浙江大学 20__ - 20__ 学年 春 学期

《软件体系结构》课程期末考试试卷　A 卷

课程号：__21190840__，开课学院：__计算机学院__

考试试卷：A 卷、B 卷 √（请在选定项上打 √）

考试形式：闭 √、开卷（请在选定项上打 √），允许带_英汉字典_入场

考试日期：_____年___月____日，考试时间：__120__分钟

诚信考试，沉着应考，杜绝违纪。

考生姓名：_____学号：_____所属院系：_____

题序	一	二	三	四	五	六	七	八	总 分
得分									
评卷人									

1. (x%) Tell whether the statements below are true or false. (please mark a √ or × in your answer page.)

(1) Coupling measures how strongly the responsibilities of a module are related.(　　)

(2) Command interface is a typical case of system initiative human-computer interaction.　　(　　)

(3) One major disadvantage of the *Pipes and Filters* style is that it does not support concurrency.　　(　　)

(4) The purpose of architecture design is to provide containers for system functionalities.　　(　　)

(5) One of the major differences between *Internet computing* and the traditional *enterprise computing* is that Internet computing may face potentially unlimited number of user requests.　　(　　)

(6) *Introduce Concurrency* is always a useful architectural tactic in meeting the real-time performance requirement.　　(　　)

(7) How functionality is partitioned is an architectural aspect of modifiability while coding techniques used within a module is not.　　(　　)

(8) The modifiability tactic *Encapsulate* can prevent architectural mismatch such as dependence on quality of services.　　(　　)

(9) We do not need to understand all system requirements to begin its architecture design.　　(　　)

(10) In *Active Redundancy*, synchronization is the responsibility of the primary component, which broadcasts to the secondaries to guarantee synchronization.　(　　)

(11) Software architecture is high-level design. ( )

2. (x%) Choose the best answer from the choices given. (There is only one correct answer for each question.)

(1) Which of the following is an architectural aspect of usability?

A. Clear interface design. B. Font used on the user interface.

C. Color of the buttons. D. Reusing data previously entered.

(2) Which fault detection tactic will assign a sequence number to an event immediately after it occurs?

A. Watchdog. B. Heartbeat. C. Condition Monitoring. D. Time Stamp.

(3) Which of the follow security tactics can be used to assure data integrity?

A. SSL. B. VPN. C. Checksums. D. Firewalls.

(4) Choose the correct ranking of the downtime using various availability tactics: (AR---Active Redundancy; PR---Passive Redundancy; SP---Spare)

A. PR<AR<SP. B. PR<SP<AR. C. AR<PR<SP. D. AR<SP<PR.

(5) Intermediaries reduce coupling by breaking dependencies among responsibilities. Which of the following intermediaries can be used to break dependence on runtime service location?

A. Data repository. B. Directory service.

C. Memory handles. D. Resource manager.

(6) *Assurance* as a security characteristic is the property that ( )

A. Data or services are being delivered as intended.

B. A transaction cannot be denied by any of the parties to it.

C. The parties to a transaction are who they purport to be.

D. Data or services are protected from unauthorized access.

(7) Which *allocation view* can be used to manage team resource allocation?

A. The deployment view. B. The implementation view.

C. The work assignment view. D. The shared-data view.

(8) Which of the following views will be the output of Attribute Driven Design (ADD)?

A. Module decomposition view. B. Process view.

C. Work assignment view. D. Deployment view.

(9) In an n-tier Web-based E-commerce system, proxy servers are used to improve system performance. This tactic can be classified as:

A. Introduce concurrency. B. Maintain multiple copies.

C. Increase computational efficiency. D. Reduce Computational Overhead.

(10) Choosing an HTTP server as a component in the system will impose constraint on the system's ( )

A. Architectural pattern. B. Developing environment.

C. Modifiability D. Concurrency.

(11) Which of the following software life cycle models takes the architecture design into consideration?

A. Waterfall model. B. Spiral model.

C. Evolutionary delivery model. D. None of the above.

(12) Using assembly language in an event generation component is a trade-off between ( )

A. Security and usability. B. Performance and portability.

C. Performance and availability. D. Availability and security.

(13) Which *allocation view* can be used in configuration management?

A. The deployment view. B. The implementation view.

C. The work assignment view. D. The shared-data view.

(14) Choose the availability tactic that originates in router design.

A. Non-stop Forwarding. B. Exception Handling.

C. State Resynchronization. D. Sanity Checking.

(15) Which of the following is the major disadvantage of the object-oriented pattern?

A. Dependency on object identity. B. Difficult to synchronize objects.

C. No control over the order of invocation. D. Too much performance overhead.

3. (x%) Architecture design.

As a software architect, you are asked to design an online bookstore to compete with amazon.com. The online bookstore's requirement for quality attributes is as follows:

- Availability
  This online bookstore will always open to accept customers' book orders. The planned capacity of the store is to serve 1,000 – 10,000 customers per hour, 24 hours a day, 7 days a week. Any short period of system down time will result in losing significant amount of revenue. Thus, the availability is the most important quality requirement. The system design must keep the potential system down time to minimum.
- Performance
  The ultimate performance goal is to guarantee minimum response time. The time between receiving a customer's request and sending the response back must be less than 5 seconds. Since the system will have large capacity, that is, at non-peak time up to 1,000 customer requests per hour are expected and at peak time up to 10,000 customer requests per hour are expected, the system design must consider the system's scalability. Also, when the system communicates with the external system in the customer's bank to verify his/her credit card, the response time from the bank cannot be guaranteed. In this case, the system must have means to reduce the potential unhappiness of the customer. This quality attribute has 2nd ranking priority.
- Security
  The system must keep all customers' personal information and credit card information secure. Also, the system must guarantee that a customer cannot use someone else's credit card to order books. This quality attribute has 3rd ranking priority.

The following are the questions that you need to answer.

(a) (9%) You are supposed to design the architecture based on a hybrid of the

following patterns:

- ***Layered pattern***
  Present the name and responsibility for each layer in the following form:
  Layer1: name: xxx; responsibility: xxx;
  Layer2: name: xxx; responsibility: xxx;
  ……
  (Or alternatively you can use a diagram to explain the layered pattern with names and responsibilities listed in each layer)
- ***Repository pattern***
  Explain how different components interact via a persist storage.
- ***Communicating processes pattern***
  List the concurrent processes (or threads) in your design.

(b) (10%) For each of quality requirements, explain how you plan to achieve it in your design by filling the following form (no less than 5 tactics in total and at least one tactic for each quality attribute, not including the one given as example):

Quality attributes	Tactic name	How to apply
Security	Limit access	Using a firewall
…	…	…

(c) (6%) List at least three tradeoffs in the design for multiple, conflicting quality attributes (not including the one given as example).

Tactic used	Conflicting quality attributes
Using a firewall to ensure security	Security and performance