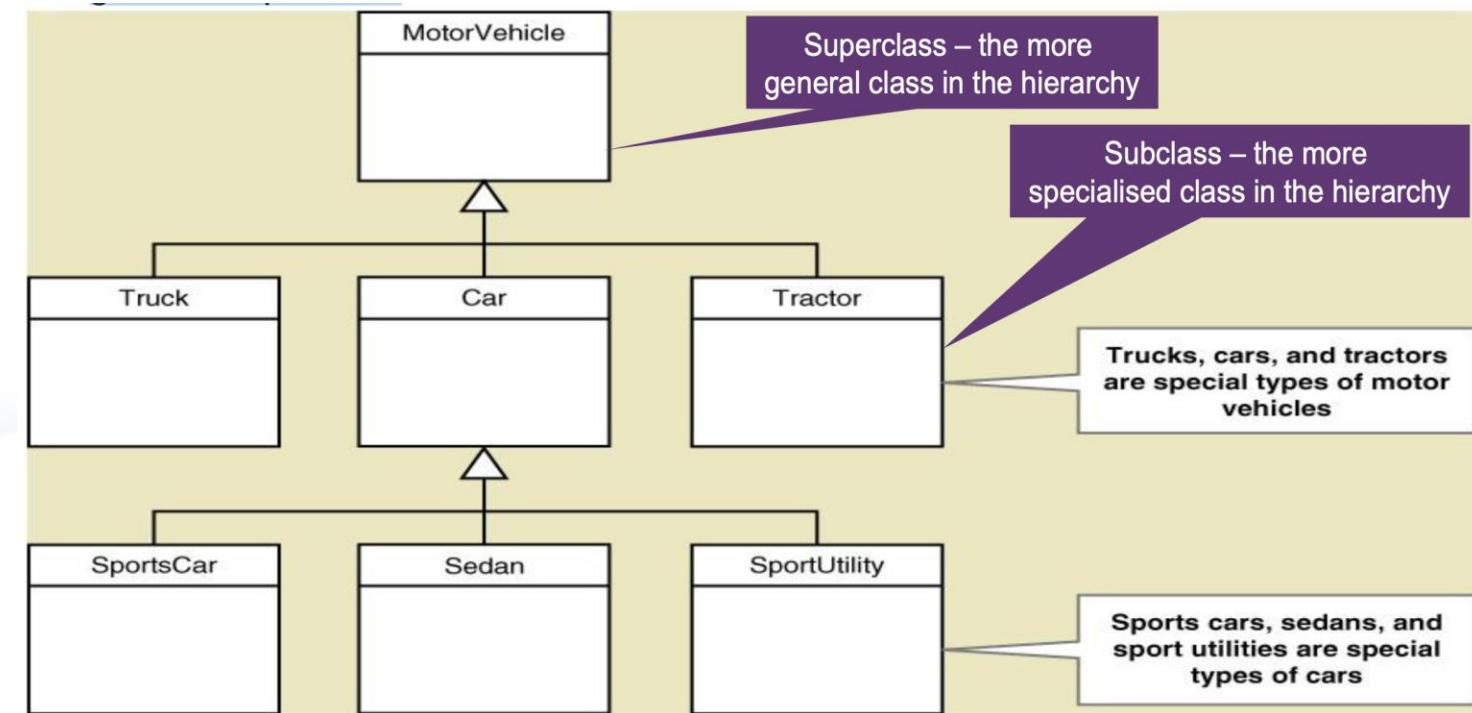
Generalisation/Specialisation

A hierarchical relationship where subordinate classes are special types of the superior classes.

层级关系 - is a relationship

A cat is an animal

James Bond is an actor – this actor is a person

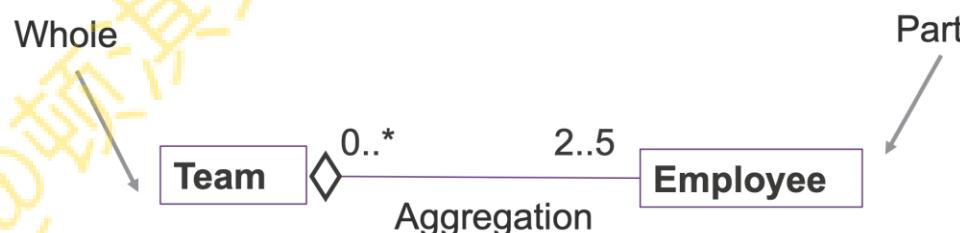


6. Identify complex relationships

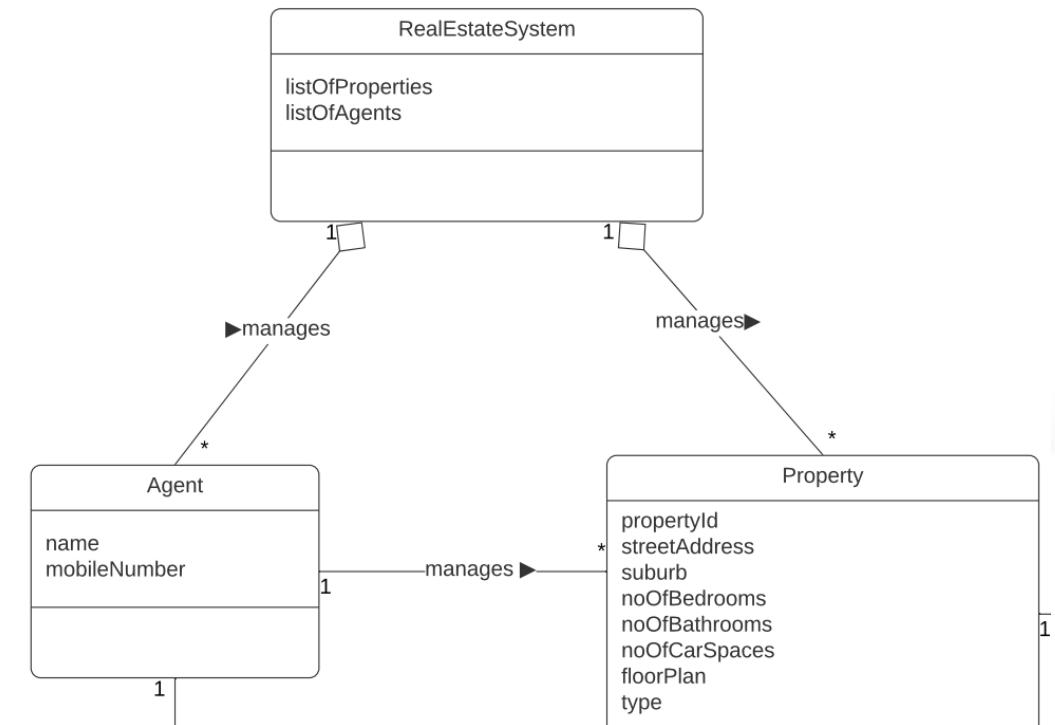
Whole-Part : Aggregation

整体和部分的关系

整体和部分可以分割开来独立存在，例如：一个小组有2到5个雇员，切断关系后，小组和雇员还是存在，不受影响



RES has agent and property



6. Identify complex relationships

Composition - 组成关系

组成关系中，包含类消失了，被包含的类也不复存在

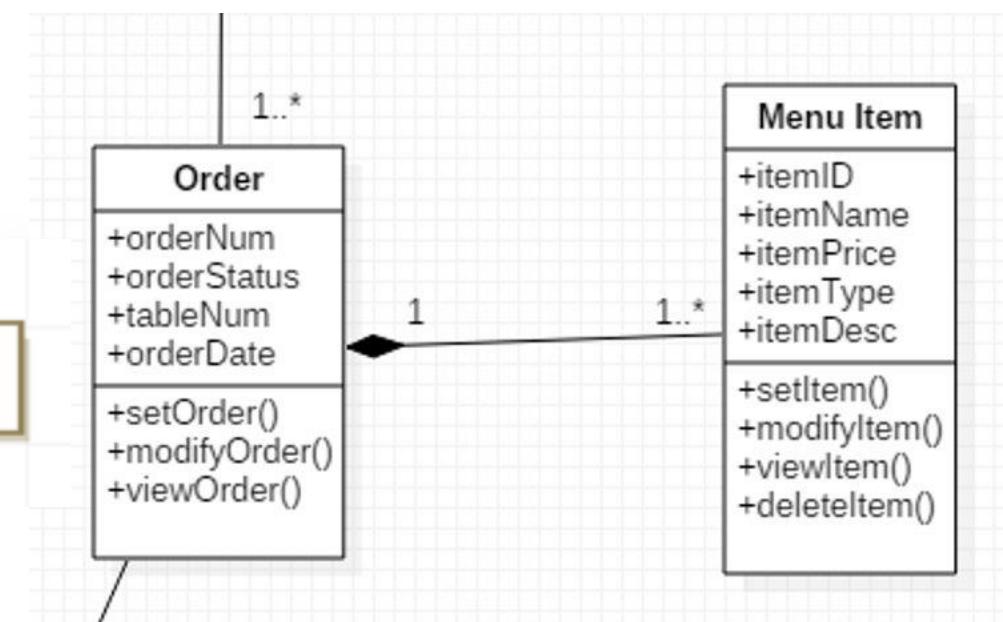
自行车由框架组成(车轮, 链条...)

自行车“消失”，组成自行车的组件也会“消失”

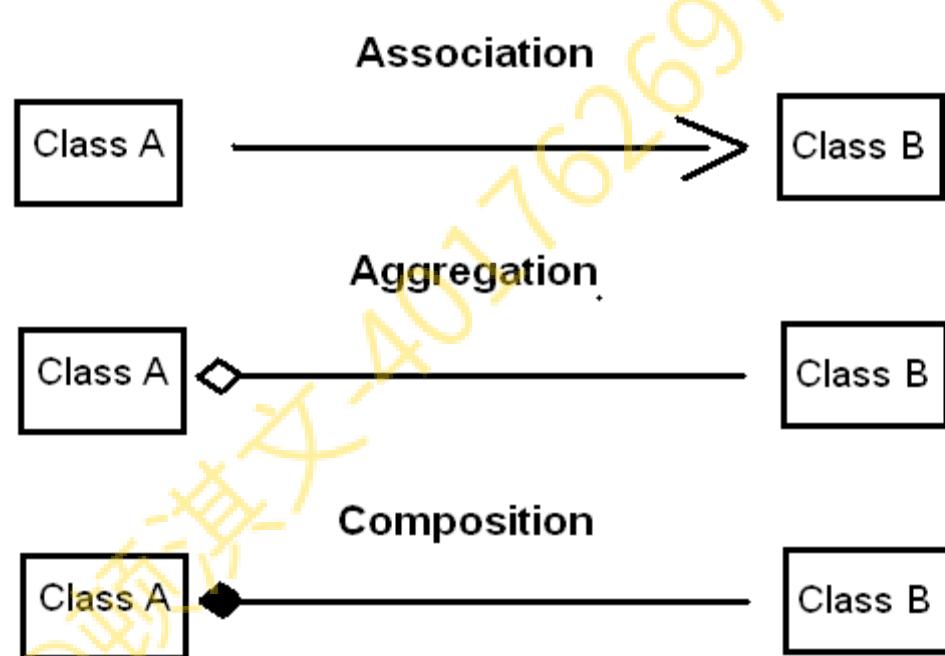


An order has menu item
A menu item belongs to an order

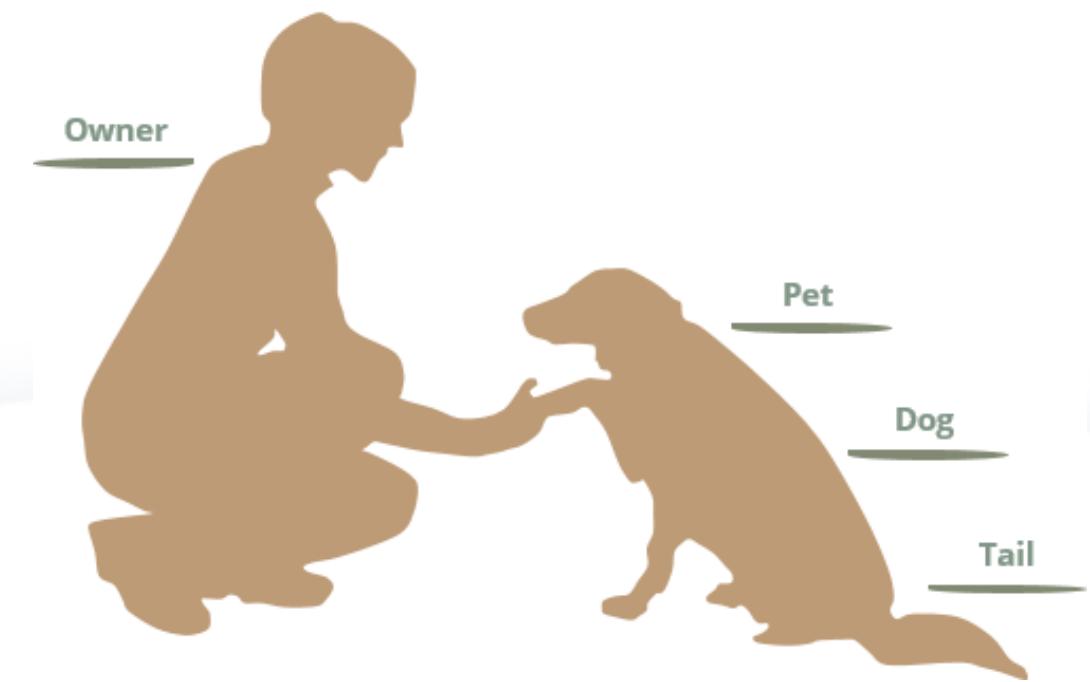
If no orders – no menu item



6. Identify complex relationships



Association • Aggregation • Composition



知识点讲解

Week 7

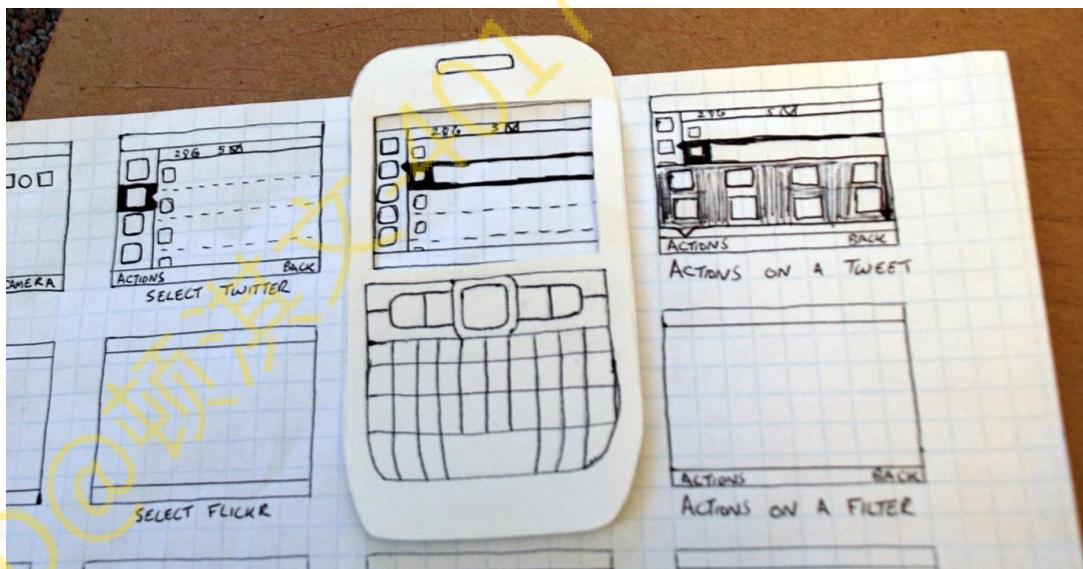
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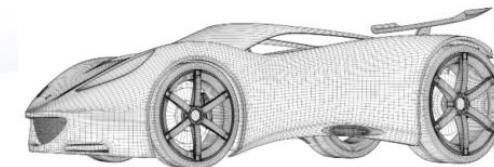


What is Prototype

Prototype is the process of quickly **mocking up the future system functionality**, using **visuals** to describes most of the words, worth of design and development specifications that detail how a system should behave and look.



Blueprint



How it works
in concept



Prototype

How it works
in practice

Why Prototype - Pros

Explore ideas before you invest in them, Improved communication between client and development team, reduced risk, reduced maintenance, greater user satisfaction, saving time and money, proof concept, exploring design and the technical skills of the system.

Benefits of Software Prototyping



Idea Validation



High-Quality Product



Enhanced User Involvement



Collaboration with Stakeholders



Fast Users' Feedbacks



Better Fundraising Opportunities



Reduction of Software Development Time and Efforts



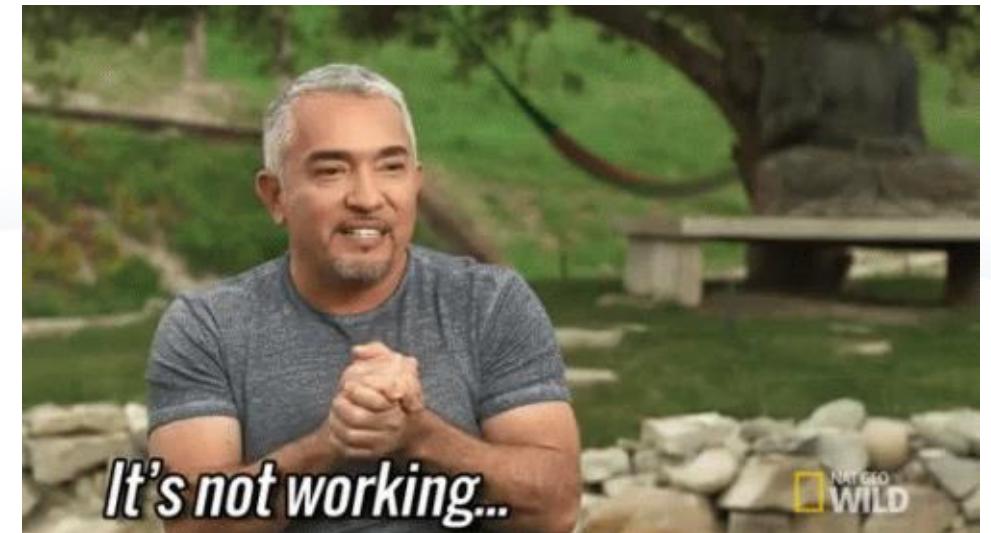
Cost-Time Efficiency



Why Prototype - Cons

Prototyping might:

- User will assume that system already developed, we need to manage expectations carefully
- Create a system that doesn't scale, and the size is limited when using paper print
- Spend a great deal of time making throw-away prototypes look good, wasting time.



It's not working...

Prototype fidelity(精度)



Low fidelity 低精度,
(手写模型,易更改)

Medium fidelity 中等精度
(电脑软件制作,模拟交互)

High fidelity 高精度
(最真实,容易被误认为最终版本
开发的绝佳参考,开发人员的学习曲线陡峭)

Usability

Usability is:

The extent to which a product can be used by specified users to achieve specified goals with **effectiveness, efficiency, and satisfaction** in a specified context of use.

Effectiveness: accuracy and completeness with which users achieve specified goals.
(how)

Efficiency: resources expended in relation to the 'effectiveness' with which users achieve goals. (time, cost..)

Satisfaction: the comfort and acceptability of the work system to its users and other people affected by its use. (comfortable)

Usability Evaluation

Learnability:

How easy is it for users to accomplish basic tasks the first time they encounter the design?(操作是否简单易懂?)

Efficiency:

Once users have learned the design, how quickly can they perform tasks?(学会如何操作后,操作的效率/时间快不快?)

Memorability:

When users return to the design after a period of not using it, how easily can they re-establish proficiency?(操作是否容易记忆)

Errors:

How many errors do users make? How severe are these errors?
How easily can they recover from the errors?(操作过程犯的错误多吗? Miss click..)

Satisfaction:

How pleasant is it to use the design?(使用感,舒适度)



Usability Evaluation Type

Formative evaluation

User experience the prototype and found the problems
用户体验原型并发现可用性问题

User provide feedback according to user interface and functionality
用户根据功能和界面提供反馈

Evaluate during developments
在开发过程中进行

Formative evaluation type :
– User Review influence final result
用户审查产品并影响最终结果
– 由 HCI 专家评估 - Heuristic evaluation, Cognitive walkthrough - learnability - • 启发式评估、认知演练 - 可学习性

Summative evaluation

Mostly after the development
发生在开发后 :

- lab experiments
通过实验室实验, 专家通过单向镜观察用户使用界面
- collect quantitative data
收集的定量结果

usability of an interface is measured by things like task times, completion rates and satisfaction

- 界面的当前可用性是通过任务时间、完成率和满意度等因素来衡量的

知识点讲解

Week 8

H



What is User Persona?

Archetypical descriptions(原型描述) of **user behavior patterns** into **representative profiles**, to humanize design focus, test scenarios, and aid design communication.” 以人性化为中心，测试应用场景，辅助设计之间的交流

Cooper, A. (2004)

Create representations of **key audience segments** for reference throughout the design process 在设计中标明受众类型

探索想象中的用户与产品交互的心理。

为特定的非通用用户创建产品，提供清晰的愿景而不是无重点的目标

Clark Andrews

AGE: 26
OCCUPATION: Software Developer
STATUS: Single
LOCATION: San Jose, CA
TIER: Experiment Hacker
ARCHETYPE: The Computer Nerd

Friendly Clever Go-Getter



"I feel like there's a smarter way for me to transition into a healthier lifestyle."

Motivations

- Incentive
- Fear
- Achievement
- Growth
- Power
- Social

Personality

| | |
|-----------|------------|
| Extrovert | Introvert |
| Sensing | Intuition |
| Thinking | Feeling |
| Judging | Perceiving |

Technology

| | |
|---------------|-----------------|
| IT & Internet | Software |
| Mobile Apps | Social Networks |

Brands



Bio

Aaron is a systems software developer, a "data junkie" and for the past couple years, has been very interested in tracking aspects of his health and performance. Aaron wants to track his mood, happiness, sleep quality and how his eating and exercise habits affects his well being. Although he only drinks occasionally with friends on the weekend, he would like to cut down on alcohol intake.

Aaron

Title: IT Students
Location: Netherlands
Age: 22-25



Social Media

Mobile Apps

Gadgets

Goals

- easy to use
- quick access
- easy to share
- find info

Pain-points

- long loading process
- confusion buttons
- too much adds
- connect with friends

Why Persona is so important?

Build Empathy

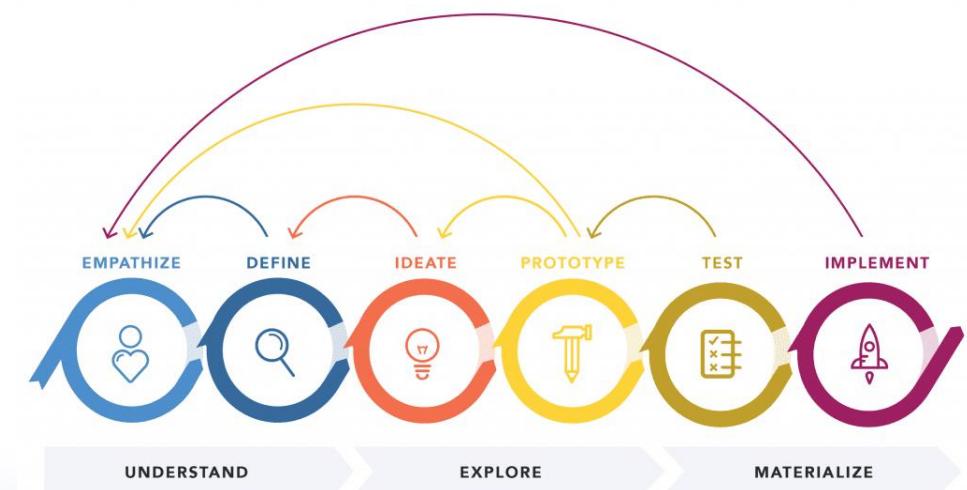
Helps users seem more real -designers' empathies and build for their users 建立起同理心

Provide Direction For Making Design Decisions

Helps focus design decision on users –don't build it for yourself or a generic user 预防设计人员的“想当然”

Communicate Research Findings

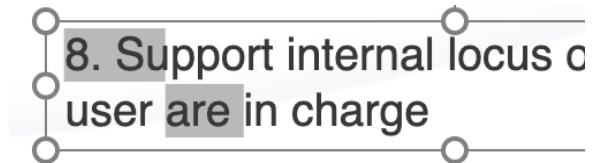
Team on the same page, communicates information in an easy to understand format 建立共识



DESIGN THINKING 101 NNGROUP.COM

Ben Shneiderman's 8 Golden Rules

1. Strive for consistency 一致性
2. Cater for diverse users – for different user 多元化
3. Offer informative feedback – interaction 交互感
4. Design dialogues that yield closure – a sequence of actions 操作闭合
5. Prevent errors – offer easy error handling messages 避免大的操作失误, 提供简单明了的错误信息
6. Permit easy reversal of actions – UNDO/REDO 撤回
7. Reduce short-term memory load – easy and clear interface 简单明了的操作界面, 避免需要用户回忆的情况
8. Support internal locus of control – feeling of they are in charge 操作感, 控制感



Jakob Nielsen has 10 heuristics 启发式 for Interface Design

Visibility of system status

Match between system and the real world

User control and freedom

Consistency and standards

Error prevention

Recognition rather than recall

Flexibility and efficiency of use

Aesthetic and minimalist design

Help users recover from errors

Help and documentation

3. Offer informative feedback

例如购物车系统

8. Support internal locus of control

1. Strive for consistency

5. Prevent errors

7. Reduce short-term memory load

2. Cater for diverse users

5. Prevent errors

Guidelines for designing UI

Donald Norman advises designing UI based on:

Affordance

–the **appearance** of a specific control should suggest the **purpose** for which it is used (i.e. functionality)

Visibility

–The user shown know how to operate something by just looking at it
–All controls must provide immediate feedback to indicate control is responding

用户界面应该能够清晰的表明他们的作用和功能

用户界面应该能让用户体验到操作的感觉,并且能够给予正确的反馈,让用户知道他们在做些什么

Design Principle

Minimise the pain

- No one likes filling in forms
 - Smart defaults, inline validation, forgiving inputs
- Illuminate a path to completion

Consider the context

- Familiar vs. foreign
- Frequently used vs. rarely uses

Ensure consistent communication

- Errors, Help Success
- Single voice despite many stakeholders

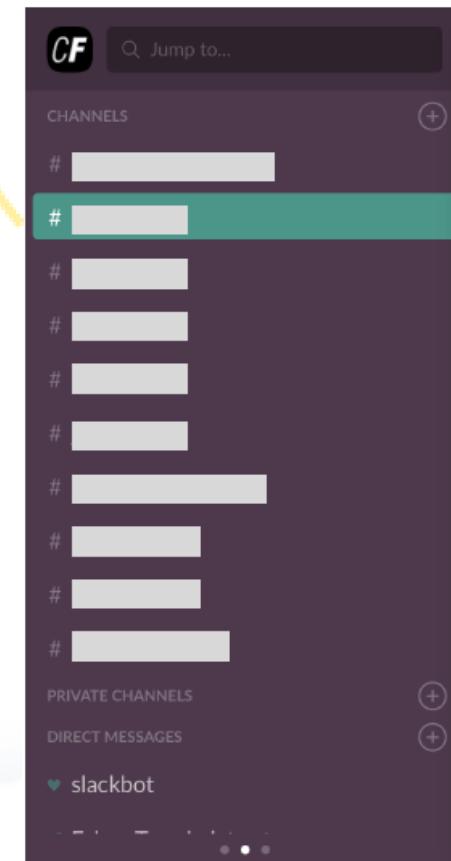
避免冗余的操作,减少使用的痛苦

系统之间内容的关联要紧密(考虑上下文)

保持一致的沟通和交流

HD@斯坦福
1401162631

Practice example



E-mail

me@domain.com

Password

Error!



E-mail

me@domain.com

Password

Password incorrect. If you don't remember your password, [reset it](#)



知识点讲解

Week 9

H



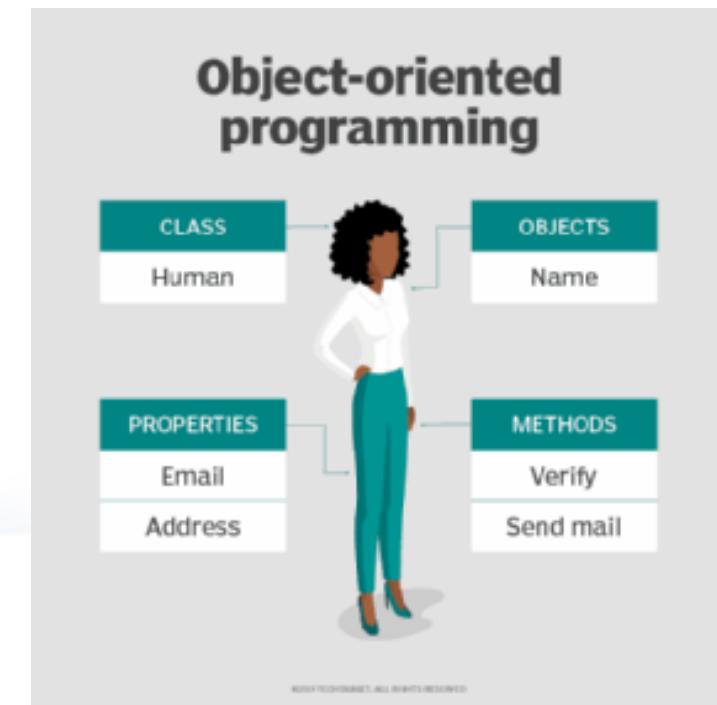
Object Oriented and OO design principle

Object-oriented refers to a programming language, system or software methodology that is built on the concepts of logical objects.

It works through the creation, utilization and manipulation of **reusable objects to perform a specific task, process or objective**

Class, Object, attributes, behavior

面向对象程序设计方法是尽可能模拟人类的思维方式，使得软件的开发方法与过程尽可能接近人类认识世界、解决现实问题的方法和过程，也即使得描述问题的问题空间与问题的解决方案空间在结构上尽可能一致，把客观世界中的实体抽象为问题域中的对象。



Object Oriented and OO design principle

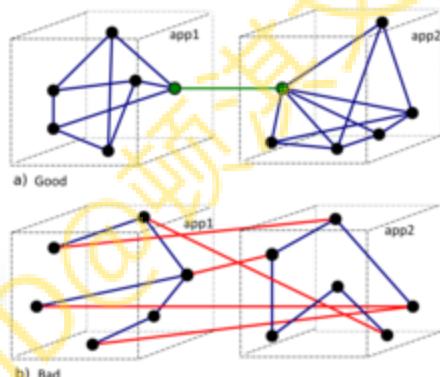
主要是面向对象（OO）的设计，判断其设计好坏的标准，主要是看类的内聚性是否高，耦合度是否低。

Cohesion 内聚

衡量模块独立性的定性标准是内聚（一个模块内各个元素彼此结合的紧密程度）

模块内的关联要紧密

低内聚性一般也代表不易维护、不易测试、不易复用以及难以理解。



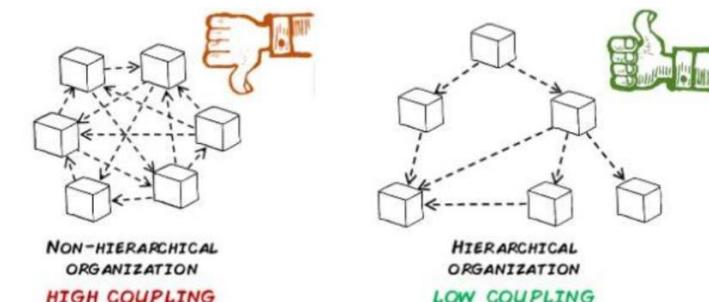
A模块该干的事儿放在A模块

Coupling 耦合

是指一程序中，模块及模块之间信息或参数依赖的程度。

模块之间的关系要清晰

Dependency hell（相依性地狱）：软件包之间的依赖性过高导致的难以维护的情况 - high coupling



Design Class Diagram

What is DCD?

A class diagram is a **UML diagram type that describes a system by visualizing the different types of objects within a system** (Navigation between classes, attribute names and properties, method names and properties)

To :

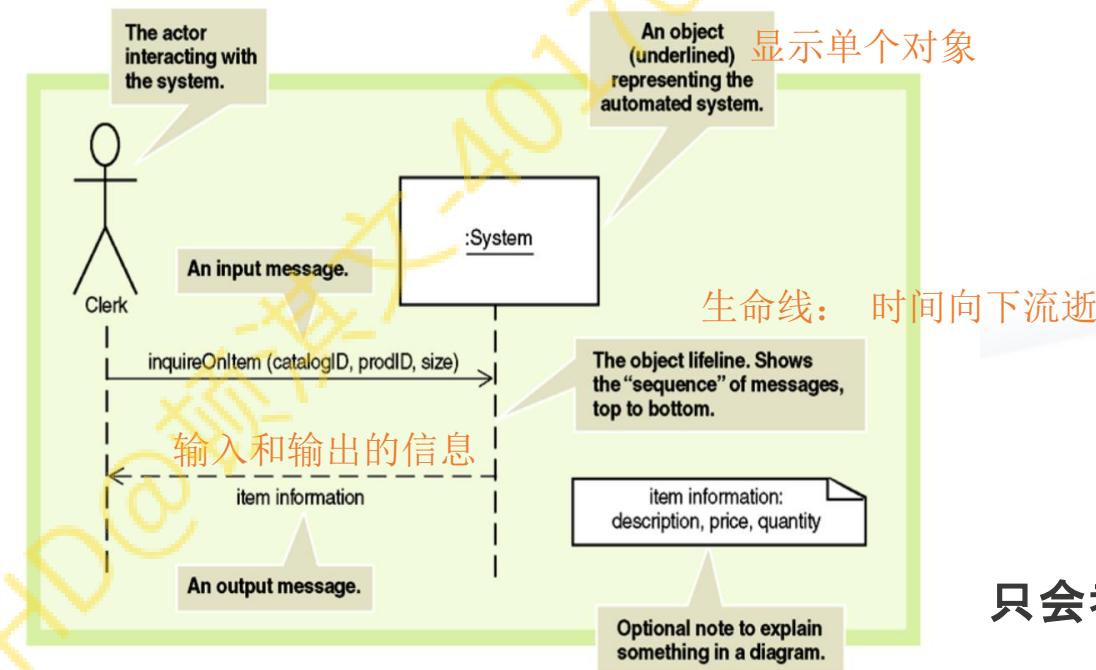
Extend the domain model class diagram developed during OO analysis

| Domain diagram Student | Design class diagram Student |
|---|--|
| <p>Student</p> <p>studentID name address dateAdmitted lastSemesterCredits lastSemesterGPA totalCreditHours totalGPA major</p> | <p>«Entity» Student</p> <p>-studentID: integer {key} -name: string -address: string -dateAdmitted: date -lastSemesterCredits: number -lastSemesterGPA: number -totalCreditHours: number -totalGPA: number -major: string</p> <p>+createStudent (name, address, major): Student +createStudent (studentID): Student +changeName (name) +changeAddress (address) +changeMajor (major) +getName () : string +getAddress () : string +getMajor () : string +getCreditHours () : number +updateCreditHours () +findAboveHours (int hours): studentArray</p> |

Sequence Class Diagram

Sequence diagrams(序列图、时序图) describe **interactions among classes** in terms of an exchange of messages over time.

A sequence diagram is a good way to visualize and validate various runtime scenarios. These can help to **predict how a system will behave** and to **discover responsibilities a class** may need to have in the process of modeling a new system



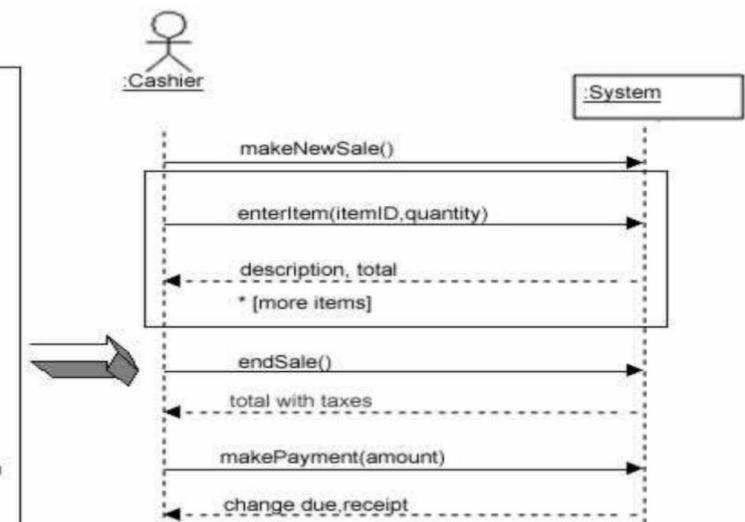
Simple Cash-only Process Sale scenario:

1. customer arrives at aPOS check out with goods and/or services to purchase.
2. Cashier starts a new sale.
3. Cashier enters a new item identifier.
4. System records new sale line item and presents item description, price and running total.

Cashier repeats steps 3-4 until indicates done.

5. System presents total with taxes calculated.
6. Cashier tells Customer the total, and asks for payment.
7. Customer pays and System handles payment.

Use case to SSD



只会考 first-cut sequence diagram

知识点讲解

Week 10

H



What is Testing and Why we need it?

Testing is a method to check whether the actual software/system product matches expected requirements and to ensure that software/system product is Defect(瑕疵) free.

The purpose of software/system testing is to identify errors, gaps or missing requirements in contrast to actual requirements.

软件/系统测试是一种测试系统/软件产品能否达到需求水准的检测方式

目的是发现/排查错误,缺失或者易漏的需求
确保开发的产品能够顺利地交付到客户手上

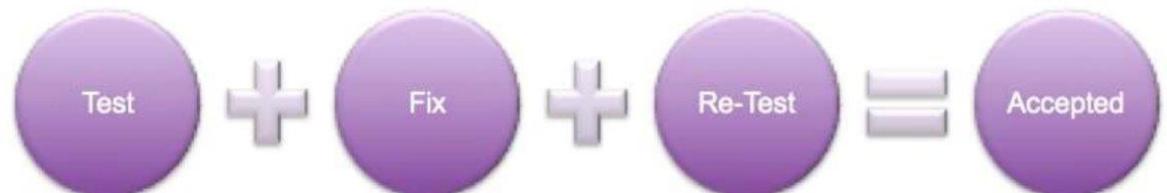
Test Process

Plan -“What” to test.

Design -“How” you are going to test

Schedule -“When” you are going to test

Execute



White, Grey, Black box testing

Black box - 黑盒测试

只注重输入/输出

黑道老大:下属去处理吧.我只看结果

White box - 白盒测试

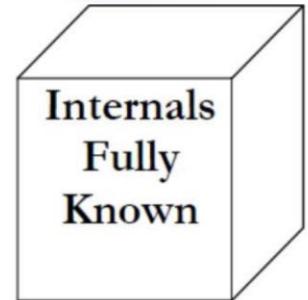
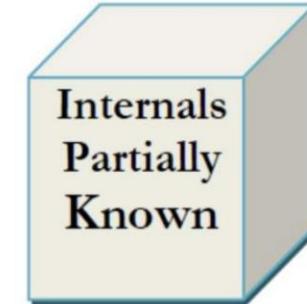
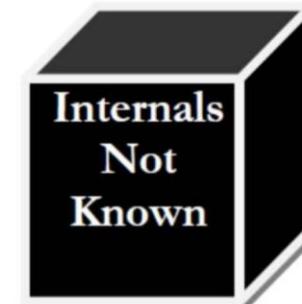
输入输出是什么? 内部程序怎么处理的? - 对测试工程师要求较高

Grey box - 灰盒测试

白+黑

输入输出的表现

对内部程序怎么处理进行部分关注



White, Grey, Black box testing

| | Black Box Testing | Grey Box Testing | White Box Testing |
|----|--|--|---|
| 1. | The Internal Workings of an application are not required to be known | Somewhat knowledge of the internal workings are known | Tester has full knowledge of the Internal workings of the application |
| 2. | Also known as closed box testing, data driven testing and functional testing | Another term for grey box testing is translucent testing as the tester has limited knowledge of the insides of the application | Also known as clear box testing, structural testing or code based testing |
| 3. | Performed by end users and also by testers and developers | Performed by end users and also by testers and developers | Normally done by testers and developers |
| 4. | -Testing is based on external expectations -Internal behavior of the application is unknown | Testing is done on the basis of high level database diagrams and data flow diagrams | Internal workings are fully known and the tester can design test data accordingly |
| 5. | This is the least time consuming and exhaustive | Partly time consuming and exhaustive | The most exhaustive and time consuming type of testing |
| 6. | Not suited to algorithm testing | Not suited to algorithm testing | Suited for algorithm testing |
| 7. | This can only be done by trial and error method | Data domains and Internal boundaries can be tested, if known | Data domains and Internal boundaries can be better tested |

Black : 用户体验, 输出结果正确性 测试者不需要有对系统的技术上的任何知识

white: 系统内部结构是否按照规定执行, 是否出错, 对技术要有一定知识储备

Grey: 对系统内部也会进行关注, 但不是全部, 因此耗时比白盒测试要短

Testing type

Functional Testing - 针对一个function的输入输出进行的测试

Unit Testing - 单元测试, 单元大小可以是一个function, 一个组件, 一个class...

Intergration testing - 集成测试 - 一个模块, 一套流程的测试 between unit and system test

System testing - 系统测试 - 对整个系统功能进行的测试

User Acceptance Testing (UAT) - 用户需求、要求和业务流程的正式测试, 用于确定系统是否满足验收标准 一般是由客户进行测试, 开发团队给予帮助和支持

Regression Testing - 回溯测试- 更改了代码后再一次进行的测试

Testing type

Performance Testing - 确定软件效率和性能的测试

Load Testing - 给予大量数据测试系统是否能够处理

Stress testing - 压力测试 - 测试系统是否能承载到达极限/超越它极限的数据量

Static Testing - 静态测试 - 测试代码中的typo, 书写等等

Accessibility Testing - 测试系统是否能够让残障人士便于使用 - html aria Accessible Rich Internet Applications

Regression Testing - 回溯测试- 更改了代码后再一次进行的测试

知识点讲解

Week 11

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Implement Process

1. Implementation planning

部署计划 - 软硬件设施? 云服务器套餐..?

2. Build the system or Buy the system

如何选择是购买还是内部开发

3. Test system – Install system

测试系统并安装

4. Maintenance and Documentation

维护与 文档

Implementation plan 在waterfall 开发流程中,早期就能够大致写下来

安装,部署系统要考虑到原有系统如何替代的问题



System install and documentation

Multiple Location – Pilot Installation 试点安装

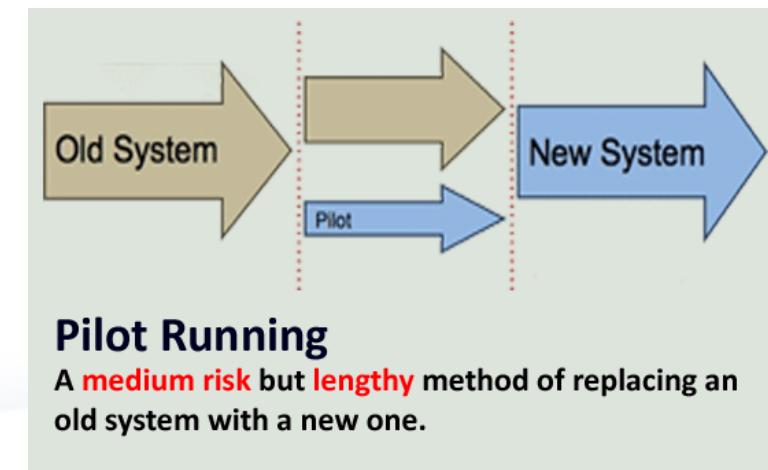
当有多个地点需要安装时,先采取试点安装的方式,选择一个特定的试点安装程序并运营,最后再全面铺开

Advantages

- Risks relatively low if problems occur
- Errors are localised to pilot site 有问题只影响试点
- Can be used to train users before implementation at their own Site 可以借此阶段进行用户训练

Disadvantages

- Lack of consistency between different parts of the organisation 缺乏一致性



System install and documentation

Multiple Function – Phased Installation

Add component to system each phased

Advantages:

Reduce risk – phased failure < system failure

Lower cost

Benefits can be realised earlier

Rate of change minimised by user

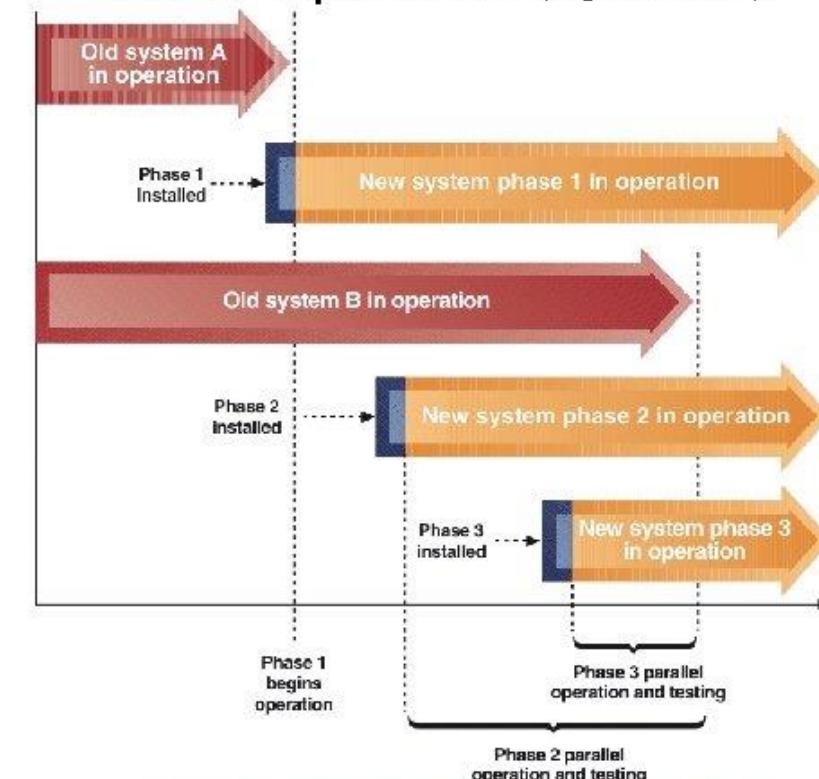
Disadvantages:

multiple phased comes more integrations problems

Limited business applicability

Phased Installation with Direct Cutover and Parallel Operation (Figure 15-22)

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System install and documentation

Direct Installation / Abrupt cutover - 直接安装/突然切换

This approach is meaningful when:

- the old system is either very small and/or very simple
- the new system is completely different from the old and comparisons would be meaningless

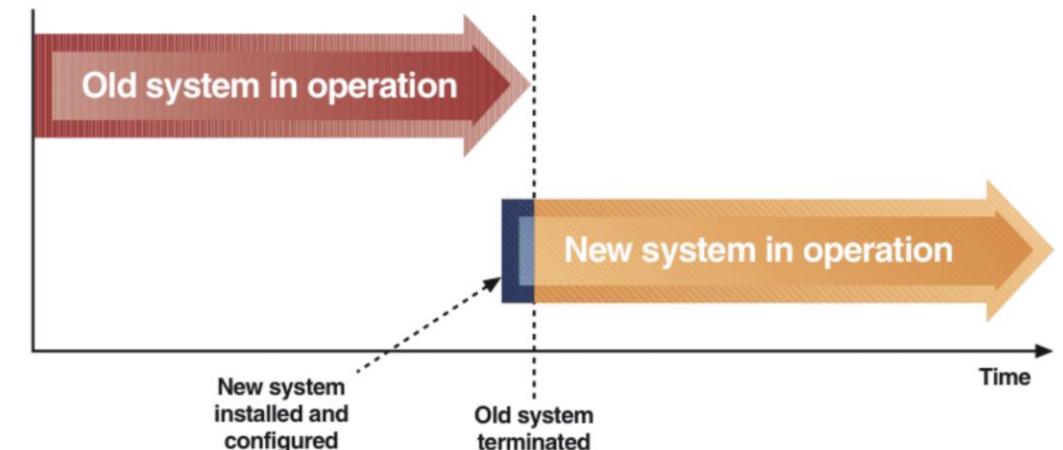
Advantages

- Simple, fewer logistic issues to manage, costs minimised

Disadvantages

- High risk .. no backup

Direct installation / Abrupt cutover



System install and documentation

Parallel Installation 并行安装

Old and new system both operate for an extended period of time.

Cut over at the end of a business cycle, after balancing between both systems

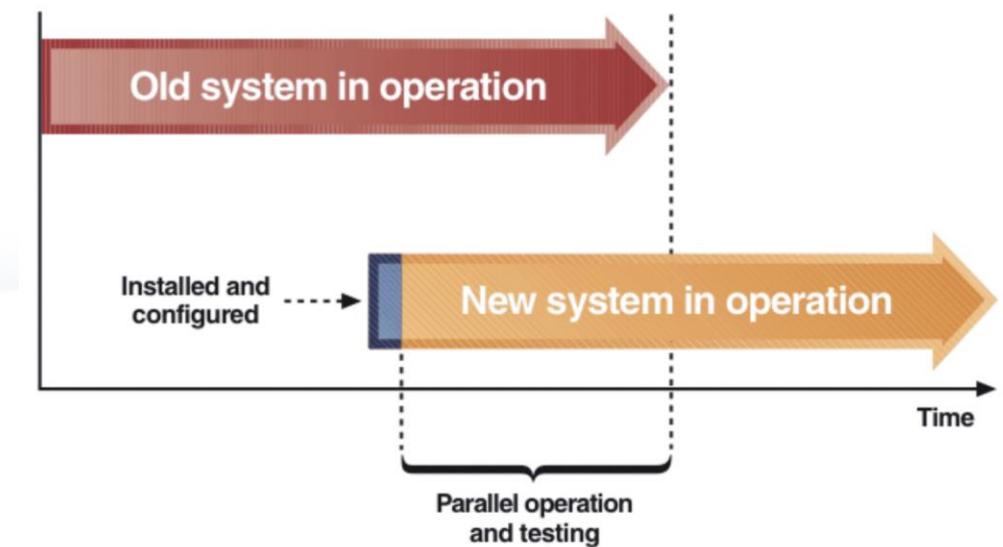
Advantages

- Risk low if problems occurs
- continual backup

Disadvantages

- High cost: increased personnel, extra space, increased managerial and logistic complexity

Parallel installation



System install and documentation – what else need to be consider

Data migration/conversation

- A critical, challenging task, that can be very complex and costly
- Can create new or reuse existing data
- Data typically obtained from:
 - Files or databases of system being replaced
 - Manual records
 - Files or databases of other systems being integrated with new system
 - Interaction with the client during normal system operation

Enviroment configuration : version /
framework / server ..

Data storage format and data content
Data migration process



Maintainance Type

Corrective Maintenance 修正类维护 - 在installation后出现,修改bug/error - 占了maintenance 75%的时间

Adaptive Maintenance 适应性维护 - 当出现新的business logic(eg. Tax law), 或者新的环境(eg.new os system), 对系统进行的维护和更改

Perfective Maintenance 完美性维护 - 对系统的performance 进行的维护,例如,系统承载的能力, usability. Legacy system更需要这类维护

Preventative Maintenance 预防性维护 - 对系统进行观测.检测,发现漏洞等, 预防未来出错

Conduct Training

Considerations:

- Users
 - Number of users, Existing skill levels, On-going usage levels –regular, occasional
- Level of detail to be imparted to the audience
- Who should conduct the training
- Where / When should the training be conducted
- Methods and resources, specialised training documentation – designed to put novice users at ease
- Need supportive User Manager who is committed to allocating time for training

Training aids

- Must be easy to use
- Reliable
- Demonstrations and classes
- Training documentation
 - especially designed to put the novice user at ease
- On-line help
- Expert users

On-going training needs after installation:

- Online help
- Resident experts
- Help desk

HD@前途

Post-implementation Review report

look at original requirements and objectives

- evaluate how well they were met
- compare costs of development and operation against original

estimates (maintenance costs)

- compare original and actual benefits
- new system reviewed to see whether more or original or additional benefits can be realised

Post implementation review

Purpose of document

The purpose of this document is to formally close a project and assess the effectiveness of the project against the deliverables.

| |
|--|
| Name of project :- Wi-Fi |
| Project objectives: |
| <ul style="list-style-type: none"> • July 2015- Roll out public Wi-Fi solution across The Grange and Oliver Cromwell's House. |
| Management processes (what processes were used to support the success of the project?) |
| <ul style="list-style-type: none"> • Initial scoping of the Councils needs regarding public Wi-Fi access carried out by ICT Principal Officer. • ICT Principal Officer researched benefits of hosting CAMB Wi-Fi service over provision of in-house Wi-Fi solution. In house solution would have cost £2000's year on year to support and maintain whereas CAMB Wi-Fi is £500 year on year managed service. • Funding sourced from Capital Programme estimated at £20k and project delivered under budget at £19,200. • Project managed by dedicated ICT Technical Officer who liaised with Virgin Media Business in the delivery of the project and assisted in the implementation of the solution. • Procurement carried out under the existing CPSN Framework Agreement and Wi-Fi services ordered from the CPSN Service Catalogue. • User Acceptance Testing carried out by ICT and reported defects back to VMB for rectification. • Project signed off by Principal ICT Officer after full acceptance testing carried out and verification from ICT Technical Officer in charge of project. |
| What went well? |
| <ul style="list-style-type: none"> • Tidey Electrical Services installed all cabling, brackets and an additional comms cabinet at OCH in a very professional and discreet manner causing very little disturbance to the Councils working day. • ICT Technical Officer (Steve Garlinge) chased VMB as necessary and escalated the various issues up to the Principal ICT Officer for resolution and followed up the necessary actions in a speedy and professional manner. • The provision of the Wi-Fi service was very quick and efficient once the infrastructure was in place and VMB accommodated an unscheduled reboot of the main ECDC router out of normal office hours to initiate the Wi-Fi service for testing the next day. |

重难点总结

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请给予我们提高和改进的机会，感谢您对 HD·EDUCATION 课程和服务的信任！

· 填写问卷操作流程 ·



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