

SYSTEMS ANALYSIS AND DESIGN

Systems Development Life Cycle (SDLC)



**CENTRAL
UNIVERSITY**

FAITH • INTEGRITY • EXCELLENCE

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- *Implementation*
- *Testing*
- *Deployment*
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- *Analysis*
- *Design*
- *Implementation*
- *Maintenance*



Systems Development Life Cycle (SDLC)

- The **SDLC** is a conceptual model which includes policies and procedures for developing or altering systems throughout their life cycles
- is the process of determining how an information system (IS) can support business needs, designing the system, building it, and delivering it to users.
- It consists of a detailed plan describing how to develop, maintain, replace and alter or enhance specific system.
- An effective SDLC should result in a high quality system that meets customer expectations, reaches completion within time and cost evaluations, and works effectively and efficiently in the current and planned Information Technology infrastructure.
- It is also called as System Development Process.



Systems Development Life Cycle (SDLC)

- SDLC is a process followed for a system project, within an organization. It consists of a detailed plan describing how to develop, maintain, replace and alter or enhance specific system.
- SDLC is used by analysts to develop an information system.

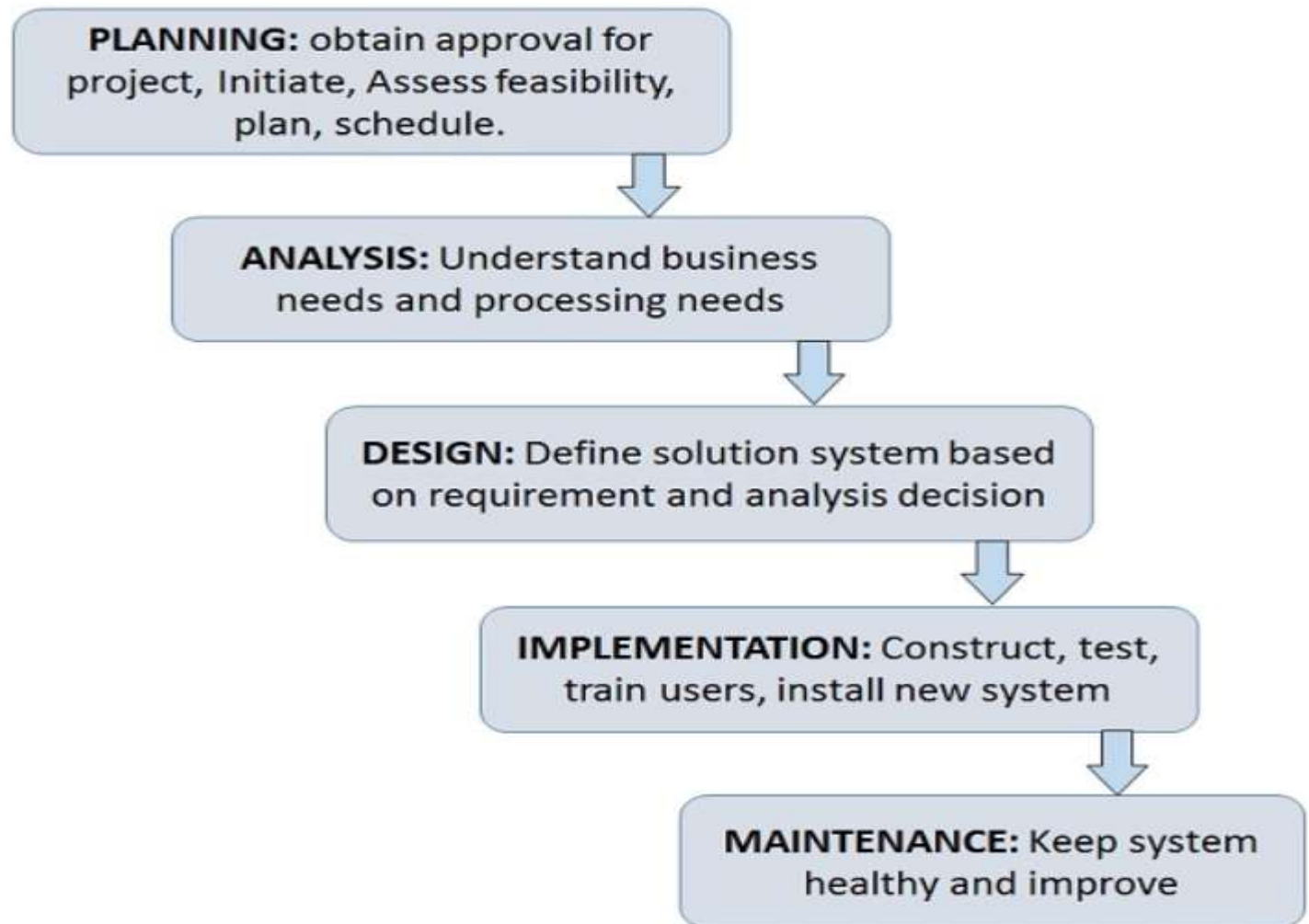
SDLC includes the following activities –

- **Requirements**
- **Design**
- **Implementation**
- **Testing**
- **Deployment**
- **Operations**
- **Maintenance**



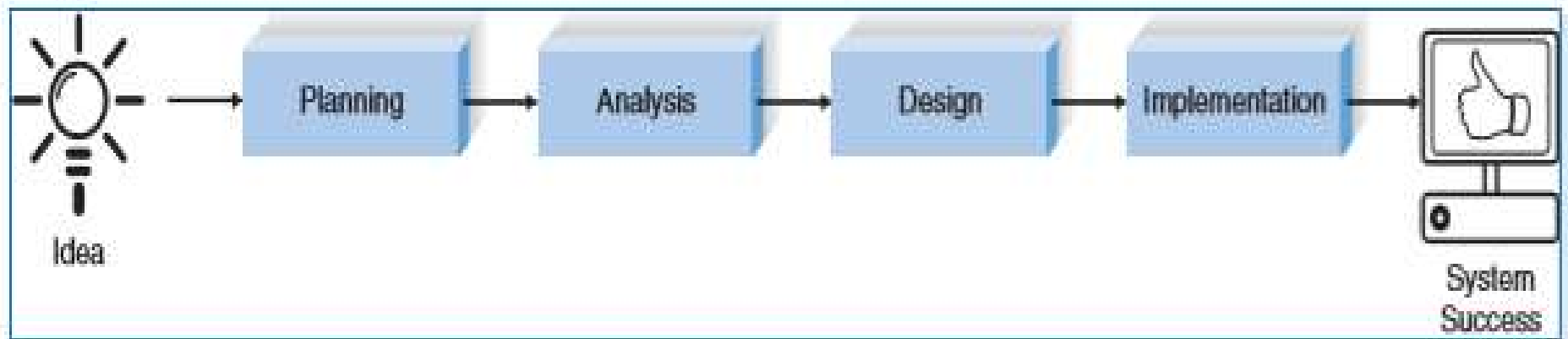
Phases of SDLC

- Systems Development Life Cycle is a systematic approach which explicitly breaks down the work into phases that are required to implement either new or modified Information System



Phases of SDLC

- *The following figure is a graphical representation of the five fundamental phases of a typical SDLC.*



A typical Software Development Life Cycle consists of the following stages:

- Stage 1: Planning,
- Stage 3: Designing,
- Stage 5: Maintenance

Stage 2: Analysis

Stage 4: Implementation

Phases of SDLC - Planning

- Planning an information system starts with gaining a holistic perspective on what the firm aims to achieve and how it will do so.
- This phase is the fundamental process of understanding *why* an information system should be built, and determining *how* the project team will go about building it.
- Planning for the quality assurance requirements and identification of the risks associated with the project is also done in the planning stage.



Phases of SDLC - Planning

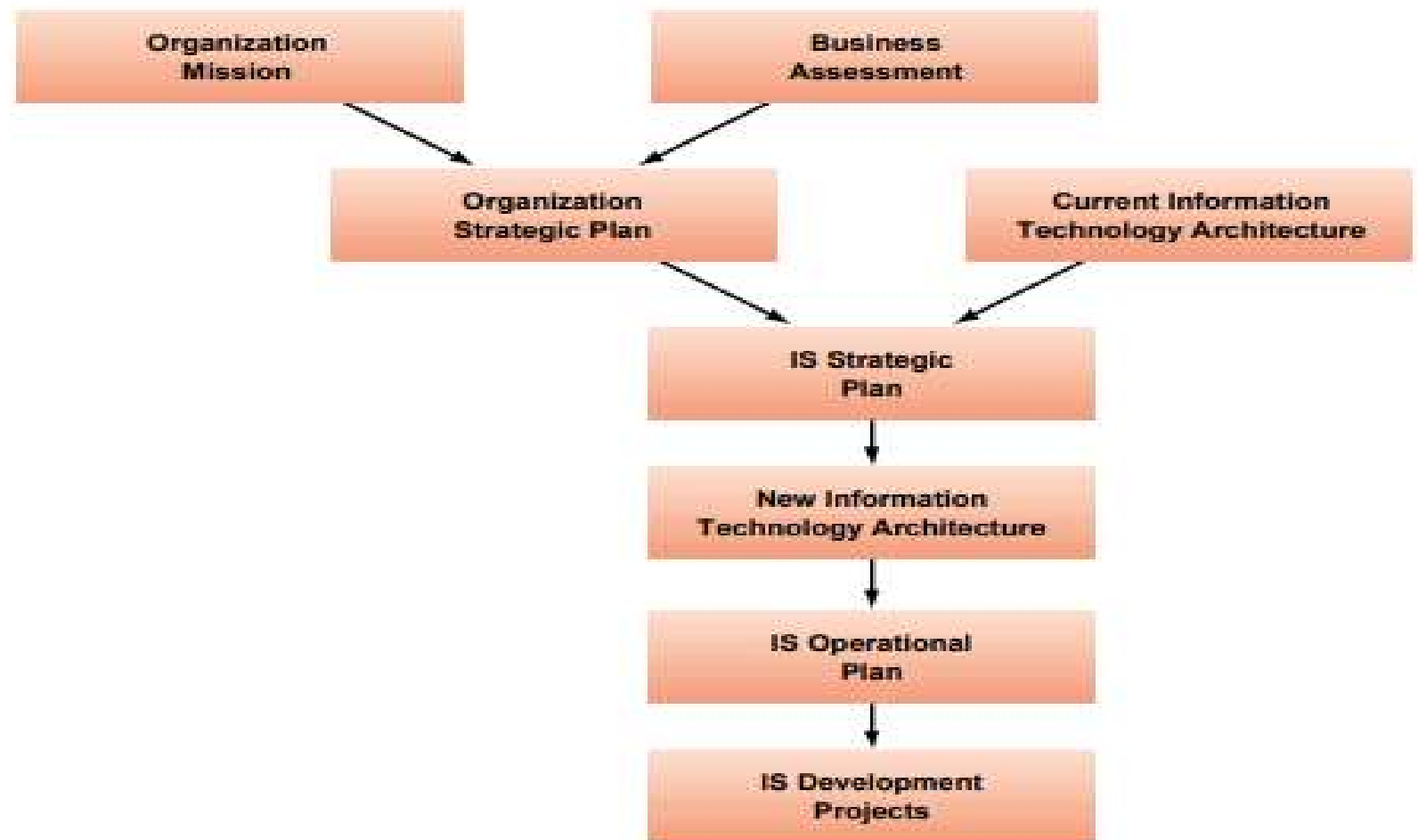
□ Planning

- Also known as Feasibility Study
- Define the problem and scope of existing system.
- Overview the new system and determine its objectives.
- Confirm project feasibility and produce the project Schedule.
- During this phase, threats, constraints, integration and security of system are also considered.
- A feasibility report for the entire project is created at the end of this phase.



□ Planning

The organization's strategic plan states the firm's overall mission, the goals that follow from the mission, and the broad steps necessary to reach these goals



❑ Planning stage has two steps

➤ *Project Initiation:*

the system's business value to the organization is identified, how will it lower costs or increase revenues?

- The technical feasibility (Can we build it?)
- The economic feasibility (Will it provide business value?)
- The organizational feasibility (If we build it, will it be used?)

➤ *Project Management:*

project manager creates a work plan, staffs the project, and puts techniques in place to help the project team control and direct the project through the entire SDLC.

The deliverable for project management is a project plan that describes how the project team will go about developing the system.



Phases of SDLC - Analysis

- During this phase the project team investigates any current system(s), identifies improvement opportunities, and develops a concept for the new system
- The analysis phase answers the questions of *who* will use the system, *what* the system will do, and *where* and *when* it will be used.



Phases of SDLC - Analysis

➤ Analysis and Specification

- Gather, analyze, and validate the information.
- Define the requirements and prototypes for new system.
- Evaluate the alternatives and prioritize the requirements.
- Examine the information needs of end-user and enhances the system goal.
- A Software Requirement Specification (SRS) document, which specifies the software, hardware, functional, and network requirements of the system is prepared at the end of this phase



Analysis stage has three steps involved

1. An *analysis strategy* is developed to guide the project team's efforts. Example is a study of the current system (called the as-is system) and its problems, and envisioning ways to design a new system (called the to-be system).
2. *Requirements gathering* (e.g., through interviews, group workshops, or questionnaires). The analysis of this information leads to the development of a concept for a new system. This concept is used to build a set of analysis models.

The system concept is then used as a basis to develop a set of business analysis models that describes how the business will operate if the new system were developed. The set typically includes models that represent the data and processes necessary to support the underlying business process.

3. The analyses, system concept, and models are combined into a document called the *system proposal*, which is presented to the project sponsor and other key decision makers (e.g., members of the approval committee) who will decide whether the project should continue to move forward.



Phases of SDLC - Design

- The design phase decides **how** the system will operate in terms of the hardware, software, and network infrastructure that will be in place; the user interface, forms, and reports that will be used; and the specific programs, databases, and files that will be needed.
- Although most of the strategic decisions about the system are made in the development of the system concept during the analysis phase, the steps in the design phase determine exactly how the system will operate.



Phases of SDLC - Design

System Design

- Includes the design of application, network, databases, user interfaces, and system interfaces.
- Transform the SRS document into logical structure, which contains detailed and complete set of specifications that can be implemented in a programming language.
- Create a contingency, training, maintenance, and operation plan.
- Review the proposed design. Ensure that the final design must meet the requirements stated in SRS document.
- Finally, prepare a design document which will be used during next phases.



Design phase has four steps

1. The design strategy is determine to clarify whether the system will be developed by the company's own programmers, whether its development will be outsourced to another firm, or whether the company will buy an existing software package.
2. Basic architecture design for the system describing the hardware, software, and network infrastructure that will be used. The interface design specifies how the users will move through the system and the forms and reports that the system will use.
3. The database and file specifications are developed. These define exactly what data will be stored and where they will be stored.
4. The analyst team develops the program design, which defines the programs that need to be written and exactly what each program will do.



Implementation phase

- This phase in the SDLC is where the system is actually built (or purchased, in the case of a packaged software design and installed).
- This is the phase that usually gets the most attention, because for most systems it is the longest and most expensive single part of the development process.



Implementation phase

Implementation

- Implement the design into source code through coding.
- Combine all the modules together into training environment that detects errors and defects.
- A test report which contains errors is prepared through test plan that includes test related tasks such as test case generation, testing criteria, and resource allocation for testing.
- Integrate the information system into its environment and install the new system.

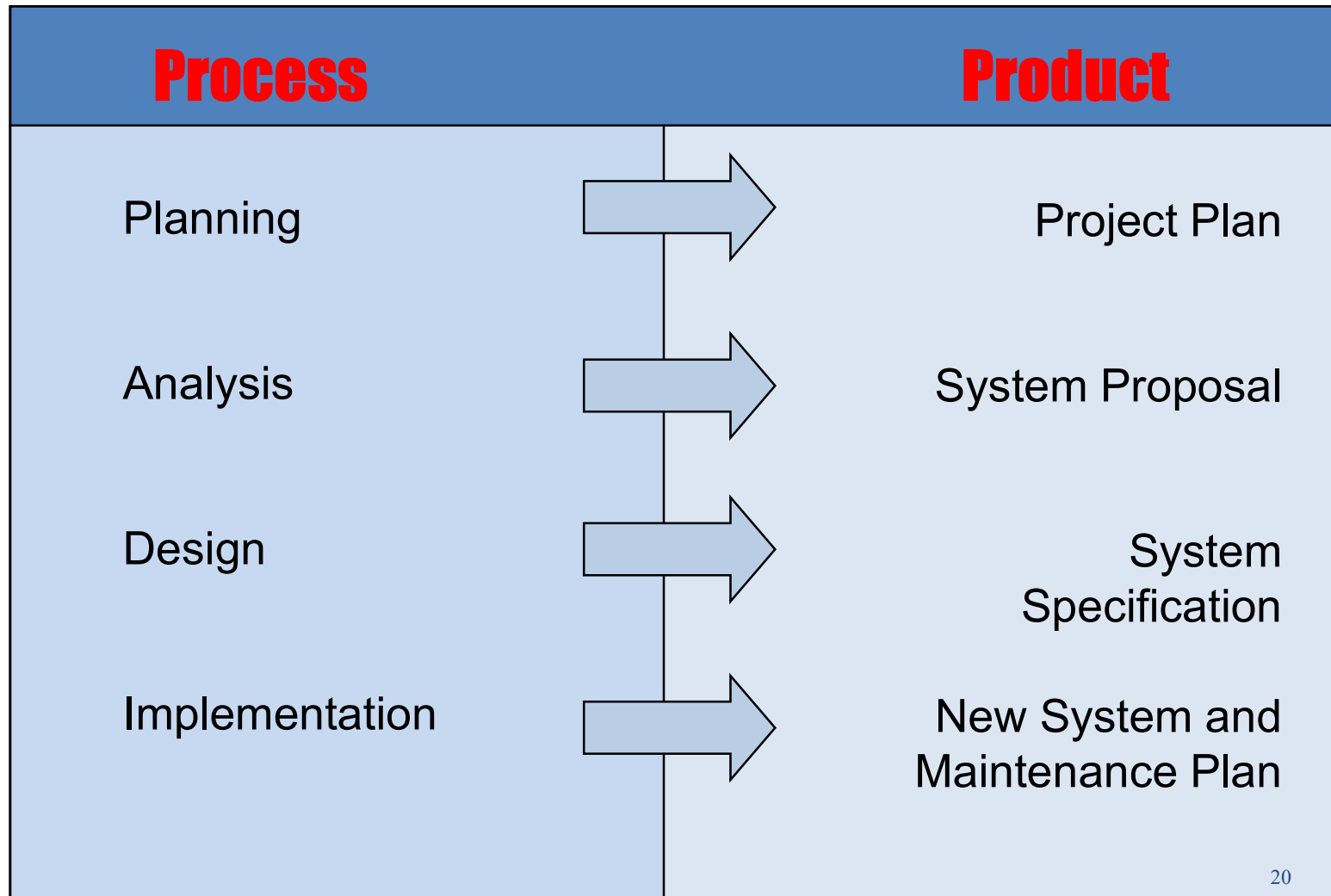


Implementation phase has three steps

1. *System construction*: The system is built and tested to ensure that it performs as designed. The cost of fixing bugs can be immense, testing is one of the most critical steps in implementation.
2. *The system is installed*: One of the most important aspects of conversion is the training plan, used to teach users how to use the new system and help manage the changes caused by the new system.
3. The analyst team *establishes a support plan* for the system which usually includes a formal or informal post-implementation review, as well as a systematic way for identifying major and minor changes needed for the system.



Processes and Deliverables



Maintenance/Support phase

- Include all the activities such as phone support or physical on-site support for users that is required once the system is installing.
- Implement the changes that software might undergo over a period of time, or implement any new requirements after the software is deployed at the customer location.
- It also includes handling the residual errors and resolve any issues that may exist in the system even after the testing phase.
- Maintenance and support may be needed for a longer time for large systems and for a short time for smaller systems.



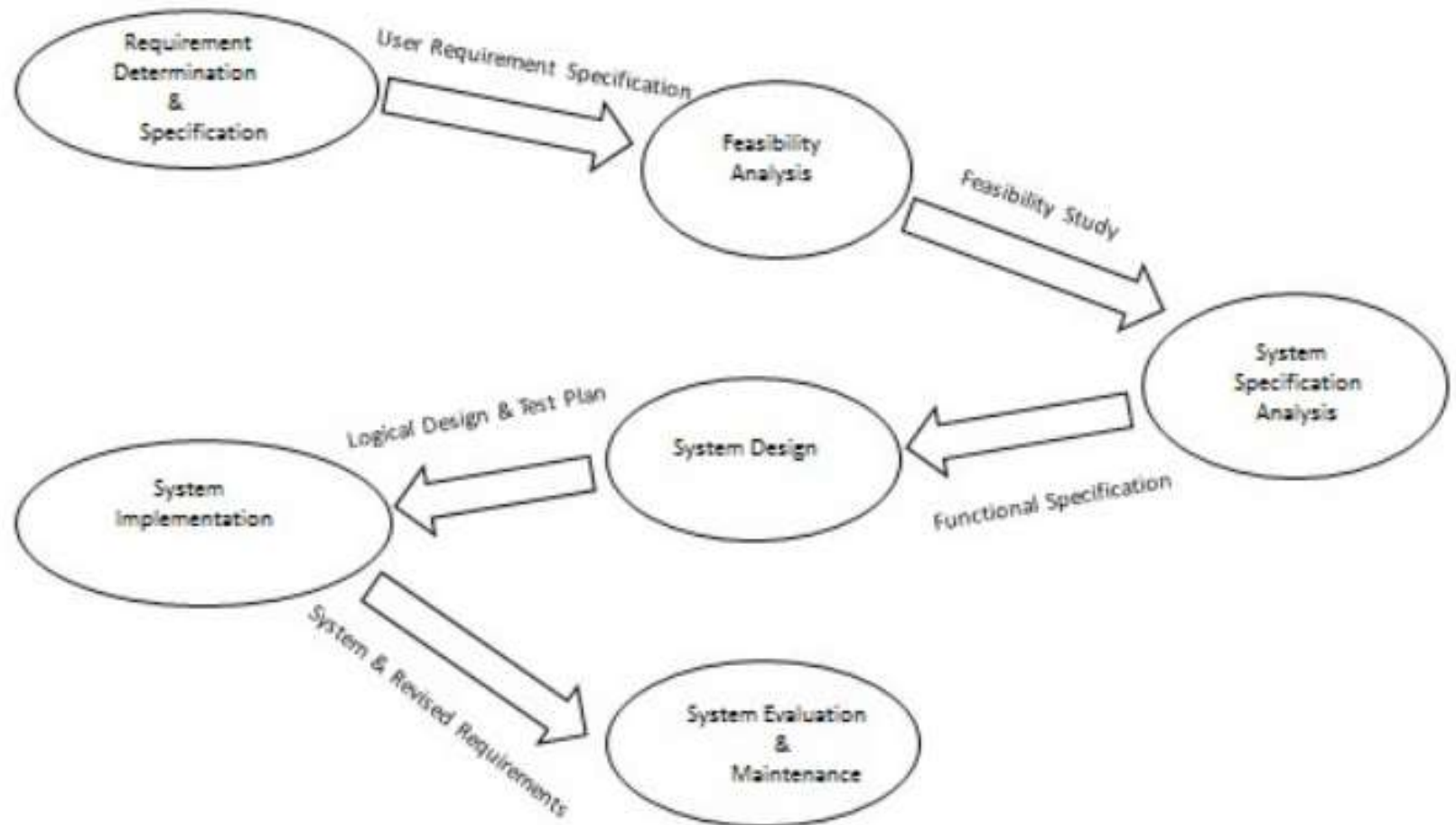
System Development Team

- Systems development teams include users, systems analysts, programmers, and technical specialists
 - *Users are employees who will interact with the system, either directly or indirectly.*
 - *Systems analysts are information systems professionals who specialize in analyzing and designing information systems.*
 - *Programmers are information systems professionals who modify existing computer programs or write new computer programs to satisfy user requirements.*
 - *Technical specialists are experts on a certain type of technology, such as databases or telecommunications.*



Life Cycle of System Analysis and Design

The following diagram shows the complete life cycle of the system during analysis and design phase



Systems Analyst

- The key person in the SDLC is the **systems analyst**, who analyzes the business situation, identifies the opportunities for improvements, and designs an IS to implement the improvements.
- The systems analyst works closely with all project team members so that the team develops the right system in an effective way.
- Systems analysts must understand how to apply technology in order to solve problems.
- Systems analysts may serve as **change agents** who identify organizational improvement needed, design systems to implement those changes, and train and motivate others to use the systems.



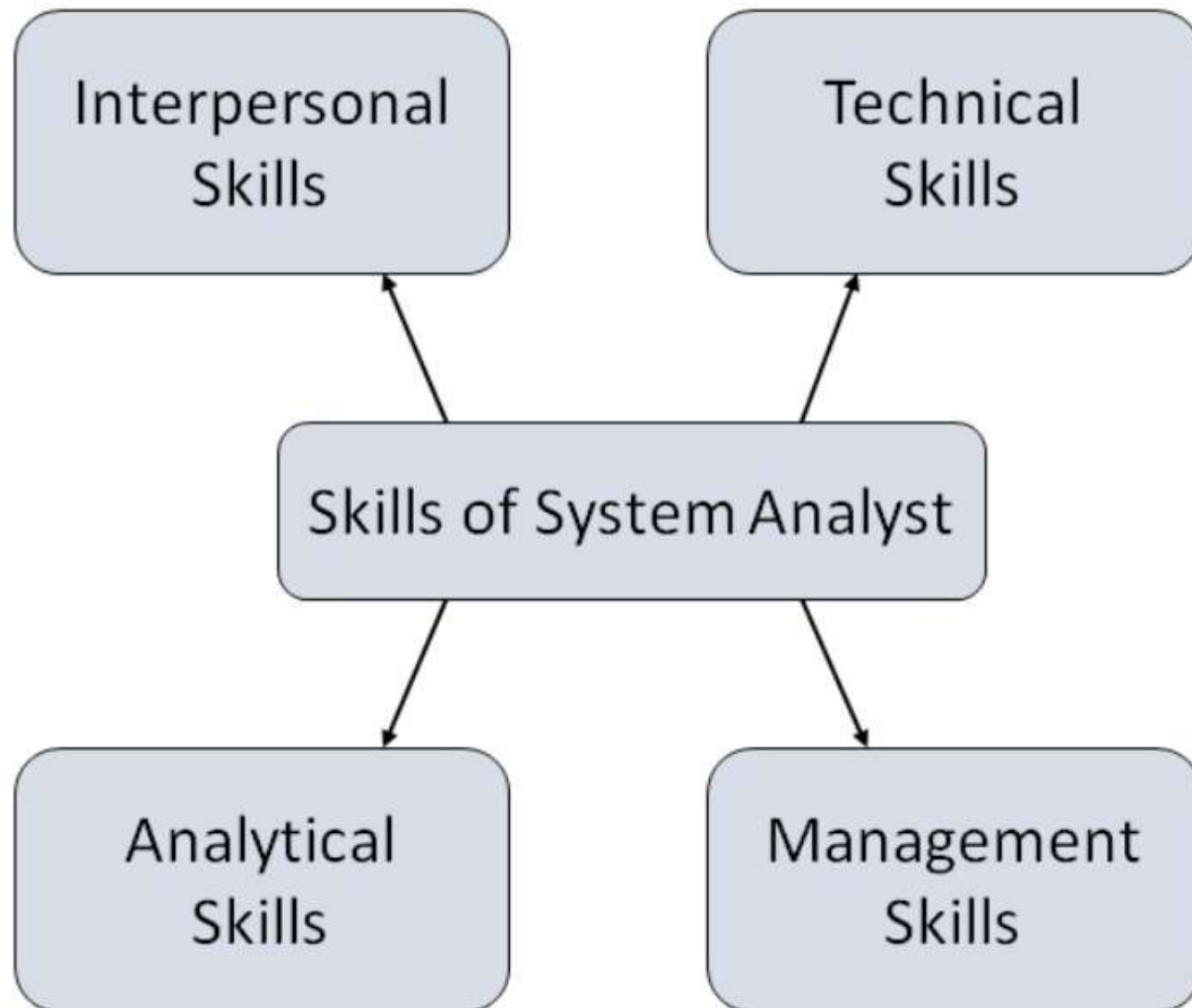
Systems Analyst Main Roles

- Defining and understanding the requirement of user through various Fact finding techniques.
- Prioritizing the requirements by obtaining user consensus.
- Gathering the facts or information and acquires the opinions of users.
- Maintains analysis and evaluation to arrive at appropriate system which is more user friendly.
- Suggests many flexible alternative solutions, pick the best solution, and quantify cost and benefits.
- Draw certain specifications which are easily understood by users and programmer in precise and detailed form.
- Implemented the logical design of system which must be modular.
- Plan the periodicity for evaluation after it has been used for some time, and modify the system as needed.



Systems Analyst Skills

Attributes of a System Analyst



Systems Analyst Skills

- **Interpersonal skills** – Need to communicate effectively.
 - Interface with users and programmer.
 - Facilitate groups and lead smaller teams.
 - Managing expectations.
 - Good understanding, communication, selling and teaching abilities.
 - Motivator having the confidence to solve queries.
- **Analytical skills** – Must be problem solvers.
 - System study and organizational knowledge
 - Problem identification, problem analysis, and problem solving
 - Sound commonsense
 - Ability to access trade-off
 - Curiosity to learn about new organization



Systems Analyst Skills

- **Management skills** – Need to manage people and pressure and risks.
 - Understand users jargon and practices.
 - Resource & project management.
 - Change & risk management.
 - Understand the management functions thoroughly.
- **Technical skills** – Must understand the technical environment, technical foundation, and technical solution.
 - Knowledge of computers and software.
 - Keep abreast of modern development.
 - Know of system design tools.
 - Breadth knowledge about new technologies.
- **Business** – Must understand how IT can be applied to business situations.
- **Ethical** - Must deal fairly, honestly, and ethically with other project members, managers, and systems users.



Other Analysts for System Analysis and Design

- The **Requirements Analyst** role focuses on eliciting the requirements from the stakeholders associated with the new system. RA understands the business well, are excellent communicators, and are highly skilled in an array of requirements elicitation techniques.
- The **Business Analyst** role focuses on the business issues surrounding the system and helps to identify the business value that the system will create, develops ideas for improving the business processes, and helps design new business processes and policies. The business analyst will have business training and experience, plus knowledge of analysis and design.
- The **Infrastructure Analyst** role focuses on technical issues surrounding the ways the system will interact with the organization's technical infrastructure (hardware, software, networks, and databases)

The infrastructure analyst will have significant training and experience in networking, database administration, and various hardware and software products



Assignment



- Compare and contrast the role of the systems analyst, business analyst, and infrastructure analyst in a systems development team.
- Explain the SDLC phases in one of the following system for Central University:
 - *Student Management System, Staff Management System, Logistics Management System, Transport Management System, Library Management System*



➤ Requirements

- Give your system a befitted Title
- The group's selected system must be documented based on the SDLC phases
- Hard copy and softcopy should be presented

