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Exam questions (paper) of Northwestern Polytechnical University (NPU)

Scores	

2020 －2021 school year 2nd semester

Class-taking college 10 Subject Software Engineering Class period 32

Exam Date May 10, 2021 Exam Time 1.5 hour Exam Form (*open* / *closed*) (A / B) paper

Class		Student Number		Name	

There are 2 parts in this exam paper. Please write down all your answers on the answer sheet at the end of the paper.

PART I Choose the right answer(1 marks for each, total 10 marks)

Direction: For each question there are four choices marked A, B, C and D. You should choose the one that best fits it.

1. Which is incorrect about software process? ( )

A. A software process will encompass a small number of framework activities and a set of umbrella activities.

B. A generic process framework for software engineering encompasses five activities: communication, planning, modeling, construction, deployment.

C. Umbrella activities are applied throughout a software project and help a software team manage and control progress, quality, change, and risk.

D. Process framework is unchangeable for all software projects, regardless of their size or complexity.

2. Which software process model is considered to be the best when the software requirements are fixed? ( )

A. Prototyping model B. Waterfall model C. Spiral model D. Incremental model

Note: 1. Generally, there is no space left for answering the questions on the paper used for setting questions, please print out the exam questions using “little four” in Arial and take care not to be out of the frame.

2. The teachers who set questions and review the paper should sign up name when the exam paper is kept on file.

3. Which is NOT the tradeoff proposed by the "Manifesto for Agile Software Development"? ( )

A. Individuals and interactions valued over processes and tools
B. Working software valued over Comprehensive documentation
C. Contract negotiation valued over Customer collaboration
D. Responding to change valued over following a plan

4. Which software architecture is right for a three-pass compiler (lexical analysis -> parser -> code generation)

A. Data-Centered Architecture
B. Data Flow Architecture
C. Call and Return Architecture
D. Client-Server Architecture

5. The following statements describe modules in a program. Which is likely to have a high degree of cohesion? ( )

A. Module "InventorySearchByID" searches the records in inventory to see if any match the specified range of ID numbers. A data structure is returned containing any matching records.
B. Module "ProcessPurchase" removes the purchased product from inventory, prints a receipt for the customer and updates the log.
C. Module "FindSet" processes the user's request, determines the set of items from inventory that match the request, and formats the items into a list that can be shown to the customer.
D. None of them.

6. Which is NOT the task performed by the SQA group? ( )

A. Review software activities to verify compliance with the defined software process.
B. Finish some coding work as part of the software process .
C. Audit designated software work products to verify compliance with those defined as part of the software process.
D. Ensures that deviations in software work and work products are docu mented and handled according to a documented procedure.

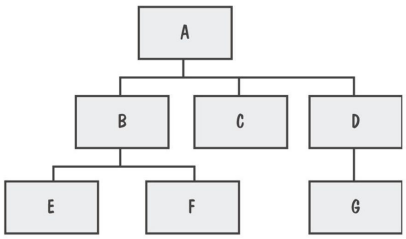
7. When allocating the effort in a software development plan, which ratio is reasonable for coding activities? ( )

A. 15%-20% B. 25%-40% C. 40%-50% D.50%-60%

8. Fitts's law describes how the distance from start point to the target and the width of the target influence the difficulty of the task. It can be used in software GUI design. Which is incorrect about Fitts's law? ( )

A. Target should be as large as possible.
B. Distance from current place to target should be as small as possible.
C. Large button is better.
D. It will decrease the size of a target object if we put it at the top border of the screen.

9. The figure below shows the component hierarchy of a software.



For the testing sequences {A};{A,B,C,D};{A,B,C,D,E,F,G}, it is **( ).**

A. Sandwich testing B. Top-down testing C. Bottom-up testing D.Big-bang testing

10. Which one will not be managed in Software Configuration Management? ( )

A. Design and analysis documents related to development.
B. Source code.
C. Email of each group members.
D. Test cases and test data.

PART II(total 40 marks)

1. (5 marks) Describe the differences between Scrum and Kanban in Agile Development?

2. (5 marks) A simple measure of reliability is: Reliability=MTTF/(1+MTTF), MTTF refers to mean time to failure. The following data is the failure time (day) for several different software:

Software1: 180, 675, 315, 212, 278, 503, 431
Software2: 477, 1048, 685, 396
Software3: 894, 1422
Software4: 160,275, 310, 966

R=370.57/(1+370.57)=0.997
R=651.5 /(1+651.5) =0.998
R=1158/(1+1158)=0.999
R=425.75/(1+425.75)=0.997

Which software has the best reliability?

3. (2 marks) Efficiency and functionality are two important software quality characteristics, which is easier to measure? Give your explain.

4. (3 marks) What is difference between validation and verification?

5. (5 marks) Explain and demonstrate how measures of module coupling, cohesion, and size can help the engineer monitor the build quality of software.

6. (5 marks) List all combination test cases for the following inputs with two pair-wise testing?

InputA: 1,2,3
InputB: true, false
InputC: a,b,c,d.

7. (5 marks) What are the Golden rules for software interface design? Give the rules and the corresponding examples.

8. (10 marks) Do class analysis with noun and verb identification and draw UML class diagram for the following library software.

The library contains books and journals. It may have several copies of a given book. Some of the books are reserved for short-term loans only. All others may be borrowed by any library member for three weeks. Members of the library can normally borrow up to six items at a time, but members of staff may borrow up to 12 items at one time. Only members of staff may borrow journals. The system must keep track of when books and journals are borrowed and returned , and enforce the rules.

(1) (2 marks) List all candidate classes with noun analysis.
(2) (2 marks) Identify the relations between candidate classes
(3) (2 marks) Identify operations between classes with verb analysis.
(4) (4 marks) Present your designed UML analysis class diagram.

PART III(total 50 marks)

Please finish the following project and submit your project report before May 17, 2021.

- **Objective**: Online hotel reservation systems
- **Resource**: development team: three members and necessary hardware and software
- **Software platform and development language**: no limit
- **Requirement Description**:

The project "Online Hotel Booking System" is a system based on accessing the internet to book for rooms in a hotel. The system will provide the following functions at least:

1. Reservation: Guests could make/cancel a reservation including quantity, type, date...
2. Billing system: Guest could check their bill and pay.
3. Changing room: Guests could change room Single to Double.....
4. Administration: Administrator could maintain rooms/guests information, and check statistic data about reservation by Month or Year.

1.1. Management

Suppose you are a project manager for this development, What need to do? How to do? Please give your solution.

1.2. Requirement analysis

Suppose you are a requirement analyzer for this software, please give your requirement analysis process including noun-verb analysis and other methods, then present your analysis result (different UML diagrams).

1.3. Design

Suppose you are a designer, please give your architecture design, component design and interface design. Notice: Only finish component design and interface design for some selected parts of your system.

1.4. Implementation

Don't need to write the complete code for this system, only list some rules for coding and one piece of pseudocode as preparation for the white-box test case design.

1.5. Testing

Present your test strategy for this software.
Write at least 10 white-box test cases and 10 black-box test cases.

1.6. Deployment and Delivery

Present deployment diagram and describe how to delivery your software.

1.7. Maintenance

Suppose there are some bugs found by your customers after release, please describe the process of your bug fix maintenance work (notice change management).

ANSWER SHEET

PART I

1	2	3	4	5	6	7	8	9	10

PART II