

System Analysis

System analysis— a problem-solving approach that decompose a system into its components for the purpose of how well the system is interaction to accomplish their purpose.

It Focus on:

1. Defining requirements.
2. Problem solving.
3. Business Problems.
4. Business issue rather than technical issue

Model-Driven Analysis Methods

Model-driven analysis – a problem-solving approach that emphasizes the drawing of pictorial system models to document and validate both existing and/or proposed systems. Ultimately, the system model becomes the blueprint for designing and constructing an improved system.

Model – a representation of either reality or vision. Since “a picture is worth of a thousand words,” most models use pictures to represent the reality or vision.

Model-Driven Approaches

- **Traditional Approaches**
 - **Structured Analysis**
 - Focuses on the flow of data through processes
 - Key model: data flow diagram
 - **Information Engineering**
 - Focuses on structure of stored data
 - Key model: entity relationship diagram

Model-Driven Approaches

- **Structured Analysis:** The Process Centered Technique which is used to analyze business requirements and problems. The key points are:-
 - Focuses on the flow of data through processes
 - Key model: data flow diagram
- **Information Engineering:** The data centered technique for planning, analyzing and designing information system.
 - Focuses on structure of stored data
 - Key model: entity relationship diagram

Model-Driven Approaches

- **Object-Oriented Approach**
 - integrates data and process concerns into objects
 - Object – the encapsulation of the data (called properties) that describes a discrete person, object, place, event, or thing, with all the processes (called methods) that are allowed to use or update the data and properties. The only way to access or update the object's data is to use the object's predefined processes.
 - **Unified Modeling Language (UML)**

Accelerated Systems Analysis

Accelerated systems analysis

approaches emphasize the construction of prototypes to more rapidly identify business and user requirements for a new system.

prototype – a small-scale, incomplete, but working sample of a desired system.

- Accelerated systems analysis approaches
 - Discovery Prototyping
 - Rapid Architected Analysis

Discovery Prototyping

Discovery prototyping – a technique used to identify the users' business requirements by having them react to a quick-and-dirty implementation of those requirements.

- **Advantages**
 - Easy to identify requirements in First time.
- **Disadvantages**
 - Look and Feel in premature
 - Can encourage a premature focus on, and commitment to, design
 - Users can be mislead to believe that the completed system can be built rapidly using prototyping tools

Rapid Architected Analysis

Rapid architected analysis – an approach that attempts to derive system models (as described earlier in this section) from existing systems or discovery prototypes.

- **Reverse engineering** – the use of technology that reads the program code for an existing database, application program, and/or user interface and automatically generates the equivalent system model.

Requirements Discovery

Requirements discovery – the process, used by systems analysts of identifying or extracting system problems and solution requirements from the user community.

Requirements Discovery Methods

- **Fact-finding** – the process of collecting information about system problems, opportunities, solution requirements, and priorities.
 - Sampling existing documentation, reports, forms, databases, etc
 - Research of relevant literature
 - Observation of the current system
 - Questionnaires and surveys
 - Interviews
- **Joint requirements planning (JRP)** –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.
 - 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.

Business Process Redesign

Business process redesign (BPR) – the application of systems analysis methods to the goal of dramatically changing and improving the fundamental business processes of an organization, independent of information technology.

FAST Systems Analysis Phases

- Scope Definition Phase
 - *Is the project worth looking at?*
- Problem Analysis Phase
 - *Is a new system worth building?*
- Requirements Analysis Phase
 - *What do the users need and want from the new system?*
- Logical Design Phase
 - *What must the new system do?*
- Decision Analysis Phase
 - *What is the best solution?*

1. Scope Definition Phase

- It is also called initial study, survey phase, planning phase.
- It deals with scope of the project and the problems, opportunities and directives that triggered project.
- This phase concerned with the system owner's view of the existing system.
- It defines the scope in terms of scale, development, strategy, schedule, resource requirement and Budget.
- The task diagram shows the total task that must be complete in this phase.

Scope Definition Phase

1.1 Identify baseline problems and opportunities:

- ☐ It defines initial baseline of the problems, opportunities, and directive that triggered the project.
- ☐ Each problem is assessed with respect to urgency, visibility tangible benefits, priority, possible solutions.
- ☐ The high level persons, owners and system analyst are involved to develop the system.
- ☐ The primary technique to complete this task includes fact finding and various types of meetings.

Scope Definition Phase

1.2 Negotiate Baseline Scope:

- ❑ During development scope can be change but initially the scope must be properly defined.
- ❑ This task perform various activities on the basis of previous task results.
- ❑ What type of **DATA** the system being studied ? For Example: In college MIS student, teacher. Books etc.
- ❑ What type of **PROCESS** the system being studied ? For Example: In college MIS Library Mgmt, student registration.
- ❑ How the system **INTERFACE** with users and locations?
For Example: Guardians, universities etc

Scope Definition Phase

1.3 Asses Baseline Project Worthiness:

- ☐ The analyst try to find out the answer of question is the project worth looking at.
- ☐ System analyst and project manager leads this task.
- ☐ The team make the plan based on guess to solve problems which are defined by above task.

Scope Definition Phase

1.4 Develop Baseline Schedule and Budget:

- ☐ It must plan the resource and schedule for the project.
- ☐ A detail schedule for next phase. For (problem analyze phase).
- ☐ Project manager is responsible for this task.
- ☐ This task gives the decision for go or no go in next phase.
- ☐ All the resources and assignments are stored in repository.

Scope Definition Phase

1.5 Communicate the project plan:

- ☐ In an organization large number of staffs involved than projects.
- ☐ The **Steering Body** monitors the project.
- ☐ The above body finalize all the task of Scope definitions phase.

Problem Analysis Phase

- ❑ This phase deals with understanding of problems opportunities and various directive of the system development.
- ❑ This phase is also called feasibility analysis phase.
- ❑ It deals with strategic plan and tactical plan.
- ❑ Direction of the project.
- ❑ Some methodologies and deliverables of problem analysis phase.

Problem Analysis Phase

2.1 Understand the problem domain:

- ☐ It deals with real problems and its sectors.
- ☐ This task is lead by project manager and facilitated by the system analyst.
- ☐ Problems are better documented to verify it.
- ☐ The system models can be constructed to understand the problems

Problem Analysis Phase

2.2 Analyze problems Opportunities:

- ☐ For properly solve the problems there must be proper **cause and effect analysis**.
- ☐ The above method is used to understand the problems and provide certain creative and valuable solutions.
- ☐ This task provide certain results in problem analysis.

Problem Analysis Phase

2.3 Analyze business Process:

- ☐ Some of the process required redesigned.
- ☐ At properly analyzed the redesigned processes.
- ☐ The DFD is used to analyzed the developed processes.

Problem Analysis Phase

2.4 Establish system improvements objectives:

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Problem Analysis Phase

2.4 Establish system improvements objectives:

- ☐ Some of the process required redesigned.
- ☐ It defines the objective in terms of schedule, cost, technology policy etc.
- ☐ The **DFD** is used to analyzed the developed processes.
- ☐ This task is accomplished by system analysts.

Problem Analysis Phase

2.5 Update or refine the project Plan:

- ☐ The project manager, analyst and other person perform this task.
- ☐ It check whether all the task can be covered by new system.
- ☐ This phase may change plan if system required.
- ☐ It provides the technique for next phase of system developments.

Problem Analysis Phase

2.6 **Communicate findings and recommendations.**

- ☐ This task is done by system analyst by taking the help of other team members.
- ☐ It checks whether all the task can be covered by new system.
- ☐ The system analyst communicate all the task to users community after developing reports.

Requirement Analysis Phase

- ❑ The requirement analysis phase defines the business requirements for a new system.
- ❑ The analyst try to find out the technical solution of the system in terms of data process and interfaces.
- ❑ This phase try to find out the answer of the questions” what do the users need and want from the new system?”
- ❑ Business requirement statement is prepared for properly managing all the task of system developments.

Requirement Analysis Phase

3.1 Identify and Express System requirements:

- ❑ To identify the various functional and non functional requirements.
- ❑ **Functional requirement** is a description of activities and services that system must provide (input ,outputs)
- ❑ **Non functional requirements** are description of features characteristics and constraints that define a satisfactory of the system.(Budgets, Time)
- ❑ Use case are used to show functional requirements.

Requirement Analysis Phase

3.2 Prioritize System Requirements:

- ❑ If the budget and schedule of any requirement is properly identified then it will be easy to find out the importance of any requirements.
- ❑ **Time boxing** is a technique which is used to define the period for any type of task.
- ❑ Two types of requirements-Mandatory requirements and desirable requirements.

Requirement Analysis Phase

3.3 Update or Refine the Project Plan:

- ☐ This task may change the scope which is fixed by scope definition phase.
- ☐ If required the team may adjust cost, schedule and other factor of system development.

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Requirement Analysis Phase

3.4 Communicate the Requirement Statement:

- ☐ The team present all the finding to the business community.
- ☐ Different type of suggestions are obtain from business community.
- ☐ Negotiating and Interpersonal skills is required to complete this task.

Logical Design Phase

- ❑ It is the process of documenting all the requirements using system models :
- ❑ Depending upon nature different types of models are constructed for the purpose of data, process and interfaces.

Logical Design Phase

4.1 **Structural Functional Requirements:**

- ❑ Construction of different models by using agile development methods.
- ❑ For data process and interfaces different models are constructed to show requirements.
- ❑ At First functional requirements are converted into system models.

Logical Design Phase

4.1 b) **Prototype Functional Requirements:**

- ☐ Different types of prototype are created for showing different requirements.
- ☐ These are the basic units for input, output and processes.

Logical Design Phase

4.2 **Validate Functional Requirements:**

- ☐ System models are checked for validation in terms of completeness and correctness.
- ☐ This task is done by SA by actively involving of system users who checks errors of the system.

Logical Design Phase

4.3 Define acceptance test case:

- ☐ All the requirements are checked in terms of data rules and business rules.
- ☐ Requirement are used for test cases.

5. The Decision Analysis Phase

- ❑ This phase concern with converting conceptual term into technical solution.
- ❑ It Identify and recommend the best technical solution of the system.

5. The Decision Analysis Phase

5.1 **Identify Candidate solution:**

- ☐ There may be more than one solution for any problems.
- ☐ The system analyst facilitates this task.
- ☐ For solution of any problems the ideas are come from internal and external sources.
- ☐ It is directly triggered with requirement analysis phase.

5. The Decision Analysis Phase

5.2 Analyze Candidate Solution:

- ❑ The cost and benefit of the system is depending upon analysis.
- ❑ Different type of feasibility analysis is done in this phase.
- ❑ The operational, economic and schedule feasibility is done by users where as the technical feasibility is done by designer and builder.

5. The Decision Analysis Phase

5.3 Compare Candidate solution:

- ☐ Different type of solutions are compared together and finalize the solution.
- ☐ The solution are present into owners and other stakeholders.
- ☐ The system analyst facilitate this task.
- ☐ The Designers and builders perform final analysis and recommendations.

5. The Decision Analysis Phase

5.4 **Update the project plan:**

- ☐ The scope may be change if required .
- ☐ Technical solution also change if required.
- ☐ Analyst, project manager and owners are highly involved in this system.
- ☐ The recommended solution is finalize by stakeholders.

5. The Decision Analysis Phase

5.5 Recommend a System Solution:

- ☐ The recommended system solution must present into business community.
- ☐ The project manager and executive sponsor should jointly facilitate this task.
- ☐ The target system solution is reformatted for presentation as a system proposal.

CHAPTER FINISHED

Feasibility analysis

- The measure of How beneficial will be the system in any organization.
- Feasibility is the measure feasibility.

Feasibility Checkpoint during Analysis

- **Scope definition check point:**
- Urgency of the problem.
- Estimated cost of the system
- To do the above task the team must be well experienced.

Feasibility Checkpoint during Analysis

- **Problem analysis Checkpoint:**
- Full description of estimated of the system.

What benefits will the system provide:

- Tangible benefit: A benefit that can be easily quantified. These benefits are measured in terms of month and year. Example: Sales, reduction in loss etc.
- Intangible benefits are those benefits that is very difficult or impossible to quantify. Example: goodwill, better services etc.

How much will be the cost of System.

- Personal costs
- Computer usage.
- Trainings
- Supply and equipment cost
- Cost of software
- Fixed Cost: The cost which occur regular intervals but relatively fixed rate:

Examples: lease and license, salaries.

Variable cost: A Cost that may change due to other factor. Ex: Usage of Computer.

Is the proposed system cost effective:

Major things that measure cost effectiveness of the system.

- Payback analysis
- Return on Investment
- Net present Value

Time value of money is a concept which must be consider at the time of determining the value of any system.

Is the proposed system cost effective:

Payback analysis: This is the analysis which determine the payback period of any investment.

Return On Investment: A Technique that compares the lifetime profitability of the system by comparing other solutions.

Net Present Value: The Price of the system after deducting annual discount.

Feasibility analysis of candidate system.

Candidate system Matrix: A tool used to document the similarities and differences between candidate systems. The column represents the candidate solutions. The rows represent characteristics that differentiate the candidates.

Feasibility analysis Matrix: A tool that is used to rank the candidate system.

System Proposal

- It is a written report or oral presentation of any recommended solution.
- Written Report : Most commonly used method to communicate all the problems and solution of any system.

Length of the written report

Execute level: one or two pages

Middle level: three to five pages.

Supervisory level: less than 10 pages

Clerk level: less than 50 pages.

System Proposal

- **Organization of the Report:**
- **Factual Format:**
 - Introduction
 - Methods and Procedures
 - Discussion and Analysis
 - Recommendation
 - Conclusions

System Proposal

- **Organization of the Report:**
- **Administrative Format**
 - Introduction
 - Conclusion and Recommendations
 - Summary and Discussion
 - Methods and Procedures
 - Final Conclusions
 - Appendixes with fact details.

System Proposal

- **Steps to write formal report:**
 - Initial Preparation
 - Outline
 - Draft text/illustrations
 - Edit
 - Final Type
 - Proofread
 - Bind
 - Check
 - Distribute.

System Proposal

- **Formal Presentation: A special meeting used to sell new ideas and gain new approval for new system.**

Effective presentation require significant time for preparation.

Conduction Formal Presentation:

- Dress Professionally:
- Avoid using the word I
- Maintain eye contact with group
- Be aware of your own mannerism.

System Proposal

➤ **Suggestions for Presentation:**

- Stop Talking
- Ask a Questions
- Try a little humor
- Use Props.
- Change your voice level
- Do something unexpected.
- Always answering seriously.
- Answer both individual and groups.
- Summarize your answers.
- Limit the time for answers
- Be honest.

System Design

- System design is specification of detailed computer based solution.
- It defined those tasks that focus on the specification of a detailed computer solution.
- It consist of input, output, files database and other computer components.

Model Driven Approaches

- Model driven design emphasizes the driven of pictorial system models to document the technical or implementation aspects of a new system.
- They are design by using logical design of any system.
- These are developed by using visio professionals, microsoft visio, Visible analyst.

Modern Structured Design

- Modern structured design is a technique that decomposes the system processes in manageable components.
- It is process centered technique for breaking up into sub modulus in hierarchy.
- It contains block, subprogram or subroutine.
- The modulus must be highly cohesive and loosely coupled.

Modern Structured Design are

- Information Engineering
- Prototyping
- Object Oriented Design

Rapid Application Development

- It is a system design approach that utilizes structured, prototyping, and JAD.
- It is merging of various other techniques by using data or process centered techniques.
- Prototyping models also used in RAD.

FAST system Design Strategies

- It is a hypothetical approach to design the system by using large number of people, and by emphasizing in time.

Build Solution of system Design

- The software is developed based on the users need.
- Users requirement is the primary things in build solution.
- First, the analyst seeks to design a system that both fulfills requirements
- and will be friendly to its end users.
- Second, and still very important, the analyst seeks to present clear
and complete specifications to the computer programmers and technicians.

Build Solution of system Design

- **Design the Application Architecture**
- The purpose of this first design task is to specify an application architecture
- It involves considering network technologies and making decisions on how the processes are connected with each other.
- System users may be involved in this activity to help address business data, process, and location issues.
- The principal deliverable of the task is the application architecture and distribution analysis that serves as a blueprint for subsequent detailed design phase activities.

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Build Solution of system Design

- **Design the System Database(s)**
- Typically the next system design task is to develop the corresponding database design specifications.
- The designer must be especially attentive to designing databases that are adaptable to future requirements and expansion.
- The *data administrator* may participate (or complete) the database design.
- Finally, SYSTEM BUILDERS may also participate when asked to build a prototype database for the project.

Build Solution of system Design

- **Design the System Interface.**
- The systems designer can work closely with system users to develop input, output, and dialogue specifications.
- Reports and other outputs are usually printed directly onto paper or displayed on a terminal screen.
- Finally, internal controls must be specified to ensure that the outputs are not lost, misrouted, misused, or incomplete.

Build Solution of system Design

- **Package Design specification.**
- where you draw the line between the system designer's and computer programmer's responsibilities.
- whether the methodology and solution calls for the design of the overall program structure.
- Analyst and designer complete this task.

Build Solution of system Design

- **Update the project Plan.**
- The *project manager* in conjunction with SYSTEM OWNERS and the entire project team, facilitates this task.
- The analysts and owners should consider the possibility that, based on the completed design work, the overall project schedule, cost estimates, and other estimates may need to be adjusted.

Buy Solution of system Design

- This is also called purchase phase.
- Decision analysis is most important part for this system.
- The buy solution is possible because of COTS.
- Decision analysis phase determine which design is best in which situation.

Task of Buy Solution

- **Research Technical Criteria and Options**
 - This task identifies which software and hardware is require to develop the system.
 - The team search the require thing from internet and already completed tasks.
 - Sources for conducting research are internal standards, information services and trade news papers.
 - Identification of vendors.
 - Identification of potential vendors, options, and technical criteria.

Task of Buy Solution

- **Solicit proposals and Quotes from Vendors**
 - This task is responsible for making two documents proposals and quotes.
 - It consist of configuration, prices, maintenances schemes, and various conditions.
 - It provides the feature of system in terms of input output and interfaces.
 - The project manager is responsible to complete this task and take input from data administrators.
 - The main task of this task is to search specific vendors for the system.

Task of Buy Solution

- **Validate vendor claims and performances**
 - All the proposals are analyzed individually and quotation are not compared with each other.
 - System designer validate all the proposals.
 - Proper identification of system and leave the proposals if the proposals cannot meet the requirements.
 - All the proposals are validate in terms of features and capabilities and other things.

Task of Buy Solution

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Task of Buy Solution

- **Evaluate and Rank vendor proposals**
 - Cost benefit analysis is done to rank the proposals.
 - The special marking is given for valid proposals.
 - The designer complete this task by taking the help from different hands.
 - The key output of this task is hardware and software recommendations of the system.
 - Cost is major factor for ranking the system.

Task of Buy Solution

- **Award contract and Debrief Vendors**
 - For final approval the proposal is sent to management level.
 - Contract is done with valid vendors.
 - The designer gives the reports and make presentation for vendors.
 - Various terms and conditions are followed by two party.
 - Contract for license agreement.

Project Management

- A project is a sequence of unique, complex, and connected activities that have one goal or purpose and that must be completed by specific time, within budget, and according to specification.

Project Management

- **Features of Project**
- All the processes must be in sequences.
- One project must be different from others.
- All the task are completed in time.
- All the task must be completed with specific details.
- Process can not be controversial.

Project Management

- **Causes of Failed project**
- Failure to establishment upper management commitment.
- Lack of organization commitment.
- Taking shortcut through system development methodology.
- Poor expectation management.
- Premature commitment to a fixed budget and schedule.
- Poor estimating technique.

Project Management Continue

- Over optimism.
- The mythical man month.
- Inadequate people management skills.
- Failure to adapt business change.
- Insufficient resources.
- Failure to manage the plan.

Project Management

- **Business Achievements Competencies**

Business Awareness

Business Partner awareness

Commitment to quality

- **Problem Solving Competencies**

Initiative

Information gathering

Analytical thinking

Project Management

- **Influences competencies**
 - Interpersonal awareness
 - Organizational awareness
 - Resourceful use of influences
- **People management competencies**
 - Motivating others
 - Communication Skills
 - Developing Others
 - Monitoring and Controlling

Project Management

- **Self Management competencies**

Self confidence

Stress management

Concern for credibility

Flexibility

Project Management

- **Project management functions**
- **Scoping:** Project scope must be clearly defined to plan activities, estimate costs, and manage expectations.
- **Planning:** It defines the activities which are required to complete the project.
- **Estimating:** project must be estimated in terms of cost, time, skills etc.
- **Scheduling:** Defining time for each task.
- **Organizing:** properly define the hierarchy of person to report the task.

Project Management

- **Project management functions**
- Directing: The task must be defined to all the members of team to motivate.
- Controlling: The task for monitoring, reporting and making progress in system development.

Project Management tools :Gantt Charts and PERT Charts

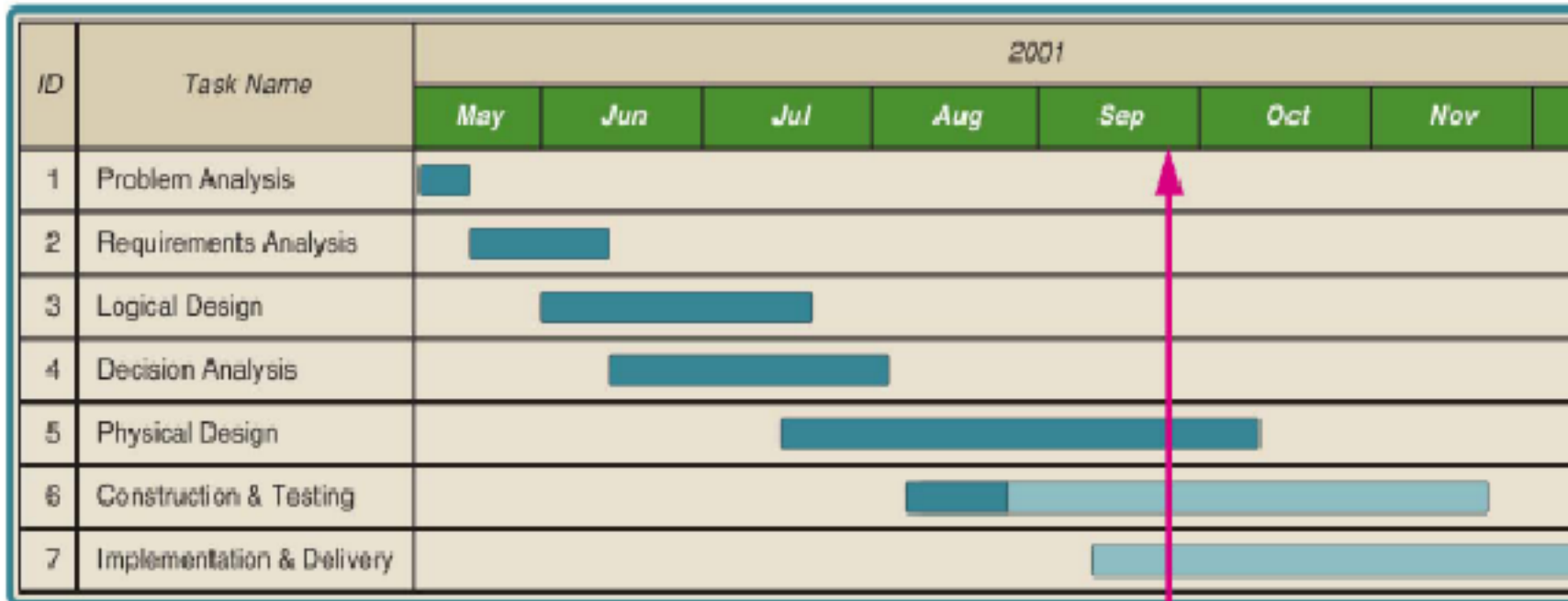
- **Gantt Charts**

A Gantt chart is a simple horizontal bar chart that depicts project tasks against calendar. Each bar represents a named project tasks. The task are listed in vertically in left hand column.

- **Pert Charts**

A Pert Chart is a graphical network model that depicts a project's task and the relationships between those tasks. Pert Chart was developed to make clear the interdependence between project tasks before those tasks was scheduled.

Project Management tools: Gantt Charts



Today

Legend

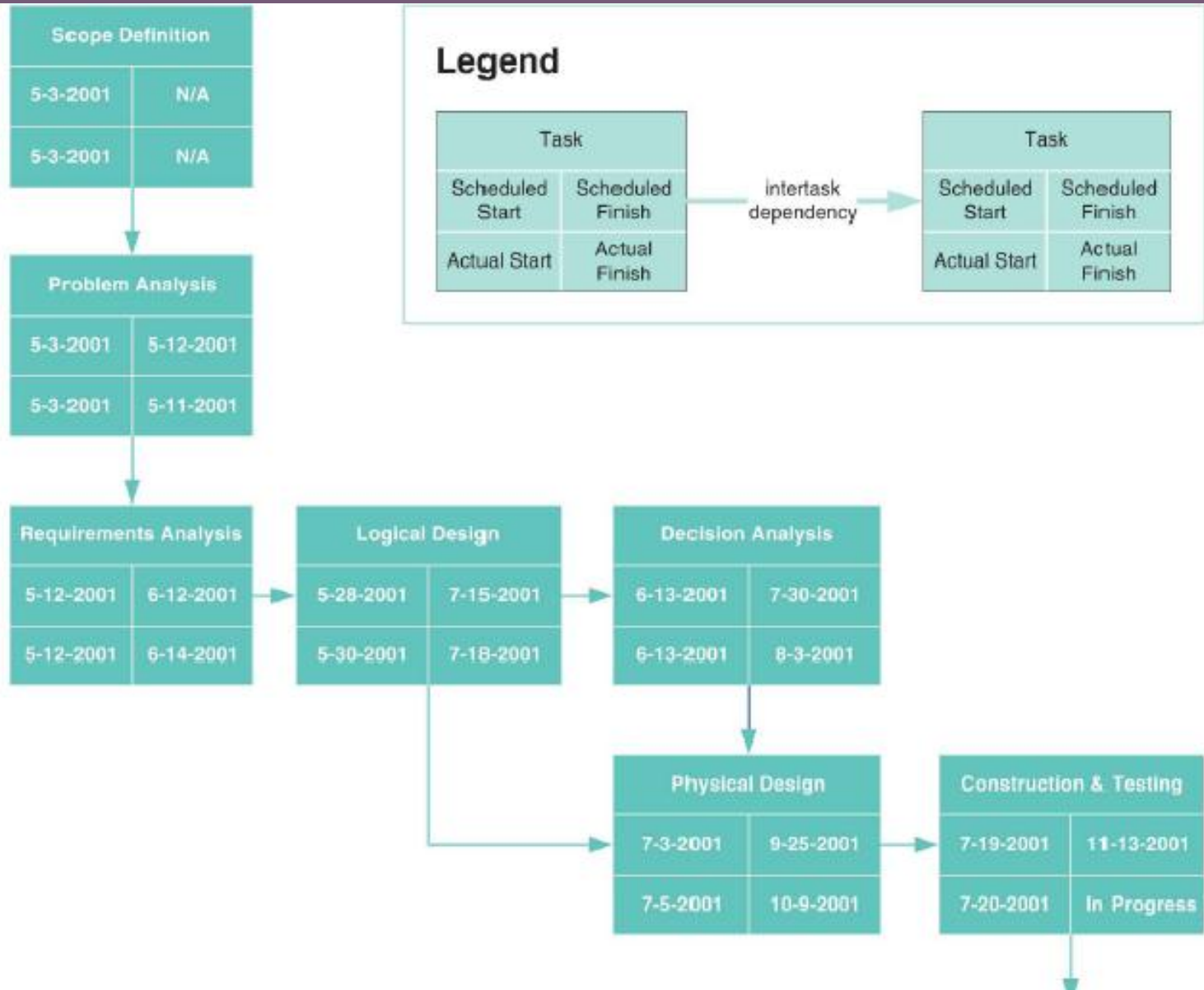


Complete task



Incomplete task

Project Management tools: PERT Charts



Project Management Life Cycle

- **Phases of Project**
- **Negotiate Scope**

Scope defines the expectation of the system and the expectation defines the satisfaction of the system.

Scope must be defined in terms of product quality, quality, time and resources.

Project Management Life Cycle

- **Identify task**
- Task identify the work to be done
- Work breakdown structure must be constructed to show the activity and task.
- WBS can be constructed by using the tool called Microsoft Visio.

Project Management Life Cycle

- **Specify Intertask dependency**
- Intertask dependency of one task to another is happen in some task.
- In other words the start or finish of individual task may depend on the start or completion of other task.
- In which four types of dependency are occurred.
- SS, SF, FS,FF are the example of dependency.

Project Management Life Cycle

- **Estimate task duration**
- The project manager must estimate duration for each task.
- WBS can be constructed by using the tool called Microsoft Visio.
- TO define the task two factors must be considered. Efficiency and Interruptions.
- The technique for estimating task are given below.
Optimistic duration pessimistic duration and expected duration .

Project Management Life Cycle

- **Assign Resources**
- In this phase all the resource is assigned for various tasks.
- The resources are:
 - People
 - Services
 - Facilities and Equipment
 - Supplies and Materials

Project Management Life Cycle

- **Assign Resources continue**
- Resource leveling It is a strategy for correcting resource overallocations.
- Critical Path is a sequence of dependent task that determines the earliest completion date for the project.

Project Management Life Cycle

- **Direct the Team effort**
- For managing the team effort the project manager have leadership. The various leadership hints.
Be consistent, Provide support, Don't make promise that you can not keep, Praise in public criticize in private..

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Project Management Life Cycle

- **Monitor and Control Progress**
- Progress Reporting
- Change Management
- Expectations Management

Project Management Life Cycle

- **Monitor and Control Progress**
- Progress Reporting
- Change Management
- Expectations Management
- Critical Path analysis:

Project Management Life Cycle

- **Asses Project Results and Experiences**
- Did the final product meet the requirement?
- Did the project come on schedule?
- Did the product come on define budget?
- Did the product developed according to allocated human resources?