Quiz Three for Software Engineering Course

June 3, 2024

Name:_____ **Student ID:**_____ **Group ID**_____ **Score:**_____

I、Please select the correct answers and fill in the answer sheet: (20 pts., 2pt. for each)

1. Which of these are objectives of Team Software Process?
A. Accelerate software process improvement B. Allow better time management by highly trained professionals
C. Build self-directed software teams D. Show managers how to reduce costs and sustain quality

2. Which of the following is one of core principles of software engineering practice?
A. All design should be as simple as possible, but no simpler. B. A software system exists only to provide value to its users.
C. Pareto principle (20% of any product requires 80% of the effort). D. Remember that you produce others will consume

3. An architectural style encompasses which of the following elements?
A. constraints B. set of components C. semantic models D. syntactic models

4. Several usability measures can be collected while observing users interacting with a computer system including
A. down time for the application B. number of user errors C. software reliability D. time spent looking at help materials

5. The level of review formality is determined by which of the following?
A. amount of preparation B. reviewer follow-up C. size of project budget D. structure of review

6. Which of the following need to be assessed during unit testing?
A. algorithmic performance B. code stability C. error handling D. execution paths

7. Integration testing of object-oriented software can be accomplished by which of the following testing strategies?
A. Cluster testing B. Glass-box testing C. Thread-based testing D. Use-based testing

8. Which of the following are reasons for testing in the wild?
A. Assessing the impact of production environments B. Failing to create test cases
C. Not understanding user demographics D. Testing for variable performance on user devices

9. Component-level metrics include measures of
A. complexity B. coupling C. module cohesion D. performance

10. A risk item checklist would contain known and predictable risks from which of these categories?
A. product size B. development environment C. staff size D. process definition

II. Please specify "T" (true) or "F" (false) for the following statements and *fill in the answer sheet.* (10 pts.)

1. Working software that meets customer needs is the primary goal of the agile team.
2. Within software process models, although the spiral model is an evolutionary process model with risk assessment, risk analysis is not required for every iteration.
3. Functional requirements describe the characteristics of a software system, such as performance, reliability, and maintainability.
4. Code review is an automated method used to discover software defects.
5. Equivalence partitioning and boundary value analysis are common black box testing methods.
6. Code refactoring can eliminate repetition and complexity in code, making it easier to understand.
7. In web application architecture design, the MVC (Model-View-Controller) pattern is a commonly used design pattern that helps separate concerns.
8. Concurrent Versions System (CVS) is a common centralized version control tool that can help developers quickly obtain and build the latest version of code for a project.
9. In software measurement, direct measures of the product include lines of code (LOC) produced, execution speed, memory size, quality, complexity, and defects reported over some set period of time.
10. Capability Maturity Model Integration (CMMI) is a comprehensive process meta-model that is predicated on a set of system and software engineering capabilities that should be present as organizations reach six different levels of process capability and maturity.

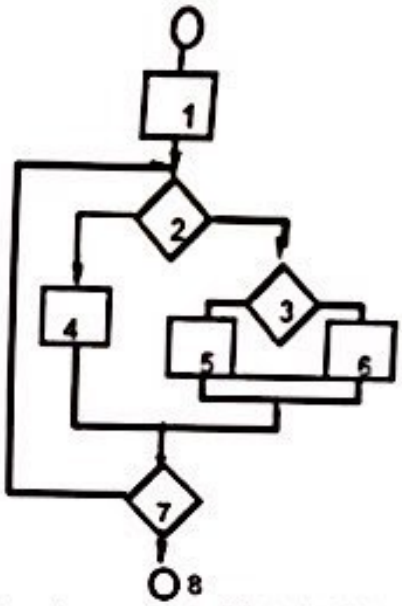
1. Please give brief answers to the following questions: (20 pts.)

(1) A stakeholder is anyone who benefits in a direct or indirect way from the system which is being developed. Please list at three kinds of Stakeholders and explain their roles in a software engineering project. **(6 pts.)**

2. According to following flowchart, suppose Predicate Node "2" and "3" are single conditions, "7" is compound condition. Please answer following question: (8pts)

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

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



3. Suppose the function is to calculate the average of all the *positive* numbers in a given sequence of N ($0< N <500$) numbers. Please design the test cases by applying equivalence partitioning and boundary value analysis technique. (6 pts.)

Part IV. Athlete Management and Service System (AMSS) (50 pts.)

Software scope: *The Asian Games will be held in Hangzhou, and the host committee plans to develop an athlete management and service system.*

Before participating in the Games, athletes need to apply for a new account. They should fill in their country, ID, name, gender, age, height, weight, photo, phone number, permanent residence address, registered sports, and other relevant information. After receiving the application, the backend inspectors of the system will query the relevant database information within three days and review the information. If the review is successful, the athlete will be given a QR (Quick Response) code, and if not, the reason for the failure or the materials to be supplemented will be notified. After athletes come to Hangzhou, they need complete their registration and active the QR code, then they can use the QR code to open dormitory doors, dine in the cafeteria, and take the sports dedicated service bus. During the competition, athletes can scan QR codes and facial recognition to check in the competitio

After the competition, they can check their result and rank. To support the above services, the system also needs to provide related backend functions such as inspectors management, sports database maintenance, logistics resource maintenance, third partied interfaces management.

1. Please draw the user case diagram for AMS. **(10 pts.)**
2. Please give the two CRC cards for classes "athlete" and "inspector". **(10 pts.)**
3. Please give the state diagram for the QR code class. **(8 pts.)**
4. Please draw the layered software architecture of AMS. **(12 pts.)**
5. Please describe the testing strategy for AMS. **(10 pts.)**

Answer:

1.