University of Regina

Assignment #2

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CS280

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1. What are the benefits in terms of software qualities of the 3-layer architectural style?

Solution -> The benefits of 3-layer architectural style are as follows :

- The 3-layer architectural style helps remove dependencies from one application to another and all the applications are independent in terms of development and performance.
- It helps developers work at the application, presentation and data side at the same time.
- It helps developers to be the part of the team working on a specific skill set.

2. Explain with concrete examples the two software design principles: strong cohesion and low coupling.

Solution - > Strong cohesion implies all the related code binding together where as low coupling implies changes in one class will not have any effects on other class.

Example of strong cohesion and low coupling would be -

Student   {

 -StudentId
 - marks
----
setStudentId(newId)
getStudentId()
setMarks(newMarksl)
getMarks()

}

In this example, the name explains what the function or module is trying to do. This implies high cohesion. Now if we make changes in setStudentId, It should have no regression effect or ripple effect on other functions which implies low coupling.

3. Based on the problem requirements elicited in Question#14 of Assignment#1, design (draw) the top level architecture of your application.

Solution ->

4. What is the goal of software testing?

Solution -> The main goal of software testing is make sure there are no bugs in the systems as well as to make sure it matches both functional and nonfunctional requirements. Software testing helps eliminate any dangers due to failure of the code in production.

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5. Compare black box testing with white box testing.

The basic difference between white box and box testing is the knowledge of the product given to the tester. In black box testing, Tester does not know the design/implementation/structure of the product being tested. The source code is unknown to the tester whereas in white box testing, the tester is familiar with design/implementation/structure of the product and source code.

6. Describe in detail the five types of software maintenance.

Solution -> There are 4 types of software maintenance -

- Adaptive -> Adaptive to changes in the both software and hardware

- Perfective -> Adapting to changes in requirements after testing phase
- Corrective -> Make correction in bugs and errors in the code.

7. Contrast between top-down strategy in software design and bottom-up strategy in software implementation and testing.

Solution -> top down strategy takes a higher level of system and keeps breaking it down to a lower level of systems until the desired structure/system is not achieved whereas the bottom-up strategy budle low level systems from same domain to make a higher level system and keep doing that until a desire system is not archived.

8. What is the difference between software validation and verification?

Solution -> verification is done is any given development phase to make sure the product satisfies the requirements decided at the beginning whereas validation is make sure that the product satisfies all the requirement at the end of the development.

9. Describe in detail the modified waterfall model.

Waterfall model is a sequential development model which is ideal for the projects longer than 1-2 years. In this model, Every stage starts only after first is finished or in a row. This model have high risk problems in development as there is high ambiguity between what developers are making and client wants if the requirement phase is not done properly. Later the bigs are found in waterfall, more difficult it is to solve them and cost is high as well.

10. Contrast evolutionary prototyping and throwaway prototyping.

Solution -> In evolutionary prototyping, once the client agree with the prototype then that protype is used to engineer the final product where as in throwaway prototyping, the prototypes is not used for the final product because it works more as a visual for the final products.

11. Describe in detail the spiral model.

Solution -> Spiral model is combination of both prototyping model and waterfall model and it's ideal for large and expensive projects. The requirements are very detailed and preliminary design is created for the system to prototype with.

12. Provide a classification of all the software engineering qualities discussed in the lecture.

The classification of software engineering qualities discussed in the class are

- Approach to quality
- Quality using metrices
- Measuring complexity
- Perspectives on quality
- Quality in testing

13. Explain in detail the following software qualities: safety, robustness, security, portability and maintainability.

Solution ->

Safety - It's the ability of the procyst to run safely without causing damage.

Robustness -> Its the ability of the product to cope with errors during execution.

Security -> Its the ability of the product to protect the data and software being processed and stored.

Portability -> Its the ability of the products to be moved in a new environment.

Maintainability -> Its the amount of effort requirement to maintain and make changes in the product.

14. Give an example of portable software and explain why it is portable.

Solution -> Mozilla firefox portable is a portable software. It's portable because it can be easily moved to a new environment. It does not require to be installed and it can be used within a external media.

15. Discuss how the reusability of components may increase the correctness of software.

Solution -> Reusability of components help increasing the correctness because the code we are reuning is already tested and reliable to work which will help save time in testing as well as increase integration in the new system because developers have already worked with in in the past.

16. Select a real-world application, and discuss its required software qualities (select three qualities).

Solution -> considering software qualities of a browser

- Functionality -> A user must be able to load and navigate through different websites.
- Portability -> A user must able to use the browser portability on a extendernal disk and local installation shouldn't be necessary
- Efficiency -> Browser must be able to load the pages in fast and efficient manner unless slowed due to network latency.
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17. Define briefly the five application areas in software engineering. For each of them, give its most important software quality.

Solution -> Five different applications of software engineering are -

- Banking -> Banking application include online banking websites, teller machines, atms and credit cards and the most important software quality in this application is Data security.
- Embedded systems -> this includes softwares installed in aircrafts and vehicles. This most important software quality in this application is reliability.
- Computer graphics -> This includes software for special effect, editing and animation . The most important software quality in this application is efficiency.
- Finance -> The softwares in this application are used in stock market, future markets and bond markets. the most important software quality in this application is Data security.
- Communication ->The softwares in this application are used in email, VoIP and messages. the most important software quality in this application is Reliability.