

Information System

Lec 6

Systems development life cycle (SDLC)

- The *systems development life cycle* (SDLC) is the process of understanding how an information system (IS) can support business needs, designing the system, building it, and delivering it to users.

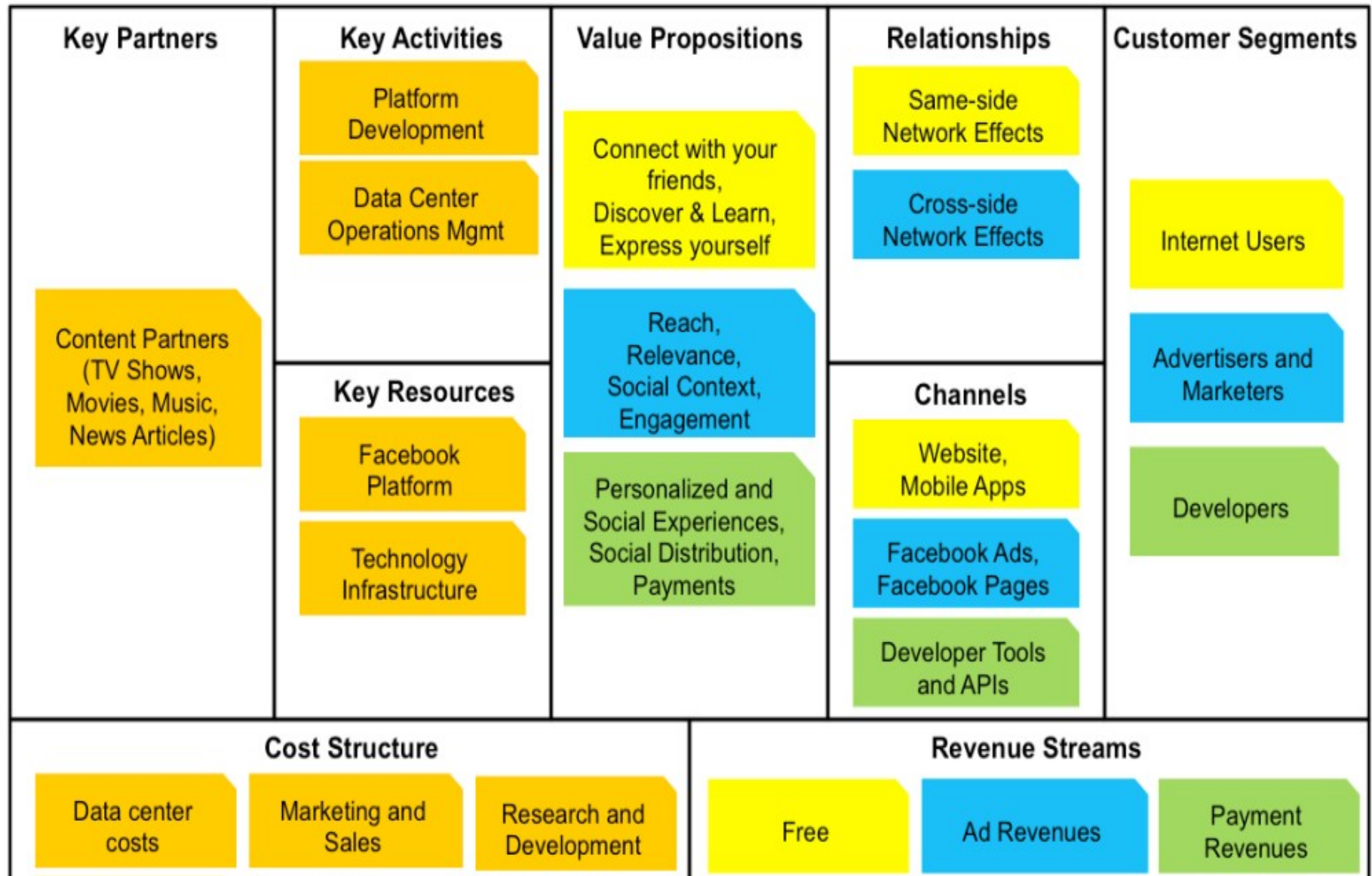
SYSTEM DEVELOPMENT TOOLS AND TECHNIQUES

- systems analysts must know how to use a variety of techniques, such as **modeling**, **prototyping**, and **computer-aided systems engineering** (CASE) tools, to plan, design, and implement information systems.

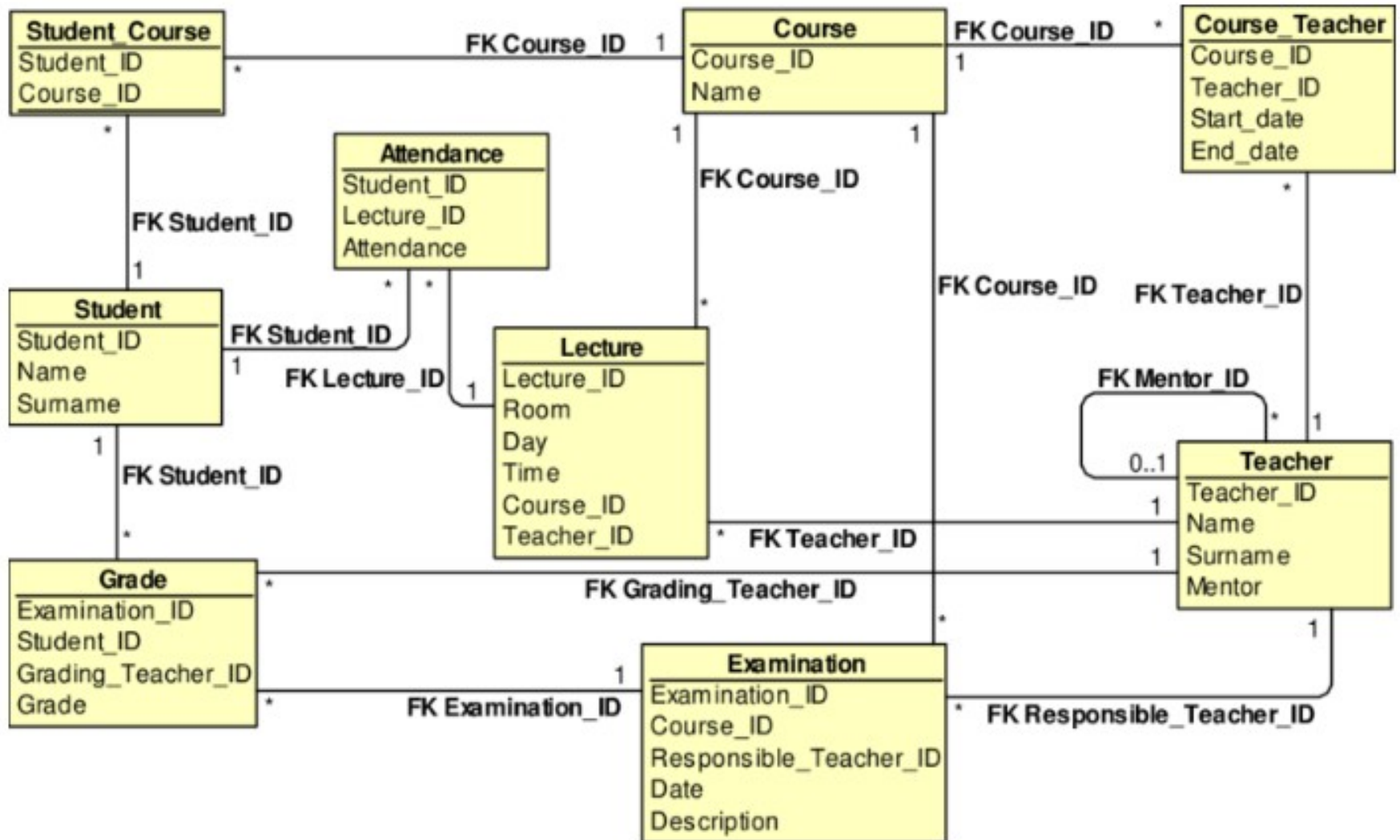
Modeling

- Modeling produces a **graphical representation** of a concept or process that systems developers can analyze, test, and modify.
- **A business model**, or requirements model, describes business **functions** that an information system must support.
- **A data model** describes **data** structures and design.
- **An object model** describes objects, which **combine data and processes**.
- **A network model** portrays the **design and protocols** of telecommunications links.
- **A process model** describes **system logic** and processes that programmers use to develop necessary code modules.

Business Model

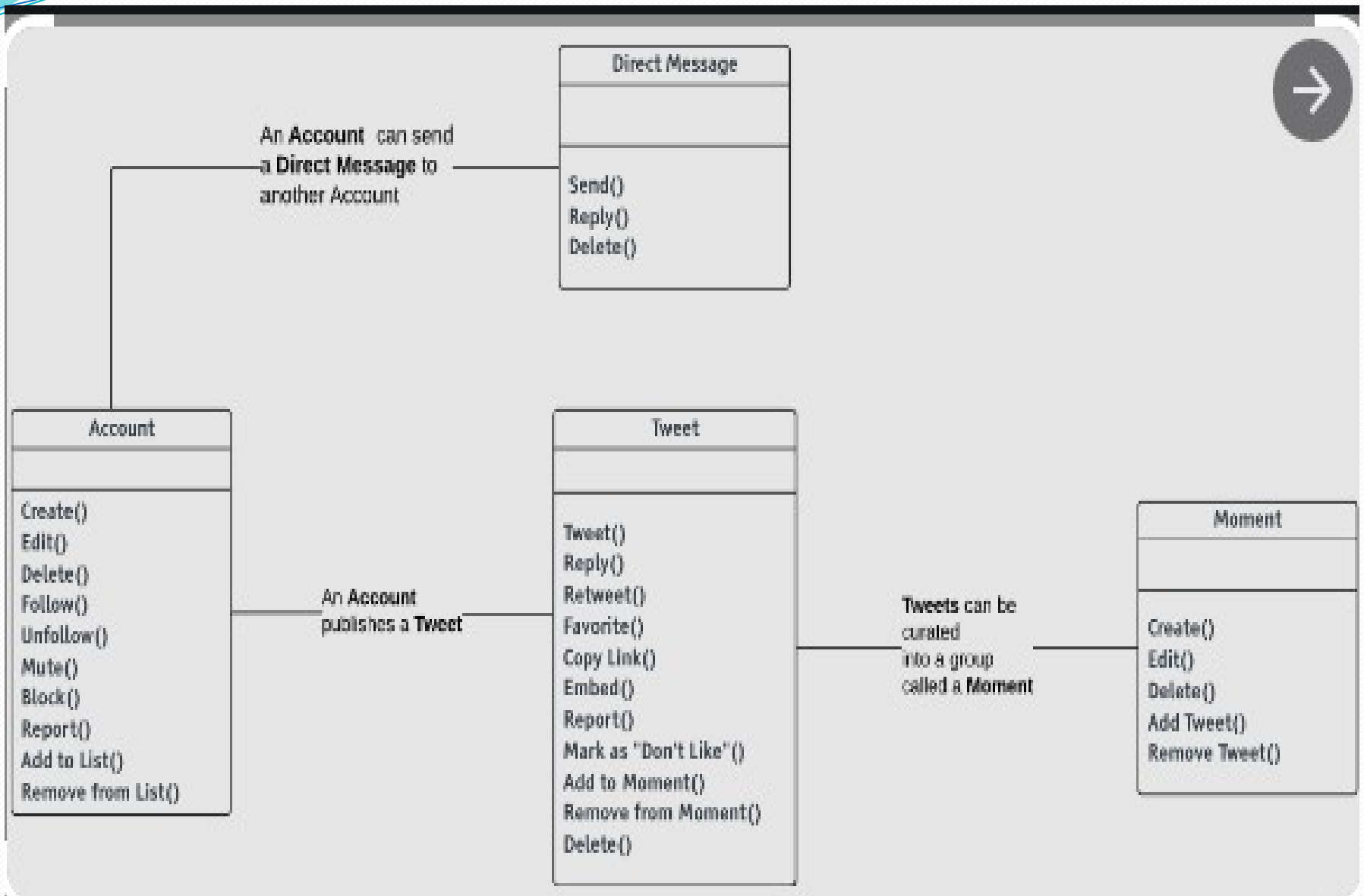


Data Model



A sample of data model in the relational database

Model Object



Prototyping

- Prototyping involves the creation of an **early working** version of the information system or its components.
 - Prototyping **tests** system concepts and **examine** system components.
 - Prototyping **speeds** up the development process significantly.
- **Disadvantage** : important decisions might be made too early, before business or IT issues are thoroughly understood.

Computer-aided systems engineering (CASE)

- Computer-aided systems engineering (CASE) is a technique that uses **powerful programs** to help systems analysts **develop and maintain** information systems.
- CASE tools provide an overall framework for systems development for **structured analysis and object-oriented analysis.**

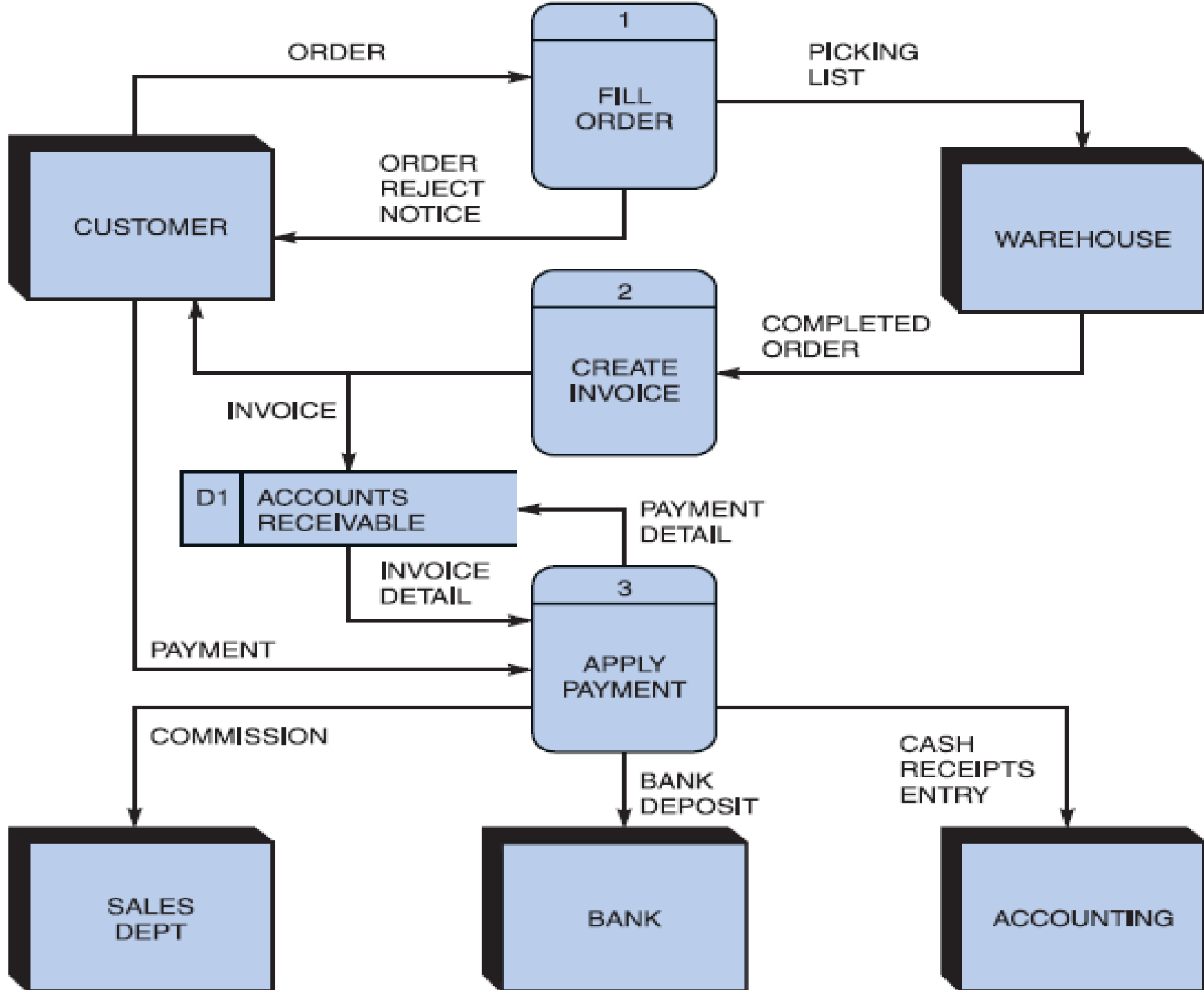
Computer-Aided Software Engineering Tool (CASE Tool)

- **CASE Tool** is used to design and implement applications.
- **CASE** software is often associated with methods for the development of information **systems** together with automated **tools** that can be used in the software development process.



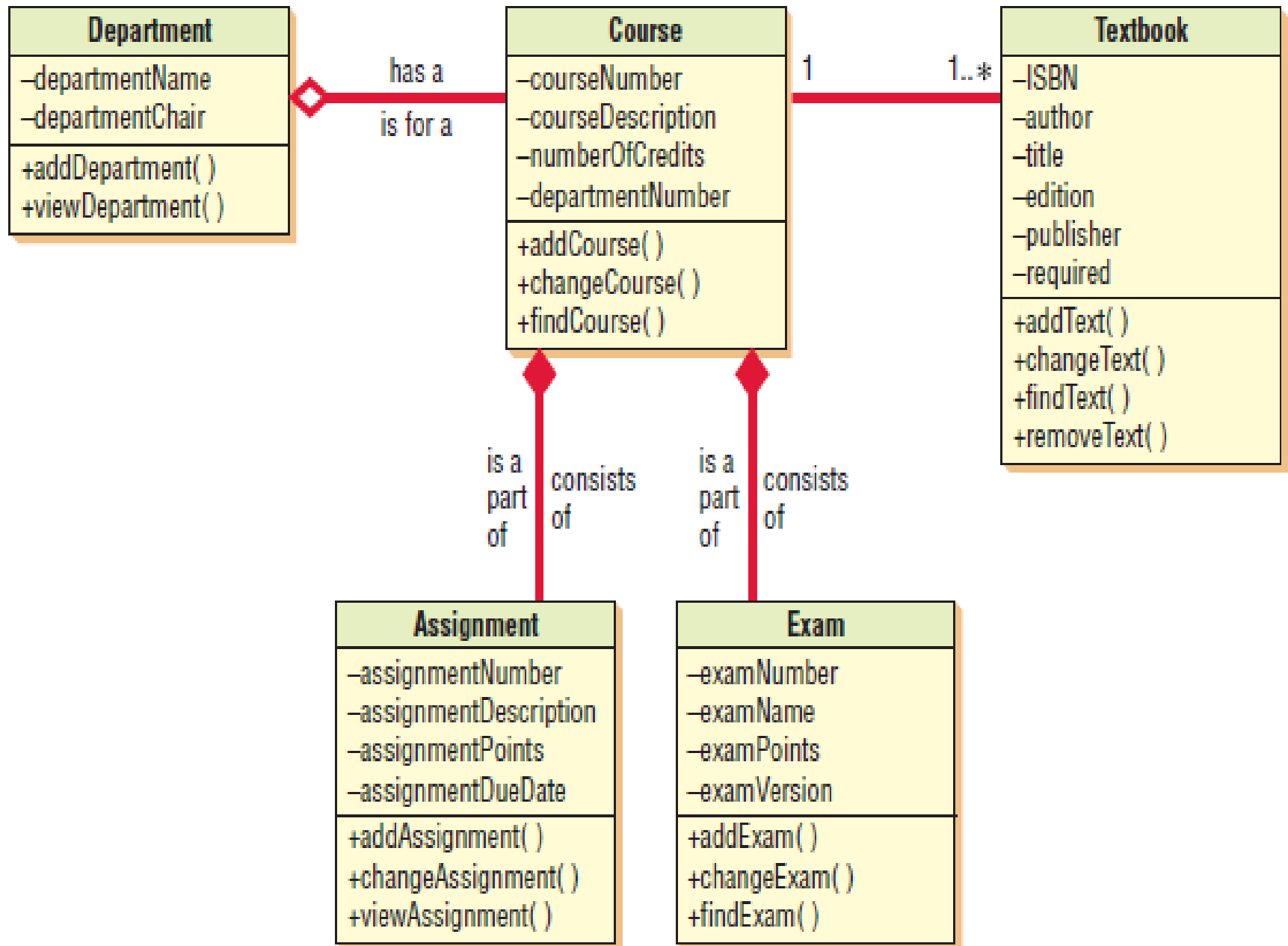
SYSTEM DEVELOPMENT METHODS

- **Structured analysis** is a traditional systems development technique.
- Because it describes the processes that transform data into useful information, structured analysis is called a **process-centered technique**.
- Structured analysis uses a series of phases, called the systems development life cycle (SDLC) to plan, analyze, design, implement, and support an information system.



SYSTEM DEVELOPMENT METHODS

- **Object-Oriented Modeling**
- Whereas structured analysis regards processes and data as separate components, object-oriented (O-O) analysis **combines data and the processes** that act on the data into things called **objects**.
- **An object** is a member of a class, which is a collection of similar objects. Objects possess characteristics called **properties**, which it inherits from its class or possesses on its own.
- In O-O programming, built-in processes called **methods** can change an object's properties.
- A **message** can request specific behavior or information from the recipient.



THE SYSTEMS DEVELOPMENT LIFE CYCLE

- Structured analysis uses a technique called the systems development life cycle (SDLC) to plan and manage the systems development process.
- The SDLC model includes the following steps:
 - Systems planning
 - Systems analysis
 - Systems design
 - Systems implementation
 - Systems operation and maintenance

SDLC

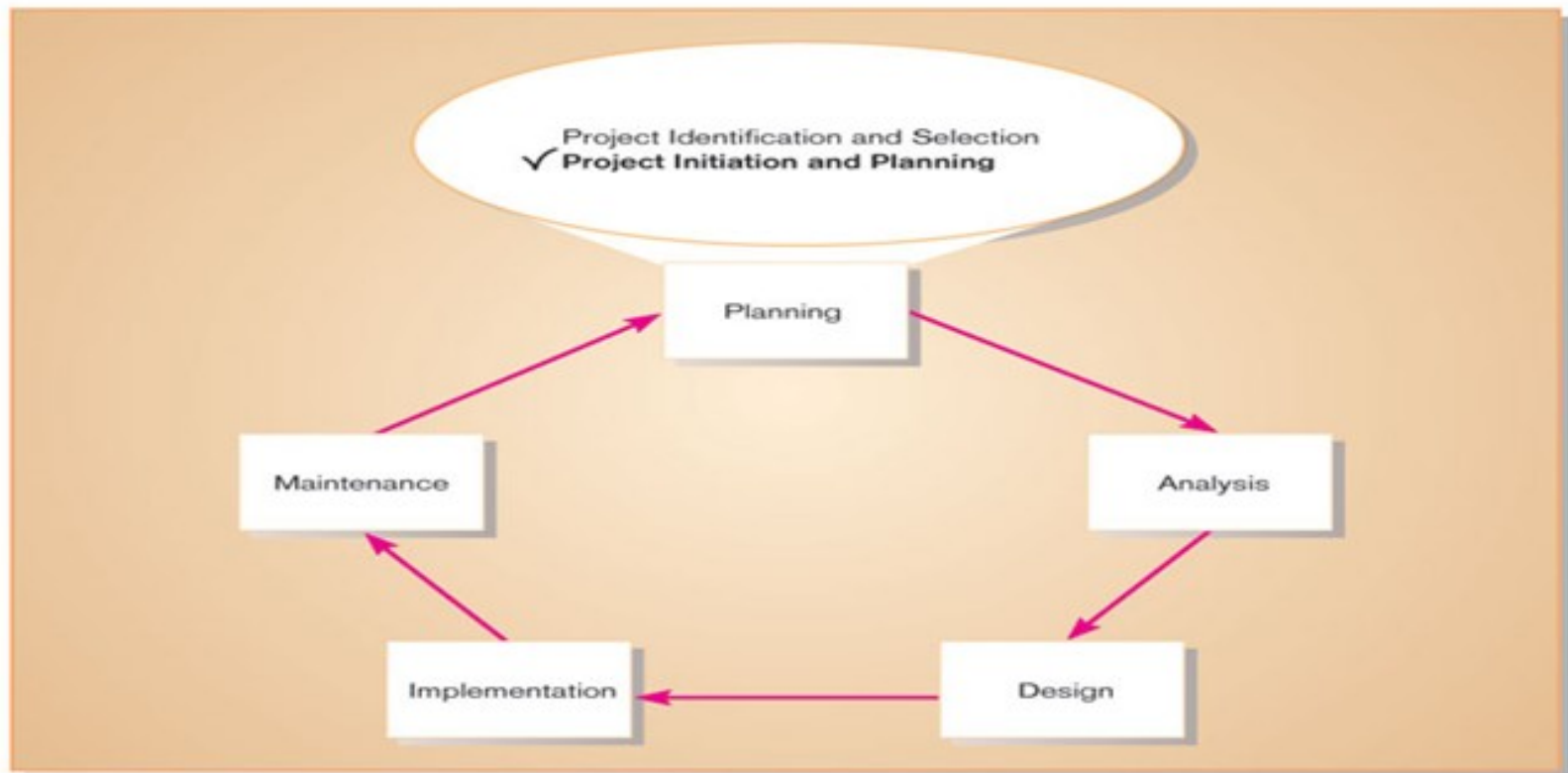


FIGURE: SDLC

Systems planning

- **Begin** with a **systems request** that **describes problems** or desired changes in an information system or a business process.
- The purpose of the planning phase is to identify clearly the nature and scope of the business opportunity or problem by performing a **preliminary investigation**, often called a feasibility study.
- **The end product**, or deliverable, is a **report** that describes business **considerations**, reviews anticipated **benefits and costs**, and **recommends** a course of action based on economic, technical, and operational factors.

Systems Analysis

- The purpose of the systems analysis phase is to understand business requirements and build a logical model of the new system.
- you develop a logical model of business processes (**data modeling, process modeling, and object modeling**)
- **The end product** is the **system requirements document**. The system requirements document describes management and user requirements, alternative plans and costs, and your recommendation.

Systems Design

- The purpose of systems design is to create a blueprint(مخطط) for the new system that will satisfy all documented requirements, whether the system is being **developed in-house or purchased as a package**. During systems design, you identify all necessary **outputs, inputs, interfaces, and processes**.
- The design is documented in **the systems design specification** and presented to management and users for their review and approval.
- Management and user involvement is critical to avoid any misunderstandings.

Systems Implementation

- During systems implementation, the new system **is constructed**.
- Structured analysis or O-O methods, the procedure is the same programs are written, tested, and documented, and the system is installed. If the system was purchased as a package, systems analysts perform any necessary modifications and configurations.
- The objective of the implementation phase is to deliver a **completely functioning and documented information system**.
- The systems implementation phase also includes an assessment, called a **systems evaluation**, to determine whether the system operates properly and if costs and benefits are within expectations.

:System operation and maintenance

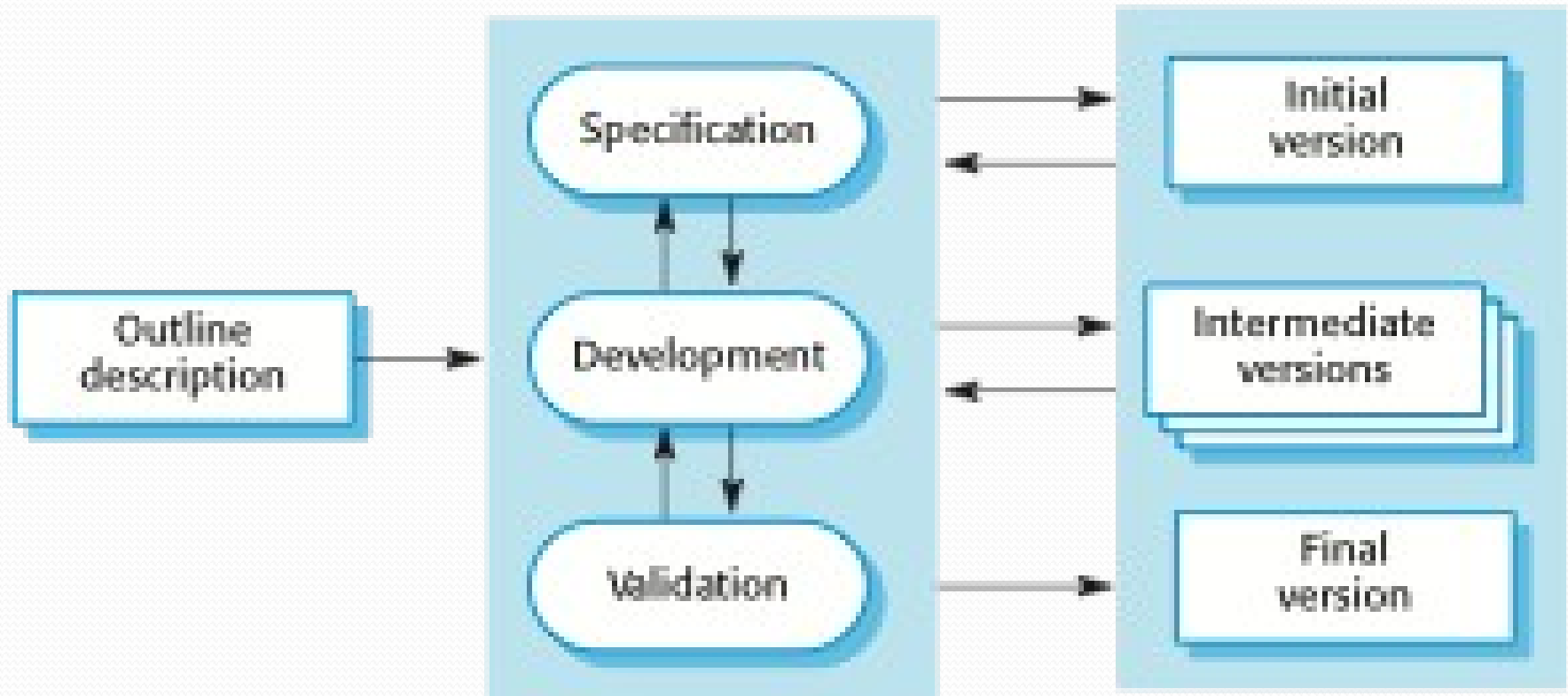
- During systems operation and support, the IT staff maintains and enhances the system.
- Maintenance changes **correct errors** and adapt to changes in the environment, such as new tax rates. Enhancements **provide new features** and benefits.
- The objective during this phase is to **maximize return on the IT investment**.

System Development Guidelines

- Stick to an overall development **plan**.
- Ensure that **users** are involved in the development process, especially when identifying and modeling system **requirements**.
- Identify major **milestones** for project review and assessment.
- Establish interim **checkpoints** between major milestones to ensure that project remains on schedule.
- Be **flexible** within the framework of your plan.
- Provide **accurate** and **reliable cost** and benefit information.

Incremental and iterative Development Methods

Concurrent activities



Agile Development Method

Incremental



Iterative

