Information Systems Acquisition, Development and Implementation

Project Management Structure

1. Which of the following best describes Source Lines of Code(SLOC)?

   a metric used to estimate the size and complexity of a software program based on the number of lines of code written.

2. Which of the following best describes Function Point Analysis (FPA)?

   a technique used to measure the size of a software application based on the functionality provided to the user.

3. The best technique to prioritise project activities and to determine the timeline for each activity is which of the following?

   Program evaluation and review techniques

4. The prime objective of evaluating a project using the capability maturity model is which of the following?

   to ensure a stable software development process

5. The best technique to estimate the duration of the project is which of the following?

   the program evaluation review technique

6. To determine project priorities and implementation, the IS auditor should review which of the following?

   portfolio management

7. The phrases and deliverables of a new system should be determined when?

   during the initial planning stage of the project

8. Which of the following techniques is used to determine the size of software having many linked modules and different attribute fields?

   Function Point Analysis (FPA)

9. Which of the following should be revalidated first when planning to add more personnel to the project to reduce the completion time?

   the critical path of the project

10. Which of the following is true for timebox management?

    it aims to prevent excess cost and time overruns that affect project completion.

11. To reduce the overall cost of the project, quality management techniques should be applied when?

    continuously throughout the project

12. For early completion of the project, emphasis on which of the following activities will be helpful?

    an activity with zero slack time

13. The technique to evaluate project progression in terms of time, cost and schedule, and to determine estimates of these by completion, is which of the following?

    Earned Value Analysis(EVA)

14. A project which is expected to be completed in 2 years has utilised only 25% of the budget after completion of the first year. The IS auditor should first determine which of the following?

    work completed compare to the schedule for completion

15. To obtain reasonable assurance about the completion of the project within the timeline, the best method is which of the following?

    to extrapolate the end date on the basis of completed work and resource availability at this point

16. The most appropriate technique to evaluate the progress of a project is which of the following?

    Gantt charts

17. On the evaluation of a 4-day project of 32 hours(8 hours per day), the IS auditor noted that at the end of day 1, 28 hours of work is still pending. The IS auditor should report which of the following?

    that the project is behind schedule

18. In which of the following phases should a proper plan and strategy for new systems be developed?

    the design phase

Business Case and Feasibility Analysis

1. Which of the following best describes a business case?

   a justification for a proposed project or investment, including the benefits, costs, risks, and alignment with organisational goals.

2. Which of the following best describes a feasibility analysis?

   an in-depth assessment of the technical, financial, legal and operational viability of a proposed project.

3. The main concern for the implementation of a new project is which of the following?

   the business case has been prepared

4. The most important consideration in a business case is which of the following?

   ROI of the project

5. An auditor reviewing the outsourcing process of an organisation should be primarily concerned about which of the following?

   the business case not having been prepared

6. An Inadequate software baseline can result in which of the following?

   scope creep

7. The prime objective of assigning process ownership in a system development project is to do which of the following?

   ensure that project requirements are aligned with business needs.

8. The most important factor for whether a business case helps management in decision-making is which of the following?

   a feasibility study

9. Business case documentation needs to preserved until which of the following?

   the end of the project life cycle

10. The IS auditor noted that a project that is more than 75% complete has already overrun by 20%, with costs increasing by 30%. Which of the following is the first course of action for the IS auditor?

    review the business case and project management

11. What should an auditor recommend when a business case is no longer valid due to an increase in cost and a reduction in the expected benefits?

    to update the business case to determined the relevance of the project

12. An auditor reviewing a feasibility study of a new project should be mainly concerned about which of the following?

    The project impact on the organisation not having been evaluated

System Development Methodologist

1. Which of the following best describes Agile Development?

   a software development approach that emphasis flexibility, collaboration, and iterative progress through small, incremental releases.

2. Which of the following best describes Reverse Engineering?

   a technique used to deconstruct software to understand its design, architecture, and functionality, often for the purpose of modification or duplication.

3. A major risk in the Agile development process is which of the following?

   Inadequate documentation

4. One of the important characteristics of the Agile approach is which of the following?

   a systematic review after the completion of each iteration to identify areas of improvement

5. A major limitation of the Agile software development methodology is which of the following?

   a lack of proper documentation due to time management

6. A major benefit of using prototyping for system development is which of the following?

   a reduction in deployment time

7. The most effective testing method for the initial phase of prototyping is which of the following?

   Top-down testing

8. The technique that relies on a prototype that can be frequently updated to address ever-changing user or business requirements is which of the following?

   Rapid Application Development (RAD)

9. The major benefit of the prototype approach is which of the following?

   significant time and cost savings

10. In the prototyping method, change control can be impacted by which of the following?

    frequent changes in requirements and design

11. The methodology for quick development at a reduced cost while ensuring high quality is which of the following?

    Rapid Application Development

12. RAD (Rapid Application Development) has which of the following advantages over the traditional SDLC?

    a reduction in the development time frame

13. A benefit of object-oriented development technique is which of the following?

    Object modules can be reused

14. A characteristic of the Object-oriented System Development (OOSD) method that enables greater security over data is which of the following?

    encapsulation

15. The waterfall life cycle approach is more suitable for which of the following?

    well-defined requirements with no expected changes.

16. A technique to study and analyse an application or a system, and to use that information to develop similar system, is known as which of the following?

    reverse engineering

17. Which of the following is a technique to enhance the system by extracting and reusing design and program components?

    software reengineering

18. Which of the following is a major concern of an IS auditor reviewing the system development approach?

    the absence of a quality plan for system development

19. A major benefit of component-based system development is which of the following?

    it supports multiple development environments

20. The greatest concern for an IS auditor for reviewing the business process reengineering process is which of the following?

    the unavailability of key controls to protect assets and information resources

21. Business process reengineering aims to achieve which of the following?

    improve the performance of products and services

22. The first step in business process reengineering is to do which of the following?

    finalise the scope and areas to be reviewed

23. The prototyping approach is used to design which of the following?

    screens, Interactive edits, and sample reports

Control Identification and Design

1. Which of the following best describes check digits?

   a validation technique where an additional digit is appended to a string of numbers to detect errors in data entry or transmission

2. Which of the following best describes the ACID principles in the context of data integrity?

   a set of principles that ensures transactions are processed reliably in a database, maintaining Atomicity, Consistency, Isolation and Durability.

3. Which of the following is the best control to address input errors?

   Limit Checks

4. Which of the following is the best control to ensure that no transactions are lost during processing?

   automated system balancing

5. To detect transposition and transcription errors, which of the following controls is the most effective?

   check digits

6. The data integrity principle, which prescribes that a transaction is either processed completely or not processed at all, falls under which of the following principles?

   atomicity

7. The technique to prevent duplication of a voucher during data entry is which of the following?

   Sequence Checks

8. The technique to control the completeness of data transmission is which of the following?

   parity bits

9. The technique used by banks for the prevention of transposition and transcription mistakes, thus ensuring the integrity of bank account numbers allotted to customers, is which of the following?

   check digits

10. Which of the following is the purpose of the checksum control?

    to ensure integrity

11. Parity bits are implemented to validate which of the following?

    data completeness

12. The best method to find transmission mistakes by adding an extra bit at the end of segment is which of the following?

    redundancy checks

13. Which of the following techniques helps to detect errors in a network transmission?

    redundancy checks

14. Which of the following techniques helps to detect as well as correct the errors by transmitting redundant information with each character?

    forward error control

15. The data integrity principle of atomicity ensures which of the following?

    that a transaction is completed in its entirety

16. Which of the following is a feature of DSS?

    DSS enables flexibility in the user's approach to decision-making

17. The knowledge domain of an expert system, which uses questionnaires to guide the user through a series of choices before coming to a conclusion, is known as which of the following?

    decision trees

18. The main risk of using a DSS is which of the following?

    the inability to specify the purpose and usage patterns

19. Questionnaires to guide the user through a set of choices to arrive at a conclusion is used by which of the following?

    decision trees

20. A Digital Support System(DSS) does which of the following?

    it emphasises flexibility in the user's approach to decision-making.

21. The business information system that provides answers to semi-structured issues and validates business decisions is which of the following?

    A DSS

22. When reviewing the decision support system, an IS auditor should be most concerned with which of the following?

    the level of skills and experience contained in the knowledge base

Testing Methodology

1. Which of the following best describes regression testing?

   a testing process that verifies whether recent code or system changes have not adversely affected existing functionalities.

2. Which of the following best describes white box testing?

   a testing approach that examines the internal structure, logic, and coding of an application.

3. Which of the following best describes black box testing?

   a method of testing that focuses on the external behavior of an application without any knowledge of its internal code or logic.

4. A test that is conducted when a system is in development phase is

   a unit test

5. The approach to unit testing is

   White box

6. Testing the network between two or more systems for accurate data flow is

   interface testing

7. In some instances, system interface failures occur when corrections are re-submitted to previously observed errors. This might indicate the absence of which of the following kinds of testing?

   integration testing

8. Unit testing shows that individual modules function correctly. The IS auditor should

   review integrated test findings

9. The purpose of regression testing is to decide if

   no new errors were introduced within the unchanged code

10. Which of the following data elements should be used while conducting a regression test?

    the same dataset as previous tests

11. The test that verifies that change in Windows Registry have not adversely affected the performance of any other features is

    regression testing

12. Which of the following type of test would be relevant when an organisation needs to determine whether a replacement or modified system is capable of functioning in its target environment without affecting other existing systems?

    sociability testing

13. What feature of white box testing differentiates it from black box testing?

    testing includes the verification of internal program logic.

14. Which of the following is the PRIMARY purpose of conducting parallel testing?

    to validate device functionality with user specifications

15. An advantage of using a bottom-up approach as opposed to a top-down approach is

    errors can be found early on in critical modules

16. Which of the following is the greatest concern about acceptance testing?

    there maybe major unsolved issues

17. An unsuccessful result of which of the following tests has a major impact on budgeted time and cost?

    acceptance testing

18. Which of the following is the main objective for conducting a system test?

    to evaluate the functioning of the system

19. An IS auditor noted a system vulnerability. To address all the undetected vulnerabilities, which of the following tests is recommended?

    system testing

20. For prototype-based system development, the most effective test approach is

    Top-down

21. The most effective method for conducting stress tests is

    using live data within the test environment

22. The greatest risk in a combined Quality Assurance Testing(QAT) and User Acceptance Testing(UAT) during the final acceptance test is

    insufficient functional testing

23. The most important factor for test data selection is

    data designed as per expected live processing

System Migration

1. Which of the following best describes a parallel changeover?

   a transition strategy where both the old and new systems run simultaneously for a period of time to ensure the new system works correctly before fully decommissioning the old system.

2. Which of the following best describes a phased changeover?

   a strategy where the new system is introduced in stages or modules, gradually replacing parts of the old system.

3. Which of the following best describes an abrupt changeover?

   a method where the old system is immediately and completely replaced by the new system at a specific point in time, without overlap.

4. Who should approve the completion and implementation of a new system application?

   User management

5. The greatest advantage of a parallel changeover is

   it provides assurance the new system meets the requirements before the old system is discontinued.

6. Which of the following is the prime objective of parallel testing?

   to ensure the new system meets the user requirements.

7. Which of the following is the greatest risk in system migration?

   a quality plan is not available for system migration

8. Which of the following is the greatest concern for a system migration project?

   an abrupt changeover is planned, immediately disposing of the legacy system.

9. To determine the functionality of the new system without adversely affecting other existing systems, most appropriate test is

   sociability test

10. Which of the following changeovers comes with the greatest risk?

    direct cutover

11. Which of the following changes has the greatest redundancy?

    parallel

12. Who has the prime responsibility for signing off on the accuracy and completeness of data migration of a new system?

    data owner

13. Which of the following is the greatest concern for an immediate cutover to the new system?

    the lack of a backup plan

Post Implementation Review

1. What is the ideal phase for conducting a post-implementation review?

   after the system has been in operation for a sufficient period to assess its effectiveness and identify any issues.

2. The post-implementation review includes

   an analysis of the return on investment

3. The IS auditor's primary focus during post-implementation review is

   to determine the operating effectiveness of the controls built into the system.

4. An IS auditor is conducting a post-implementation review of an ERM system. They are most likely to review

   access control settings

5. A post-implementation review should cover

   the lessons learned in order to improve future projects.

6. A post-implementation review is conducted primarily to

   ensure that the project meets the intended business requirements.

7. Which of the following is the main objective of a post-implementation review?

   to determine whether project objectives have been met.

Configuration and Release Management

1. What is the primary goal of release management?

   to deliver new or changed services smoothly and efficiently.
2. What does baseline control ensure in configuration management?

   establishing minimum system or security requirements

Key Points

- Function Point Analysis(FPA) often used for estimating the complexity and effort required for software development.
- Program Evaluation and Review Technique(PERT) is considered more accurate and appropriate compared to Critical Path Methodology(CPM) for estimations of project duration.
- Gantt charts are primarily used to monitor the progress of the project.
- Source Lines of Code(SLOC) and FPA are techniques to estimate software size.
- Component-based development and RAD are software development methologies.
- The objective of a portfolio management is to manage the various projects of an organisation.
- Portfolio management includes prioritisation, budgeting, approvals, and monitoring the implementation.
- Portfolio management helps to align the projects in accordance with the business objective.
- Source Lines of Code(SLOC) is a traditional way of estimating software size on the basis of a single parameter, such as the number of lines of code.
- Slack time is the buffer or extra time before the project completion deadline, and an activity can be delayed up to the slack time without impacting the overall project completion date.

- Earned Value Analysis(EVA) determines and evaluates the following factors on a periodic basis
  - How does the actual spending up to the current date compare to the budget?
  - What will the estimated completion time be?
  - What will the estimated total expenditure be?
- Gantt Chats are used to determine the status of the project, such as whether the project is delayed, ahead of schedule, or on schedule.
- Gantt Charts are used for tracking and monitoring achievements of milestones.
- A business case is a document that provides a rationale for undertaking a project or investment.
- A software baseline is the an agreed-upon features of the software to be designed and developed.
- Any additional requirement must go through the formal change management procedure.
- An inadequate baseline will result in scope creep.
- A feasibility study is an analysis that takes various factors into account, such as economic, technical and legal factors, to ascertain the likehood of completing the project successfully.
- Feasibility study helps to assess whether a solution is practical and achievable within the established budgets and schedule requirements.
- Top-down testing begins with the system's major functionality and gradually moves to other functionality.
- In prototyping, more emphasis is given to major functionality such as screens, and reports, thereby covering most of the proposed system's features in a short period.
- The objective of Rapid Application Development (RAD) is the quick development of a system while reducing cost and ensuring quality.
- Rapid Application Development(RAD) relies on a prototype, which can frequently updated to address the ever-changing user or business requirements.
- Object-oriented System Development technique (OOSD) is a programming techniques with the objective to make program code that can be reusable and maintainable.

- Object here refers to a small piece of the program that can be used individually or in combination with other objects.
- Object-oriented System Development technique (OOSD) uses a technique known as encapsulation, in which objects interact with each other.
- Encapsulation provides enhanced security for data.
- The ability of two or more objects to interpret a message is termed as polymorphism.
- Reverse engineering is the process of detailed analysis and study of a system with the objective of developing a similar system.
- Software reengineering and business process reengineering are the processes of updating a system or process to enhance the system functionality to make the system or processes better and more efficient.
- In Component-based development, ready-made components (objects) are assembled together to design and develop a specific application.
- Reengineering is the process of updating a system to enhance the system functionality to make the system better and more efficient.
- The prototype is basically a preliminary version of a system to test a concept, process or any assumptions about the functionality, design or internal logic.
- In prototyping, more emphasis is given to major functionality such as screens, and the report thus shapes most of the proposed system's features in a short period.
- Check digits are used as a simple error-detection technique in which an additional digit is added to a number (such as a credit card number) to verify its accuracy and detect data entry or transmission errors.
- The ACID principles - Atomicity, Consistency, Isolation and Durability are fundamental to ensuring that database transactions are processed in a way that maintains data integrity, even in cases of system failures or errors.
- Limit checks restrict the data input up to certain predefined limits.
- Data is checked for certain limits, either upper or lower, as in the number entered should not be greater than 100.
- A limit check is an input control.
    - It is a preventive control to restrict invalid input into the system.
    - It ensures that only data within the predefined limit can enter the system.
- Automated system balancing reconciles the total input and total output.

- Any difference will be shown as an error for further investigation and correction.
- The principle of atomicity prescribes that a transaction is either processed completely or should not processed at all.
- The principle of consistency prescribes that all integrity conditions must be applied to each transaction of the database.
- The principle of isolation prescribes that each transaction should be separated from other transactions.
- Sequence checks involves testing a list of items or files of records for the correct ascending or descending sequence based on predefined requirements.
- Sequence checks checks whether vouchers are in sequence and thus prevents the duplication of the vouchers.
- Parity bits are used to verify complete and accurate data transmission.
- Parity bits are used as the simplest form of error-detecting code when data is transferred from one computer to another.
- An parity bit - an extra bit is added to the data in such a way that total number of 1 bits in the data string is either even or odd.
- This parity is then verified by the receiving computer to validate the data accuracy and completeness during transmission.
- The purpose of a checksum is to ensure data integrity and data completeness.
- Parity checks, checksums and cyclic redundancy are used to verify and validate complete and accurate data transmission.
- Cyclic Redundancy Checksums(CRCs) / redundancy checks involve applying complex mathematical calculations and are more accurate than parity bits and checksums.
- Cyclic Redundancy Checksums(CRCs) can check for a block of transmitted data.
- The sending computer generates the Cyclic Redundancy Check(CRC) and transmits it with the data.
- The receiving machine again generates a CRC and compare it to the transmitted CRC.
- If both of them are equal, then the block is assumed error-free.
- Forward error control works on same principle as redundancy checksums.

- In addition to detecting errors, they have the capability to correct the errors found.
- It helps the receiver computer to correct the error.
- Digital Support System(DSS)
  - supports decision that are either semi-organised or less organised.
  - uses standard data access and retrieval techniques.
  - flexible and user-friendly when it comes to changing environments and user decision-making.
- Regression testing helps to detect unintended side effects caused by new code.
- White box testing, also known as clear box or glass box testing, involves testing the internal structure and workings of an application.
- Black box testing is a testing method that evaluates the functionality of an application by focusing on the inputs and outputs without considering the internal workings of the system.
- In white box testing, program logic is verified.
- The purpose of the integration test is to validate the accurate and correct information flow between the systems.
- The objective of sociability testing is to ensure that the new system works as expected in existing infrastructure without any adverse impact on other existing systems.
- In the bottom-up approach, the test starts from an individual program or module and gradually the entire system is tested.
- One benefit of the bottom-up approach is that tests can begin before the full system is completed.
- In the top-down approach, the test starts at the broad system level and moves towards individual programs and modules.
- One benefit of the top-down approach is the early detection of interface errors.
- The top-down approach is best suited for prototype-based system development.
- Generally, in a system development life cycle,
  - unit testing is conducted first.
  - followed by integrated testing, system testing and acceptance testing.

- Acceptance tests include Quality Assurance Testing(QAT) and User Acceptance Testing(UAT).
- System testing tests the complete and full system capabilities.
  - it covers end to end system specifications.
  - it covers functionality test, recoverability test, security test, load test, volume test, stress test and performance test.
- It is the user management that assumes ownership of the project and should provide sign-off for completion and implementation of the system with regard to the agreed deliverables.
- Parallel testing involves comparing the results of the new system with the old system to determine the correct processing of the new system.
- Changeover should be phased or parallel to address the risk of implementing a new system.
- Disposing of the old system will complicate the fall-back strategy.
- In direct cutover, a new system is implemented from a cut-off date and the old system is completely discontinued once the new system is implemented.
- The main challenge in parallel method is the requirement of more resources to maintain both systems.
- The data owner assumes the responsibility for reviewing the completeness and accuracy of data migration and provides sign-off for it.
- One of the purposes of conducting a post-implementation review is to do a cost-benefit analysis and check the return on investment to determine that the original business case requirements are met.
- One of the reasons for conducting a post-implementation review is to identify the lessons learned and use them to improve future projects.