SYSTEM ANALYSIS & DESIGN

UNIT-2

Feasibility study:

A feasibility study is a preliminary assessment that assists management in determining if a system is viable for development or not.

- It recognizes the possibilities of enhancing an existing system, creating a new system, and producing revised estimations for ongoing system development.
- It is used to sketch out the problem and determine whether a practical or acceptable solution exists.
- The primary goal of a feasibility study is to affirm the scale of the problem rather than solving it.
- A feasibility study produces a formal system proposal, which serves as a decision document and describes the whole nature and scope of the proposed system.

Types of Feasibility

The following are the various types of feasibility study:

1. Technical Feasibility:

Technical feasibility aids in gaining access to existing resources as well as technology essential for completing the user's needs in the software within the budget and schedule constraints.

In the technical feasibility, the following tasks are done:

- Assists in assessing the stability of the technology employed.
- Is the required technology available?
- Or are the proposed functionalities viable to integrate with current/available technology?
- Examine the technical talents and talents of software development team members.
- It looks at the technical viability of each implementation option.

Importance of technical feasibility:

- It studies and assesses whether or not the solution is supported by existing technology.
- The analyst assesses if existing technological resources should be updated or new ones introduced to meet the new needs.
- It assures that the candidate system responds appropriately to the extent to which it can support the technological upgrade.

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2. Operational/ Behavioral Feasibility:

The behavioral feasibility is analyzed to determine whether or not the people or workers in the firm will utilize it.

Operational feasibility is based on human resources and determines whether or not the program will work after it has been properly created.

The operational feasibility performs the following tasks:

- The operational feasibility aids in deciding whether or not the solution proposed by the software development team is acceptable.
- Operational feasibility also aids in establishing if the issues foreseen in the user requirements are a high priority.
- It determines whether the program is user-friendly or not
- Its interface should be simple enough that everyone can utilize it.
- Assists in determining if the organization is pleased with the alternative options presented by the software development team members.

Importance of operational feasibility:

- It assesses if the system is functional once it has been built and installed.
- It assures that management will support the proposed system and will operate in the modern organizational setting.
- It assesses whether users will be impacted and if they will accept changed or new business processes that influence the potential system advantages.
- It also assures that the candidate system's computing resources and network architecture are operational.

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Importance of behavioral feasibility:

- It assesses and predicts user attitudes or behaviors regarding the creation of a new system.
- It aids in deciding if the system necessitates extra effort to educate, retrain, transfer, and modify employee job status on new business practices.

3. Economic Feasibility:

Economic feasibility determines if the necessary software has the ability to provide financial rewards for a company.

This sort of research includes the cost of the software development team, the cost of the study involved in completing a feasibility study, and the expected cost of software and hardware.

Only if software focuses on the concerns described below can it be regarded viable:

- The expense of training, development team, software, and hardware.

- The cost of undertaking software research activities such as requirements analysis and requirements elicitation.
- The cost of developing software to provide long-term benefits for a company.
- It is also studied if the program can be produced within the financial constraints.
- Because some clients demand a lot of functionality in their program but are unwilling to spend the appropriate money.

Importance of Economic Feasibility:

- It assesses the efficacy of a potential system using the cost/benefit analysis approach.
- It displays the net advantage of the candidate system in terms of organizational benefits and expenses.
- The primary goal of the Economic Feasibility Study is to evaluate the economic needs of a candidate system before committing investment capital to a project.
- It selects the alternative that maximizes the organization's net value by returning cash as soon as possible and with the least amount of risk affiliated with constructing the candidate system.

4. Scheduling feasibility:

It is the most significant research for determining the project's success.

If the projects are not finished by the deadline, they will all fail.

An organization can estimate the time necessary to complete a project through scheduling feasibility.

The time required for the creation of the system is calculated based on the requirements.

When all of these components are in order, manpower is assigned to their respective jobs, and every effort is made to complete the assignment before the deadline.

Importance of Scheduling feasibility:

- It guarantees that the project is finished within the time frame or schedule specified.
- It also evaluates and confirms whether or not the project's deadlines are feasible.

Steps Involved in Feasibility Study:

When doing a feasibility study, the following steps are followed:

1. Create a project team and choose a project leader.
2. Create system flowcharts.
3. Determine the shortcomings of the present system and define targets.
4. List the alternative solutions or probable candidate systems for meeting objectives.
5. Determine the feasibility of each choice, including technical feasibility, operational feasibility, and so on.
6. Each proposed system's performance and cost-effectiveness should be weighed.

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7. Rank the other options and choose the best candidate system.
8. Prepare a system proposal for the final project direction and submit it to management for approval.

Advantages of conducting a feasibility study:

- Improves project team concentration
- Aids in discovering new prospects
- Provides essential information for decision making
- Narrows business choices
- Increases the possibility of success by analyzing a variety of parameters.

System Analyst:

A Systems analyst is a person who is overall responsible for development of a software. He is the computer professional charged with analyzing, designing and implementing computer-based information systems. He is the crucial interface among users, programmers and MIS managers. A Systems analyst can be defined as follows:

A Systems analyst is a computer specialist who translates business problems and requirements into information systems and acts as liaison between IS (Information Systems) department and rest of the organization.

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Roles of a Systems Analyst:

The Systems analyst performs the following roles during various phases of SDLC. He works as a:

- **Problem Investigator:** He visits the various departments of the organization and interviews the users. He analyses the problems of the current system and collects their new requirements. The analyst initially works as an investigator by extracting the real problems of the users.
- **Problem Solver:** The analyst solves the problems of the current system faced by the users. He determines how people, method and technology can improve the current system. After feasibility analysis, he presents the system proposal to the management.
- **Systems Designer:** The analyst creates a detailed physical (current) and logical (proposed) design of the system.
- **Motivator:** The analyst motivates users to participate in development and implementation of the proposed system. This helps to understands user's feelings about the proposed system. The analyst interprets the thoughts of users and hence, draws conclusions. He appeals management and users for getting the support in development and implementation of the proposed system.
- **Project Manager:** The analyst monitors the development and implementation of software in relation to quality, cost and time. He works with the project leader for managing the

project properly. For development of small systems, the Systems analyst is generally the project leader.

Systems Planning and Initial Investigation:

In the system planning and initial investigation, the main objective is to identify the most important requirements for the system. It is an important step to identify the relevant system requirements for the system as a whole, for the subsystems, and for the system components. Since requirements may have been identified also in other studies (for example, in the RIT), System planning and the initial investigation is a consolidation of the relevant requirements for the system.

The system planning and initial investigation provide the following information:

Step 1: Identification of the goals and requirements of the system to be designed is one of the most important and difficult tasks in computer-aided software engineering (CASE). For this reason, many CASE tools support a set of goals and requirements analysis techniques. In this paper, we propose a method for identifying the goals and requirements of a system based on the user's expectations. We also describe an experimental study that demonstrates the effectiveness of our method.

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Step 2: Definition of the most important requirements for the system as a whole, for the subsystems, and for the system components. The requirements' engineering team is responsible for determining the set of requirements that are associated with each quality attribute.

Step 3: Definition of the architecture of the system in terms of its subsystems and components. The architecture of the system is determined by the architecture of its subsystems and components. The architecture of each subsystem and component is determined by their design and development teams. The architecture of the system evolves throughout the life cycle of the system.

Step 4: Cost analysis of the requirements. Requirements engineering can perform cost/benefit analysis to select the most critical requirements, i.e. those that need to be included in the system. Cost analysis can be applied to both the cost of implementing the requirements in the system and the cost of failure of the system.

The first phase of the system development life cycle is the initiation phase. This phase begins with the initiation activities and ends with the establishment of the program office and the completion of the preliminary system specification. During the initiation phase, the management decides on the scope and goals of the system development, and the program office, which is responsible for managing the development of the system, is established.

Strategies for Determining Information Requirement:

In order to collect information so as to study existing system and to determine information requirement, there are different strategies, which could be used for a purpose. These strategies are discussed below.

Interview

The interview is a face-to face method used for collecting the required data. In this method, a person (the interviewer) asks questions from the other person being interviewed may be formal or informal and the questions asked may be structured or unstructured. The interviewer must plan the interview and should have clear understanding of issues.

Questionnaire

A questionnaire is a term used for almost used for almost any tool that has questions to which individuals respond. The use of questionnaires allows analysts to collect information about various aspects of a system from a large number of persons. The questionnaire may contain structured or unstructured questions. The use of a standardized questionnaire gives more reliable data than other fact-finding techniques.

Record Review

Record review is also known as review of documentation. Its main purpose is to establish quantitative information regarding volumes, frequencies, trends, ratios, etc. In record review, analysts examine information that has been recorded about the system and its users. Procedures, manuals and forms are useful sources for the analyst to study the existing systems. The main limitation of this approach is that the documentation on the existing system may not be complete and up-to-date.

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Observation

Another information-gathering tool used in system studies is observation. It is the process of recognizing and noticing people, objects and occurrences to obtain information. Observation allows analysts to get information, which is difficult to obtain by any other fact-finding method. This approach is most useful when analysts need to observe the way documents are handled, processes are carried out and whether the specified steps are actually followed. This technique is time consuming and costly. Electronic observation and monitoring methods are being used these days because of their speed and efficiency.

Problem Definition Process:

Problem Definition Process is a tool that can be used to compare different problems, for example, within an organization or in a project, and can highlight general problems that were previously unclear. What initially appears to be the whole problem is often only a part or a symptom of a larger, deeper, and more complex issue.

The problem definition process helps to visualize the problem, by presenting it from different angles and to help define the broader context and associated problems.

Implementing the Problem Definition Process is especially effective when all stakeholders are involved. In this way, one can develop valuable insights about the size of the problem and its possible consequences.

Steps in the Problem Definition Process:

1. Describe the vision

Start by describing how things should work in the most ideal situation. Before the problem is described or treated, a few sentences should be used to explain what the situation would be if the problem did not exist.

2. Describe the problem

Accurately describing the problem is often half the work. Summarise the problem briefly and position the key information at the beginning of the single-phrase problem definition.

3. Describe the financial consequences of the problem

Once the problem is defined, it must be explained why it is a problem. After all, nobody has the means to solve every small problem.

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Project initiation:

Project initiation is the first step in starting a new project. During the project initiation phase, you establish why you're doing the project and what business value it will deliver—then use that information to secure buy-in from key stakeholders.

The project initiation process: 4 steps to get started

1. Create a project charter or business case

In this first step, you demonstrate why your project is necessary and what benefit it will bring. You can do this with either a project charter or a business case. These two documents follow the same fundamental idea, since they're both used to outline key project details and pitch your initiative to stakeholders.

The main difference between them is scope—you can use a project charter for smaller initiatives, and a business case for larger projects that require significant resources.

A project charter demonstrates why your project is important, what it will entail, and who will work on it—all through the following elements:

Why: The project's goals and purpose

What: The scope of the project, including an outline of your project budget

Who: Key stakeholders, project sponsors, and project team members

2. Identify key stakeholders and pitch your project

Next up, determine who needs to sign off on your project charter or business case. This includes key stakeholders who have a say in the outcome of your project—for example, executive leaders, project sponsors, or cross-functional teams that you're requesting budget or resources from.

Aside from key stakeholders, now is also a good time to identify other individuals who may be impacted by or interested in your project. They may also be able to provide additional support in the form of insight or resources.

Getting stakeholder buy-in during the initiation phase not only helps you secure approval, support, and resources—it also increases project visibility and prevents costly roadblocks later on in the project life cycle.

3. Run a feasibility study

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At this point you've pitched your project, demonstrating that it adds value and fits with your company's overall strategic plan. Now, it's time to run a feasibility study to confirm your project is possible with the resources you have at your disposal.

Simply put, a feasibility study evaluates whether your project could be successful. It answers the following questions:

- Does my team have the required resources to complete this project?
- Will there be enough return on investment (ROI) to make this project worth pursuing?

If you can answer yes to both questions, you have a solid rationale to move forward with your project. If your feasibility study concludes that you don't have enough budget or resources, you've created a strong case to go back to stakeholders and request more. And if your project's ROI isn't up to snuff, you can use that data to tweak your project plan—or pursue a different opportunity entirely.

4. Assemble your team and tools

Now that your project is approved and its feasibility proven, you can finally start to assemble your team, workspace, and tools. Here are some pointers to get you started:

- A good team can go a long way in making your project a success, and it can take time to find people with the right experiences and skills. It's a good idea to start this process as soon as

possible once your project is confirmed—especially if you need to hire new employees or onboard contractors.

- Consider how you want to organize your team structure. For example, do you want a simple hierarchical structure with team members reporting into single team leads—or does it make more sense to divide your team by geographical region?
- Where you work can influence how you work. If you're planning to manage your project remotely, make sure you have the right infrastructure set up to manage a virtual team. And if your team will work onsite, keep in mind that you may need to request office space well in advance of your project kick-off meeting.
- Choose the right tools. Consider how your team will work together on daily tasks—for example, will you use email, Google docs, or more robust project management software

Project planning:

Project planning is the process of defining project deliverables, tasks, work breakdown structure, and schedule.

It also involves estimating costs and resources needed to complete the project, managing risks to ensure successful completion of the project on time and budget and communicating plans and progress throughout the organization.

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Steps of Project Planning:

1. How to Create and Analyze Business Case

The business case is the reason why your organization needs to carry out the project. It should outline the problem, such as a lack of repeat customers or a day longer supply line than competitors and describe how this will be solved and how much monetary benefit should accrue to the organization once the project is completed.

2. How to Identify and Meet Relevant Stakeholders for Approval

Identifying project stakeholders means listing anyone who will be affected by your project, so includes the public and government regulatory agencies. For the project planning phase however, it should only be necessary to meet those who will directly decide whether the project will happen or not.

3. Define Project Scope

The scope of your project is an outline of what it is and isn't setting out to achieve. It is necessary to delineate the boundaries of your project to prevent "scope creep", i.e. your resources going towards something that's not in your project's goals.

4. Set Goals and Objectives

The goals and objectives for your project will build on the initial objectives outlined in the business plan. At this step you will give finer detail to the initial broad ideas and set them in a project charter as reference points for your project as it proceeds.

5. Determine Deliverables

Deliverables are the concrete results that your project produces. One of the most important project planning steps is to decide on what these deliverables will be and who is responsible for both producing and receiving them.

6. Create Project Schedule and Milestones

Your project schedule is a very important document that outlines when different tasks of a project are due to begin and end, along with major measurement milestones. It will be referred to when measuring project progress. It will be available to all stakeholders and should be adhered to as closely as possible.

7. Assignment of Tasks

Within your team everyone should know what their role is and who is responsible for different elements of the project. Assigning tasks clearly should remove any uncertainty about roles and responsibilities on your team.

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8. Carry Out Risk Assessment

Having a functional risk management plan means performing a strong assessment at the planning stage of the project. All potential risks should be identified along with their possible effect on the project and likelihood of occurring.

Background analysis:

The background analysis is also referred to as a situation analysis, and is the nuts and bolts of the marketing plan. This analysis sets the scene for pretty much everything that follows it and, if done well, will provide your marketing plan, and business for that matter, with a solid foundation.

Once the project is initiated, the analyst begins to learn about the setting, the existing system, and the physical processes related to the revised system.

Fact Analysis:

A fact analysis isolates the relevant facts and helps to expose the legal question and issue(s). This skill takes practice! The PEC (Parties, Events, Claims) method of factual analysis is a helpful starting point.

As data are collected, they must be organized and evaluated and conclusions drawn for preparing a report to the user for final review and approval. Some of the tools available for data organization and analysis are input/output analysis, decision tables, and structure charts.

Review of Written Documents:

The documentation which is prepare to developed the new system it includes forms, records, reports, manuals etc. its organized & evaluated during the development of the system. This document helps in determining to what extends they are met by the present system. The day-to-day problems may have force to make the changes that are not reflected in the manual.

On–site Observation:

The other type of fact-finding method which is used by the system analyst is on-site observation. The purpose of on-site observation is to get a close study of the possible requirement for the system. On-site is the most difficult fact-finding techniques. It requests intrusion in to the user's area & can cause adverse reaction by the user staff if it is no handled properly.

Interview:

This method is used to collect the information from groups or individuals. Analyst selects the people who are related with the system for the interview.

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Questionnaire:

It is the technique used to extract information from number of people. The Questionnaire consists of series of questions framed together in logical manner.

Software Performance Engineering (SPE) is a systematic, quantitative approach to constructing software systems to meet performance objectives.

Performance Analysis:

Performance Analysis is the process of studying or evaluating the performance of a particular scenario in comparison of the objective which was to be achieved.

The performance analysis step consists of 3 basic steps:

1. Data Collection: It is a process by which data related to performance of a program is collected. They are generally collected in a file; it may be presented to a real user in a real time.

2. Data Transformation: It is applied often to reduce the volume of data. For example, a profile recording the minutes spent in each sub routine job on each processor might be transformed to

determine minutes spent in each subroutine on each processor and the standard deviation from this mean.

3. Data Visualization: Although data reduction techniques can recue the volume of data, it is often necessary to explore raw data. This process can benefit much more from the use of data visualization techniques.

Efficiency Analysis:

Efficiency concerns how to generate as much output with minimum input. Here is an indication that a system can be said to be inefficient:

- Much time is wasted on the activities of human resources, machines, or computers.
- Data is input or copied to excess.
- Data processed in excess.
- Information is generated in excess.
- Effort required for these tasks are too excessive.
- Material required for these tasks are too excessive.

Service Analysis:

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Service analysis is an important procedure that needs to be followed by any organization in order to understand the standard of service that is being provided by them. The service analysis documents serve as feedback from different consumers as well. This is a necessary process which allows any company to understand and improve the services provided by the company. This type of analysis is generally done in the form of a questionnaire that is provided both to the employees as well as the consumers.