18CSC206J SOFTWARE ENGINEERING AND PROJECT MANAGEMENT
UNIT-III
SOFTWARE CONSTRUCTION

1 MARKS

S.NO	QUESTIONS	LEVEL	CLO	PG. NO
1.	_____ is an industry strength software product of a large size requires stringent coding standards. A.Coding B.Coding Methods C.Coding Framework **D.Constructing**	1	3	176
2.	Converting the specifications into software code is totally dependent on the _____ Team. A.Coding B.Developing C.Debugging **D.Constructing**	1	3	176
3.	_____increases software code reuse and enhances productivity of developers. **A.Modularity** B.Simplicity C.Clarity D.Relability	1	3	177
4.	Standard naming conventions can be used so that the code has _____ A.Modularity B.Simplicity **C.Clarity** D.Relability	1	3	177
5.	Object-oriented programming, abstraction and information hiding can be used to add_____ A. Degree of Modularity **B.Degree of Simplicity**	1	3	177

C.Degree of Clarity

D.Degree of Relability

6.	_____ is one of the most important aspects of industry strength software products.	1	3	177

A.Modularity

B.Simplicity

C.Clarity

D.Relability

7.	To Ensure safety, the software product must have the error less than _____.	1	3	178

A.0.00001%

B.0.01%

C.0.000001%

D.0.001%

8.	_____will ensure a consistent coding production with standard code that will be easy to debug and test.(L2,CLO3),178	1	3	34

A.Coding

B.Coding Methods

C.Coding Framework

D.Constructing

9.	Which is the most labor intensive phase in software development? (L1,CLO3),178	1	3	36

A.Software Coding

B.Software Developing

C.Software Debugging

D.Software Constructing

10.	_____is a powerful tool to eliminate defects and improve software code.(L2,CLO3),179	1	3	32

A. **Deskcheck**

B. Walkthrough

C. Inspection

D. Code Review

11.	_____ is the formal code review initiated by	1	3	32

developer.(L2,CLO3),179

A.Deskcheck

B. Walkthrough

C. Inspection

D. Code Review

12. _____is the fnal review of the software code.(L2,CLO3),179 1 3 34

A. Deskcheck

B. Walkthrough

C. Inspection

D. Code Review

13. _____enables programmers to store large pieces of code inside procedures and functions.(L2,CLO3),180 1 3 36

A. **Structured programming**

B. Object oriented programming

C.Automatic code generation

D. Pair programming

14. Which among the following firm is working to develop automatic code generation system?(L1,CLO3),180 1 3 36

A. **Sun Microsystems**

B. HP

C. IBM

D. Dell

15. SOA has been evlolved recently for the purpose of _____.(L1,CLO3),181 1 3 36

A.Software construction

B. Inspection

C. Code Reuse

D. Code Review

16. Which technique isused in Test driven development?(L2,CLO3),181 1 3 37

A.SOA

B. eXtreme programming

C. Scrum

D.Reuse

17. _____is the quality driven development technique employed in the eXtreme Programming.(L2,CLO3),181 — 1 | 3 | 38

A. Structured programming

B. Object oriented programming

C. Automatic code generation

D. **D. Pair programming**

18. _____plays an important role in the construction phase.(L2,CLO3),181 — 1 | 3 | 39

A.Confguration management

B.Coding

C.Coding Methods

D.Coding Framework

19. _____ phase is one of the most labor intensive phases in software development cycle.(L1,CLO3),183 — 1 | 3 | 41

A. **Software construction**

B. B.Code Generation

C. Automatic Code Generation

D. D.Coding

20. Which phase generates the complete source code of the application.(L1,CLO3),183 — 1 | 3 | 56

A.Software construction

B.Code Generation

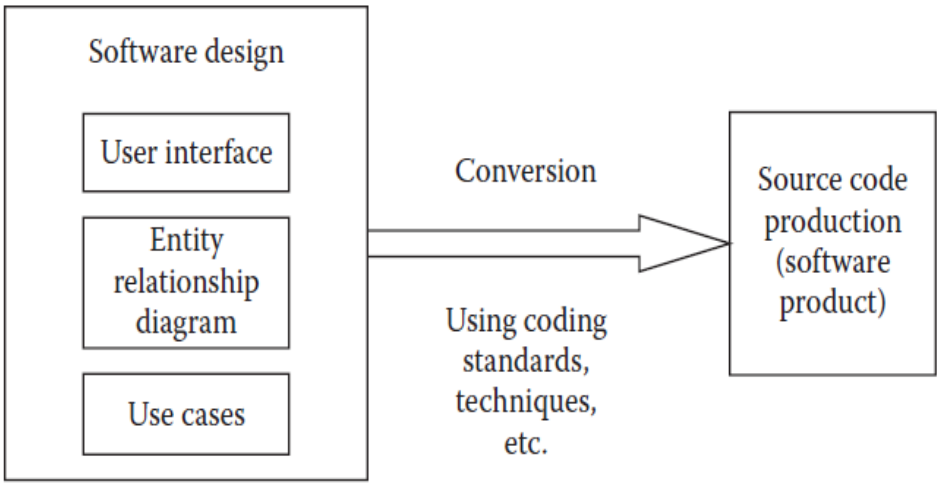
C. Automatic Code Generation

D.Coding

4 MARKS:

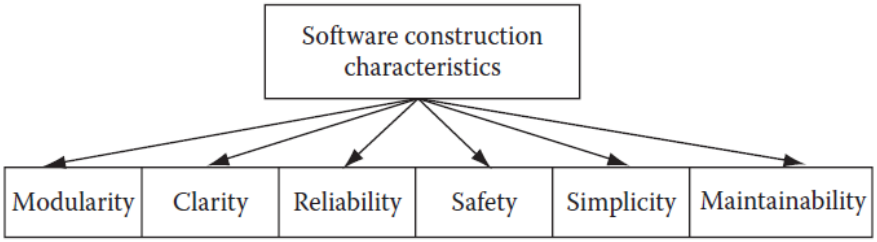
1. Explain Source code production from software design with neat sketch. — L2 | CLO3

Developers are given software design specifications in the form of use cases, flow diagrams, UI mock ups, etc., and they are supposed to write a code so that the built software matches these specifications. Converting the specifications into software code is totally dependent on the construction team. How well they do it depends on their experience, skills, and the process they follow to do their job. Apart from these facilities, they also need some standards in their coding so that the work is fast as well as has other benefits like maintainability, readability, and reusability.



2. List the coding standards in software construction. L1 CLO3

Some of the coding standards include standards for code modularity, clarity, simplicity, reliability, safety, and maintainability.

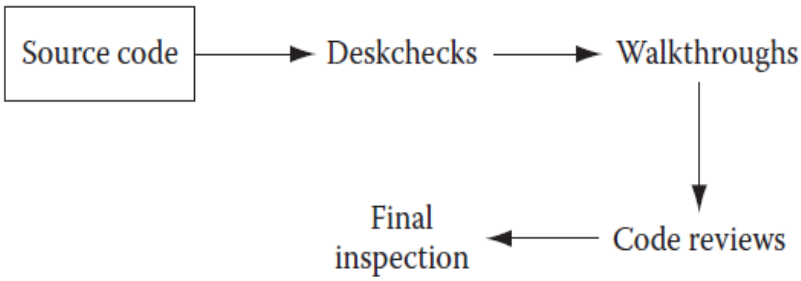


3. Elaborate in detail about the Quality Control. L2 CLO3

It is estimated that almost 70% of software defects arise from faulty software code. To compound this problem, software construction is the most labor intensive phase in software development. Any construction rework means wasting a lot of effort already put in. Moreover, it is also a fact that it is cheaper to fix any defects found during construction at the phase level itself. If those defects are allowed to go in software testing, then fixing those defects will become costlier. That is why review of the software code and fixing defects is very important.

4. Categorize the techniques to ensure the quality of the written code. L2 CLO3

There are some techniques available like deskchecks , walkthroughs, code reviews, inspections, etc. that ensure quality of the written code



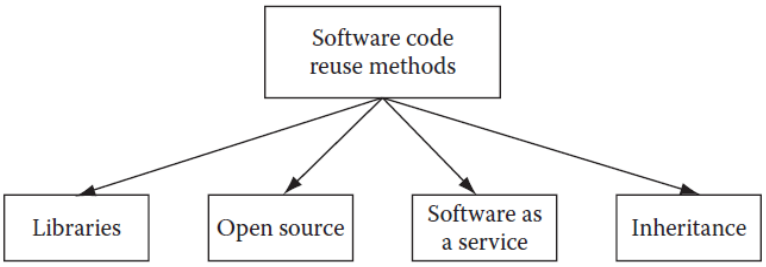
5. Elaborate the evolution of different programming techniques in coding methods. L2 CLO3

Different programming techniques include,

- Structured Programming
- Object-Oriented Programming
- Automatic Code Generation
- Test-Driven Development
- Pair Programming.

Explain in detail about the Code reuse methods. L2 CLO3

Many techniques have evolved to reduce the labor intensive nature of writing source code. Software code reuse is one such technique. Making a block of source code to create a functionality or general utility library and using it at all places in the source code wherever this kind of functionality or utility is required is an example of code reuse. Code reuse in procedural programming techniques is achieved by creating special functions and utility libraries and using them in the source code. In object-oriented programming, code reuse is done at a more advanced level. The classes Software Construction containing functions and data themselves can not only be reused in the same way as functions and libraries, but the classes can also be modified by way of creating child classes and using them in the source code.



7. Explain the importance of configuration management in construction phase. L2 CLO3

Configuration management plays an important role in the construction phase. Due to changes in requirements and design, an already developed source code needs to be changed. So it happens that the development team ends up with many versions of a source code during the project. If the version control management is not handled properly, then many developers may start working on a wrong version of source code, and thus a lot of rework may be needed in the end. There is one more dimension to configuration management for the construction phase. During construction, many software builds are maintained for different versions of the product being developed. These builds can break if a bad piece of code is checked into the build by any developer. When the build is broken, then no other developer can check in his code.

Thus, development is halted until the build is rebuilt with the correct code. Imagine what may happen in the case of distributed teams located at far-flung locations with different time zones and a central build is being maintained. It will be difficult to communicate and manage the build process in such a scenario. In such scenarios, smoke test application can be deployed, which can run whenever a new code is checked-in in the build. If the smoke test fails, that means the build has failed and thus the automated system can e-mail the build information to concerned people. If the build fails, then the developer who had checked-in in the code gets the message and immediately tries to fix the build. Once the build is fixed, then other developers can check-in their code.

8. Discuss about the unit testing in detail. L2 CLO3

Whenever a developer writes a piece of code, he feels confident that he has written a clean code and that it does not need testing. But most of the time he is wrong. It is because no source code is perfect, especially the first time. Only after some rounds of review it becomes perfect. At the same time, it is very difficult to review one's own code. That is why a quality control measure is taken in form of unit testing to ensure that developers test their codes themselves and only then can submit their code if the code passes the unit tests .

For unit testing, generally developers are comfortable as long as there are no changes required (due to change in design or requirements) in their code. But once some change takes place in the code somewhere, other things change. What would be the impact of that change on other parts of the software product under development?

Similarly what impact will it have on their own code if changes take place in other modules being written by other people? Generally, it is one of the most challenging situations in software construction to find the impact of change on other parts of the product under development. Such situations call for unit testing of the written code, and no piece of code should go to build without doing this. A formal and rigid adherence to unit tests should be a must for all source codes being written and no liberty should be allowed.

9. Discuss about the Integration testing in detail. L2 CLO3

Most software development is done after partitioning the software application under development first and then allocating it to distributed teams. Generally, modules of code are developed first. Later, they need to be integrated with each other to make a complete software application. Modules are integrated with each other through open interfaces. Whether or not the integration is working fine, it must be tested to ensure integration has been achieved. This kind of testing is known as integration testing.

Integration testing has been becoming more and more important, as most software being developed is modular in nature. With the advent of SOA, which is all about loosely coupled software components, integration testing has become even more important.

10. Explain in detail about software construction Artifacts. L2 CLO3

The software construction phase is one of the most labor intensive phases in software development cycle. This phase generates the complete source code of the application. Apart from source code, documentation is also made so that when any maintenance is required on the built application, the source code could be well understood, and changing any source code will be easy. Review reports are also generated after reviews are conducted.

11. Summarize about the Pair Programming. L2 CLO3

Pair programming is a quality driven development technique employed in the eXtreme Programming development model. Here, each development task is assigned to two developers. While one developer writes the code, the other developer sits behind him and guides him through the requirements (functional, nonfunctional). When it is the turn of the other developer to write the code, the first developer sits behind him and guides him on the requirements. So developers take turns for the coding and coaching work. This makes sure that each developer understands the big picture and helps them to write better code with lesser defects.

12. Explain about the Test-Driven Development. L2 CLO3

This concept is used with iteration-based projects especially with eXtreme Programming technique. Before developers start writing source code, they create test cases and run the tests to see if they run properly and their logic is working. Once it is proved that their logic is perfect, only then they write the source code. So here, tests drive software development, and hence it is appropriately named test-driven development.

13. Explain in detail about Automatic Code Generation. L2 CLO3

Constructing and generating software code is very labor intensive work. So there has always been fascination about automatic generation of software code. Unfortunately, this is still a dream. Some CASE and modeling tools are available that generate software code. But they are not sophisticated. They are also not complete. Then there are business analyst platforms developed by many ERP software vendors that generate code automatically when analysts configure the product. These analyst

platforms are first built using any of the software product development methodologies. The generated code is specific to the platform and runs on the device (hardware and software environment) for which the code is generated.

Generally, any code consists of many construction unit types. Some of these code types include control statements such as loop statements, if statements, etc., and database access, etc. Generating all of the software code required to build a software application is still difficult. But some companies like Sun Microsystems are working to develop such a system.

14. Elaborate Peer reviews. L2 CLO3

Peer Reviews are employed when a complete review of the source code is not important. Here, the developer sends his piece of code to the designated team members. These team members review the code and send feedback and comments to the developer as suggestions for improvement in the code. The developer reads those feedbacks and may decide to incorporate or to discard those suggestions. So this form of review is totally voluntary. Still, it is a powerful tool to eliminate defects or improve software code.

15. Explain in detail about Reliability. L2 CLO3

Reliability is one of the most important aspects of industry strength software products. If the software product is not reliable and contains critical defects, then it will not be of much use for end users. Reliability of source code can be increased by sticking to the standard processes for software construction. During reviews, if any defects are found, they can be fixed easily if the source code is neat, simple, and clear.

Reliable source code can be achieved by first designing the software product with future enhancement in consideration as well as by having a solid structure on which the software product is to be built. When writing pieces of source code based on this structure, there will be little chance of defects entering into the source code. Generally during enhancements, the existing structure is not able to take load of additional source code and thus the structure becomes shaky. If the development team feels that this is the case, then it is far better to restructure the software design and then write a code based on the new structure than to add a spaghetti code on top of a crumbling structure.

12 Marks:

1. Categorize the various coding standards and explain its characteristics with examples. L2 CLO3
2. Classify the different kinds of reviews done at different stages in software code writing. L2 CLO3
3. List the techniques to ensure the quality of written code and discuss them in detail. L2 CLO3
4. Elaborate in detail about Quality control. L2 CLO3
5. Categorize the various coding methods and explain them in detail. L2 CLO3
6. Classify the different kinds of programming techniques and elaborate in detail L2 CLO3
7. Compare and contrast unit testing and integration testing with appropriate scenarios. L2 CLO3
8. Discuss in detail about L2 CLO3
   a. Pair Programming
   b. Test driven development
   c. Object oriented programming
9. Explain the following in detail L2 CLO3
   a. Structured Programming

b. Automatic code generation
c. Software code reuse

10. Explain in detail about L2 CLO3
a. Configuration management
b. software construction Artifacts