

INSTITUTE OF INDUSTRIAL AND INFORMATION TECHNOLOGY

System Analysis and Design



System Analysis

Systems analysis defines the problems to be solved and provides the architecture of the proposed system.

The terms **analysis** and **synthesis** come from Greek where they mean respectively "to take apart" and "to put together".

Analysis is defined as the procedure by which we break down an intellectual or substantial whole into parts.

Synthesis is defined as the procedure by which we combine separate elements or components in order to form a coherent whole.

System Analysis

- System analysis is an explicit formal inquiry carried out to help a decision maker identify a better course of action and make a better decision than he might otherwise have made.
- Systems analysis is a problem-solving technique that decomposes a system into its component pieces for the purpose of studying how well those component parts work and interact to accomplish their purpose.

System Analysis

- This is a process used in the design of new systems. Systems analysis follows stages of investigation, design and implementation.
- Each stage should involve close consultation with potential users, in the various functional areas of the organisation, to ensure that their information and operational requirements are met.

When to use system analysis and design

- To correct problem in existing system
- To improve existing system
- Usher in a new system
- Outside group may mandate change
- Competition can lead to change

System Project Overview

■ Scope Definition

Is the project worth looking at?

■ Problem Analysis

Is a new system worth building?

■ Requirements Analysis

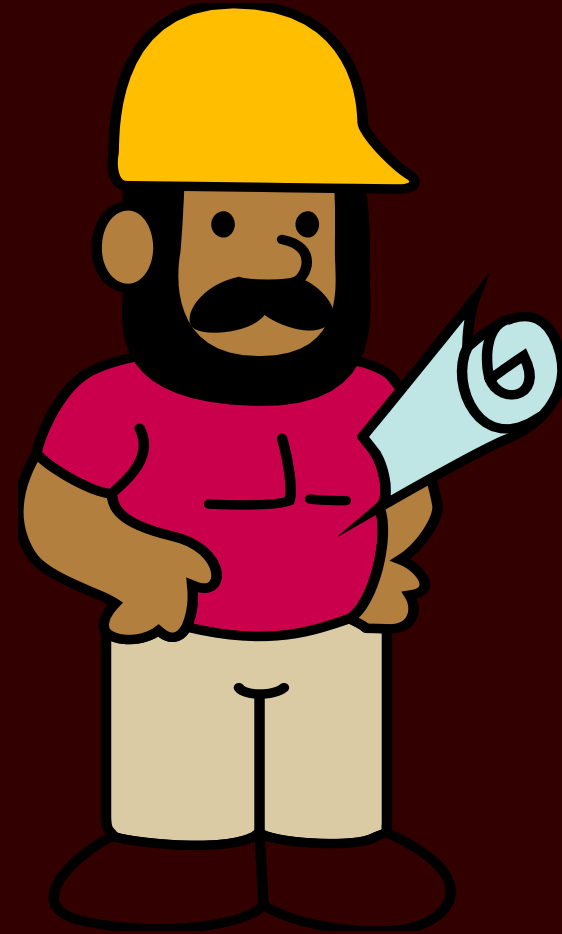
What do the users need and want from the new system?

■ Logical Design

What must the new system do?

■ Decision Analysis

What is the best solution?





How the customer explained it



How the Project Leader understood it



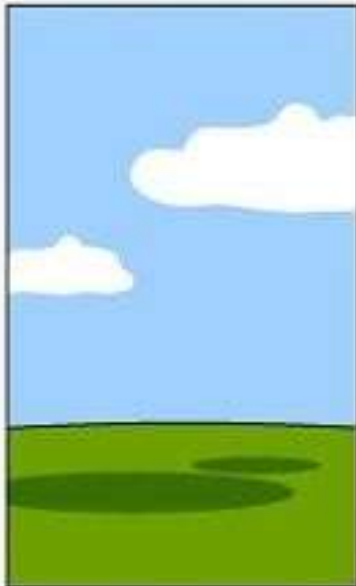
How the System Analyst designed it



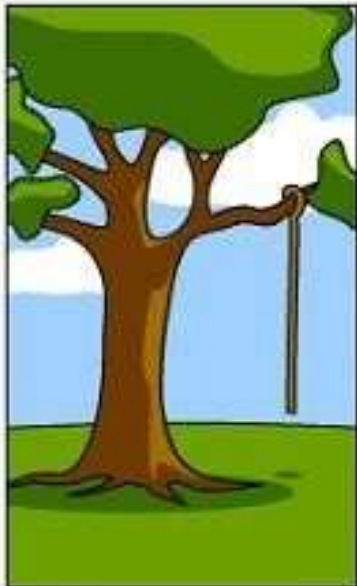
How the Programmer wrote it



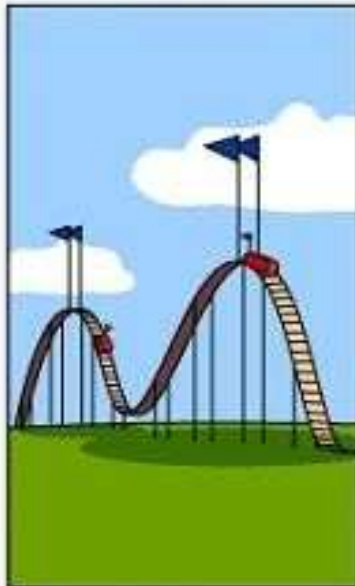
How the Business Consultant described it



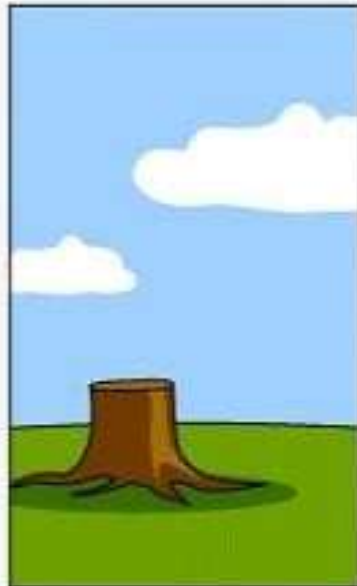
How the project was documented



What operations installed



How the customer was billed



How it was supported



What the customer really needed

SWOT Analysis for System Project

Possible IT Strengths

- Excellent Web design staff
- Low systems analyst turnover
- Recently upgraded network

Possible IT Weaknesses

- Still using several legacy systems
- Budget increase was turned down
- Documentation needs updating

Possible IT Opportunities

- Well-position for expansion
- Can be first with new software
- High potential for B2B growth

Possible IT Threats

- Aggressive new Web competition
- Impact of new government rules
- Other firms offer better benefits

System Analysis Techniques

Logical data modeling

This is the process of identifying, modeling and documenting the data requirements of the system being designed. The data are separated into entities (things about which a business needs to record information) and relationships (the associations between the entities).

Data Flow Modeling

This is the process of identifying, modeling and documenting how data moves around an information system. Data Flow Modeling examines processes (activities that transform data from one form to another), data stores (the holding areas for data), external entities (what sends data into a system or receives data from a system), and data flows (routes by which data can flow).

Entity Behavior Modeling

This is the process of identifying, modeling and documenting the events that affect each entity and the sequence in which these events occur.

Reasons for systems projects

- Improved service
- Better performance
- More information
- Stronger controls
- Reduced cost

Factors that affect systems projects

■ Internal Factors

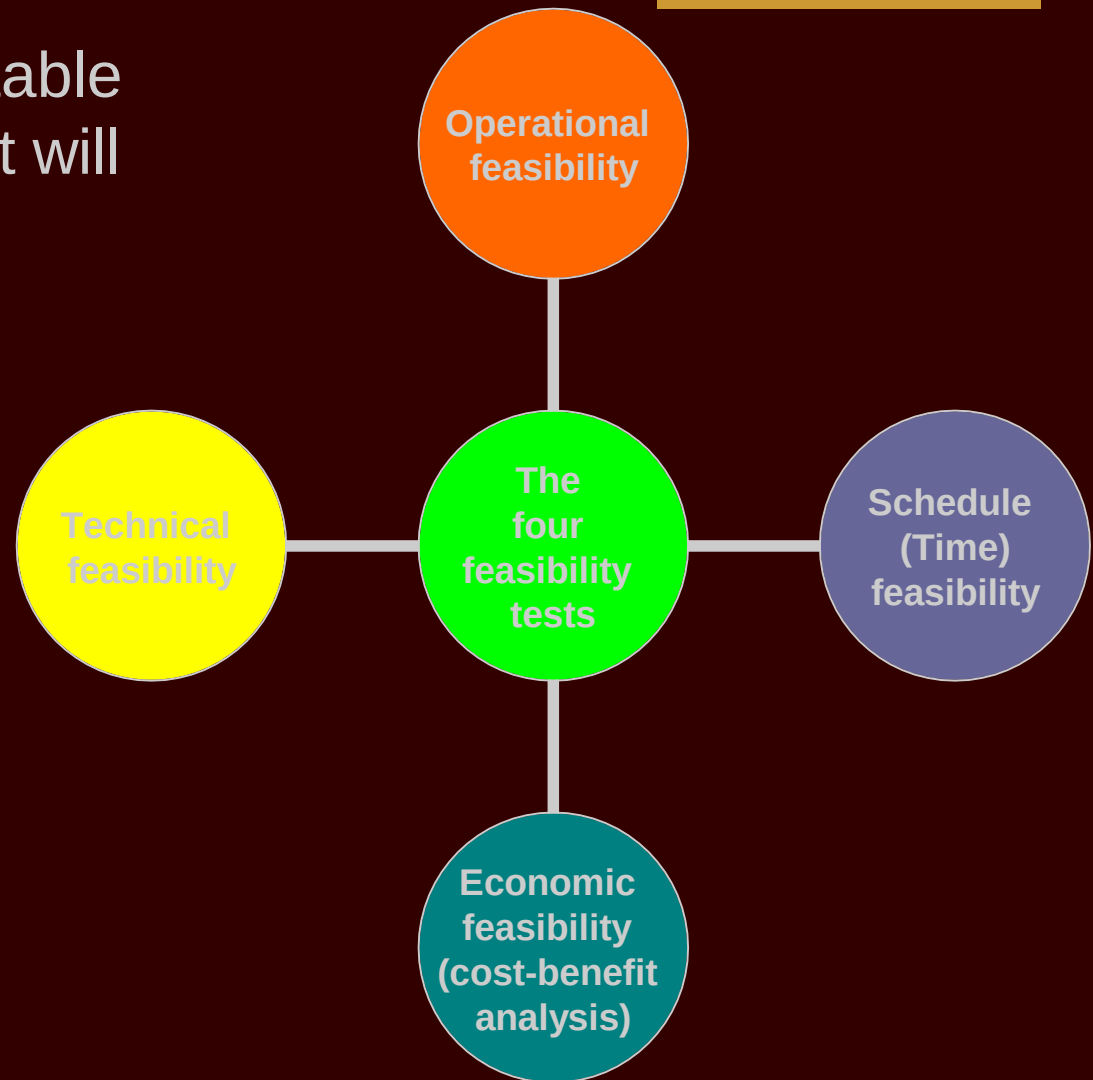
- Strategic plan
- Top managers
- User requests
- Information technology department
- Existing systems

■ External Factors

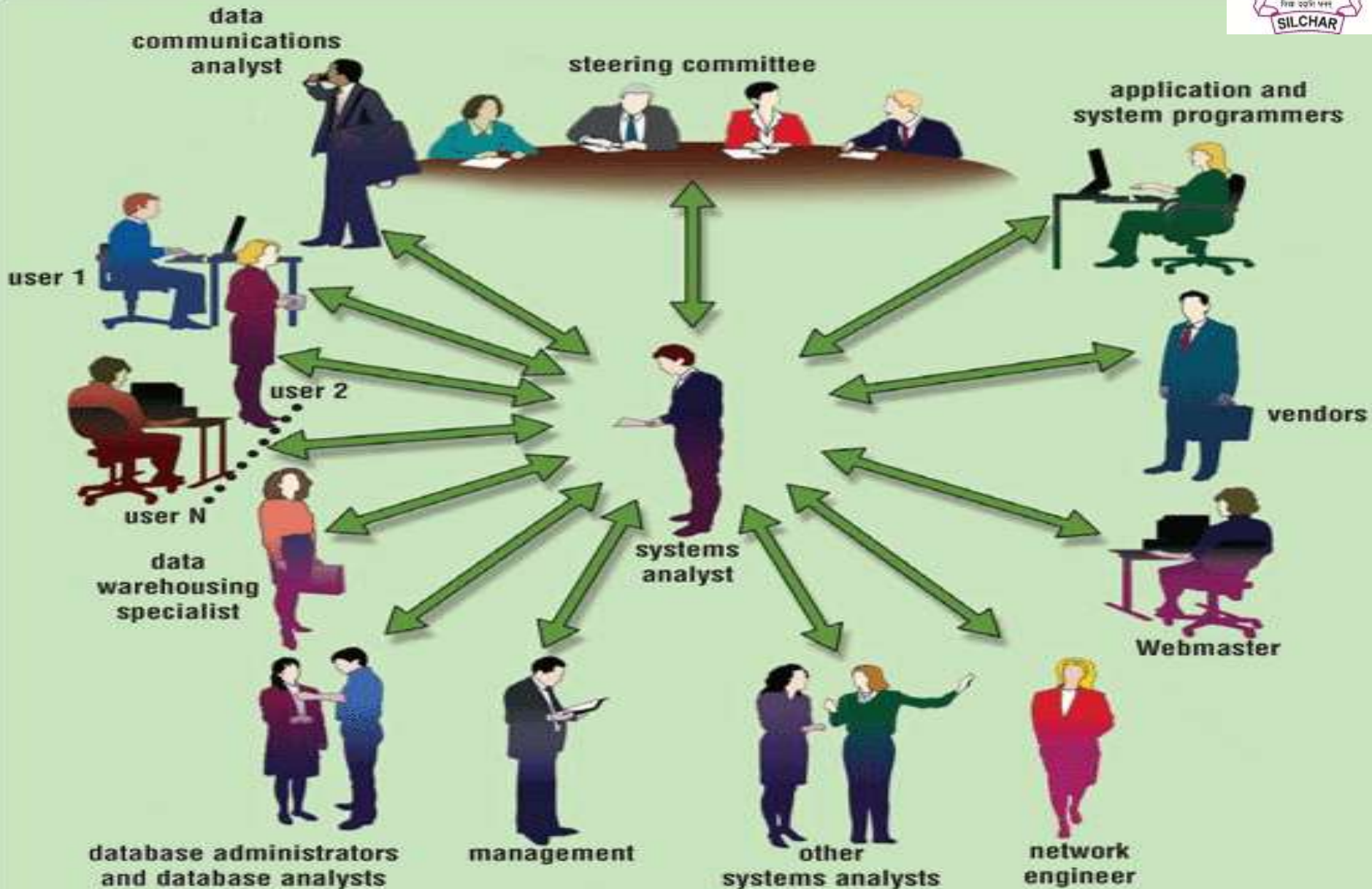
- Technology
- Supplier
- Customers
- Technology
- Competitors
- The economy
- Government

Systems Development Life Cycle Feasibility Study

Measure of how suitable
system development will
be to the company



Participants

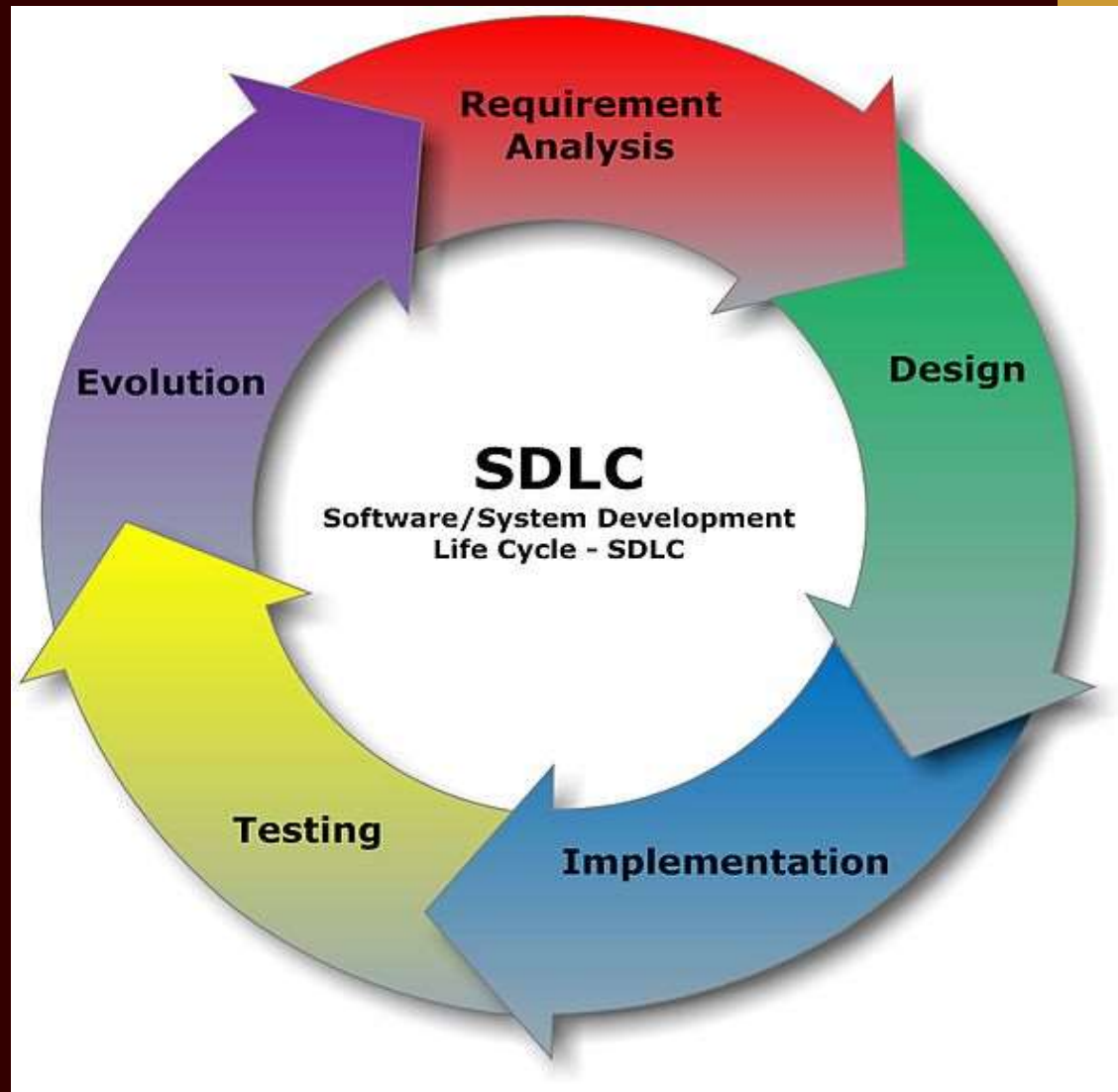


Systems Development Life Cycle (SDLC)



- The SDLC in system analysis and design aims to produce a high quality system that meets or exceeds **customer expectations**, reaches completion **within time** and **cost** estimates, works **effectively** and **efficiently** in the current and planned Information Technology infrastructure, and is inexpensive to maintain and cost-effective to enhance.

Systems Development Life Cycle (SDLC)



Systems Development Life Cycle

Phase 1. Planning



- Review project requests
- Prioritize project requests
- Allocate resources
- Identify project development team
- Identifying business value
- Analyze feasibility
- Develop work plan
- Staff the project
- Control and direct project

Systems Development Life Cycle

Phase 2. Analysis



- Conduct preliminary investigation.
- Determine exact nature of problem or improvement and whether it is worth pursuing.
- Findings are presented in feasibility report (feasibility study)
- Perform detailed analysis activities:
 - Study current system
 - Determine user requirements
 - Recommend solution
- Analysis strategy
- Gathering business requirements
- Requirements definition
- Process modeling
- Data modeling

Systems Development Life Cycle

Phase 3. Design



- Assesses feasibility of each alternative solution
- How system will be developed
- Recommends the most feasible solution
- Design selection
- Architecture design
- Interface design
- Data storage design
- Program design

Systems Development Life Cycle

Phase 4. Implementation



- Construction
 - ✓ Program building Develop programs
 - ✓ Install and test new system
 - ✓ Program and system testing
- Installation
 - ✓ Conversion strategy
 - ✓ Training plan
 - ✓ Convert to new system
 - ✓ Support plan

Systems Development Life Cycle

Phase 5. Support and Maintenance



- Conduct post-implementation system review
- Identify errors and enhancements
- Monitor system performance

Requirements Analysis Information Discovery



The process of collecting information about system problems, opportunities, solution requirements, and priorities

Information Discovery

- Review and sampling of existing documentation, reports, forms, databases, etc
- Interview
- Joint-application design (JAD) session
- Joint requirement planning (JRP)
- Research of relevant literature
- Observation of the current system
- Questionnaires and surveys

Product Information Discovery



- References from vendor
- Talk to current users of product
- Product demonstrations
- Trial version of software
- Benchmark test measures performance

Information Discovery

Joint requirements planning (JRP)

The use of facilitated workshops to bring together all of the system owners, users, and analysts, and some systems designer and builders to jointly perform systems analysis.

JRP is generally considered a part of a larger method called joint application development (JAD), a more comprehensive application of the JRP techniques to the entire systems development process.

Benefits of JRP/JAD

- **Saves Time:** It reduces the number of interviews needed to gather the requirements and reduces discrepancies. Everyone is in the room.
- **Saves Money:** Fewer change requests, eliminates re works.
- **Increased user buy in:** users participation creates ownership of the system.
- **Better Requirements Documentation:**
- **Higher Customer Satisfaction:** Customer knows at what stage the product is. The system meets customer needs.

Systems Development Life Cycle

Strengths

- Control.
- Monitor large projects.
- Detailed steps.
- Evaluate costs and completion targets.
- Documentation.
- Well defined user input.
- Ease of maintenance.
- Development and design standards.
- Tolerates changes in MIS staffing.

Weaknesses

- Increased development time.
- Increased development cost.
- Systems must be defined up front.
- Rigidity.
- Hard to estimate costs, project overruns.
- User input is sometimes limited.

System Analysis Methodologies



- Lifecycle/waterfall approach,
- CASE tools,
- Prototype,
- RAD/RSD,
- JAD,
- Object-oriented methodology.