

第一章：什么是软件，什么是遗留软件，什么是软件工程；

How should we define software?

- ① **instructions (computer programs) that when executed provide desired features, function, and performance;**
- ② **data structures that enable the programs to adequately manipulate information and**
- ③ **documentation that describes the operation and use of the programs.**
- ④ **service based on Knowledge**



Legacy Software P(7)

- were developed decades ago and have been continually modified to meet changes in business requirements and computing platforms.
- costly to maintain and risky to evolve.
 - have inextensible design, convoluted code, poor or nonexistent documentation, test cases and results that were never archived, a poorly managed change history, etc.
- is characterized by longevity and business criticality.

The Nature of Software (P3)

Key point:

- Software is both a product and a vehicle that delivers a product
- As a product, software is an information transformer — producing, managing, acquiring, modifying, displaying, or transmitting etc.
- As a vehicle used to deliver the product, software acts as the basis for the control of the computer(OS), the communication of information(NET), and the creation and control of the other programs(tools and environments).

Software Engineering P(15)

- Fritz Bauer
 - Software engineering is the establishment of sound engineering principles in order to obtain reliable and efficient software in an economical manner.
- IEEE
 - ① The application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software; that is, the application of engineering to software.
 - ② The study of approaches as in (1).
- 《Cross Talk》
 - Software engineering is a layered technology that encompasses a process, methods for managing and engineering software, and tools.

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第二，三章：2.2 节如何对当前项目自适应调整（3.3 节有例子小型项目沟通活动）

第四章：4.1 节传统的过程模型（特点（xx 驱动），怎么运用，并发模型的例子）

第五章只关注极限编程（为什么极限编程把 5 个框架活动简化成了 4 个）

第七章：理解需求：7.2 建立根基（4 步）；

第八章：用例图（8.2 画用例图的步骤；课件里的用例图），活动图

第九章：类图（9.1-9.6 画类图的步骤；课件里的类图，组合设计模式）；多态概念

第十章：顺序图和状态图（区别和联系，顺序图开发了一个交互场景，状态图整个图聚焦于一个对象的生存周期）[UML 图 | 时序图（顺序、序列）绘制 - 知乎 \(zhihu.com\)](https://www.zhihu.com/question/20440000/answer/100000000)

见 PPT

第十一章：11.3 设计概念

第十二章：风格和模式

十三章：13.2 七个面向对象原则（前四个必考）；内聚和耦合的理解

第十七章：什么是总体测试策略；四个步骤（单元测试（测五种错误），集成测试（自顶向下，自底向上，三明治法；冒烟测试，回归测试），确认测试（阿尔法测试，贝塔测试），系统测试（五种测试））知道这些概念在这章

第十八章（面向过程）：基本路径测试前三步（给定程序或流程图）（必考）

第十九章（面向对象）：面向对象测试和传统软件测试的区别（在单元测试和集成测试不一样，为什么）

第二十二章 4p 中的 product 和 7 章中的建立根基有关

第二十二章重点：组建团队考虑的因素（people）（课本附近找答案），w5hh 原则（project）

W5H2 is a project development principles that addresses project objectives, milestones and schedules, responsibilities, management and technical approaches, and required resources.

1.WHY: All stakeholders should assess the validity of business reasons for software work, which allows the team to focus on the business purpose of the software. The Generic Process Framework for Software Engineering encompasses five framework activities: communicate, planning, modeling, construction, and deployment. We need to discuss with the client in the communication activity to clarify the business purpose, which is called "asking the first questions". This helps to identify stakeholders who are interested in building the software, while also giving us the flexibility to choose a process model based on business purposes. For example ,if a customer is in a hurry to get a product to market, we may as well choose the Incremental Process Model.

2. WHAT - It means to define the task set required for the project. The software engineering process is not a dogmatic rule, which needs 'Process Adaptation' in order to balance software quality and development agility. For example, in the 'communication' activity, the task sets generated by small projects and large projects are different, and the task sets of large projects are often more complex.

3.WHEN - when to do it? It means developing a project schedule, defining important milestones and timelines for the project. Many software engineering tasks in complex systems are carried out in parallel (such as concurrent development models), and without scheduling, the interdependencies between tasks will be very difficult to understand, which may lead to project delays.

4. WHO - It means determining which team member has which responsibilities. Since 'People' are the most important part of the 4Ps. A good project manager should organize in a way that maximizes everyone's skills and abilities. The distribution of skills among team members must be appropriate for the problem to be solved.

5.WHERE - Where is their organization located? The stakeholders involved in the software process are divided into 5 categories, not only developers but also senior managers and customers, who have responsibilities alike. We ought to recognize Multiple viewpoints and work toward collaboration in requirements modeling .

6. HOW - Once the product scope is determined, the technical strategy and management strategy must be defined. The technical strategy is addresses such questions: what kind of process model is selected? How to carry out requirement modeling, design modeling? How to do software testing? Management strategy is about software configuration management and management of team members (what organizational paradigm is adopted).

7. HOW MUCH – The cost is estimated through the life cycle of software projects. Estimation begins by describing the scope of the product, then breaks the problem down into a set of smaller problems, and estimates for each. Reasonable allocation of resources determines the smoothness and efficiency of software process.

5W2H is a process of doing things organized, standardized, and logical. Every time you accept a work task, you can apply this analysis method, so that you can be calm and not have no clue. Because it extracts the key to finding and solving problems, which is very helpful for decision-making and implementation measures.

1. In your own words describe what is a software process.

用你自己的语言描述什么是软件过程。

A process is a collection of activities, actions, and tasks that are performed when some work product is to be created. An activity strives a broad objective and is applied regardless of the application domain, size of the project, complexity of the effort, or degree of the rigor with which software engineering is to be applied. An action encompasses a set of tasks that produce a major work product. A task focuses on a small, but well-designed objective that produces a tangible outcome.

5. Behavior modeling in expressing the state diagram, what are the two simply described its core content?

行为建模中表达状态的图有哪两种，简单描述其核心内容？

State diagram and sequence diagram

State diagram: describe the object of the class of all possible condition of the transfer of the state and event occurs, is to describe an entity dynamic behavior, based on incident response shows how the entities are based on the current state to respond to different events.

Sequence diagrams, sequence diagrams, also calls the sequence diagram, mainly used for detailed steps of a process, in the system is used to describe the dynamic interactions between objects, mainly reflect the information transmission between objects in chronological order.

2. UML and the UP is the same meaning?

UML 和 UP 是同一个意思吗？给出你自己的解释。

It isn't.

UML is an object-oriented modeling language, it is to use unified, standardization of the mark and definition to the object-oriented software system description and modeling.

The UML is composed of three building blocks:

Item - these are the modeling element itself.

Relationship - that show how two or more objects are related. (correlation and dependence, generalization, realization)

Figure - the UML model view, show a collection of objects. (static model, dynamic model)

Static model: class diagram, component diagram and deployment diagram

Dynamic model: object diagram, use case diagram, sequence diagram, collaboration diagram, state diagram, activity diagram

The UP is a kind of popular iterative and incremental software development process framework. In the unified process (rup) one of the most famous and widely recorded unified process refinement is relationship.

UP with four stages

Initial -- the base of the project: lifetime goal.

Elaboration - software architecture evolution: life span frame.

Structure - software: initial operation function.

Transfer - the software is deployed to the user environment: product release.

UML is a general visual modeling language, does not give us any modeling method.

But UP is methodology, it tells us how to construct the software system. Built UP using UML visualization as it touch the syntax.

4. System structure (architecture), frame (framework), the system structure model, architecture pattern) what is the difference between the three?

体系结构 (architecture)、框架 (framework)、体系结构模式 (architecture pattern) 三者之间有什么差异？

Software architecture refers to the one or more system structure, it consists of software components, the externally visible properties of components as well as the relationship between them. It is the system organization of the software system, it is to constitute a system component interfaces, behavior patterns, collaboration system problems, such as decision combined. It not only involves the structure and behavior, but also involves the system of use, functionality, performance, flexibility, reusability, the understandability, economy and technology constraints of weigh and aesthetic consideration.

3. XP's reconstruction and pair programming ideas.

阐述 XP 中的重构和结对编程的理念。

XP's central idea is simultaneously, before and after can be designed at the beginning of the code refactoring means that design as the system construction and continuous Refactoring to improve design (or source) of internal structure, but did not change its external function or behavior.

Refactoring is the process of changing a software system in such a way that it does not alter the external behavior of the code yet improves the internal structure. It is a disciplined way to clean up code that minimizes the chances of introducing bugs. In essence, when you refactor you are improving the design of the code after it has been written

Pair programming: are two programmers face the same computer, in collaboration with the same design, same algorithm, the same piece of code, or the same set of tests. Compared with the two programmers work independently, pair programming often took only about half of the time can write out higher quality code. Not only can reduce software development costs, but also can improve software quality, is more as

4. What is the baseline, what practical significance? 什么是基线，有什么实践指导意义？ 书427
A specification or product that has been formally reviewed and agreed upon, that thereafter serves as the basis for further development, and that can be changed only through formal change control procedures.
Before a software configuration item becomes a baseline, changes may be made quickly and informally. However, once a baseline is established, changes can be made, but a specific, formal procedure must be applied to evaluate and verify each change.
Baseline is a milestone in software development, the logo is in the formal technical review has been approved for one or more of the delivery of software configuration items.
Provides a baseline for the development of workpiece fixed-point and snapshot
New project can offer of fixed-point set up from the baseline. As a separate branch of the new project and then to the original project (on the main branch) conducted by the changes in isolation.
Each developer has a baseline of artifacts can be update as his private workspace in isolation.
When the trust to the update is not stable or not, the baseline for the team to provide a way to cancel the change.
Can take advantage of the baseline to build configuration based on a specific release, they would reproduce the errors have been reported.

2. 重构意味着修改全部设计吗？如果不是，那么它又是什么含义？
Refactoring means to modify all design? If not, then what is it meaning?
It isn't. Refactoring is a part of the code maintenance, not correct mistakes, and do not add new functionality. But is used to improve the readability of the code, or change the structure and design of the code, to make it easier to maintain in the future.
Software refactoring means without changing the software function and external visibility conditions, in order to improve the software structure, improve the clarity and extensibility and reusability of software modification.

Software framework of software development projects are common part of the process to extract domain-specific software architecture, framework of software projects in different areas have different types. It is a for a specific application in the field of providing scalable architecture template instance. It illustrates the whole design, dependencies between collaborating objects, responsibility allocation and control process, characterized by a set of abstract classes, and collaboration between its instance method, it provides the context for component reuse.

Software architecture pattern describes a appeared in the context of a specific design special reappearance of design problems, and its solutions provide a good general plan proved. Design pattern is simple speak can reuse design paradigm. Is some kind of scenario you can apply a solution to (design). So it is a smaller concept. Often an architecture consists of multiple design patterns.

4. Demand analysis, the object-oriented analysis method and what is the difference between structured analysis method?

进行需求分析时，面向对象分析方法和结构化分析方法有什么差别？

Structured method the basic idea is to solve the problem as a system to use the thinking method of system science to analyze and solve problems. Structured approaches can be summarized as: the basic idea of top-down, stepwise refinement, modular technology.

Top-down decompose step by step, it is to point to in the program design, the first consider problem of aspect, after determine the main direction, and its excellent deep into the problem of the specific details, from easy to difficult, step by step to solve the problem. This is a from fuzzy to clear, from generalization to a specific process. And incremental refinement is in complex problems, design a sub-operation first goal as a transition, to gradually thinning

Structured approaches emphasize function abstraction and modularity. Because it adopted the method block to handle the problem, can put a more complex problem is decomposed into several easy to deal with the parts, reducing the difficulty of the problem. Due to the structured method is clear, coherent, and effectively decompose the problem of heavy and complicated, made clear when writing programs, simplifies the programming personnel multifarious work; And when reading the same can also, give a person the sense with clear.

Object-oriented is a kind of applied objects, classes, inheritance, encapsulation, concepts such as aggregation, message passing, polymorphism to construct the system of software development methods. Object oriented is the transaction problem is decomposed into each object, establishing the object's purpose is not in order to complete a step, but in order to describe something in the whole solution and the thinking of object-oriented design is from other to solve the problem. Object-oriented approach advocated from the objective world is the nature of the inherent things, set out to construct the system advocates human thinking method commonly used in real life to get to know and understand, describe the objective things, emphasize finally established system to map the problem domain. Objects in the system, as well as the relationships between objects can faithfully reflect the things and their relationships inherent to the problem domain.

In terms of programming, structured method has more advantages, it is clear, coherent, steps and tidy, facilitating reading comprehension; In functional user using method, object-oriented method is more easy to understand, its simple operation, clear interface, makes software USES a simple.

5. You said they talk should include the content of the management of the project.

谈谈你自己认为的项目管理应该包括的内容。

a. Project scope management is in order to achieve the goal of the project, the content of the work for project management process control. Define the scope, it includes the scope of the plan, the scope of the adjustment, etc.

B. project time management: is the final finish in order to ensure that project a series of management process. Definition it includes specific activities, activity scheduling, time estimates, progress arrangement and time control work. A lot of people introduce the GTD time management, raise working efficiency.

C. Project cost management: to ensure to complete the project actual costs and expenses shall not exceed the budget costs and expenses of management process. It includes resource allocation, cost, cost budget and cost control and so on a work.

d. project quality management is to ensure that projects meet customer quality requirements as specified in the implementation of a series of management process. It includes quality planning, quality control and quality assurance, etc.

E. human resource management is the ability to ensure that all stakeholders and enthusiasm are the most efficiently and the use of a series of management measures do. It includes organization planning, team building, hiring of personnel and project team construction and so on a series of work.

F. project communication management: to ensure that project reasonable collection and transmission of information needed to implement a series of measures, which include communication planning, information transmission and progress reports, etc.

G. project risk management: involved in a project may encounter all kinds of uncertain factors. It includes risk identification, risk quantification, formulating strategies and risk control, etc.

H. project procurement management: to get needed resources from project implementation organization or service a series of management measures. It includes procurement, sourcing and procurement, resource selection and contract management and other projects.

I. project integration management: means all work to ensure that the project can organically coordinate and cooperate with a set of comprehensive and overall project