4) **What is SDLC? Explain the different phases of SDLC. (May/June 2015, Nov/Dec 2014, May/June 2014, May/June 2013)**

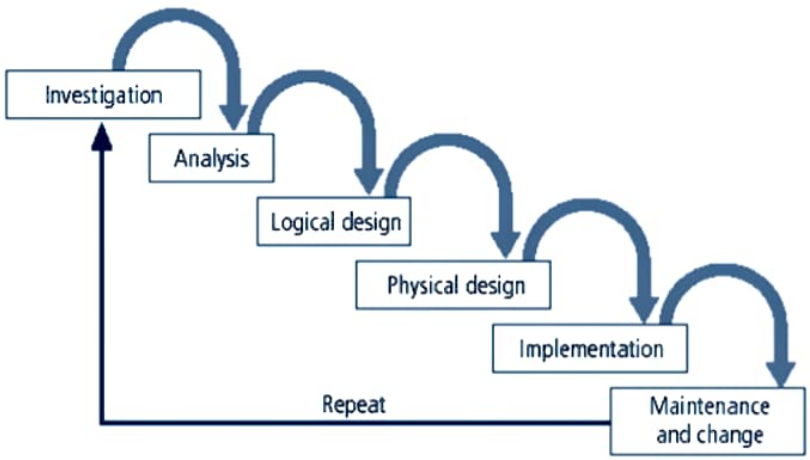
Methodology

- The SDLC is a methodology for the design and implementation of an information system in an organization.
- A methodology is a formal approach to solving a problem based on a structured sequence of procedures.
- Using a methodology ensures a rigorous process and avoids missing those steps that can lead to compromising the end goal.
- The goal in this case is creating a comprehensive security posture.
- A methodology also increases the probability of success.
- Once a methodology has been adopted, the key milestones are established and a team of individuals is selected and made accountable to accomplish the project goals.

SDLC Waterfall Methodology

Phases

- The traditional SDLC consists of six general phases.
- The different variations of SDLC range from three to 12 stages, all of which have been mapped into the six presented here.
- Each of these stages come from the Waterfall model pictured in Figure, in which each phase begins with the results and information gained from the previous phase.



SDLC Waterfall Methodology

- In the **Investigation phase**
  - The process begins with an investigation of the problem facing the organization
  - Analysis of current organizational practices considered in the context of the investigation
- Then proceeds into the **logical and physical design phases**.

- During the **design phases** potential solutions are identified and are associated with evaluation criteria.
- In the **implementation phase**
  - Solutions are evaluated
  - Selected, and
  - Acquired through a make-or-buy process.

These solutions, whether made or bought, are tested, installed, and tested again. Users of systems are trained and documentation developed.

- Finally, the system becomes mature and is **maintained** and modified over the remainder of its operational life.

Investigation

In the Investigation phase

- What is the problem the system is being developed to solve?
- The investigation phase begins with
  - An examination of the event or
  - Plan that initiates the process.
- During the investigation phase
  - The objectives
  - Constraints, and
  - Scope of the project is specified.
- A preliminary cost benefit analysis is developed to evaluate the perceived benefits and the appropriate levels of cost for those benefits.
- At the conclusion of this stage a feasibility analysis is performed which
  - Assesses the economic
  - Technical and
  - Behavioral feasibilities of the process and ensures that implementation is worth the organization's time and effort.

Analysis

- The analysis phase begins with the information gained during the investigation phase.
- This phase consists
  - Primarily of assessments of the organization,
  - The status of current systems, and
  - The capability to support the proposed systems.
- Analysts begin to determine
  - What the new system is expected to do and
  - How it will interact with existing systems.
- This phase ends with the documentation of the findings and an update of the feasibility analysis.

Logical Design

- The information gained from the analysis phase is used to begin creating a solution system for a business problem.
- In any systems solution, it is imperative that the first and driving factor is the business need.

- Then, based on the business need applications are selected that are capable of providing needed services.
- Based on the applications needed, **data support and structures** capable of providing the needed inputs are then chosen.
- Finally, based on all of the above, **specific technologies** to implement the physical solution are delineated.
- The logical design is, therefore, the **blueprint** for the desired solution.
- The logical design is implementation independent, meanings that it contains no reference to **specific technologies, vendors, or products**.

Physical Design

- The specific technologies are selected to support the alternatives identified and evaluated in the logical design.
- The selected components are evaluated based on a make-or-buy decision.
- Final designs integrate various components and technologies. After yet another feasibility analysis, the entire solution is presented to the organizational management for approval.

Implementation

- In the implementation phase
  - Any needed software is created
  - Components are ordered, received, and tested.
  - Afterwards users are trained and supporting documentation created.
  - Once all components are tested individually, they are installed and tested as systems.
- Again a feasibility analysis is prepared, and the sponsors are then presented with the system for a performance review and acceptance test.

Maintenance and Change

- The maintenance and change phase is the longest and most expensive phase of the process.
- This phase consists of
  - The tasks necessary to support and
  - Modify the system for the remainder of its useful life cycle.
- Even though formal development may conclude during this phase, the life cycle of the project continues until it is determined that the process should begin again from the investigation phase.

At periodic points

  - The system is tested for compliance and the feasibility of continuance versus discontinuance is evaluated.
  - Upgrades, updates, and patches are managed.
  - As the needs of the organization change the systems that support the organization must also change.
- When the current system can no longer support the evolving mission of the organization, the project is terminated and a new project is implemented.