Question 2: Multiple Choice（单项选择）(20 points)

1. Which of the following tactic can be used to achieve the Modifiability?

[A]

A) Hide information　　B) Ping/echo

C) Manage event rate　　D) Maintain a model of the task

2. Which of the following tactic can be used to achieve the Security?

[B]

A) Introduce concurrency　　B) Limit Exposure

C) Reduce computational overhead　　D) Manage event rate

3. Which of the following tactic can be used to achieve the Performance?

[C]

A) heart beat　　B) Limit access

C) Increase computation efficiency　　D) Maintain integrity

4. Which diagram is a great tool for representing an external view of a system?

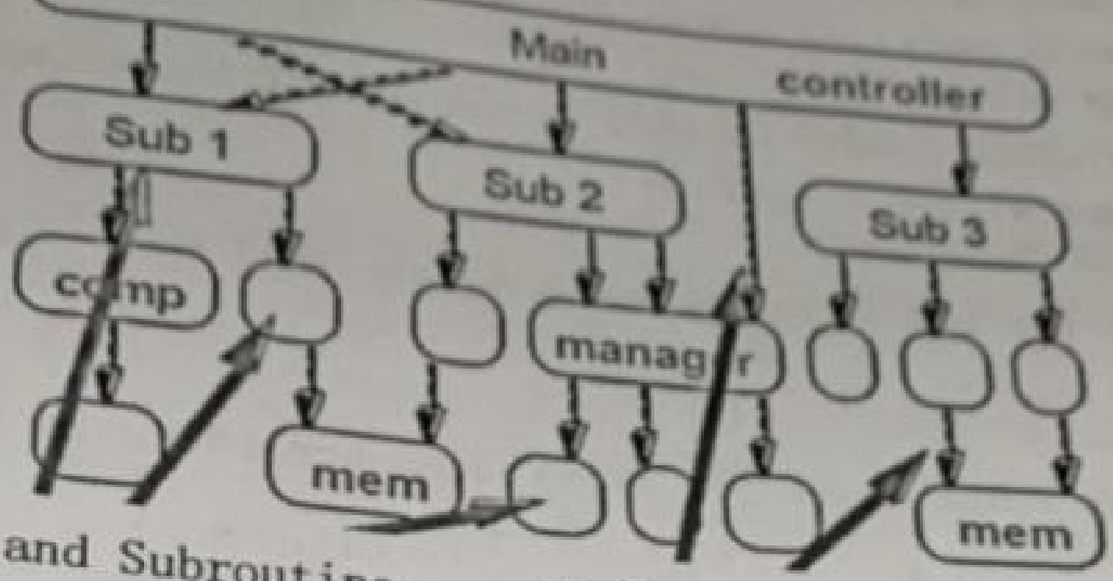
[D]

A) Sequence diagram　　B) Communication diagram

C) Activity diagram　　D) Use Case diagram

5. Which architecture style does the following diagram describe?

[A]



A) Main Program and Subroutine　　B) Sequential Batch

C) Layered　　D) Repository

Question 3: Architecture Analysis and Design (z0 points)

1.Quality Attribute and Architecture Style (38 points)

A business software company produces a series of office software. Considering usability, such a software product maintains a configuration file, which contains end-user's specific usage preference items. And each product hasits specific configuration file.

However, in real usage scenarios it is found that the configuration informationfrom different products often overlaps(重叠)or has similar details on lots of aspects. Once an end user installs the office software series, he or she has to repeatedly perform many redundant operations to preserve the same usage preference setting. Now please use a new strategy and design a software tool to manage various configure files in a unified way.

Followings are some detailed requirements for the system.

(1) Each user could check a specific configuration item by searching itskeyword.

(2)The average latency a configuration item is accessed is required tobe less than 20ms.

(3)The tool should adopt the same UI with the windows,to which end users will be familiar

(4)When apart of configration information is damaged, the system could recover according to the initial setting file within 5 seconds.

(5)only authorized adminstrator has the authority to delete a configuration item

(6)the unit tester could perform unit test at the compole time .thr response to each test can be observable, and 90% of statements have been executed in each unit test.

(7)every minor update of this system should be accomplished by 2 developers within 1 hour.

1) Identify and name the related quality attributes according to the requirements.

2) For each quality attribute, give the corresponding quality attribute scenario.

3) For each quality attribute, list at least 2 solutions for archiving the corresponding quality attribute.

4) According to the requirements, which software architecture style is better for the system? Describe the reason and list the advantages and disadvantages of architecture style you choose for the system.

日期: /

功能分析：

性能

刺激源 用户

刺激 访问配置项

制品 系统中配置文件

环境 在正常运行条件下

响应 配置项被访问

响应度量 平均延迟小于20ms

易用性

刺激源 用户

刺激 使用系统功能

制品 系统UI界面

环境 系统正常工作

响应 系统采用与Windows相同风格UI

响应度量 用户最终熟悉系统操作

可用性

刺激源 系统内部故障

刺激 部分配置信息损坏

制品 系统

环境 系统正常工作

响应 系统把根据最初配置文件恢复正常

响应度量 在5S内恢复

日期: /

安全性

刺激源	用户
刺激	删除配置文件
制品	系统
环境	系统正常工作
响应	授予用户权限 阻止
响应度量	授权用户可以删除，非授权用户被

可测试性

刺激源	单元测试人员
刺激	对系统进行单元测试
制品	系统
环境	系统编译阶段
响应	每次测试结束可被观察
响应度量	90%语句在一个单元测试中被执行

可修改性

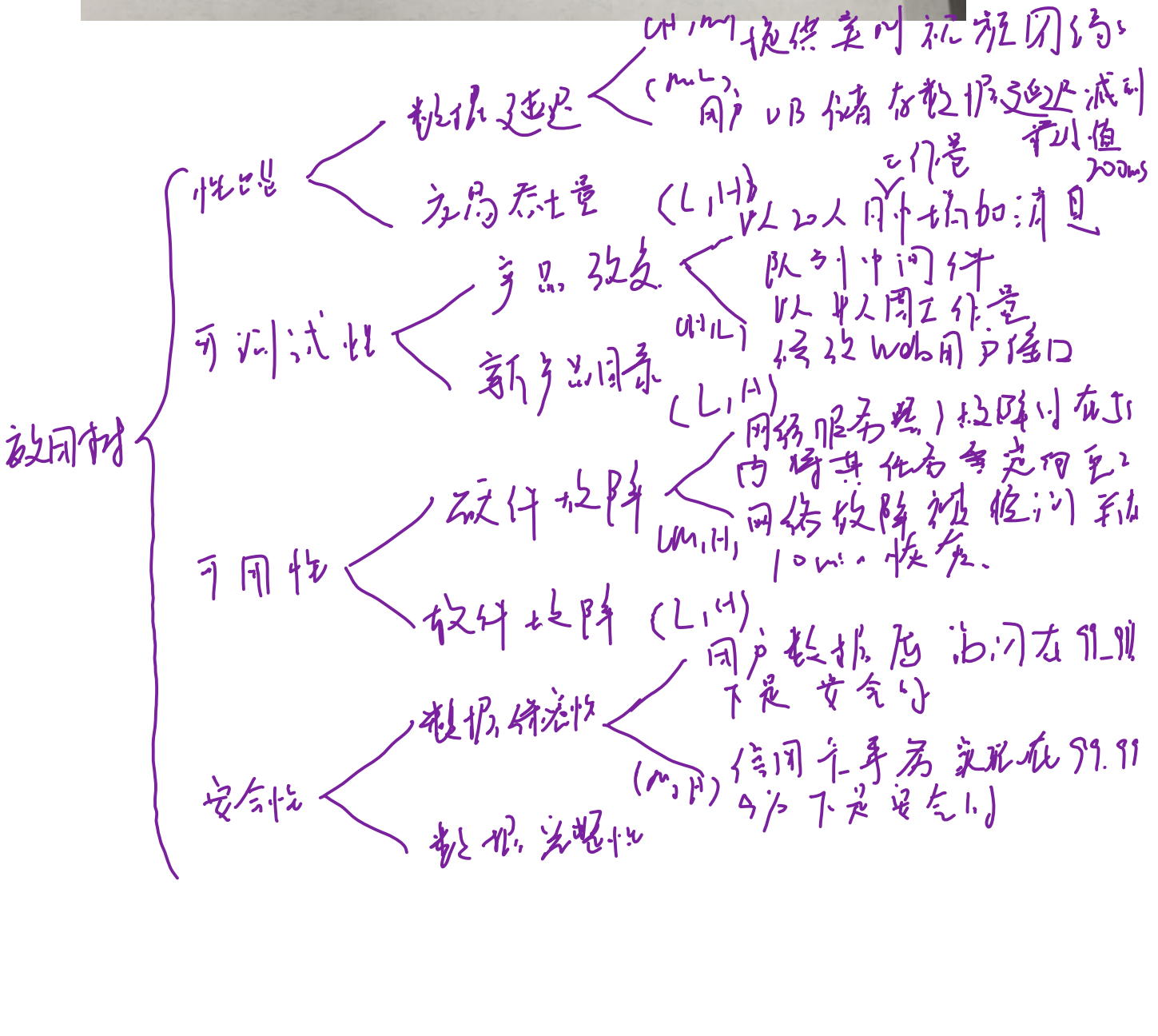
刺激源	开发人员
刺激	对系统进行更新
制品	系统
环境	系统正常工作
响应	系统架构更新
响应度量	由2名开发人员1小时架构

2. Utility Tree (16 points)

A software company plans to develop a video sharing Web site. The development team analyzed the Quality Attributes, designed architecture and wanted to use Utility Tree to evaluate the architecture, followings are the scenarios.

(1) Deliver video in real time
(2) Add message queue(消息队列) middleware in < 20 person-month
(3) The crash of Web server #1 requires traffic redirected to Web server #2 in < 5 seconds
(4) Reduce storage latency on customer DB to < 200ms
(5) Change Web user interface in < 4 person-weeks
(6) Any network failures should be detected and recovered in < 10 minutes
(7) Credit card transactions are secure 99.999% of the time
(8) User Database accessing is secure 99.99% of the time

According the scenarios, please construct a Utility Tree.



3. Architecture Evaluation (16 points)

Identify and record risks and non-risks, sensitivity points and tradeoffs is an important task in architecture evaluation. Please describe the definitions of risk, non-risk, sensitivity point and tradeoffs and then read the following descriptions and point out each description is a risks, non-risks, sensitivity points or tradeoffs.

(1) "although the underlying(底层) framework of this system is good and stable, rules for writing business logic tier of your 3-tier style are not clearly articulated (说明)."

(2) "Changing the timing scheme from a harmonic (精确的) framework to a non-harmonic framework would impact far reaching impacts (极大地影响) to other modules."

(3) "In order to achieve the required level of performance in the discrete event generation component, assembly language had to be used thereby reducing the portability (可移植性) of this component."

(4) "Assuming message arrival rates of once per second, a processing time of less than 30ms, and the existence of one higher priority process, a 1 second soft deadline seems reasonable."