

System Analysis and Design

Introduction to System Analysis II

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Required Skills of the Systems Analyst

- Systems analysts need a great variety of special skills, like:
 - Technical knowledge and skills.
 - Business knowledge and skills.
 - People knowledge and skills.
 - Integrity skills and ethics.

Technical Knowledge and Skills

- A systems analyst should understand the fundamentals about:
 - Computers and how they work.
 - Devices that interact with computers, including input devices, storage devices and output devices.
 - Communications networks that connect computers.
 - Databases and database management systems.
 - Programming languages.
 - Operating systems and utilities.

Technical Knowledge and Skills, *Cont'd*

- A systems analyst also need to know a lot about tools and techniques for developing systems, like:
 - Software packages such as Microsoft Access and LibreOffice Base that can be used to develop systems.
 - Integrated development environments (IDEs) for specific programming languages, such as Netbeans, Eclipse and MS Visual Studio .NET.

Technical Knowledge and Skills, *Cont'd*

- Computer-aided system engineering (CASE) tools that store information about system specifications created by analysts and sometimes generate program code, such as GNU Ferret.
- Program code generators, testing tools, configuration management tools, software library management tools, documentation support tools, project management tools and so on.

Business Knowledge and Skills

- What business functions do organizations perform?
- How are organizations structured?
- How are organizations managed?
- What type of work goes on in organizations –for example, finance, manufacturing, marketing, customer service and so on?

People Knowledge and Skills

- Because analysts usually work on development teams with other employees, systems analysts need to understand a lot about people skills.
- It is critical that the analyst understand how people:
 - Think.
 - Learn.
 - React to change.
 - Communicate.
 - Work (in a variety of jobs and levels).

Integrity Skills and Ethics

- A systems analyst is asked to look into problems that involve information in many different parts of organization.
- The analyst must have the integrity to keep private informations, such as health, salary and job performance.

Integrity Skills and Ethics, *Cont'd*

- They are expected to uphold the highest ethical standards when it comes to private proprietary information they might encounter on the job.
- Any appearance of impropriety can destroy an analyst's career.

Project Management

- **Management:** is getting things done through other people.
- **Project:** a planned undertaking that has a beginning and an end that produces a predetermined result or product.
- Project management is a special type of management.
- **Project Management:** is organizing and directing other people to achieve a planned result within a predetermined schedule and budget.

Project Success Factors

- In 1995, the Standish Group published results of a study on system development project success:
- The results indicated that:
 - $\approx 32\%$ of all development projects are canceled before they are finished.
 - More than half of computer system projects cost almost double the original budget.
 - $\approx 42\%$ have the same scope and functionality as originally proposed.

Project Success Factors, *Cont'd*

- In fact, many systems are implemented with only a portion of the requirements satisfied.
- Depending on the company size, completely successful projects (on time, on budget, with full functionality) range from only 9% to 16%.
- System development is a difficult activity requiring very careful planning, control and execution.

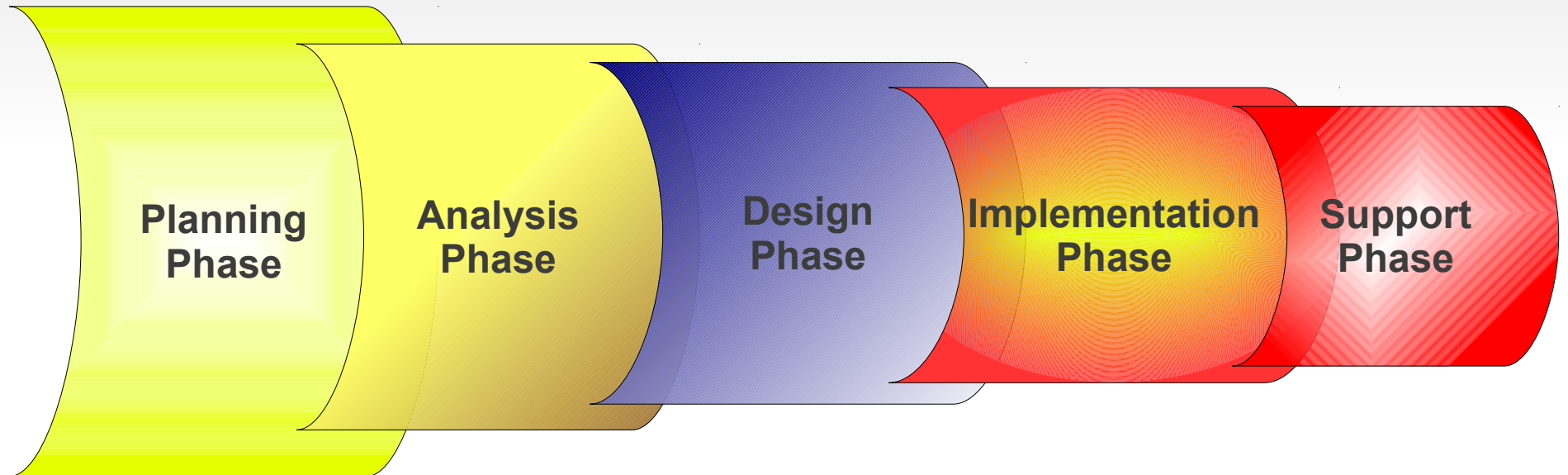
Project Success Factors, *Cont'd*

- The primary reasons of not fulfilling the desired objectives:
 - Incomplete or changing system requirements.
 - Limited user involvement.
 - Lack of executive support.
 - Lack of technical support.
 - Poor project planning.
 - Unclear objectives.
 - Lack of required resources.

Project Success Factors, *Cont'd*

- Most of these problems could be corrected with strong project management.
- Some reasons for success are the following:
 - Clear system requirement definitions.
 - Substantial user involvement.
 - Support from upper management.
 - Thorough and detailed project plans.
 - Realistic work schedules and milestones.

Software Development Life Cycle (SDLC)



Software Development Life Cycle (SDLC), *Cont'd*

- SDLC is a method of system development.
- We will come to these phases in detail, later.
- SDLC consists of:
 - **Planning phase:** the initial phase of the SDLC whose objective is to identify the scope of the new system and plan project.
 - **Analysis phase:** one phase of the SDLC whose objective is to understand user needs and develop requirements.

Software Development Life Cycle (SDLC), *Cont'd*

- **Design phase:** the phase of the SDLC where the system and programs are designed.
- **Implementation phase:** the phase of the SDLC where the new system is programmed and installed.
- **Support phase (Maintenance phase):** the phase of the SDLC that occurs after the system is installed.

Project Management Tasks: Analysis Phase

- Monitor and control scope.
- Monitor and control progress.
- Update schedule.
- Conduct status reviews.
- Organize teams.
- Provide leadership for teams.
- Coordinate with users/clients.
- Evaluate risks.
- Plan in detail design phase.
- Make presentation.

Project Management Tasks: Design Phase

- Monitor and control scope.
- Monitor and control progress.
- Monitor and control budget.
- Conduct status reviews.
- Coordinate team member training.
- Track open issues.
- Encourage/lead team members.
- Monitor technical problems.
- Reorganize team assignments.
- Monitor subcontractor/vendors.
- Plan in detail implementation phase.

Project Management Tasks: Analysis Phase

- Monitor and control scope.
- Monitor and control progress.
- Monitor and control budget.
- Conduct status reviews.
- Reorganize team assignments.
- Coordinate with users/clients.
- Track testing and quality.
- Take corrective action.
- Coordinate data conversion.
- Conduct system installation.
- Conduct post-implementation review.

Project Management Tasks

- **Project Scope Management:** defining and controlling the functions that are to be included in the system as well as the scope of the work to be done by the project team.
- **Project Time Management:** building a detailed schedule of all project tasks and then monitoring the progress of the project against defined milestones.
- **Project Cost Management:** calculating the initial cost/benefit analysis and later updates and monitoring expenditures as the project progresses.

Project Management Tasks, *Cont'd*

- **Project Quality Management:** establishing a total plan for ensuring quality, which includes quality control activities for every phase of the project.
- **Project Human Resource Management:** recruiting and hiring project team members; also training, motivating, team building and implementing related activities to ensure a happy productive team.

Project Management Tasks, *Cont'd*

- **Project Communications Management:** identifying all stakeholders and key communications to each; also establishing all communications mechanisms and schedules.
- **Project Risk Management:** identifying and reviewing throughout the project all potential risks for failure and developing plans to reduce these risks.
- **Project Procurement Management:** developing requests for proposals, evaluating bids, writing contracts and then monitoring vendor performance.

Project Initiation

- Projects are initiated for various reasons:
 - To respond to an opportunity.
 - To resolve a problem.
 - To conform to a directive.

The Project Planning Phase

- The planning phase consists of the activities that are required to get the project organized and started:
 - Define the project.
 - Produce the project schedule.
 - Confirm project feasibility.
 - Staff the project.
 - Launch the project.

Defining the Problem

- Carefully defining the problem is one of the most important activities of the project.
- This activity defines the target that you want to hit.
- If the target is ill defined, then all subsequent activities will lack focus.
- One primary cause of project failure is an unclear objective.

Defining the Problem, *Cont'd*

- The first task in this activity is to review the business needs that originally initiated the project.
- **Business Benefits:** the benefits that accrue to the organization; often measured in monetary terms.
- Business benefits are normally described in terms of the influences that can change the financial statements, either by decreasing costs or by increasing revenues.

Defining the Problem, *Cont'd*

- The second task in this activity is to identify, at a high level, the expected capabilities of the new system.
- **System Scope Document:** a document –containing description, business benefits, and system capabilities – to help define the scope of a new system.
- **Proof of Concept Prototype:** a very preliminary prototype built to illustrate that a solution to a business need is feasible.
- **Context Diagram:** a graphical diagram showing the scope of the system.

Producing the Project Schedule

- **Phase:** is made up of a group of related activities.
- **Activity:** is made up of a group of related tasks.
- **Task:** is the smallest piece of work that is identified and scheduled.

Producing the Project Schedule, *Cont'd*

- It may not be possible to schedule every task in the entire project.
- It is too early to know all the tasks that will be necessary.
- However, one of the requirements of the project planning phase is to provide estimates of the time to complete the project and the total cost of the project.
- The payment of salaries to the project team is one of the major factors of the project cost.

Confirming Project Feasibility

- Economic feasibility.
- Organizational and cultural feasibility.
- Technological feasibility.
- Schedule feasibility.
- Resource feasibility.

Confirming Project Feasibility, *Cont'd*

- Economic feasibility:
 - Is the anticipated value of the benefits greater than projected costs of development?
 - Does the organization have adequate cash flow to fund the project during the development period?

Staffing the Project

- Project manager should:
 - Develop a resource plan for the project.
 - Identify and request specific technical staff.
 - Identify and request specific user staff.
 - Organize the project team into workgroups.
 - Conduct preliminary training and team-building exercises.