Shiksha Mandal's

# G.S.College Of Commerce,Wardha

## Department of B.Com Computer Application

BCCA Part-III Sem-V

# System Analysis & Design

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# UNIT-II

**System Analysis- System Planning and The Initial Investigation-** Introduction, Bases For Planning in System Analysis, Initial Investigation.

**Information Gathering-** Introduction, What Kinds of Information Do We Need?, Where Does Information Originate?, Information Gathering Tools.

**The Tools Of Structured Analysis-** Introduction, What is Structured Analysis?, The Tools of Structured Analysis.

**Feasibility Study-** Introduction, System Performance Definition, Feasibility Study.

# UNIT-II

## System Analysis- System Planning And The Initial Investigation

### Bases for planning in System Analysis

- Planning information systems in business has become increasingly important during the past decade. First, information is now recognized as a vita resource and must be managed. It is equal in importance to cash, physical facilities and personnel.
- Second, more and more financial resources are committed to information systems. As computer systems are becoming integral to business operations, top management is paying more attention to their development.
- Third, there is a growing need for formal long-range planning with information systems that are complex, require months or years to build, use common data bases, or have a greater competitive edge.
- The objectives are to map out the development of major systems and reduce the number of small, isolated systems to be developed and maintained. Proper planning for information systems ensures that the role played by the system will be congruent with that of the organization.

# STRATEGIC MIS PLANNING

- Planning for information system development must be done within the framework of the organization's overall MIS plan. It may be viewed from two dimensions:
- The time horizon dimension specifies whether it is short range, which is tantamount to the MIS yearly plan, medium term, or long range.
- The focus dimension tells whether the primary concern is strategic, managerial or operational.
- Strategic (MIS) planning is an orderly approach that determines the basic objectives for the user to achieve, the strategic and polices needed to achieve the objectives and the tactical plans to implement the strategies. The first task in strategic planning is to set the MIS objectives and the results expected.
- Considerations of these objectives must deal with their fit with the organization's strategic plan, the types of systems and services to be offered, the role of users in system development, and the technology to be used. Once the MIS objectives are set, MIS policies are defined as a guideline to be used in carrying out strategy. MIS policies, in turn are translated into long range, medium range and short-range plans for implementation.

## INITIAL INVESTIGATION:

- In the system development life cycle is the identification of a need. This is a user's request to change, improve, or enhance an existing system. Because there is likely to be a stream of such requests, standard procedures must be established to deal with them.
- The initial investigation is one way of handling this. The objective is to determine whether the request is valid and feasible before a recommendation is reached to do nothing, improve or modify the existing system, or build a new one.
- The user's request identifies the need for change and authorizes the initial investigation.
- It may undergo several modifications before it becomes a written commitment. Once the request is approved, initiates a detailed user-oriented specification of system performance and analysis of the feasibility of the candidate system.

# INFORMATION GATHERING

## What kinds of information Do we Need?

### Information about the Firm

- Information about the organization's policies, goals, objectives, and structure explains the kind of environment that promotes the introduction of computer-based systems.
- Company policies are guidelines that determine the conduct of business. Policies are translated into rules and procedures for achieving goals.
- A statement of goals describes management's commitment to objectives and the direction system development will follow.
- Objectives are milestones of accomplishments towards achieving goals. Information from employee manuals, orientation chart, indicates management directions and orientation.
- The organization chart represents an achievement-oriented structure.
- It gathering information about the firm, the analyst should watch for the correspondence between what the organization claims to achieve and actual operations

## Information about user staff

- Another kind of information for analysis is knowledge about the people who run the present system-their job functions and information requirements, the relationships of their jobs to the existing system, and the interpersonal network that holds the user group together.
- The actually focusing on people's, authority relationships, job status and functions, information requirements and interpersonal relationships.
- Information of this kind highlights the organization chart and establishes a basis for determining the importance of the existing system for the organization.

## Information about Work Flow

- Work flow focuses on what happens to the data through various points in a system. This can be shown by a data flow diagram or a system flowchart.
- A data flow diagram represents the information generated at each processing point in the system and the direction it takes from source to destination.
- The information available from such charts explains the procedures used for performing tasks and work schedules.

**Where does information originate?**

Information is gathered from two principal sources: personnel or written documents from within the organization and from the organization's environment.

The primary external sources are:

1.vendors

2.Government documents

3.Newspapers and professional journals

**The primary internal sources are:**

1.Financial reports

2.Personal staff

3.Professional staff

4.system documentation or manuals

5.The user or user staff

6.Reports and transaction documents

## Information Gathering Tools:

- This means that the analyst must decide on the information gathering tool and how it must be used.
- Although there are no standard rules for specifying their use, an important rule is that information must be acquired accurately, methodically, under the right conditions, and with minimum interruption to user personnel.

## Review of Literature, Procedure, and Forms

- Therefore, as a first step, a search of the literature through professional references and procedures manuals, textbooks, company studies, government publications, or consultant studies may prove invaluable.
- The primary drawback of this search is time. Often it is difficult to get certain reports, publications may be expensive, and the information may be outdated due to a time lag in publication.
- Procedures manuals and forms are useful sources for the analyst.
- They describe the format and functions of the present system. Included in most manuals are system requirements that help determine how well various objectives are met.
- Up-to-date manuals save hours of information gathering time.
- Unfortunately, in many cases manuals do not exist or are seriously out of date.

**Ideal SRS Document should −**

- ❖ be complete, Unambiguous, and Jargon-free.
- ❖ specify operational, tactical, and strategic information requirements.
- ❖ solve possible disputes between users and analyst.
- ❖ use graphical aids which simplify understanding and design.
- ❖ There are various information gathering techniques −

**Interviewing:**

- ➢ The interview is a face to face interpersonal role situation in which a person called the interviewer asks a person being interviewed questions designed to gather information about a problem area.
- ➢ The interview is the oldest and most often used device for gathering information in systems work. It has qualities that behavioral and on-site observations do not possess. It can be used for two main purposes:(1)as an exploratory device to identify relations or verify information and (2) to capture information as it exists.
- ➢ Systems analyst collects information from individuals or groups by interviewing. The analyst can be formal, legalistic, play politics, or be informal; as the success of an interview depends on the skill of analyst as interviewer. Interview is considered a requirement, the interviewer might gain the respondent's time and attention, but cannot be certain of the accuracy of the information gathered during the interview.

## Unstructured Interview –

- The unstructured interview is a relatively nondirective information gathering technique. It allows respondents to answer questions freely in their own words.
- The responses are spontaneous rather than forced. They are self-revealing and personal rather than forced. They are self-revealing and personal rather than general and superficial.

## Structured Interview –

In the structured approach, the questions are presented with exactly the same wording and in the same order to all the subjects.

- It has standard questions which user need to respond in either close (objective) or open (descriptive) format. Structured interviews and questionnaires may differ in the amount of structuring of the questions. Questions may be either closed or open ended.

## Advantages of Interviewing

- This method is frequently the best source of gathering qualitative information.
- It is useful for them, who do not communicate effectively in writing or who may not have the time to complete questionnaire.
- Information can easily be validated and cross checked immediately.
- It can handle the complex subjects.
- It is easy to discover key problem by seeking opinions.
- It bridges the gaps in the areas of misunderstandings and minimizes future problems.
- Its flexibility makes the interview a superior technique for exploring areas where not much is known about to ask or how to formulate questions.
- It offers a better opportunity than the questionnaire to evaluate the validity of the information gathered.
- It is an effective technique for eliciting information about complex subjects and for probing the sentiments underlying expressed opinions.
- Many people enjoy being interviewed, regardless of the subject.

# Questionnaires

- In contrast to the interview is the questionnaire, which is term used for almost any tool that has questions to which individuals respond. It is usually associated with self-administered tools with items of the closed or fixed alternative type. This method is used by analyst to gather information about various issues of system from large number of persons.
- There are two types of questionnaires −
- **Open-ended Questionnaires** − It consists of questions that can be easily and correctly interpreted. They can explore a problem and lead to a specific direction of answer.
- **Closed-ended Questionnaires** − It consists of questions that are used when the systems analyst effectively lists all possible responses, which are mutually exclusive.

## Advantages of questionnaires

- It is very effective in surveying interests, attitudes, feelings, and beliefs of users which are not co-located.
- It is useful in situation to know what proportion of a given group approves or disapproves of a particular feature of the proposed system.
- It is useful to determine the overall opinion before giving any specific direction to the system project.
- It is more reliable and provides high confidentiality of honest responses.
- It is appropriate for electing factual information and for statistical data collection which can be emailed and sent by post.
- It is economical and requires less skill to administer than the interview. Unlike the interview, which generally questions one subject at time, a questionnaire can be administered to large numbers of individuals simultaneously.

# Observation

- This is a method of gathering information by noticing and observing the people, events, and objects. The analyst visits the organization to observe the working of current system and understands the requirements of the system.
- Another information gathering tool used in system studies is on-site observation. It is the process of recognizing and noting people, objects and occurrences to obtain information. The analyst's role is that of an information seeker who is expected to be detached.
- The major objective of on-site observation is to get as close as possible to the real system being studied. For this reason, it is important that the analyst is knowledgeable about the general makeup and activities of the system.

As an observer, the analyst follows a set of rules. While making observations, more likely to listen than talk and to listen with a sympathetic and genuine interest when information is conveyed.

When human observers are used, four alternative observation methods are considered:

**1.Natural or contrived:** A natural observation occurs in a setting such as the employee's place of work, a contrive observation is set up by the observer in a place like a laboratory.

**2. Obtrusive or unobtrusive:** An obtrusive observation takes place when the respondent knows is being observed, an unobtrusive observation takes place in contrived way such as behind a one-way mirror.

**3.Direct or indirect:** A direct observation takes place when the analyst actually observes the subject or the system at work.

In an indirect observation, the analysts uses mechanical devices such as cameras and videotapes to capture information.

**4.Structured or unstructured:** In a structured observation, the observer looks for and records a specific action such as the number of soups cans a shopper picks up before choosing one.

Unstructured methods place the observer in a situation to observer whatever might be pertinent at the time.

## Advantages

- It is a direct method for gleaning information.
- It is useful in situation where authenticity of data collected is in question or when complexity of certain aspects of system prevents clear explanation by end-users.
- It produces more accurate and reliable data.
- It produces all the aspect of documentation that are incomplete and outdate.

## What is Structured Analysis?

Structured analysis is a set of techniques and graphical tools allow the analyst to develop a new kind of system specifications that are easily understandable to the user. Analysts work primarily with their wits, pencil and paper.

Structured Analysis is a development method that allows the analyst to understand the system and its activities in a logical way. The traditional approach focuses on cost/benefit and feasibility analysis, project management, hardware and software selection and personnel considerations.

It is a systematic approach, which uses graphical tools that analyze and refine the objectives of an existing system and develop a new system specification which can be easily understandable by user.

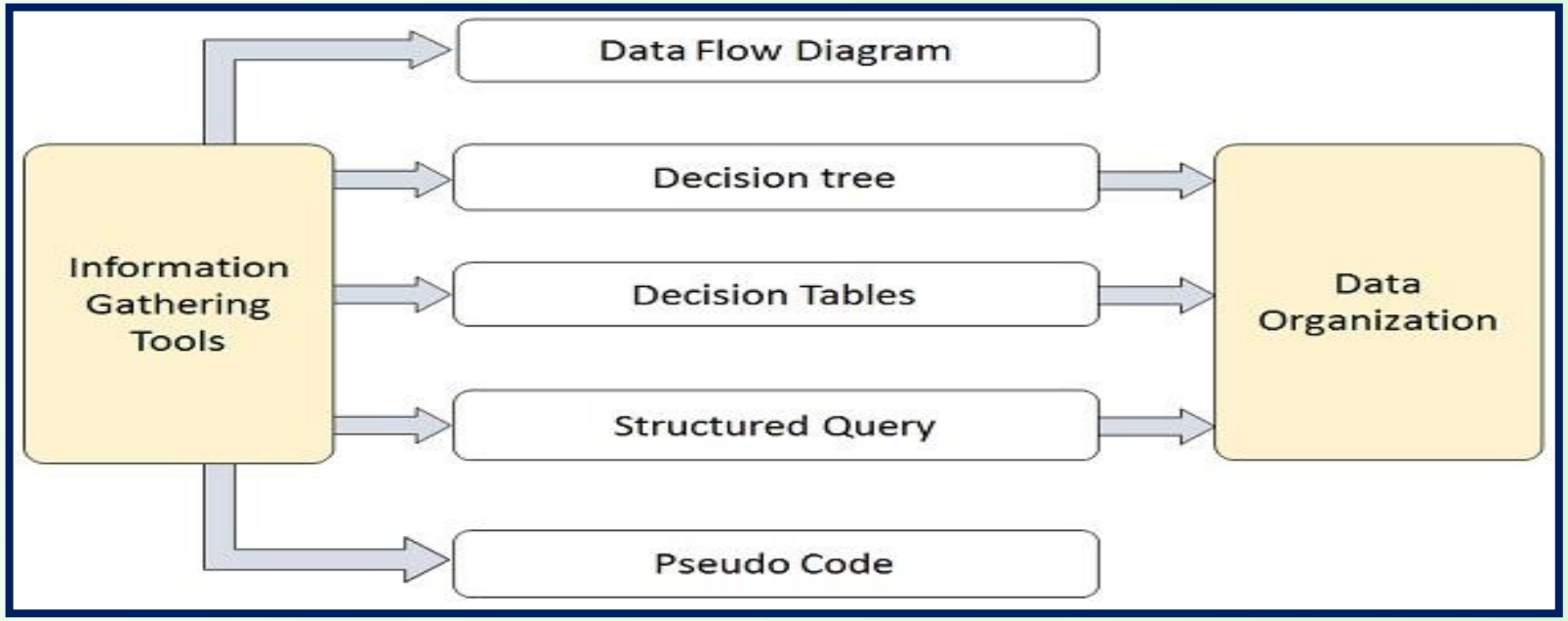
It has following attributes −

- It is graphic which specifies the presentation of application.
- It divides the processes so that it gives a clear picture of system flow.
- It is logical rather than physical i.e., the elements of system do not depend on vendor or hardware.
- It is an approach that works from high-level overviews to lower-level details.

## Structured Analysis Tools

During Structured Analysis, various tools and techniques are used for system development. They are −

- ❖ Data Flow Diagrams
- ❖ Data Dictionary
- ❖ Decision Trees
- ❖ Decision Tables
- ❖ Structured English
- ❖ Pseudo code



# Data Flow Diagram (DFD)

A DFD, also known as a “bubble chart”, has the purpose of clarifying system requirements and identifying major transformations that will become programs in system design. So, it is the starting point of the design phase that functionally decomposes the requirements specification down to the lowest level of detail. A DFD consists of a series of bubbles joined by lines. The

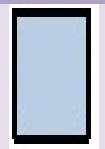
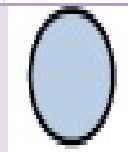
- It is a technique developed by Larry Constantine to express the requirements of system in a graphical form.
- It shows the flow of data between various functions of system and specifies how the current system is implemented.
- It is an initial stage of design phase that functionally divides the requirement specifications down to the lowest level of detail.
- Its graphical nature makes it a good communication tool between user and analyst or analyst and system designer.
- It gives an overview of what data a system processes, what transformations are performed, what data are stored, what results are produced and where they flow.

# Basic Elements of DFD

DFD is easy to understand and quite effective when the required design is not clear and the user wants a notational language for communication. However, it requires a large number of iterations for obtaining the most accurate and complete solution.

However, it requires a large number of iterations for obtaining the most accurate and complete solution.

The following table shows the symbols used in designing a DFD and their significance −

| Symbol Name | Symbol | Meaning |
|---|---|---|
| Square |  | Source or Destination of Data |
| Arrow |  | Data flow |
| Circle |  | Process transforming data flow |
| Open Rectangle |  | Data Store |

## Types of DFD

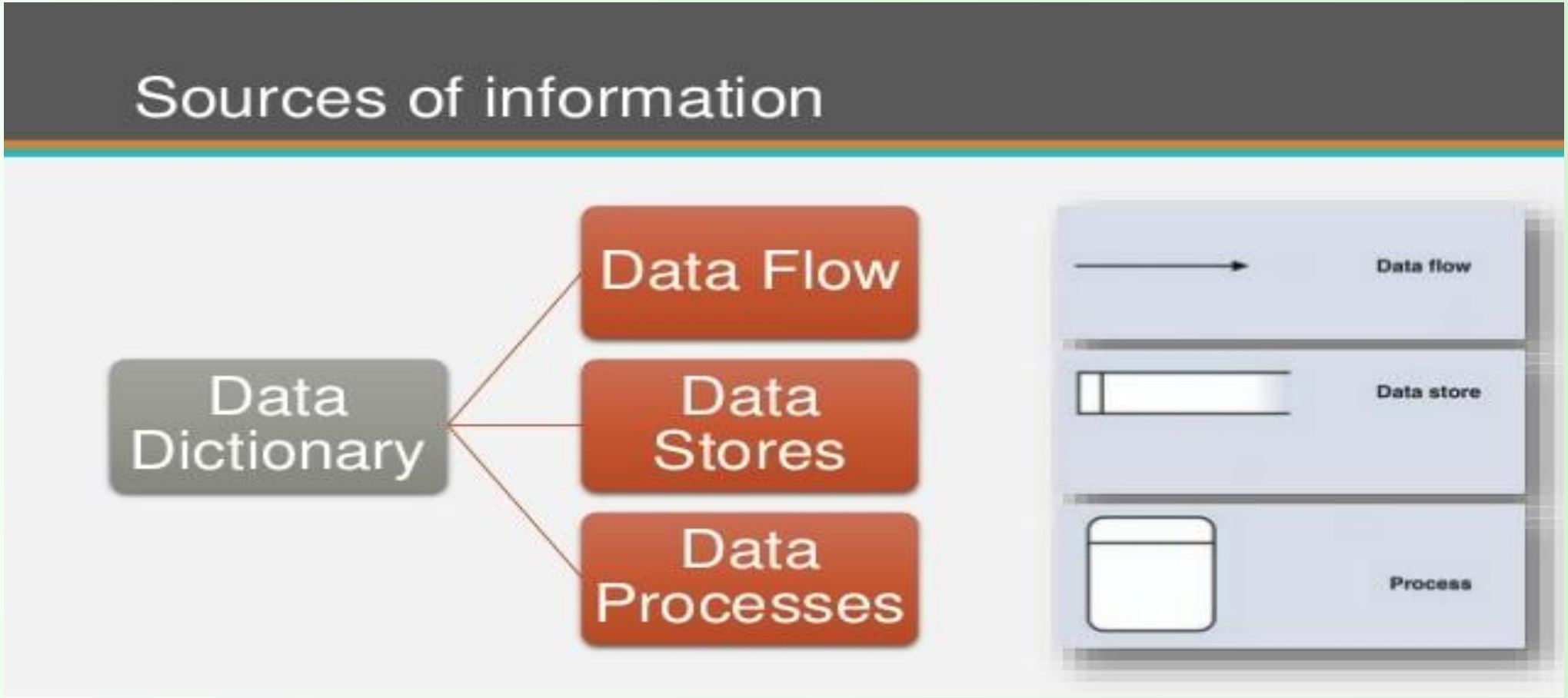
DFDs are of two types: Physical DFD and Logical DFD. The following table lists the points that differentiate a physical DFD from a logical DFD.

| Physical DFD | Logical DFD |
|---|---|
| It is implementation dependent. It shows which functions are performed. | It is implementation independent. It focuses only on the flow of data between processes. |
| It provides low level details of hardware, software, files, and people. | It explains events of systems and data required by each event. |
| It depicts how the current system operates and how a system will be implemented. | It shows how business operates; not how the system can be implemented. |

# Data Dictionary

- A Data Dictionary is a collection of names, definitions, and attributes about data elements that are being used or captured in a database, information system, or part of a research project.
- It describes the meanings and purposes of data elements within the context of a project, and provides guidance on interpretation, accepted meanings and representation.
- A Data Dictionary also provides metadata about data elements. The metadata included in a Data Dictionary can assist in defining the scope and characteristics of data elements, as well the rules for their usage and application.
- A data dictionary is a structured repository of data elements in the system. It stores the descriptions of all DFD data elements that is, details and definitions of data flows, data stores,, and the processes.
- A data dictionary improves the communication between the analyst and the user. It plays an important role in building a database. Most DBMSs have a data dictionary as a standard feature. For example, refer the following table –

Data Dictionary provides **all information about names** that are used in system models. Data Dictionary also provides information about entities, relationships, and attributes that are present in system model. As a part of structured analysis and design tool, implementation of a data dictionary is done.



# Data Dictionary

Data Dictionary outlining a Database on Driver Details in NSW

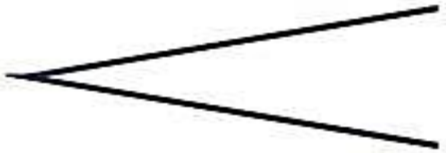
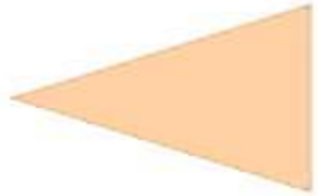
| Field Name | Data Type | Data Format | Field Size | Description | Example |
|---|---|---|---|---|---|
| License ID | Integer | NNNNNN | 6 | Unique number ID for all drivers | 12345 |
| Surname | Text | | 20 | Surname for Driver | Jones |
| First Name | Text | | 20 | First Name for Driver | Arnold |
| Address | Text | | 50 | First Name for Driver | 11 Rocky st Como 2233 |
| Phone No. | Text | | 10 | License holders contact number | 0400111222 |
| D.O.B | Date / Time | DD/MM/YYYY | 10 | Drivers Date of Birth | 08/05/1956 |

| Sr.No. | Data Name | Description | No. of Characters |
|---|---|---|---|
| 1 | ISBN | ISBN Number | 10 |
| 2 | TITLE | title | 60 |
| 3 | SUB | Book Subjects | 80 |
| 4 | ANAME | Author Name | 15 |

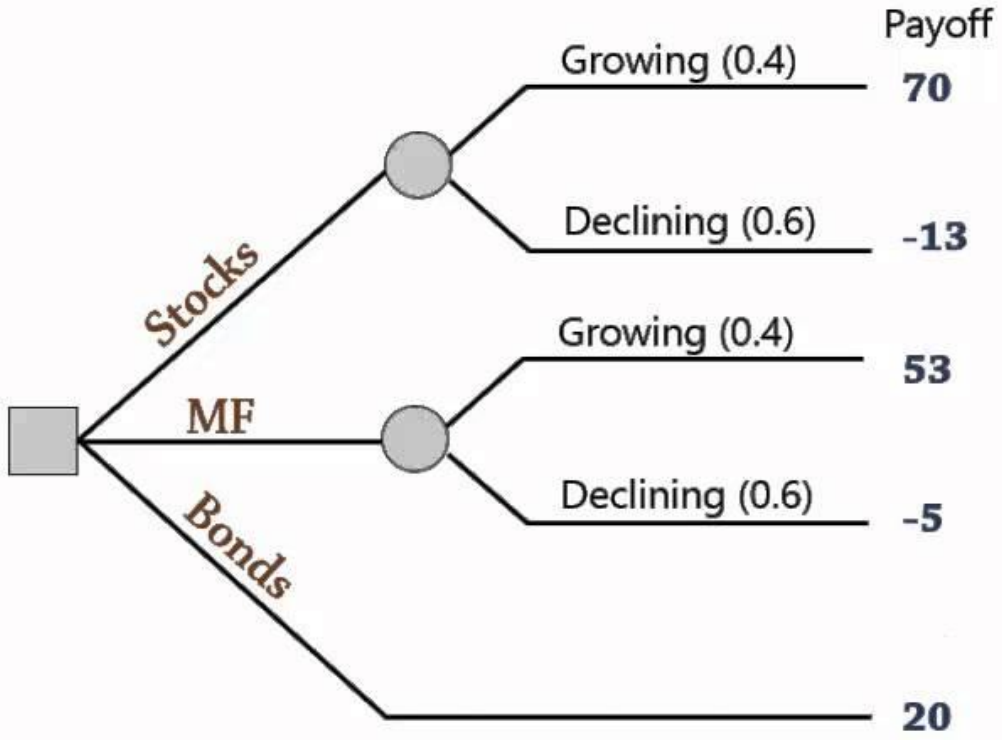
# Decision Tree

- A **decision tree** is a decision support tool that uses a tree-like model of decisions and their possible consequences, including chance event outcomes, resource costs, and utility.
- It is one way to display an algorithm that only contains conditional control statements.
- Decision trees are a method for defining complex relationships by describing decisions and avoiding the problems in communication.
- A decision tree is a diagram that shows alternative actions and conditions within horizontal tree framework. Thus, it depicts which conditions to consider first, second, and so on.
- Decision trees depict the relationship of each condition and their permissible actions.
- A square node indicates an action and a circle indicates a condition. It forces analysts to consider the sequence of decisions and identifies the actual decision that must be made.

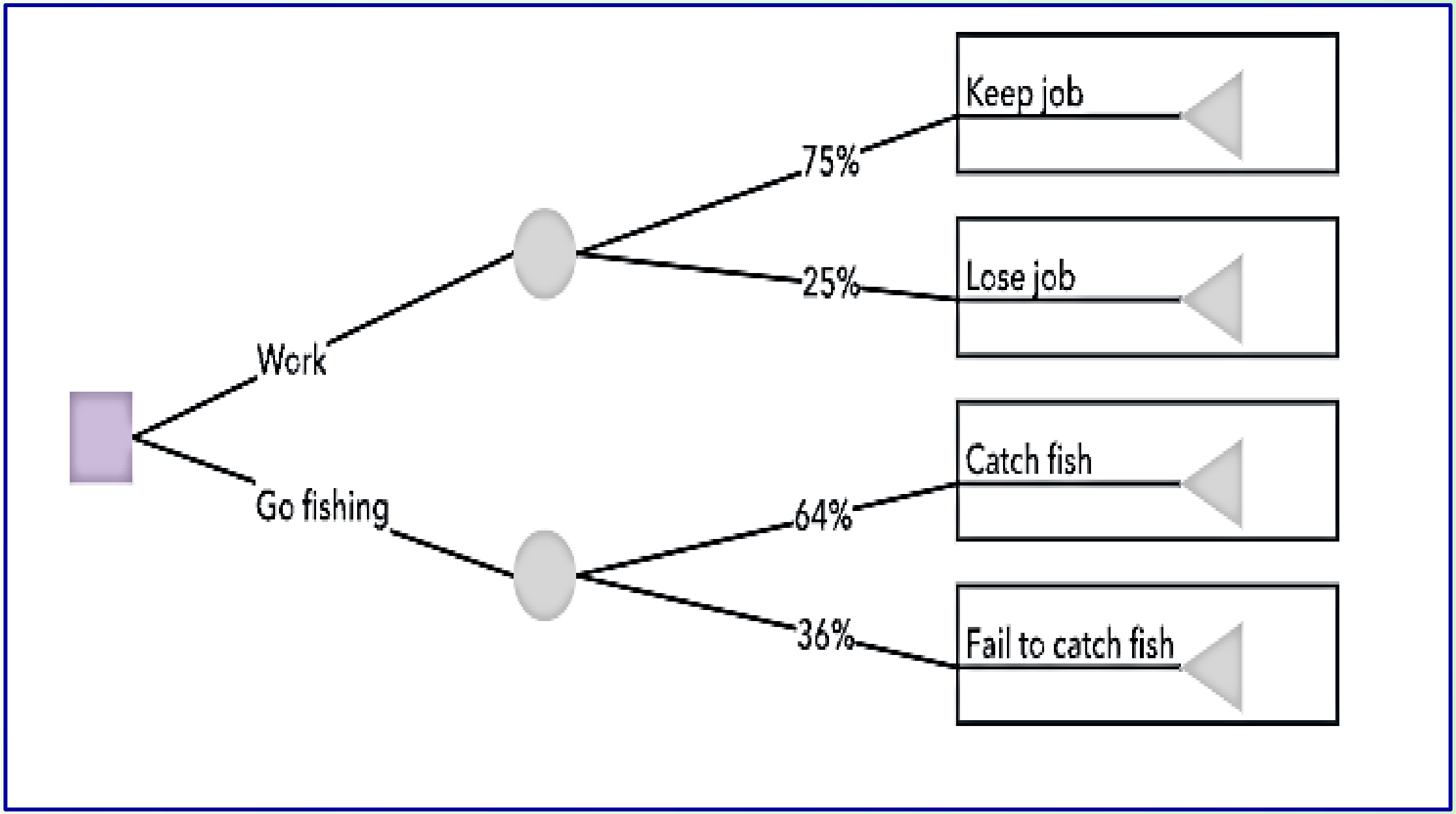
- A decision tree is a map of the possible outcomes of a series of related choices.
- It allows an individual or organization to weigh possible actions against one another based on their costs, probabilities, and benefits.
- They can can be used either to drive informal discussion or to map out an algorithm that predicts the best choice mathematically.
- A decision tree typically starts with a single node, which branches into possible outcomes. Each of those outcomes leads to additional nodes, which branch off into other possibilities. This gives it a treelike shape.
- There are three different types of nodes: chance nodes, decision nodes, and end nodes. A chance node, represented by a circle, shows the probabilities of certain results.
- A decision node, represented by a square, shows a decision to be made, and an end node shows the final outcome of a decision path.

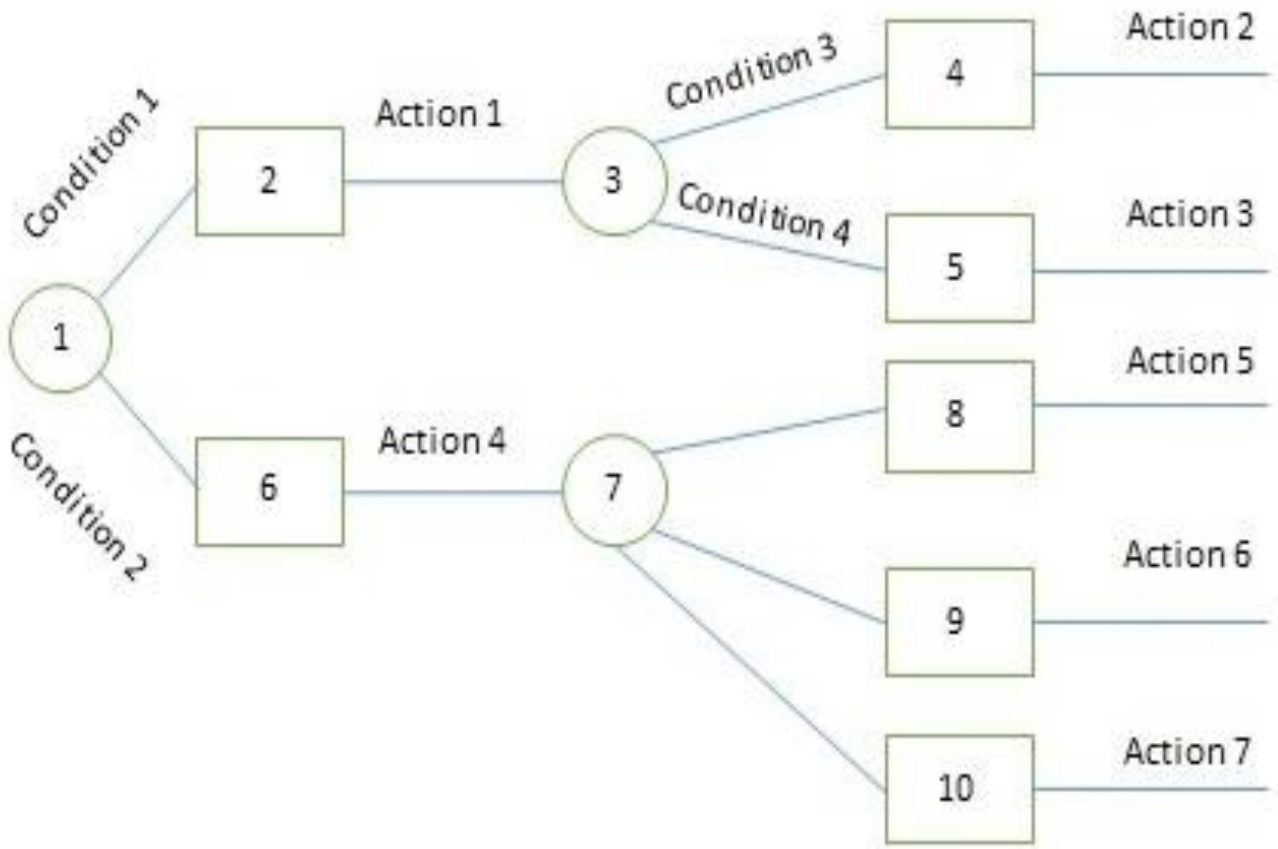
| Shape | Name | Meaning |
| --- | --- | --- |
|  | Decision node | Indicates a decision to be made |
|  | Chance node | Shows multiple uncertain outcomes |
|  | Alternative branches | Each branch indicates a possible outcome or action |
|  | Rejected alternative | Shows a choice that was not selected |
|  | Endpoint node | Indicates a final outcome |

# Decision Tree



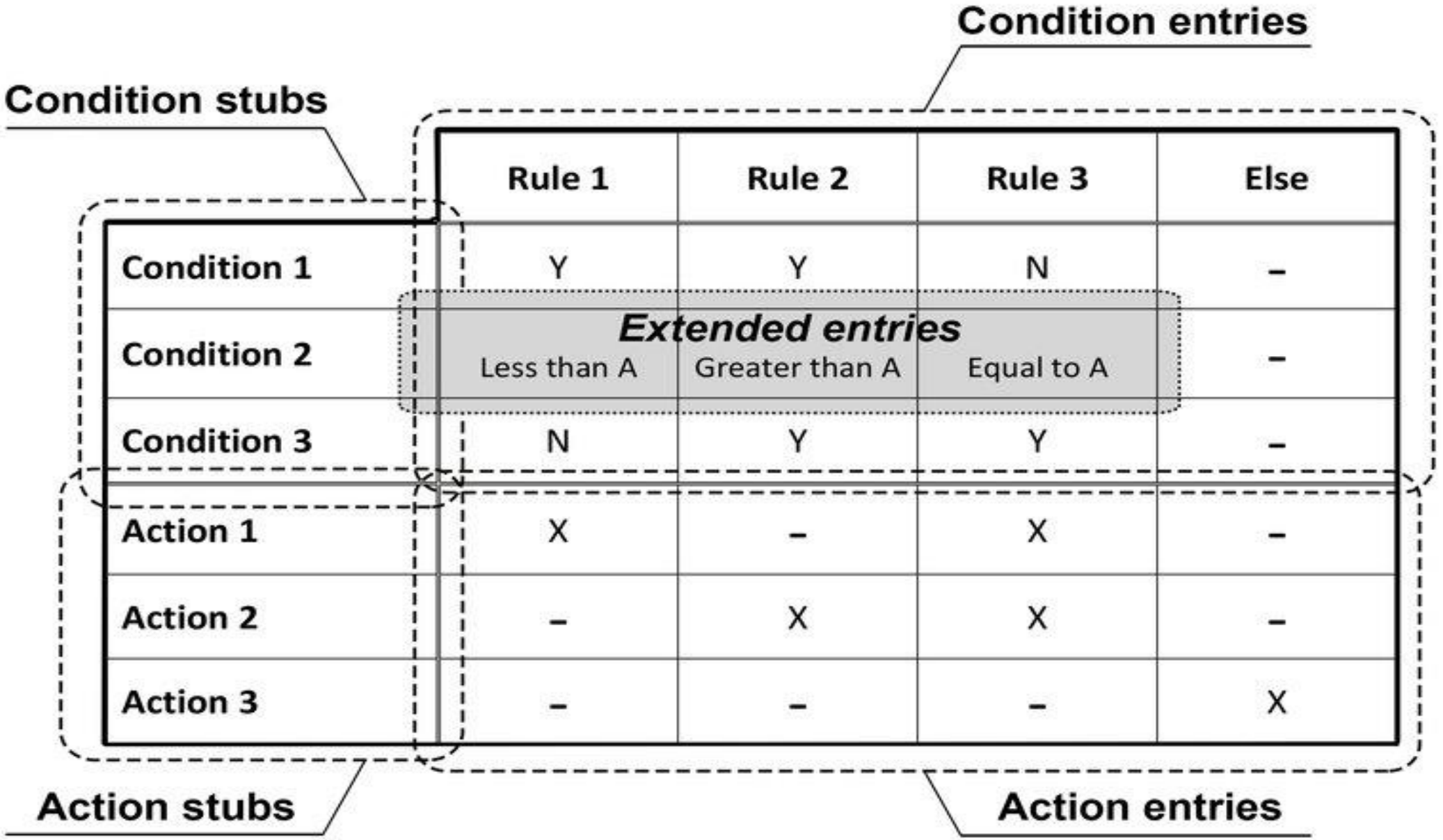

| Alternatives | Growing | Declining |
|---|---|---|
| *Stocks* | 70 | -13 |
| *Mutual Funds* | 53 | -5 |
| *Bonds* | 20 | 20 |
| *Probability* | 0.4 | 0.6 |


Work
Go fishing
75%
25%
64%
36%
Keep job
Lose job
Catch fish
Fail to catch fish


Condition 1
Action 1
Condition 3
Action 2
2
3
4
1
Condition 4
Action 3
5
Action 5
8
Action 4
6
7
Condition 2
Action 6
9
Action 7
10

# Decision Tables

- Major drawback of a decision tree is the lack of information in its format to tell us what other combinations of conditions to test. This is where the decision table is useful.
- A decision table is a table of contingencies for defining a problem and the actions to be taken. It is a single representation of the relationships between conditions and actions.
- Decision tables are a method of describing the complex logical relationship in a precise manner which is easily understandable.
- It is useful in situations where the resulting actions depend on the occurrence of one or several combinations of independent conditions.
- It is a matrix containing row or columns for defining a problem and the actions.
- A decision table consists of two parts : stub and entry. The stub part is divided into an upper quadrant called the condition stub and a lower quadrant called the action stub. The entry part is also divided into an upper quadrant called the condition entry and lower quadrant called the action entry.


Condition entries
Condition stubs
Rule 1
Rule 2
Rule 3
Else
Condition 1
Y
Y
N
–
Extended entries
Less than A
Greater than A
Equal to A
Condition 2
–
Condition 3
N
Y
Y
–
Action 1
X
–
X
–
Action 2
–
X
X
–
Action 3
–
–
–
X
Action stubs
Action entries

| Sr.No | Elements | Location | Definition |
|---|---|---|---|
| 1 | Condition stub | Upper left quadrant | Sets forth in question form the condition that may exist |
| 2 | Action stub | Lower left quadrant | Outlines in narrative form the action to be taken to meet each condition |
| 3 | Condition entry | Upper right quadrant | Provides answers to questions asked in the condition stub quadrant |
| 4 | Action entry | Lower right quadrant | Indicates the appropriate action resulting from the answers to the conditions in the condition entry quadrant. |

- To express the program logic we can use a limited-entry decision table consisting of 4 areas called the *condition stub*, *condition entry*, *action stub* and the *action entry*:

Condition entry

| | Rule1 | Rule2 | Rule3 | Rule4 |
|---|---|---|---|---|
| Condition1 | Yes | Yes | No | No |
| Condition2 | Yes | X | No | X |
| Condition3 | No | Yes | No | X |
| Condition4 | No | Yes | No | Yes |
| Action1 | Yes | Yes | No | No |
| Action2 | No | No | Yes | No |
| Action3 | No | No | No | Yes |

Condition stub

Action stub

Action Entry

| CONDITIONS | Rule 1 | Rule 2 | Rule 3 | Rule 4 |
|---|---|---|---|---|
| **Advance payment made** | Y | N | N | N |
| **Purchase amount = Rs 10,000/-** | - | Y | Y | N |
| **Regular Customer** | - | Y | N | - |
| **ACTIONS** | | | | |
| **Give 5% discount** | X | X | - | - |
| **Give no discount** | - | - | X | X |

# Components of a Decision Table

**Condition Stub** − It is in the upper left quadrant which lists all the condition to be checked.

**Action Stub** − It is in the lower left quadrant which outlines all the action to be carried out to meet such condition.

**Condition Entry** − It is in upper right quadrant which provides answers to questions asked in condition stub quadrant.

**Action Entry** − It is in lower right quadrant which indicates the appropriate action resulting from the answers to the conditions in the condition entry quadrant.

❖The entries in decision table are given by Decision Rules which define the relationships between combinations of conditions and courses of action. In rules section,

❖Y shows the existence of a condition.

❖N represents the condition, which is not satisfied.

❖A blank - against action states it is to be ignored.

❖X (or a check mark will do) against action states it is to be carried out.

❖For example, refer the following table −

# Structured English

When the process logic involves formulas or iteration, or when structured decisions are not complex, an appropriate technique for analyzing the decision process is the use of structured English.

•As the name implies, structured English is based on

•(1) structured logic, or instructions organized into nested and grouped procedures, and

•(2) simple English statements such as add, multiply, and move.

•A word problem can be transformed into structured English by putting the decision rules into their proper sequence and using the convention of IF-THEN-ELSE statements throughout.


# Structured English

- **Structured English** is the use of the English language with the syntax of structured programming to communicate the design of a computer program to non-technical users by breaking it down into logical steps using straightforward English words.
- Structured English gives aims to get the benefits of both the programming logic and natural language: program logic helps to attain precision, whilst natural language helps with the familiarity of the spoken word.
- Structure English is derived from structured programming language which gives more understandable and precise description of process. It is based on procedural logic that uses construction and imperative sentences designed to perform operation for action.
- It is best used when sequences and loops in a program must be considered and the problem needs sequences of actions with decisions.
- It does not have strict syntax rule. It expresses all logic in terms of sequential decision structures and iterations.

# Writing Structured English

- To write structured English, you may want to use the following conventions:
- •**1.** Express all logic in terms of one of these four types: sequential structures, decision structures, case structures, or iterations
- •**2.** Use and capitalize accepted keywords such as IF, THEN, ELSE, DO, DO WHILE, DO UNTIL, and PERFORM.
- •**3.** Indent blocks of statements to show their hierarchy (nesting) clearly.
- •**4.** When words or phrases have been defined in a data dictionary, underline those words or phrases to signify that they have a specialized, reserved meaning.
- •**5.** Be careful when using "and" and "or," and avoid confusion when distinguishing between "greater than" and "greater than or equal to" and like relationships. "A and B" means both A and B; "A or B" means either A or B, but not both.

| Structured English Type | Example |
|---|---|
| Sequential Structure<br>A block of instructions in which no branching occurs | Action #1<br>Action #2<br>Action #3 |
| Decision Structure<br>Only IF a condition is true, complete the following statements; otherwise, jump to the ELSE | IF Condition A is True<br>THEN implement Action A<br>ELSE implement Action B<br>ENDIF |
| Case Structure<br>A special type of decision structure in which the cases are mutually exclusive (if one occurs, the others cannot) | IF Case #1 implement Action #1<br>ELSE IF Case #2<br>Implement Action #2<br>ELSE IF Case #3<br>Implement Action #3<br>ELSE IF Case #4<br>Implement Action #4<br>ELSE print error<br>ENDIF |
| Iteration<br>Blocks of statements that are repeated until done | DO WHILE there are customers.<br>Action #1<br>ENDDO |

# A Structured English Example

The following example demonstrates how a spoken procedure for processing medical claims is transformed into structured English

•We process all our claims in this manner.

•First, we determine whether the claimant has ever sent in a claim before; if not, we set up a new record. The claim totals for the year are then updated.

•Next, we determine if a claimant has policy A or policy B, which differ in deductibles and copayments (the percentage of the claim claimants pay themselves). For both policies, we check to see if the deductible has been met ($100 for policy A and $50 for policy B).

•If the deductible has not been met, we apply the claim to the deductible.

•Another step adjusts for the copayment; we subtract the percentage the claimant pays (40 percent for policy A and 60 percent for policy B) from the claim.

•Then we issue a check if there is money coming to the claimant, print a summary of the transaction, and update our accounts.

•We do this until all claims for that day are processed.

```
DO WHILE there are claims remaining
  IF claimant has not sent in a claim
    THEN set up new claimant record
  ELSE continue
Add claim to YTD Claim
  IF claimant has policy-plan A
    THEN IF deductible of $100.00 has not been met
           THEN subtract deductible-not-met from claim
           Update deductible
         ELSE continue
         ENDIF
         Subtract copayment of 40% of claim from claim
  ELSE IF claimant has policy-plan B.
         THEN IF deductible of $50.00 has not been met
                THEN subtract deductible-not-met from claim
                Update deductible
         ELSE continue
         ENDIF
         Subtract copayment of 60% of claim from claim
    ELSE continue
  ELSE write plan-error-message
  ENDIF
 ENDIF
 IF claim is greater than zero
   THEN print check
 ENDIF
 Print summary for claimant
 Update accounts
ENDDO
```

For example, see the following sequence of actions −

```
if customer pays advance
   then
      Give 5% Discount
   else
      if purchase amount >=10,000
         then
            if the customer is a regular customer
               then Give 5% Discount
            else No Discount
         end if
      else No Discount
   end if
end if
```

# Pseudocode

- **Pseudocode** is a plain language description of the steps in an algorithm or another system. Pseudocode often uses structural conventions of a normal programming language, but is intended for human reading rather than machine reading.
- It typically omits details that are essential for machine understanding of the algorithm, such as variable declarations and language-specific code.
- The programming language is augmented with natural language description details, where convenient, or with compact mathematical notation.
- A pseudocode does not conform to any programming language and expresses logic in plain English. It may specify the physical programming logic without actual coding during and after the physical design.
- It is used in conjunction with structured programming.
- It replaces the flowcharts of a program.

# What is Pseudo-Code ?

- A mixture of natural language and high-level programming concepts that describes the main ideas behind a generic implementation of a data structure or algorithm.

  -Expressions: use standard mathematical symbols to describe numeric and boolean expressions -use ← for assignment ("=" in Java)
  -use = for the equality relationship ("==" in Java)

  -Method Declarations: -**Algorithm** name(***param1, param2***)

  -Programming Constructs:
  - decision structures: **if ... then ... [else ... ]**
  - while-loops: **while ... do**
  - repeat-loops: **repeat ... until ...**
  - for-loop: **for ... do**
  - array indexing: **A[i]**

  -Methods:
  - calls: object method(args)
  - returns: **return** value

- In computer science, pseudocode is a plain language description of the steps in an algorithm or another system.
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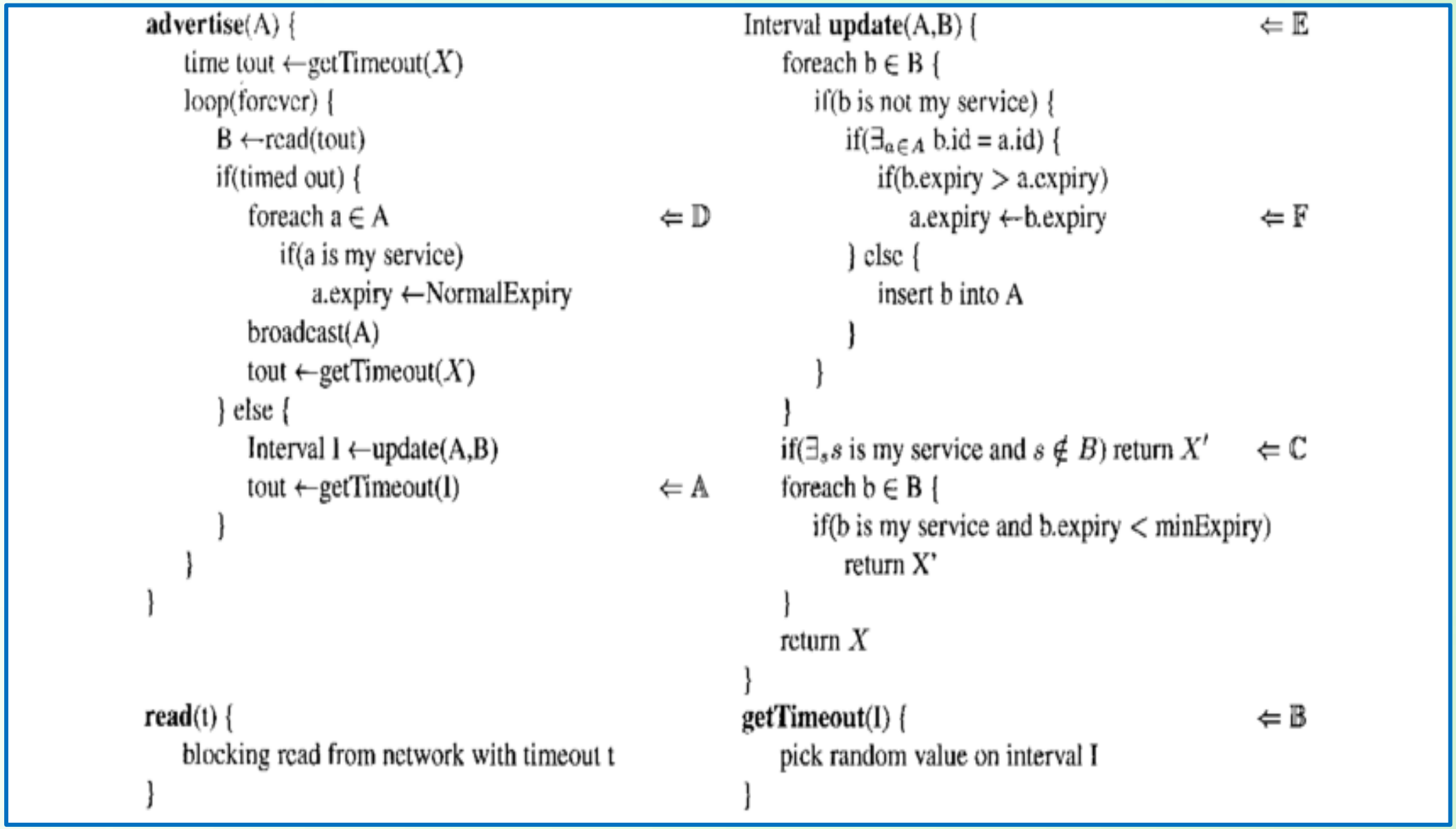
advertise(A) {
time tout ←getTimeout(X)
loop(forever) {
B ←read(tout)
if(timed out) {
foreach a ∈ A
if(a is my service)
a.expiry ←NormalExpiry
broadcast(A)
tout ←getTimeout(X)
} else {
Interval I ←update(A,B)
tout ←getTimeout(I)
}
}
}
read(t) {
blocking read from network with timeout t
}
⇐ D
⇐ A
Interval update(A,B) {
foreach b ∈ B {
if(b is not my service) {
if(∃a∈A b.id = a.id) {
if(b.expiry > a.expiry)
a.expiry ←b.expiry
} else {
insert b into A
}
}
}
if(∃s s is my service and s ∉ B) return X'
foreach b ∈ B {
if(b is my service and b.expiry < minExpiry)
return X'
}
return X
}
getTimeout(I) {
pick random value on interval I
}
⇐ E
⇐ F
⇐ C
⇐ B

# Guidelines for Selecting Appropriate Tools

Use the following guidelines for selecting the most appropriate tool that would suit your requirements −

- ❖Use DFD at high- or low-level analysis for providing good system documentations.
- ❖Use data dictionary to simplify the structure for meeting the data requirement of the system.
- ❖Use structured English if there are many loops and actions are complex.
- ❖Use decision tables when there are a large number of conditions to check and logic is complex.
- ❖Use decision trees when sequencing of conditions is important and if there are few conditions to be tested.

# Feasibility Study:

## System Performance Definition :

A System's required performance is defined by describing its outputs in a user acceptable format and at a higher level of detail than what was described in the initial investigation. This involves three steps

1.Statement of constraints

2.Indentification of specific system objectives

3.Description of outputs

### 1.Statement of Constraints:

Constraints are factors that limit the solution of the problem. Some constraints are identified during the initial investigation and are discussed with the user. There are general constraints that might have a bearing on the required performance of a candidate system.

### 2.Indentification of specific system objectives

Once the constraints are spelled out, the analyst proceeds to identify the system's specific performance objectives. They are derived from the general objectives specified in the project directive at the end of the initial investigation.

In our scenario, the candidate system's anticipated benefits are as follows:

1.Improved collection schedule.

2.Cost reduction

3.Physical space reduction.

4.Improved customer service.

**Description of Outputs:**

A final step in system performance definition is describing the outputs required by the user. An actual sketch of the format and content of the reports as well as a specification of the media used, their frequency and the size and number of copies required are prepared at this point.

**Feasibility Study:**

Many feasibility studies are decisioning for both users and analysts. First ,the study often presupposes that when the feasibility document is being prepared, the analyst is in apposition to evaluate solutions.second,most studies to overlook the confusion inherent in system development-the constraints and the assumed attitudes.if the feasibility study is to serve as a decision document, it must answer three key questions:

1.Is there a new and better way to do the job that will benefit the user?

2.What are the costs and savings of the alternatives?

3.What is recommended?

# FEASIBILITY CONSIDERSTIONS

There are mainly three considerations involved in feasibility analysis.

1.Economic

2.Technical

3.Behavioral

## Economic feasibility

Economic analysis is the most frequently used method for evaluating the effectiveness of a candidate system. The procedure called cost/benefit analysis is used to determine the benefits and savings that are expected from a candidate system and compare them with cost. If benefits outweigh costs, then the decision is to made design and implement the system. Otherwise, further justification or alterations in the proposed system will have to be made if it is to have a chance of being approved.

## Technical feasibility

Technical feasibility mainly deals with the existing computer system (i.e.: hardware, software, etc) and to what extent it can support the proposed system. For ex: if the current computer is operating at 80 percent capacity-then running another application could overload the system or require additional hardware. This involves financial considerations to accommodate technical enhancements.

## Behavioural feasibility

This deals with the behaviour of the user staff. An estimate should be made of how strong a reaction the user staff have toward the development of a computerized system.

It is common knowledge that computer installations have something to do with turnover, transfers, retraining and changes in employee job status.

Therefore, it is understandable that the introduction of a candidate system requires special effort to educate, sell and train the staff on new ways of conducting business.

## Steps in Feasibility Analysis:

Feasibility analysis involves eight steps:

1. Form a project team and appoint a project leader.
2. Prepare system flowcharts.
3. Enumerate potential candidate systems.
4. Describe and identify characteristics of candidate systems.
5. Determine and evaluate performance and cost effectiveness of each candidate system.
6. Weight system performance and cost data.
7. Select the best candidate system.
8. Prepare and report final project directive to management.

## Form a Project Team and Appoint a Project Leader:

The concept behind a project team is that future system users should be involved in its design and implementation. Their knowledge and experience in the operations area are essential to the success of the system. For small projects, the analysts and an assistant usually suffice, however more complex studies require a project team. The team consists of analysts and user staff-enough collective expertise to devise a solution to the problem.

## Prepare system Flowcharts

The next step in the feasibility study is to prepare generalized system flowcharts for the system. Information-oriented charts and data flow diagrams prepared in the initial investigation are also reviewed at this time.

## Enumerate Potential candidate Systems:

This step identifies the candidate systems that are capable of producing the outputs included in the generalized flowcharts. This requires a transformation from logical to physical system models.

**Describe and Identify Characteristics of Candidate Systems**

**Determine and evaluate performance and cost effectiveness of each candidate system.**

**Weight system performance and cost data.**

**Select the best candidate system.**

**Prepare and report final project directive to management**.

## Feasibility Report:

The report is a formal document for management use, brief enough and sufficiently nontechnical to be understandable, detailed enough to provide the basis for system design.

There is no standard format for preparing feasibility reports. Analysis usually decide on a format that suits the particular user and system. Most reports, however, begin with a summary of findings and recommendations, followed by documented details.

Starting with summary information highlights the essence of the report, giving management the option of reviewing the details later.

The report contains the following sections:

1.Cover letter formally presents the report and briefly indicates to management the nature, general findings and recommendations to be considered.

2.Table of contents specifies the location of the various parts of the report. Management quickly refers to the sections that concern them.

3.Overview is a narrative explanation of the purpose and scope of the project, the reason for undertaking the feasibility study, and the department involved or affected by the candidate system.

4.Detailed findings outline the methods used in the present system. The system effectiveness and efficiency as well as operating costs are emphasized.

5.Economic justification details point-by –point cost comparisons and preliminary cost estimates for the development and operation of the candidate system.

6.Recommendations and conclusion suggest to management the most beneficial and cost effective system.

# Oral Presentation

The feasibility report is a good written presentation documenting the activities involving the candidate system. Invariably the project leader or analyst is expected to give an oral presentation to the end user. Although it is not as polished as the written report, the oral presentation has several important objectives. The most critical requirements for the analyst who gives the oral presentation are

1.Communication skills and knowledge about the candidate system that canbe translated into language understandable to the user.

2.Ability to answer questions, clarify issues, maintain credibility and pick up on any new ideas or suggestions.

The presentation may aim at informing, confirming or persuading.

1.Informing: This simply means communicating the decision already reached on system recommendations and the resulting action plans to those who will participate in the implementation.

2.Confirming:A presentation with this purpose verifies facts and recommendations already discussed and agreed upon.

3.Persuading: This is a presentation pitched toward selling ideas-attempts to convince executives to take action recommendations for implementing a candidate system.

# Dimension of planning:

The following conditions dictate today’s business strategies:

- ❖High interest rates make it more important that business realizes a good return on investment
- ❖Inflation puts pressure on profit when it occurs.
- ❖The growing trend toward guaranteed employment suggests that costs are becoming fixed and the commitment to business expansion may not be easily changed.
- ❖Resource shortages impede expansion.
- ❖Regulatory constraints slow entry into the market.
- ❖Increased productivity paves the way for expansion.

# Strategic MIS Planning

- Planning for information system development must be done within the framework of the organization's overall MIS plan. It may be viewed from two dimensions:
- **The time horizon dimension** specifies whether it is short range, medium range or long-range plan.
- **The focus dimension** tells whether the primary concern is strategic, managerial or operational.
- Strategic (MIS) planning is an orderly approach that determines the basic objectives, the strategies and policies needed to achieve the objectives, and the plans to implement the strategies. The first task in strategic planning is to set the MIS objectives and the results expected. The objectives must be set in such a way that they meet the organization's needs. Once the objectives are set, MIS policies are defined as a guideline to carry out the plan. These MIS policies are in turn translated into long-range, medium-range and short-range plans for implementation.

❖In determining the MIS strategic plan, the following are to be taken into consideration

❖The MIS objectives and strategies that can be derived from the corporate strategic plan.

❖The person who will review and approve the plan.

❖The time taken to complete the plan and the contents of the plan.

❖The highlights or focus of the plan (computer security, new application development, new technology)

❖In most cases, the answers depend on the structure and complexity of the MIS organization, the level of computerization in the firm, the hit rate of the MIS division and the influence of MIS in getting projects approved by top management.

# Managerial And Operational Mis Planning

Managerial MIS planning combines strategic with operational plans. It is a process in which specific functional plans are related to a specific number of years. These plans show how strategies are to be carried out to achieve long-range plans. The next step is to find short-range plans that are used for carrying out the day-to-day activities of the system. They are programmed plans requiring a year's commitment.

The MIS operating plan requires more user involvement to define the system requirements. System development must support organizational MIS objectives as laid out in the corporate plan. System development must also identify and select applications that are the organization's priorities. Bowman, Davis and Whether be have described this link as a three-stage model consisting of the following

- **Strategic system planning** – establishing relationships between the organization plan and the plan for a candidate system.
- **Information requirements analysis** – identifying organization requirements to direct the specific application of system development projects.

- **Resource allocation** – determining hardware, software, telecommunications, facilities, personnel and financial resources to execute the development of the system.
- Thus, planning for system development activities is a major aspect. Broad corporate strategic objectives should be the basis for system development objectives, which specify the goals in the form of specific action plans. Formalizing the planning process makes it easier to reorient and gain the support of upper, middle and operating management for candidate systems. The following figure shows a top-down approach to planning, the relationship between the corporate strategic plan and the goals and activities of the system development function.


Thank You