

IBPS IT Officers Exam

Study Materials

Software Engineering

Basics



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1. Define Software Engineering

The establishment and use of sound engineering principles in order to obtain economically software that is reliable and works efficiently on real machines.

2. Differentiate Software engineering methods, tools and procedures.

Methods : Broad array of tasks like project planning, cost estimation etc..

Tools : Automated or semi automated support for methods.

Procedures : Holds the methods and tools together. It enables the timely development of computer software.

3. Write the disadvantages of classic life cycle model.

Disadvantages of classic life cycle model :

1. Real projects rarely follow sequential flow. Iteration always occurs and creates problem.
2. Difficult for the customer to state all requirements
3. Working version of the program is not available. So the customer must have patience.

4. What do you mean by task set in spiral Model?

Each of the regions in the spiral model is populated by a set of work tasks called a task set that are adopted to the characteristics of the project to be undertaken.

5. What is the main objective of Win-Win Spiral Model?

The customer and the developer enter into the process of negotiation where the customer may be asked to balance functionality ,performance and other product against cost and time to market.

6. Which of the software engineering paradigms would be most effective? Why?

Incremental / Spiral model will be most effective.

Reasons:

1. It combines linear sequential model with iterative nature of prototyping
2. Focuses on delivery of product at each increment
3. Can be planned to manage technical risks.

7. Who is called as the Stakeholder?

Stakeholder is anyone in the organization who has a direct business interest in the system or product to be built.

8. Write the objective of project planning?

It is to provide a framework that enables the manager to make reasonable estimates of resources, cost and schedule.

9. What is Boot Strapping?

A sequence of instructions whose execution causes additional instructions to be loaded and executed until the complete program is in storage.

10. Write a short note on 4GT.

Fourth Generation Technique. 4GT encompasses a broad array of software tools. Each tool enables the software developer to specify some characteristics of software at a higher level.

11. What is FP ? How it is used for project estimation ?

Function Point. It is used as the estimation variable to size the each element of the software. It requires considerably less detailed. Estimated indirectly by estimating the number of inputs, outputs, data files, external interfaces.

12. What is LOC ? How it is used for project estimation?

LOC : Lines of Code. It is used as estimation variable to size each element of the software. It requires considerable level of detail..

13. Write the formula to calculate the effort in persons-months used in Dynamic multi variable Model?

Software Equation : $E = [LOC * B^{0.333/P}]^3 * (1/t^4)$ Where E is effort in person-months, t is project duration, B is special skills factor, P is productivity parameter.

14. What is called object points?

It is an indirect software measure that is computed using counts of the number of screens, reports and components.

15. What are the four different Degrees of Rigor ?

Four different degrees of Rigor are

1. Casual
2. Structured
3. Strict
4. Quick reaction

16. Write about Democratic Teams in software development. (Egoless Team)

It is egoless team. All team members participate in all decisions. Group leadership rotates

from member to member based on tasks to be performed.

17. What are the two project scheduling methods ?

- PERT- Program Evaluation and Review Techniques
- CPM- Critical Path Method

18. What is called support risk?

The degree of uncertainty that the resultant software will be easy to correct , adapt and enhance.

19. What is RMMM?

Risk Mitigation, Monitoring and Management Plan. It is also called Risk Aversion.

20. What are four impacts of the project risk?

Catastrophic, Critical, Marginal, Negligible.

21. List the tools or methods available for rapid prototyping.

Rapid prototyping (Speed)

1. 4GT
2. Resuable software components
3. Formal specification and prototyping environments.

22. What is the need for modularity ?

Need for modularity: Easier to solve a complex problem. Can achieve reusability. Best effort and complexity reduces.

23. What are the five criteria that are used in modularity?

- Modular Decomposability
- Modular composability
- Modular understandability
- Modular continuity
- Modular protection

24. What is Software Architecture?

The overall structure of the software and the ways in which that software provides conceptual integrity for the system.

25. What are the models are used for Architectural design?

- Structural models
- Framework models
- Dynamic models
- Process models
- Functional models

26. What is cohesion?

It is a measure of the relative functional strength of a module. (Binding)

27. What is Coupling?

Measure of the relative interdependence among modules. (Measure of interconnection among modules in a software structure.)

28. List the coupling factors.

- Interface complexity between modules

- Reference to the module
- Data pass across the interface.

29. Define Stamp coupling.

When a portion of the data structure is passed via the module interface , then it called stamp coupling.

30. Define common coupling.

When a number of modules reference a global data area, then the coupling is called common coupling.

31. Define temporal cohesion.

When a module contains tasks that are related by the fact that all must be executed with the same span of time, then it termed as temporal cohesion.

32. Write a short note on structure charts.

These are used in architectural design to document hierarchical structure, parameters and interconnections in a system. No Decision box . The chart can be augmented with module by module specifications of I/P and O/P parameters as well as I/P and O/P attributes.

33. What do you mean by factoring?

It is also called vertical partitioning. It follows Top-Down strategy. We can say that there are some top level modules and low level modules.

- Top level modules ---- Control functions ,actual processing work
- Low level modules ----Workers. Performing all input computation and output tasks.

34. What is Aesthetics?

- Aesthetics : It is a science of art and beauty. These are fundamental to software design, whether in art or technology.
- Simplicity, Elegance(refinement), clarity of purpose.

35. What do you mean by common coupling?

Common coupling : When a number of modules reference a global data area , then the coupling is called common coupling.

36. Write about Real Time Systems.

It provides specified amount of computation with in fixed time intervals. RTS sense and control external devices, respond to external events and share processing time between tasks.

37. Define Distributed system .

It consists of a collection of nearly autonomous processors that communicate to achieve a coherent computing system.

38. Compare Data Flow Oriented Design with data structure oriented design

- Data flow oriented design : Used to represent a system or software at any level of abstraction.
- Data Structure oriented design : It is used for representing information hierarchy using the three constructs for sequence, selection and repetition.

39. Define Architectural Design and Data Design.

- Architectural Design : To develop a modular program structure and represent the relationships between modules.

- Data Design : To select the logical representations of data objects , data storage and the concepts of information hiding and data abstraction.

40. What are the contents of HIPO diagrams?

Visual table of contents, set of overview diagrams, set of detail diagrams.

41. What are the aspects of software reuse.

- Software development with reuse
- Software development for reuse
- Generator based reuse
- Application system reuse

42. Define Configuration Status Reporting .

What happened? Who did it?

When it happened? What else will be affected?

It is also called status accounting.

43. What is the need for baseline?

Need for Baseline :

1. Basis for further development
2. Uses formal change control procedure for change
3. Helps to control change

44. Define SCM.

It is an umbrella activity that is applied throughout software process. It has a set of tracking and control activities that begin when a software engineering project begins and terminates only when the software project is taken out of operation.

45. List the SCM Activities.

- Identify a change
- Control change
- Ensure that change is being properly implemented
- Report changes to others who may have an interest

46. What is meant by software reusability?

A software component should be designed and implemented so that it can be reused in many different programs.

47. What is CASE ?

CASE : Computer Aided Software Engineering

CASE provides the engineer with the ability to automate manual activities and to improve engineering insight.

48. Write the distinction between SCM and software support.

SCM : It has a set of tracking and control activities that begin when a software engineering project begins and terminates only when the software project is taken out of operation. Software support : It has a set of software engineering activities that occur after software has been delivered to the customer and put into operation.

49. What is the difference between basic objects and aggregate objects used in software configuration.

Basic Objects : It represents unit of text. E.g Section of requirement specification, Source listing for a component. Aggregate objects: Collection of basic objects. And other aggregate objects. E.g Full design specification

50. Explain Linear Sequential Model and prototyping model in detail

- Linear Sequential Model :
 - Explanation, Diagram , Advantages, Disadvantages
- Prototyping model:
 - Explanation, Diagram , Advantages, Disadvantages

51. Explain Spiral model and win-win spiral model in detail.

- Spiral Model :
 - Six Task Regions : Customer Communication
 - Planning
 - Risk Analysis
 - Engineering
 - Construction and Release
 - Customer Evaluation
 - Diagram , Details of four circles
- Win-Win spiral model:
 - The customer and the developer enter into the process of negotiation, where the
 - customer may be asked to balance functionality, performance, and other product against
 - cost and time to market.
 - Activities, diagram , explanation

52. Explain the process of ‘ Risk Analysis and Management.’

Risk Identification

Risk Estimation

Risk Assessment

Risk Management and Monitoring

Risk Refinement

53. Explain the types of coupling and cohesion.

Coupling : Measure of the relative interdependence among modules.

Types: Data coupling , Stamp coupling, control coupling, External coupling, Common coupling, Content coupling

Cohesion : It is a measure of the relative functional strength of a module.

Types: Coincidentally cohesive, Logically cohesive, Temporal cohesion, procedural cohesion, communicational cohesion, High cohesion, sequential cohesion.

54. Explain Jackson system development with an example.

Steps are : Entity Action step

Entity Structure step

Initial modeling step

Function step

System Timing step

Implementation step

Example : University with two campuses.

55. Explain Data Flow Oriented design in detail.

The objective of this design is to provide a systematic approach for the derivation of program structure.

Design and information flow

Design process considerations

(Atleast one of the following with an example)

Transform flow and analysis

Transaction flow and analysis

56. What is software reuse? Explain the various aspects of software reuse.

A software component should be designed and implemented so that it can be reused in many different programs.

Explanation of Aspects:

- Software development with reuse
- Software development for reuse
- Generator based reuse
- Application system reuse

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