

680211 Software Engineering

1. What are the elements of a system?
2. What are the roles of system analyst?
3. What are the characteristics of system?
4. Distinguish between a program and a software product.
5. What are the steps in feasibility analysis?
6. Distinguish between initial investigation and feasibility study. In what way are they related?
7. What do you mean by cost/benefit analysis? Define its classifications.
8. What is the principal aim of the software engineering discipline? What does the discipline of software engineering discuss?
9. Explain why the effort, time, and cost required to develop a program using the build and fix style increase exponentially with the size of the program. How do software engineering principles help tackle this rapid rise in development time and cost?
10. What do you understand by the term life cycle model of software development? What problems might a software development organization face if it does not follow any life cycle models during development of a large software product?
11. What problems would a software development organization face if it does not have a documented process model, and therefore, follows only an informally described life cycle model?
12. What are the objectives of the feasibility study phase of software development? Explain the important activities that are carried out during the feasibility study phase of a software development project.
13. If you were to interview a user to obtain biographical information (age, education, years of experience on the job, and so forth) about the staff of 10 employees and you have only one hour to acquire the information, which of the following methods would you use and why?
 - a. Structured interviews using open-ended questions.
 - b. Unstructured interviews of five minutes each.
 - c. Self-administered questionnaires.
 - d. Structured interviews using closed questions.
14. Take an organization with which you are familiar and examine the following:
 - a. Primary subsystems.
 - b. Characteristics.
 - c. Elements.
 - d. Purpose.
15. What are software metrics?
16. Explain why the spiral life cycle model is considered to be a meta model.
17. Does construction of a prototype always increase the overall cost of software development?
18. What are the major phases in the waterfall model of software development? Which phase consumes the maximum effort for developing a typical software product?
19. For a project beset with many risks, would you recommend use of the prototyping or the spiral model? Explain your answer.
20. What are the major advantages of first constructing a working prototype before developing the actual product?
21. Irrespective of whichever life cycle model is followed for a software product development, why is it necessary for the final documents to describe the product as if it were developed using the classical waterfall model?
22. What is a prototype? Under what circumstances is it beneficial to construct a prototype? Does construction of a prototype always increase the overall cost of software development?
23. What are the major shortcomings of the iterative waterfall model? Name the life cycle models that overcome these shortcomings. How are the shortcomings taken care in those models?

24. If the prototyping model is being used in a development effort, is it necessary to develop an SRS document? Justify your answer.
25. What are software metrics? What is the role of metrics in project management? What is the role of metrics in process management?
26. Suggest a suitable life cycle model for a software project which your organization has undertaken on behalf of certain customer who is unsure of his requirements and is likely to change his requirements frequently. Give the reasoning behind your answer.
27. Which of the development process models are suitable for the following projects-
 - a. A simple data processing project.
 - b. A data entry system for office staff who have never used computers before.
 - c. An on-line inventory management system for an automobile industry.
 - d. A spreadsheet system that has some basic features and many other desirable features that use these basic features.
 - e. A flight control system with extremely high reliability.
28. List the major responsibilities of a software project manager.
29. What are the limitations of the cost estimation models?
30. What problems are likely to occur if a module has low cohesion?
31. What is meant by the size of a software project? Why does a project manager need to estimate the size of the project? How is the size estimated?
32. Explain why adding more manpower to an already late project makes it later.
33. List the important shortcomings of LOC for use as a software size metric for carrying out project estimations.
34. List the important items that a Software Project Management Plan (SPMP) document should discuss.
35. Enumerate the different types of cohesion that a module might exhibit. Give examples of each.
36. Enumerate the different types of coupling that might exist between two modules. Give examples of each.
37. What according to you characterizes a good software design?
38. Is it true that whenever you increase the cohesion of your design, coupling in the design would automatically decrease? Justify your answer by using suitable examples.
39. What problems are likely to arise if two modules have high coupling?
40. Assume that the size of a semi-detached type software product has been estimated to be 35,000 lines of source code. Assume that the average salary of software developers is Rs. 10,000 per month. Determine the effort required to develop the software product, the nominal development time and the cost to develop the product.
41. What are the different categories of software development projects according to the COCOMO estimation model? Give examples of software product development projects belonging to each of these categories.
42. Construct a decision tree of discount policy:
Bookstores get a trade discount of 25%;
For orders from libraries and individuals, 5% allowed on orders of 6-19 copies per book title;
10% on orders for 20-49 copies per book title;
15% on orders for 50 copies or more per book title.
43. Construct a Structured English of discount policy:
Bookstores get a trade discount of 25%;
For orders from libraries and individuals, 5% allowed on orders of 6-19 copies per book title;
10% on orders for 20-49 copies per book title;
15% on orders for 50 copies or more per book title.

44. Construct a decision table of discount policy:
Bookstores get a trade discount of 25%;
For orders from libraries and individuals, 5% allowed on orders of 6-19 copies per book title;
10% on orders for 20-49 copies per book title;
15% on orders for 50 copies or more per book title.
45. Discuss risk identification, analysis and management activities in software development projects with the help of suitable illustrations.
46. Why is accurate estimation of the effort required for completing a project difficult? Briefly explain the different effort estimations methods that are available. Which one would be the most advisable to use and why?
47. Suppose you are developing a software product in the organic mode. You have estimated the size of the product to be about 100,000 lines of code. Compute the nominal effort and the development time.
48. What is meant by software configuration management? How can you manage software configuration? Why is software configuration management crucial to the success of large software product development projects?
49. Do you agree with the following assertion? “A design solution that is difficult to understand would lead to increased development and maintenance cost.” Give reasoning for your answer.
50. What do you mean by the terms cohesion and coupling in the context of software design? How are these concepts useful in arriving at a good design of a system?
51. Explain how the overall cohesion and coupling of a design would be impacted if all modules of the design are merged into a single module.
52. Compute function point value for project with following information:
No. of inputs=14, no. of outputs=20, no. of enquires=15, no. of files=10, no. of external interface=8. Assume that all complexity adjust values are average.
53. Complete f_p value for project with following information:
no. of i/p = 32
no. of o/p = 30,
no. of enquires = 24,
no. of files = 18,
no. of external interface = 8.
Assume complexity adjust value.
54. Why do we test systems? How important is testing?
55. Explain different types of testing.
56. What are the test strategies for conventional software?
57. Distinguish between an error and a failure in the context of program testing. Testing detects which of these two? Justify your answer.
58. What are driver and stub modules in the context of integration and unit testing of a software product? Why are stub and driver modules required?
59. Why testing of software is necessary? What is the distinction between ‘alpha’ and ‘beta’ testing?
60. Distinguish between alpha, beta, and acceptance testing.
61. Why is it important for a software development organization to obtain ISO 9001 certification?

62. Consider the following C function names sort.

```
void sort(int a[], int n){
    int i,j;
    for(i=0;i<n-1;i++)
        for(j=i+1;j<n;j++)
            if(a[i]>a[j])
            {
                temp=a[i];    a[i]=a[j];    a[j]=temp;    }
            }
```

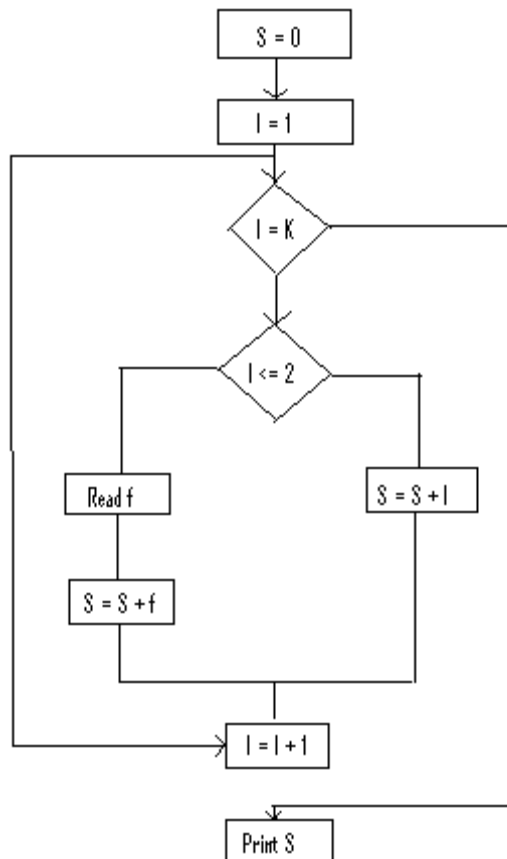
Determine the cyclomatic complexity of the sort function.

63. Explain cyclomatic complexity. Find out the cyclomatic complexity of the following pseudo code:

```
IF X < Y
THEN Statement 1;
ELSE IF Y >= Z
THEN Statement 2;
END
```

64. List and briefly describe the factors that affect the quality of a system.

65. To carry out white-box testing of a program its flowchart representation is obtain as follows:



Find out Cyclomatic Complexity?

66. Consider the following code

```
if (( A > B) AND ( C > D)) then
```

A = A + 1

B = B + 1

endif

Find out Cyclomatic Complexity?

67. Distinguish between the following:

- a. String and system testing
- b. Artificial and live test data
- c. Error tolerance and accuracy
- d. Compiling and assembling