# Systems Analysis and Design Course

**Bachelor Degrees in Computer Science Course**

https://uod.ac.

## Topic 1: Systems Development Overview

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25 September 2022

# Learning Objectives

- Define Information Systems Analysis and Design.
- Discuss the Modern Approach to SAD that Combines Process and Data Views.
- Describe the Role of The Systems Analyst.
- Describe the SDLC and Alternatives.

# System Development Life Cycle

- System study
- Feasibility study
- System analysis
- System design
- Coding
- Testing
- Implementation
- Maintenance

# The Systems Development Life Cycle

- **The Systems Development Life Cycle (SDLC) is the process of determining how an Information System (IS) can support business needs, designing the system, building it, and delivering it to users.**
- **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 Development Life Cycle

- **Information Systems (IS)** are the support structure for meeting the company's strategies and goals.
- New systems need!:
  - Because employees request it.
  - To obtain a competitive advantage.

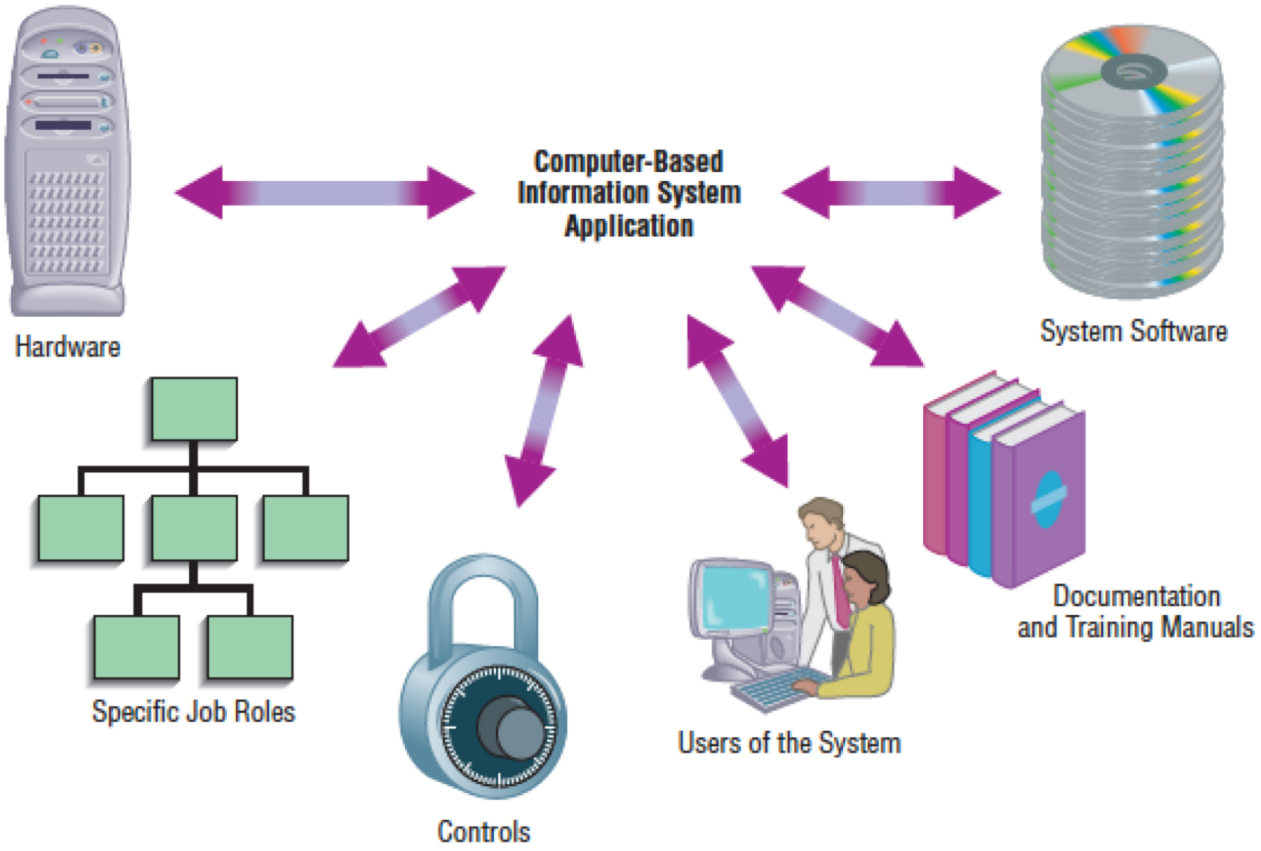
# Information Systems Analysis and Design

- **A method used to create and maintain systems that perform basic business functions.**
- **Main goal: Improve employee efficiency by applying software solutions to key business tasks**
- **A structured approach to ensure success**
- **Systems Analysts perform SAD based upon:**
  - Understanding of organization's objectives, structure, and processes.
  - Knowledge of how to exploit information technology for the advantage.

# Systems Analysis and Design: Core Concepts

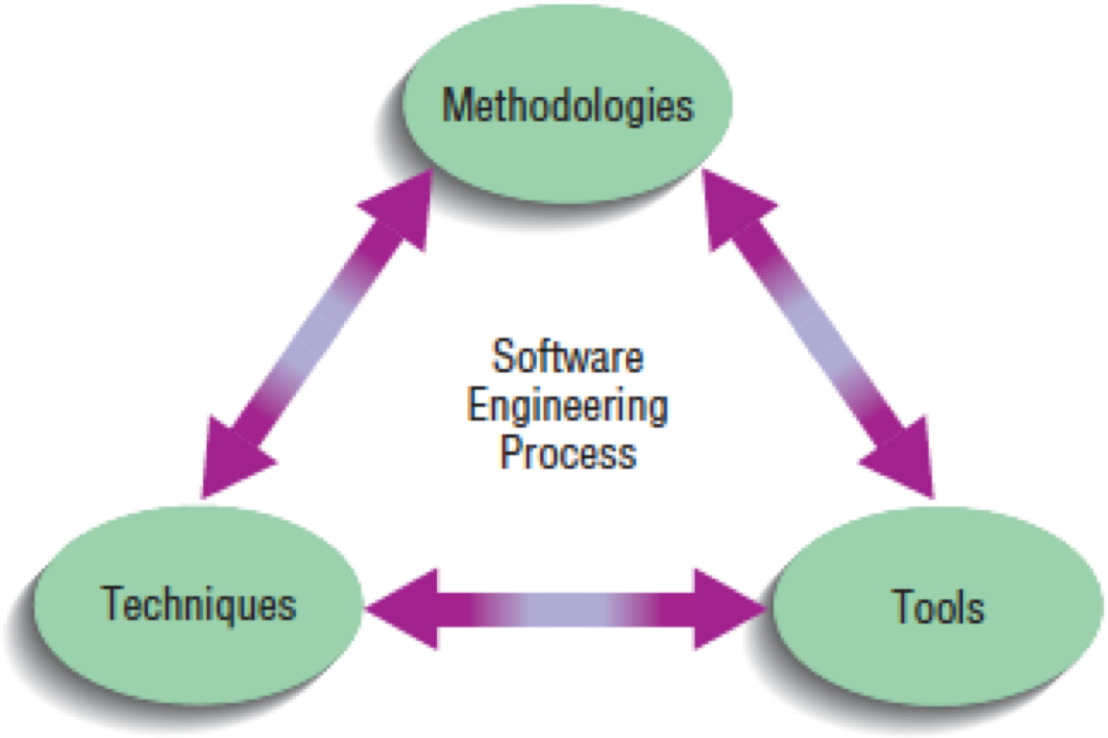
- **Major goal: to improve organizational systems by developing or acquiring application software and training employees in its use.**
- **System: Turns data into information and includes:**
  - Hardware and system software
  - Documentation and training materials
  - Job roles associated with the system
  - Controls to prevent theft or fraud
  - The people who use the software to perform their jobs.

# Systems Analysis and Design: Core Concepts




Components of a Computer-Based Information System Application

# Software Engineering Process



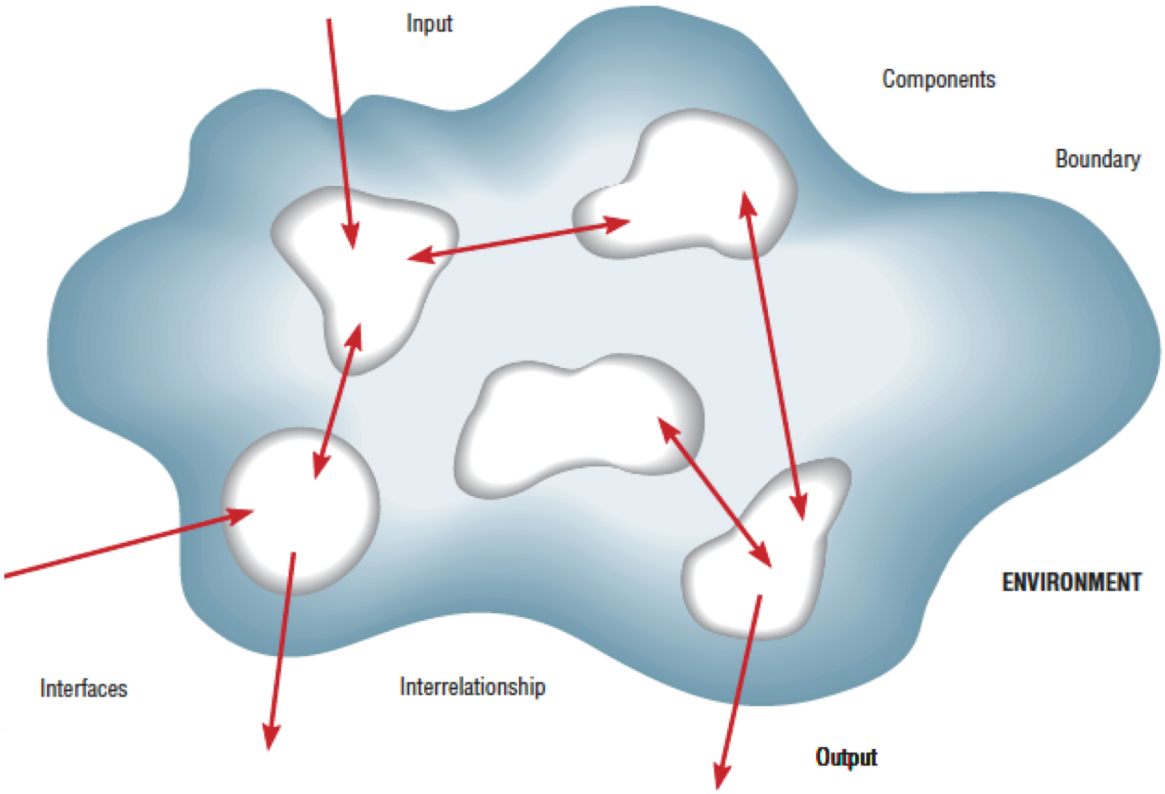

The software engineering process uses methodologies, techniques, and tools

# Systems

- **A system is an interrelated set of business procedures used within one business unit working together for a purpose.**
- **Example: Payroll system (keeps track of checks) and Inventory system (keeps track of supplies)**
  - **A system exists within an environment**
  - **A boundary separates a system from its environment**
  - **A system has nine characteristics**

# Systems

- **A system characteristics**
  - **Components**
  - **Interrelationships**
  - **Boundary**
  - **Purpose**
  - **Environment**
  - **Interfaces**
  - **Input**
  - **Output**
  - **Constraints**




Characteristics of a System

# Systems

- **Describe your university or college as a system. What is the input? The output? The boundary? The components? Their interrelationships? The constraints? The purpose? The interfaces? The environment? Draw a diagram of this system.**

# Important System Concepts

## ❖Decomposition

- **The process of breaking down a system into smaller components**
- **Allows the systems analyst to:**
  - ➢**Break a system into small, manageable and understandable subsystems**
  - ➢**Focus on one area at a time, without interference from other areas**
  - ➢**Concentrate on component pertinent to one group of users without confusing users with unnecessary details**
  - ➢**Build different components at independent times and have the help of different analysts**

# Important System Concepts

## ❖Modularity

- Process of dividing a system into modules of a relatively uniform size
- Modules simplify system design

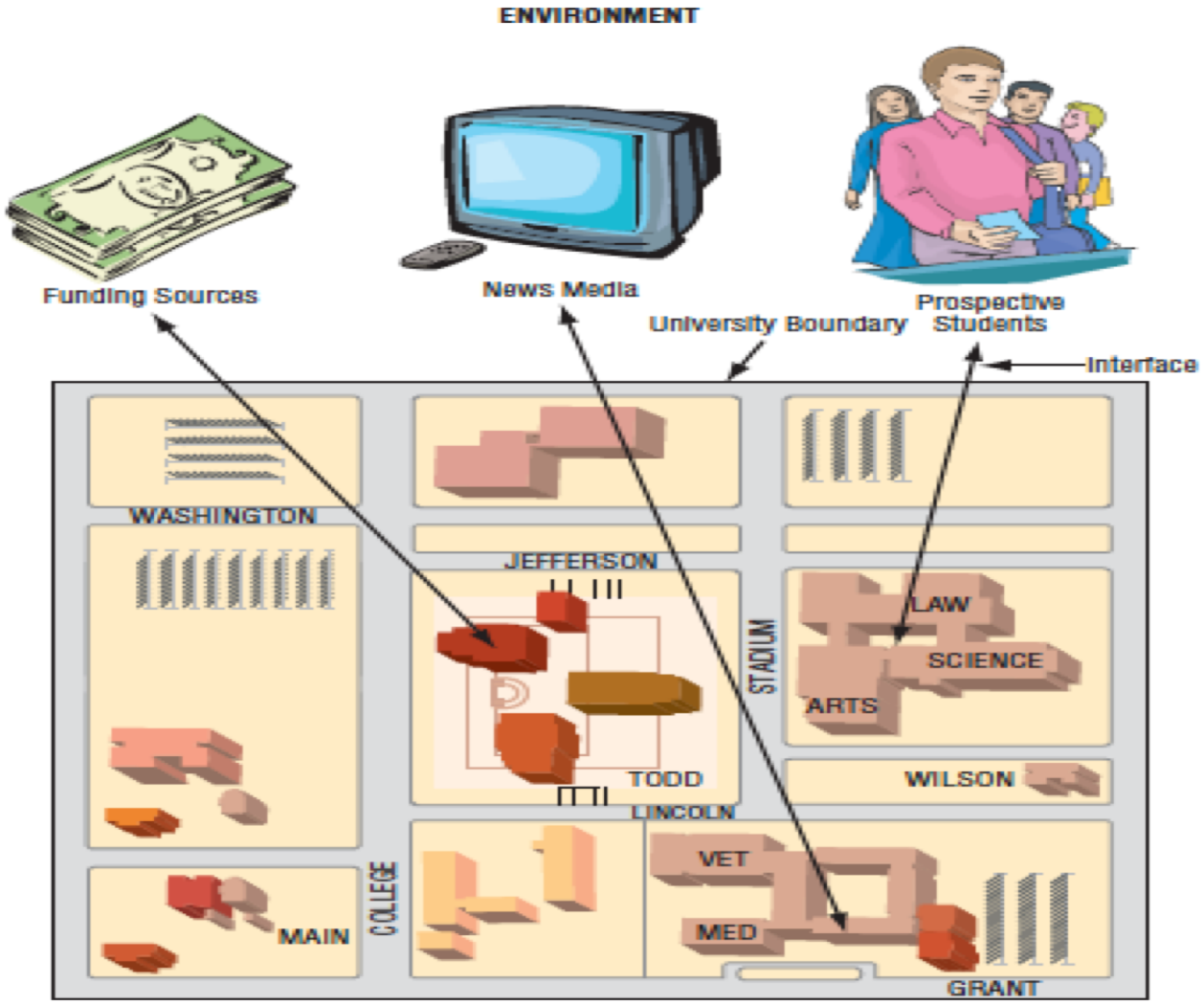
## ❖Coupling

- Subsystems that are dependent upon each other are coupled
- Desired: loose coupling

## ❖Cohesion

- Extent to which a subsystem performs a single function
- Desired: high cohesion

# Important System Concepts

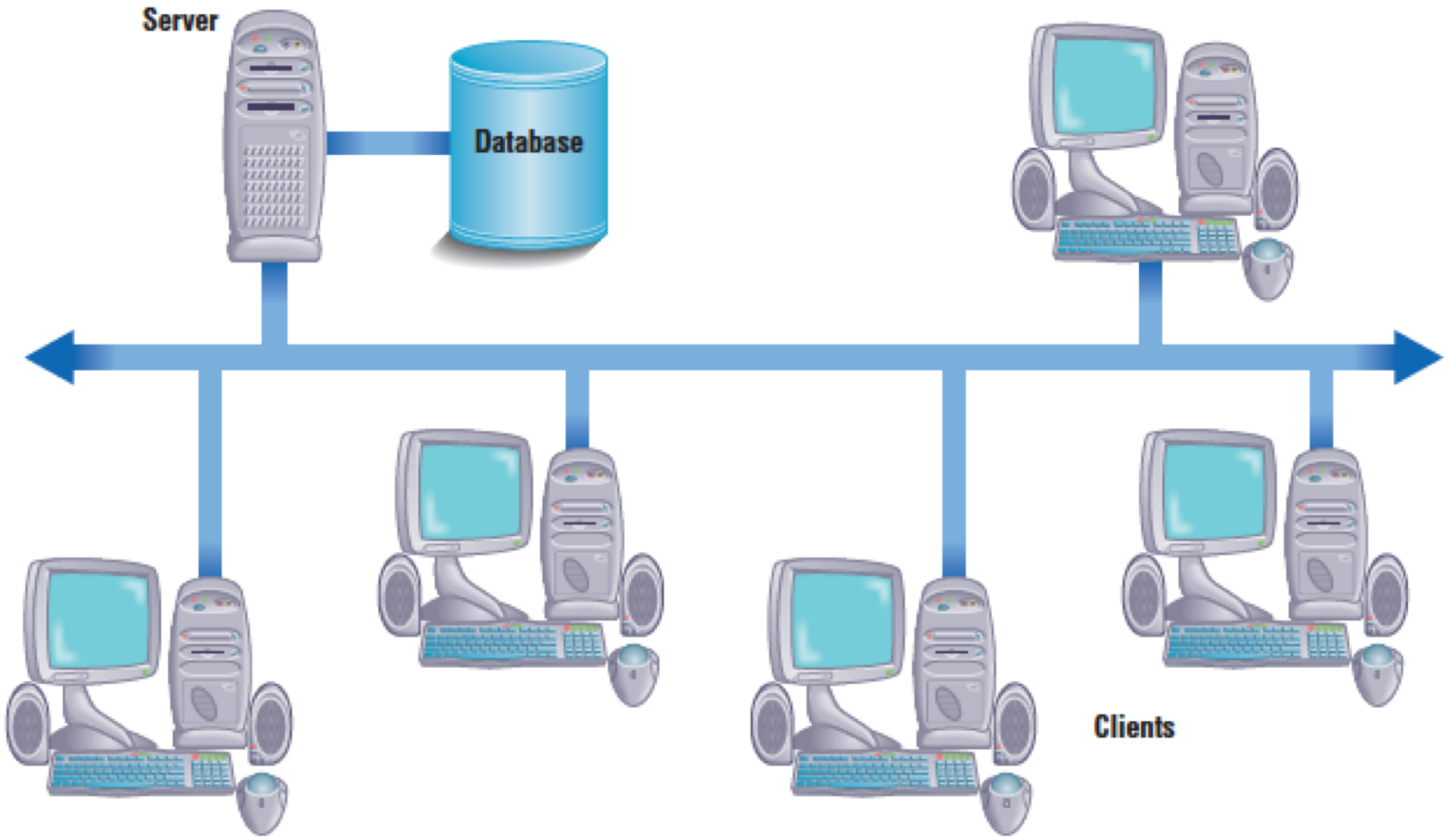



A University as a System

# A Modern Approach to Systems Analysis and Design

- **Systems Integration:**
  - **Allows hardware and software from different vendors to work together**
  - **Enables procedural language systems to work with visual programming systems**
  - **Visual programming environment uses client/server model**

# A Modern Approach to Systems Analysis and Design




The Client/Server Model

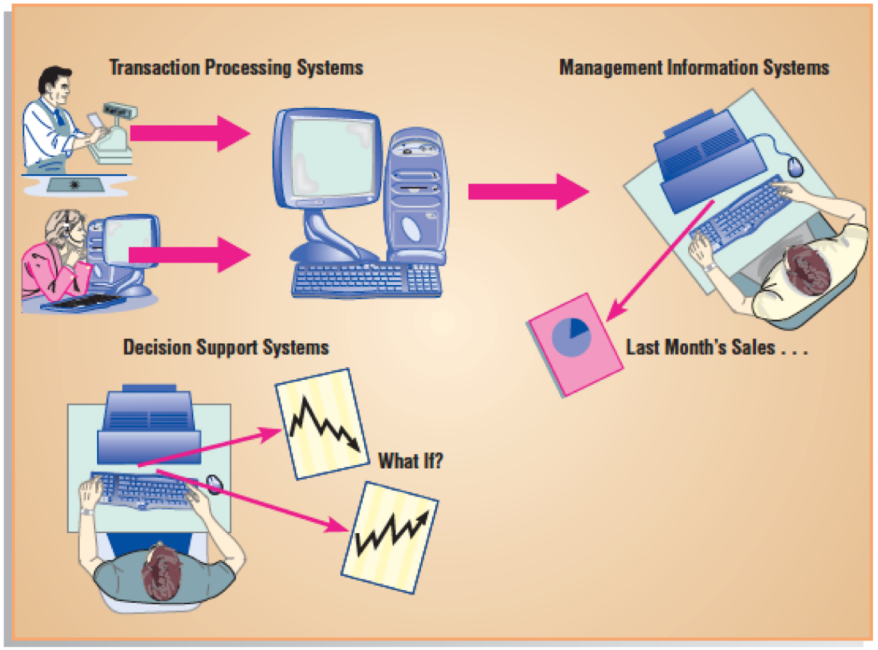
# A Modern Approach to Systems Analysis and Design

- **Role in Systems Development:**
  - **Study problems and needs of an organization**
  - **Determine best approach to improving organization through use of:**
    - **People**
    - **Methods**
    - **Information technology**
  - **Help system users and managers define their requirements for new or enhanced information systems**

# A Modern Approach to Systems Analysis and Design

## ❑Types of Information Systems and Systems Development

- **Three classes of information systems**
  - ➢**Transaction processing systems**
  - ➢**Management information systems**
  - ➢**Decision support systems**




Depictions of three classes of information systems: TPS, MIS, and DSS.

# Systems Development Life Cycle (SDLC)

## ❑Systems Development Methodology:

- **A standard process followed in an organization to conduct all the steps necessary to analyze, design, implement, and maintain information systems.**

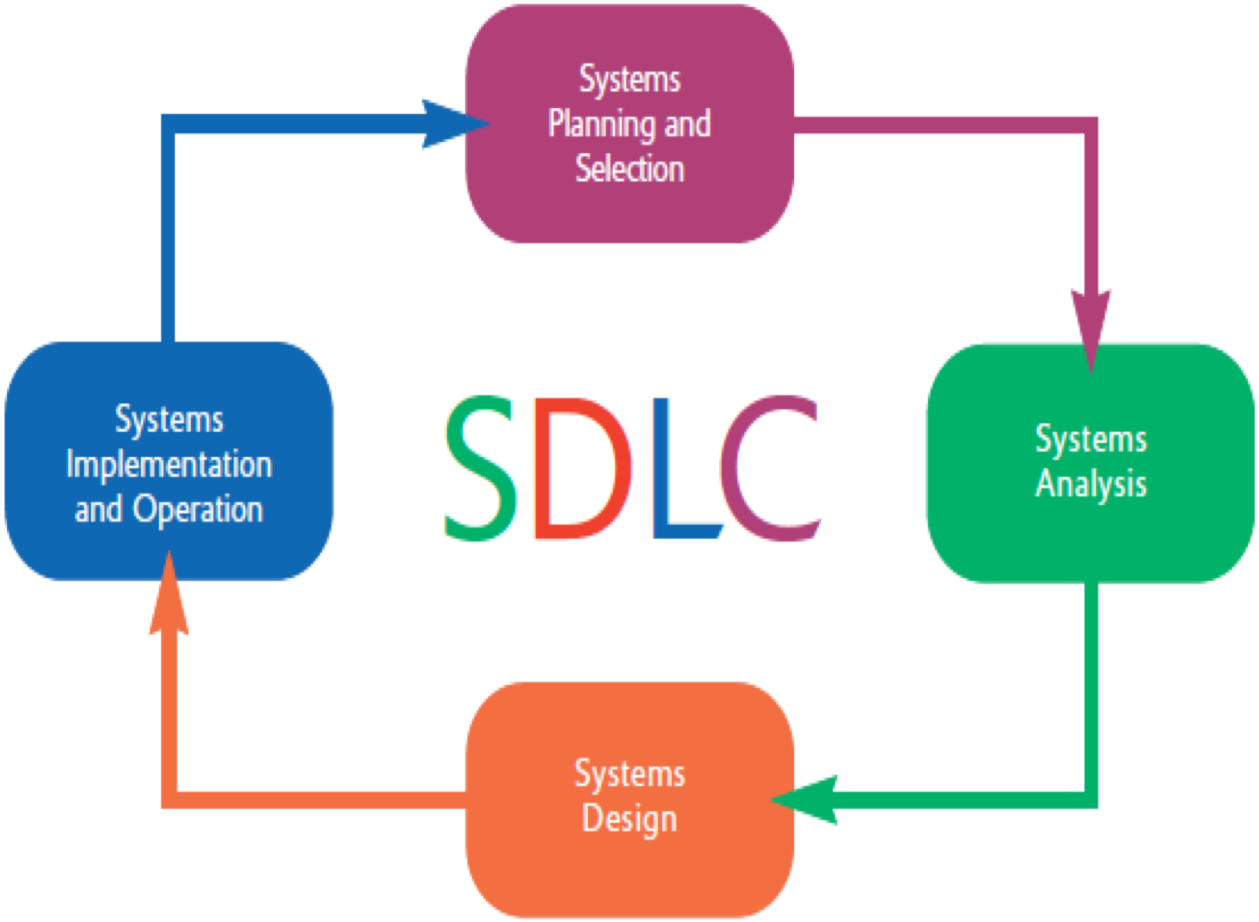
## ❑Systems Development Life Cycle (SDLC):

- **The series of steps used to mark the phases of development for an information system.**

# Systems Development Life Cycle (SDLC)

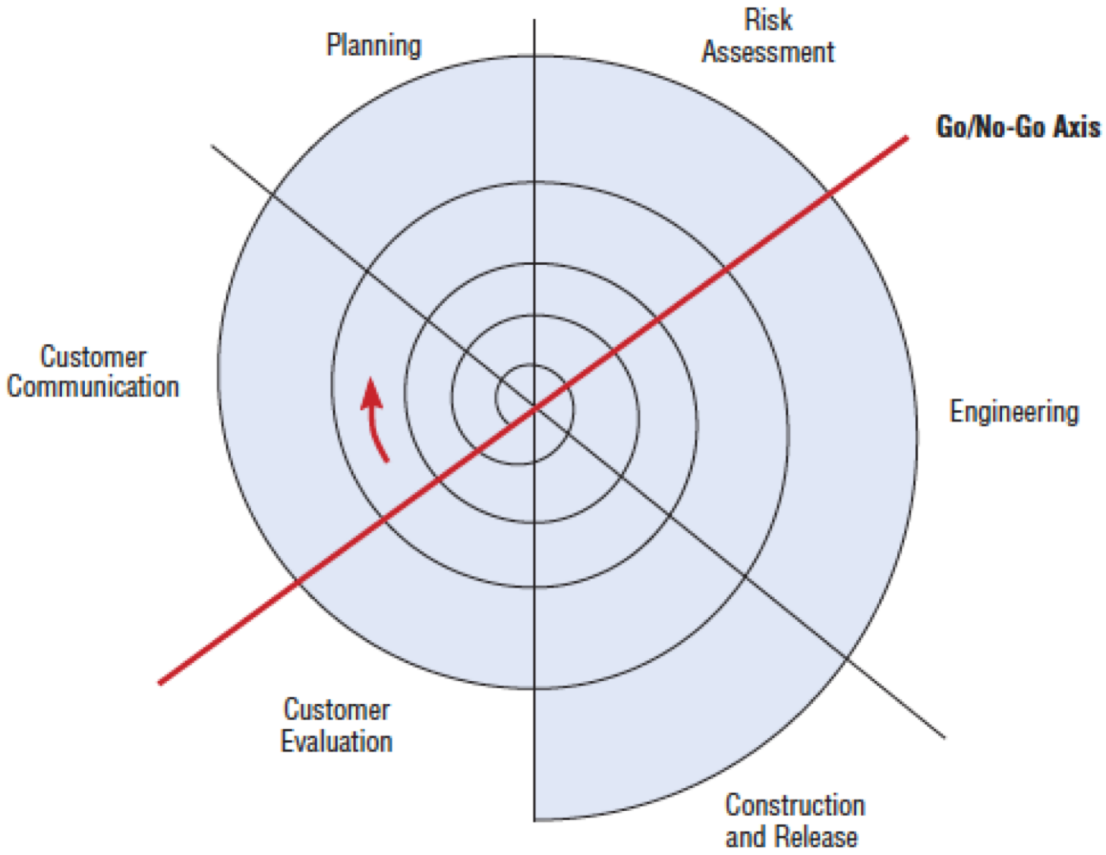
- **SDLC a structured step-by-step approach for developing information systems.**
- **Typical activities include:**
  - **Determining budgets**
  - **Gathering business requirements**
  - **Designing models**
  - **Writing user documentation**

# Systems Development Life Cycle (SDLC)




The Systems Development Life Cycle (SDLC)

# Systems Development Life Cycle (SDLC)




Evolutionary Model SDLC

# Systems Development Life Cycle (SDLC)

## ❑Phase 1: Systems Planning and Selection.

- **Two Main Activities:**
  - ➢ **Identification of need**
  - ➢**Investigation and determination of the scope**

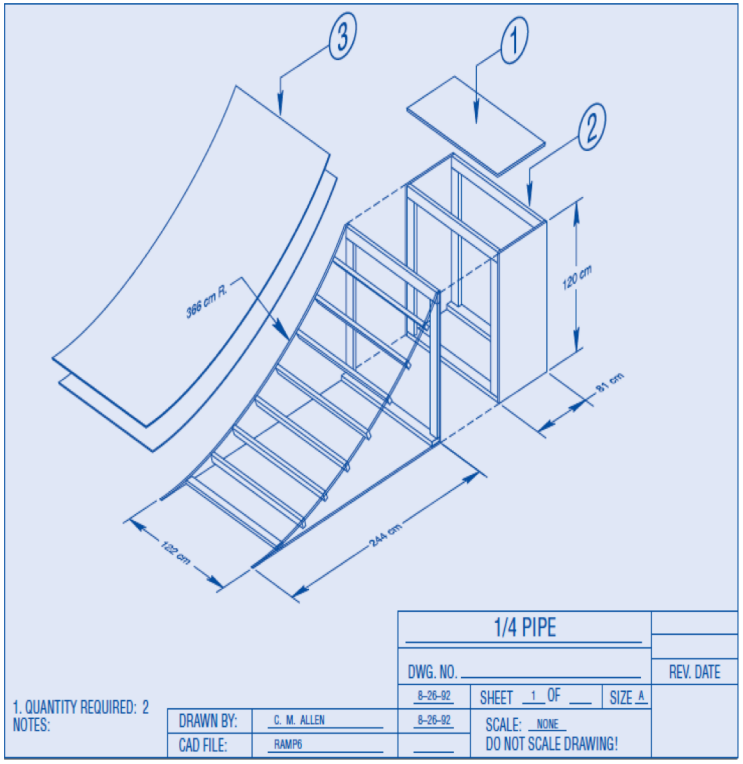
## ❑Phase 2: Systems Analysis.

- **Study of current procedures and information systems**
  - ➢**Determine requirements**
  - ➢**Generate alternative designs**
  - ➢**Compare alternatives**
  - ➢**Recommend the best alternative**

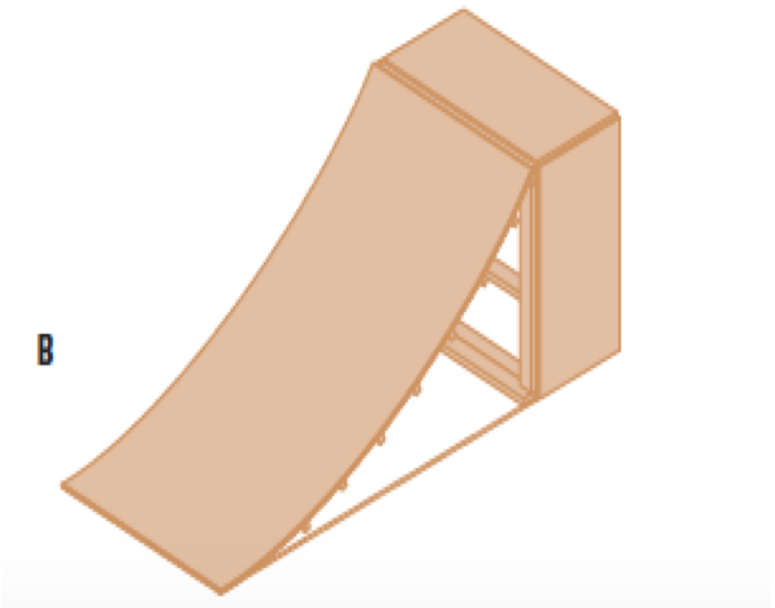
# Systems Development Life Cycle (SDLC)

- **Phase 3: System Design.**
  - **Logical Design - Business aspects of the system**
  - **Physical Design - Technical specifications:**
- **Phase 4: System Implementation, Operation and Maintenance.**
  - **Hardware and Software Installation**
  - **User Training**
  - **Documentation**
  - **Operations**
  - **Maintenance (fix errors, make changes)**

# Systems Development Life Cycle (SDLC)




Logical Design: A Skateboard Ramp Blueprint




Physical Design: A Skateboard Ramp

# THANK YOU