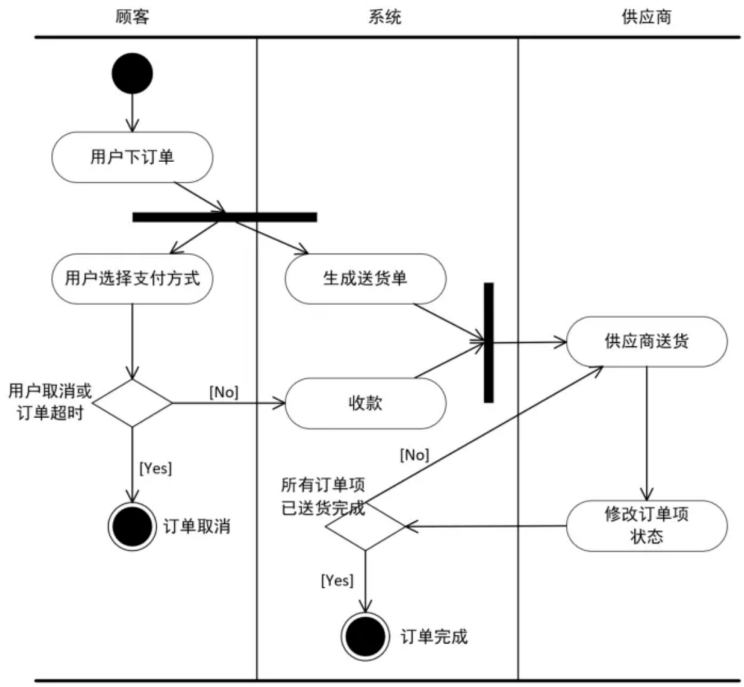
是上面的变形，具体说是添加了特定的分区



Sequence Diagram

14. 面向对象——UML顺序图（Sequence Diagram） - 知乎 (zhihu.com)

Architecture

Data-centred+Data flow+Call and Return Architecture+Layerd Architecture

历年题复习

1. **Please take our course project as an example to explain what are Normal, Expected, and Exciting requirements for QFD (Quality Function Deployment)?**

Normal requirements are written **in the project requirements to meet the requirements of Party A's software requirements**, such as building beautiful museum model, etc

Expected requirements are **not written in the project requirements, but as a mature software engineering should achieve software requirements,** such as smooth running, software security, etc.

Exciting requirements are requirements that are not written into the project requirements, that are not anticipated, that do not affect the functionality of the program, but that **can greatly enhance the user experience by having them**, such as particularly fine museum and collection modeling

2. **Compared with the Prescriptive process, what are the advantage and disadvantage of Agile process, respectively?**

优点：开发周期短，随时应对需求变化

缺点：**需要团队**的高效协作、沟通，**不适用于人数规模大**的开发团队，**需要与客户频繁沟通**协作

3. **(1)What are the three golden rules of UI design? (2) The shortcut for copy is defined as "Ctrl +C", and why is the shortcut for paste is defined as "Ctrl +V" rather than "Ctrl +P"?**

(1) Place the user in control; Reduce the user's memory load; Make the interface consistent

(2) V距离C近，而且V也可以解释为Viscidity

4. During Scrum (About 15-minute daily meeting), which basic questions should team members answer?

   昨天完成了什么，今天计划做什么，遇到了什么困难

5. What does the Rules of Thumb emphasis（推荐法测）? Why the level of abstraction should be relatively high?

   The model should **focus on requirements which are visible** with in problem or business domain.

   Abstraction levels are high in thumb rule.Because we can focus on someing really important

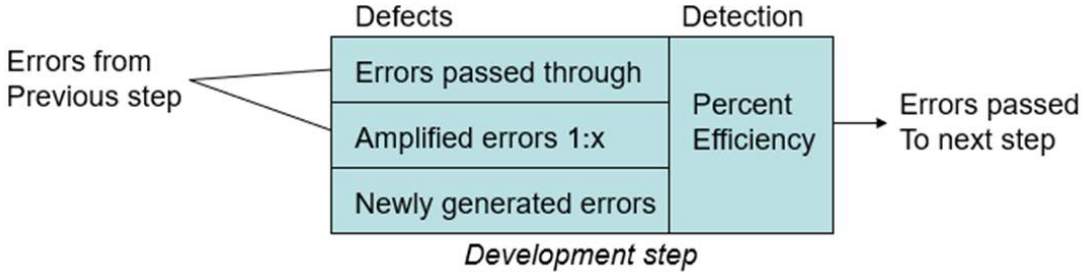
   New elements added in the analysis model should help in **better understanding of the software requirements** of the system.

   These elements provide **better understanding of the functionality, behaviour and information domain** of the system.

   Coupling should be minimized throughout the system

   The model should **be simple**

6. Formal technical review(FTR) is very important for uncovering software errors before the software is released to the end users since errors can be amplified in the latter steps if they cannot be found in the former phase, as shown in the following defect amplification models:

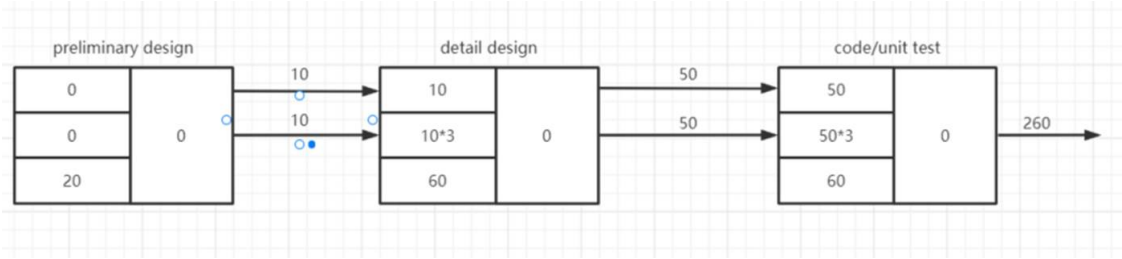


   Suppose: (1) the newly generated errors are 20, 60, 60 for the preliminary design, detail design and code/unit test respectively; (2) the errors passing through and that whose being amplified are the same between preliminary and detail design and between detail design and code/unit test; (3) the value of x, which is also the same for detail design and code/unit test, is 3.

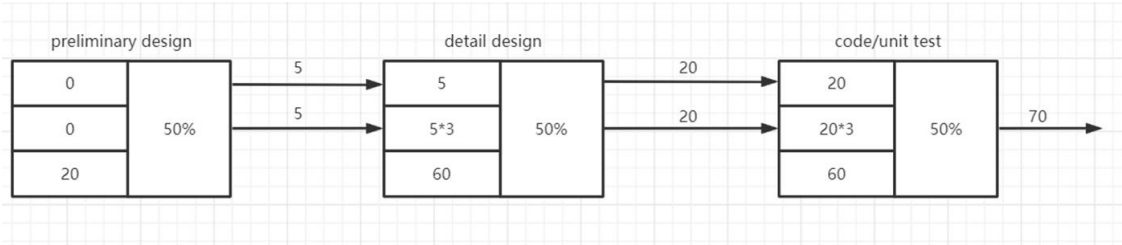
   If the values of percent efficiency for the whole process without FTR (Formal Technical Review) and with FTR are 0 and 50% respectively, please illustrate the defect amplification process for preliminary design, detail design and code/unit test, and calculate the final errors after code/unit test respectively.

   这里的计算好像就是很依赖这个3，然后平均的送过去，这样的话至少算是会算的

   without FTR: 260



with FTR: 70



7. **For the software projects, a series of stakeholders are involved. Please list at least three types of stakeholders and give a brief explanation for them.**

   购买软件的客户

   开发软件的工程师

   维护软件的工程师

   项目经理

8. **There are two conventional estimation methods: LOC (lines of code) approach and FP (function point) approach. Suppose the burdened labor rate =$8000 per month. For a type of software project, the average productivity is 625 LOC person-month (i.e. LOC/pm) and 6.4 FP/pm, respectively, and the total estimated lines of code are 35000 and 370FP, respectively. Please answer following questions.**

   (1) What are the costs of per LOC and per FP? In term of person-months (pm), what are the total estimated project cost by above two estimation methods, respectively?

   8000/625

   8000/6.4

   35000/625*8000

   370/6.4*8000

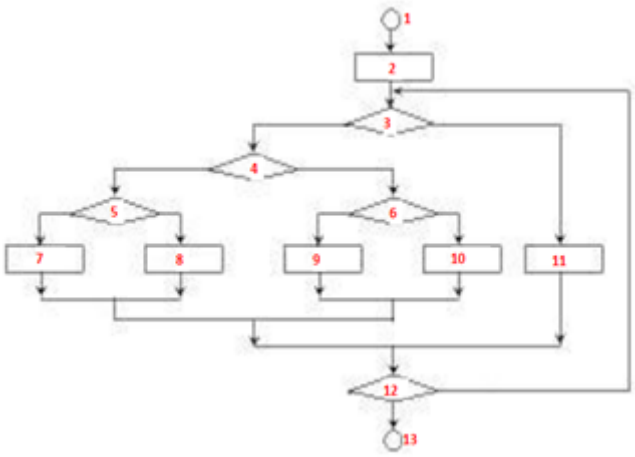
   (2) Why do FP-based metrics have advantages over LOC-based metrics in some aspects?

   - 独立于语言之外
   - FP关注功能性
   - 反应用户需求
   - 允许基准和比较
   - 支持估算和生产力度量

9. **According to the right flowchart, suppose all the Predicate**

   Node 5 is complex condition and other nodes are single conditions.

   Please answer following questions:



(1) What is the value of Predicate Node number, P ?

用下面那个公式算

(2) What is the value of the Cyclomatic Complexity, V(G)?

V (G) = E - N + 2 or V (G) = P + 1(判断节点数)

(3) Please list all independent logical paths for testing.

10. Which UML diagrams are useful for analysis modeling?Provide an example of each.

    Use-case diagram

    Activity diagram

    Class diagram、

    State diagram

11. List 3 characteristics that can serve as a guide to evaluate design quality

    Design **implements all explicit requirements** from the analysis model, as well as accommodating implicit customer requirements

    Design must **be understandable** to the people who generate the code to implement design, those who test it, and those who support it.

    Design must provide **a complete picture of the software**.addressing the data, functional, and behavioral domains froman implementation perspective

12. List the four design models required for acomplete specification of a software designand the role of each

    Data design - high level model depicting user's view of thedata or information.

    Architecture design - shows relationships andcollaborations among specific analysis model software andhardware elementsInterface design

    Interface depicts a set of operations thatdescribe the externally observable behavior of a class andprovides access to its operations

    Component-level design - Describes the internal detail ofeach software component

13.

(1) How does the object-oriented view of component-level design differ from the conventional view?

The object-oriented view focuses on the elaboration of design classes that come from both the problem and infrastructure domains. Classes are elaborated by specifying messaging details, identifying interfaces, defining attribute data structures, and describing process flow for operations. In the traditional view, three of components are refined: control modules, domain modules, and infrastructure modules. This requires representations to be created for data structures, interfaces, and algorithms for each program module in enough detail to generate programming language source code.

(2) List four interface design issues present in the development of most user interfaces.

- System response time
- User help facilities
- Error information handling
- Menu and command labeling
- Application accessibility
- Internationalization

14.

(3) What are the attributes of a good software test?

- Has a high probability of finding an error
- Not redundant
- Should be capable of uncovering a whole class of errors
- Should not be too simple or too complex

(4) Describe the differences between black-box testing and white-box testing.

- Black-box testing involves testing the functionality of a software component without knowing the details of its internal logic. White-box testing involves testing the independent logic paths with full implementation knowledge.

(5) List four types of systems tests.

- Recovery testing
- Security testing
- Stress testing
- Performance testing