



# DSS and Concepts



# Phases in a Decision Process

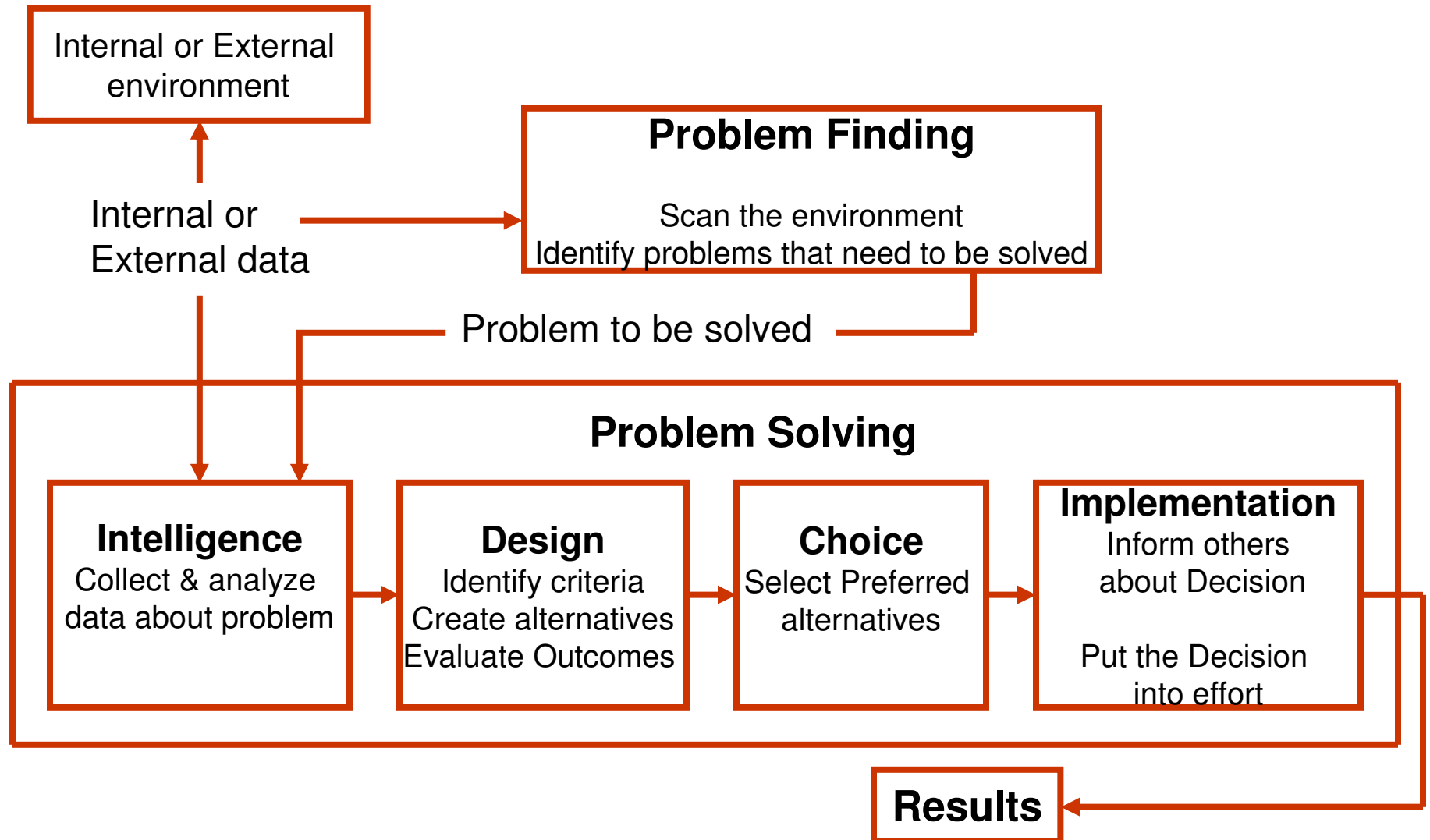
## ■ Problem Finding:

- Process of identifying and formulating problems that should be solved.
- It is the key to effective decision making.

## ■ Problem Solving:

- Process of using information, knowledge and intuition to solve the problem that has been previously defined.
- Problem solving process can be divided into 4 phases:
  - Intelligence
  - Design
  - Choice
  - Implementation

# Phases in a Decision Process...

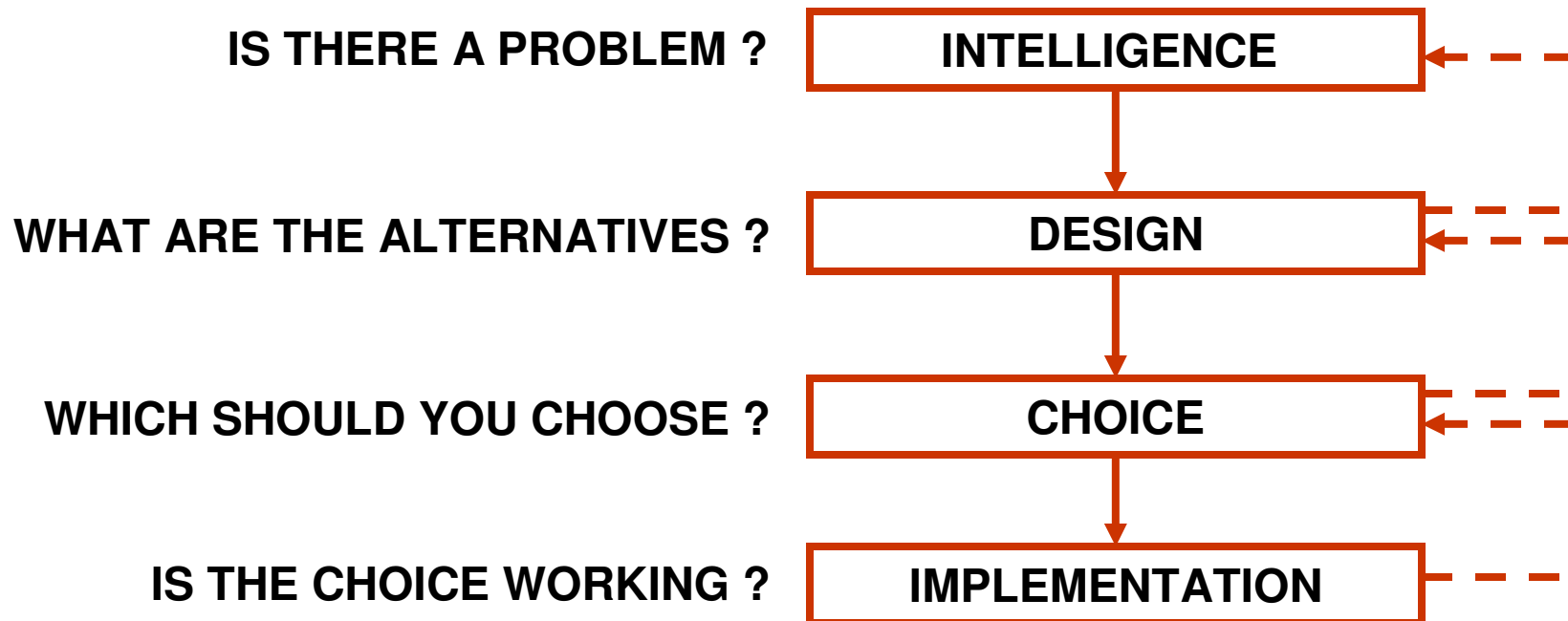




# Concepts

- **RATIONALITY:**
  - How people should make decisions.
- **SATISFICING:**
  - Choosing a satisfactory alternative rather than searching for an optimal one.

# Simon's Model of Decision Making



Herbert A. Simon (1960) described 4 different stages in decision making.



# Simon's Model of Decision Making...

## ■ Intelligence:

- It consist of identifying the problems occurring in the organization.
- This broad set of information gathering activities is required to inform managers how well the organization is performing and where the problems exist ?
- It includes the collection and analysis of data related to the problem.
- It should include *complete* and *accurate* data and figuring out what the data imply for the decision at hand.
- *MIS systems can help identify problems as Exception Reporting needs to be done here.*



# Simon's Model of Decision Making...

## ■ Design:

- It includes systematic study of the problem.
- Creation of alternatives
- Evaluation of outcomes.
- It also includes making the problem manageable and developing criteria and models for evaluating alternatives.
- *In this stage smaller DSS systems are ideal because they operate on simple models and which in turn can be developed quickly and can be operated with limited data.*



# Simon's Model of Decision Making...

## ■ Choice:

- It consist of choosing among alternatives.
- In this stage manager can use information tools that can calculate and keep track of the Consequences and Costs etc.
- *Larger DSS is required in this stage as extensive data on variety of alternatives lies there and complex analytical models are needed to account for all the consequences.*





# Simon's Model of Decision Making...

## ■ Implementation:

- It is the process of putting the decision into effect.
- It also includes explaining the decision to the appropriate people, building consensus that the decision makes sense and creating commitment to follow through whether or not their preferred alternative is chosen.
- *Support system can range from MIS to smaller systems and a project planning software operating on micro computers.*



# DSS Concept

- DSS concept originated in late 1960s with computer timesharing.
- A person could interact directly with computer without having to go through information specialists.



# Gorry and Scott Morton Grid

- In 1971 the term DSS was coined by:
  - G. Anthony Gorry
  - Michael S. Scott Morton
- They felt a need for a framework to channel computer applications toward management decision making.
- They developed Gorry and Scott Morton Grid.
- The Grid is based on both Simon's concept of programmed and non-programmed decisions and Robert N. Anthony's concept of management levels.

# Gorry and Scott Morton Grid...

		Management Levels		
		Operational Control	Management Control	Strategic Planning
Degree of Problem Structured	Structured	Accounts Receivable Order Entry Inventory Control	Budget Analysis Engineered Costs Short Term Forecasting	Tanker Fleet, Warehouse & Factory Location
	Semi-Structured	Production Scheduling Cash Mgt. PERT/CPM Systems	Variance Analysis Overall Budget Preparation Sales & Production	Mergers & Acquisition New product Planning R & D Planning
	Unstructured			



# Gorry and Scott Morton Grid...

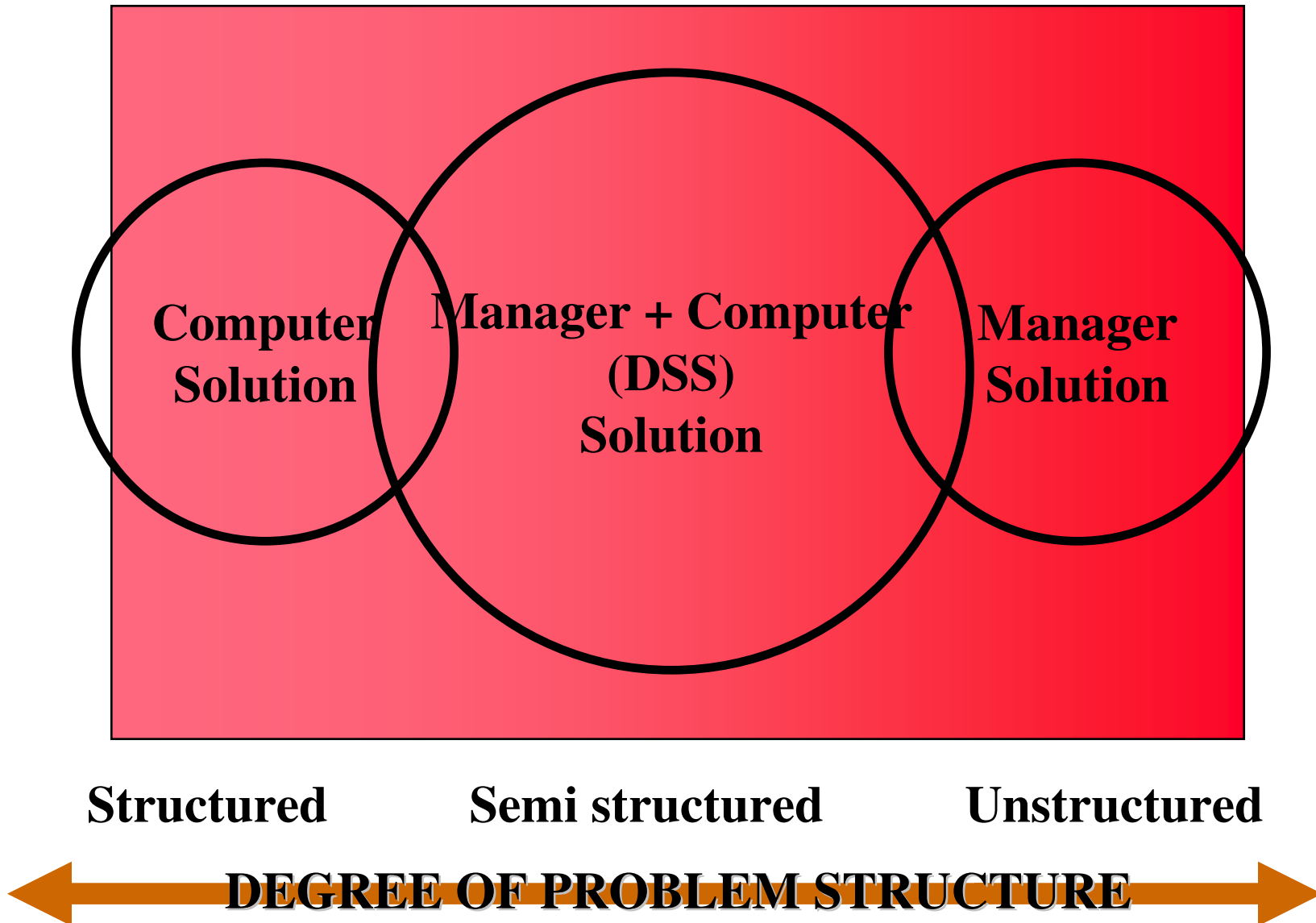
- Gorry and Scott Morton described decision types in terms of problem structure, ranging from structured to semi structured to unstructured.
- Anthony used the names strategic planning, management control and operational control to describe top, middle and lower management levels.
- Upper area was named Structured Decisions and lower area was named DSS.



# Gorry and Scott Morton Grid...

- Simon's phases of decision making are used to determine problem structure.
  - A fully *Structure Problem* is one in which the first three of Simon's phases are structured.
  - An *Unstructured Problem* is one in which none of the three phases are structured.
  - A *Semi structured Problem* is one in which one or two of the phases are structured.
  - For example:
    - Accounts receivable planning is done by Operational Control Managers, who make *structured decisions* whereas R&D planning is done by Strategic Planning Managers making *unstructured decisions*.

# The DSS Focuses on Semi structured Problems





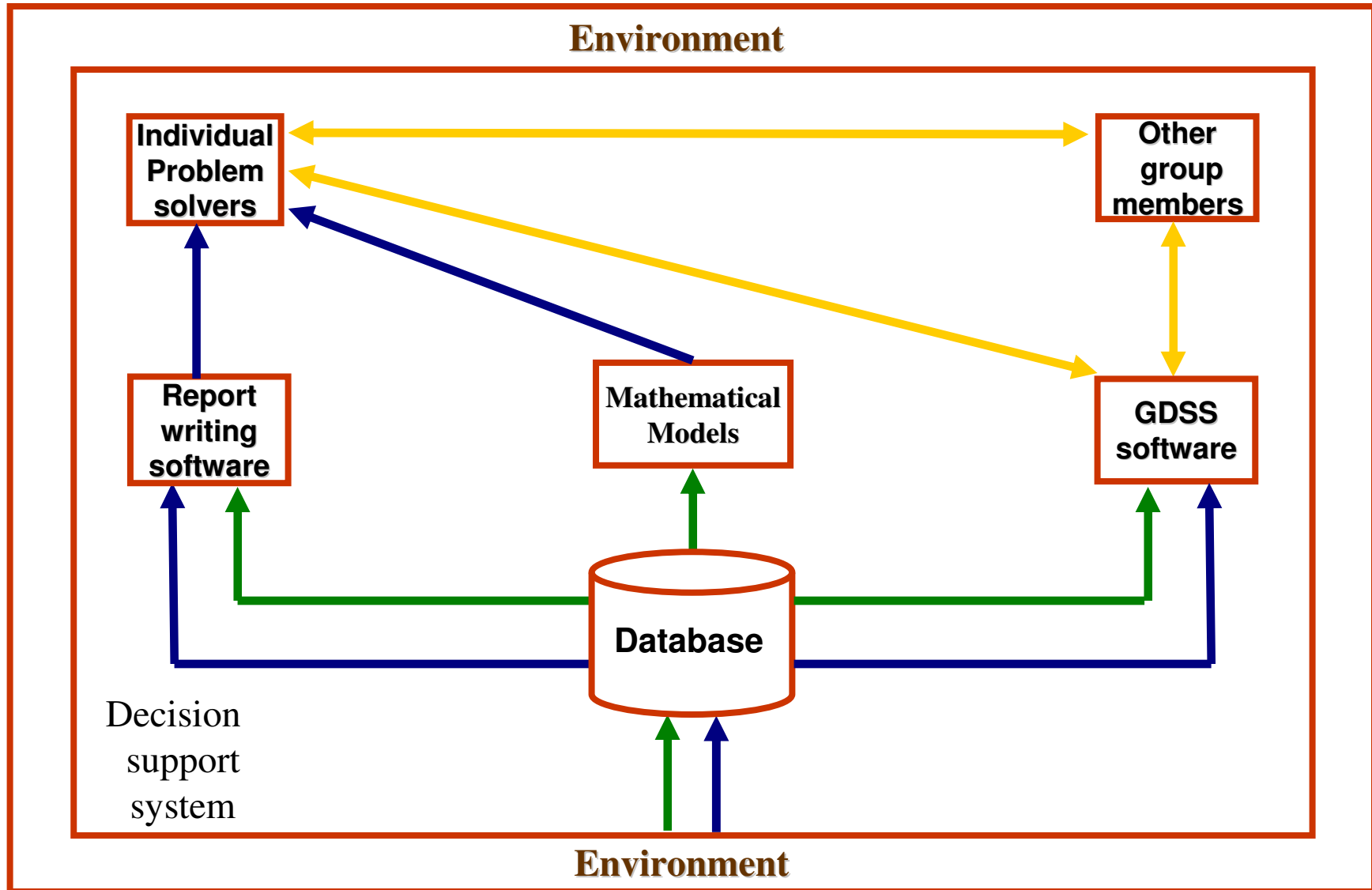
# Decision Support System

- DSS are a major category of MSS.
- They are computer based IS that provide interactive information support to managers during the decision making process.
- DSS use:
  - Analytical Models
  - Specialized Databases
  - A Decision Maker's own insights & judgements.
  - An interactive, computer based modeling process to support the semi-structured & Unstructured Decisions by individual managers.





# A DSS Model





# MIS Vs DSS

- MIS focus on providing managers with pre-specified information products that report on the performance of the organization.
- MIS are designed to support structured types of decisions involved in operational and tactical planning and control.
- DSS focus on providing information to support specific types of decisions by individual managers.
- DSS support managers to solve typical semi-structured and unstructured types of decisions involved in tactical and strategic levels of an organization.



# MIS Vs DSS...

- Objective of MIS is to provide information about the performance of basic organizational functions and processes (Marketing, Manufacturing and finance).
- Objective of DSS is to provide information and decision support techniques needed to solve specific problems or pursue specific opportunities.



# DSS Vs MIS

	<b>MIS</b>	<b>DSS</b>
<b>INFORMATION PROVIDED</b>		
<b>Information form &amp; Frequency</b>	<b>Periodic, Exception &amp; Demand Reports &amp; Responses.</b>	<b>Interactive inquiries &amp; Responses</b>
<b>Information Format</b>	<b>Prespecified, Fixed format</b>	<b>Ad hoc, Flexible &amp; Adaptable format</b>
<b>Information Processing Methodology</b>	<b>Information produced by extraction &amp; manipulation of operational data</b>	<b>Information produced by analytical modeling of operational &amp; External Data</b>
<b>DECISION SUPPORT PROVIDED</b>		
<b>Type of support</b>	<b>Provide information about performance of the organization</b>	<b>Provide information &amp; Decision Support Techniques to confront specific problems or opportunities</b>
<b>Stages of Decision making</b>	<b>Support intelligence &amp; implementation stages of Decision making</b>	<b>support intelligence, design, choice &amp; implementation stages of decision making</b>
<b>Types of Decisions supported</b>	<b>Structured decisions for Operational &amp; Tactical Planning &amp; Control</b>	<b>Semi structured &amp; unstructured decision for tactical &amp; strategic planning &amp; control</b>
<b>Types of Decisions Makers supported</b>	<b>Indirect Support designed for many managers</b>	<b>Direct support tailored to decision making styles of individual managers</b>



# DSS Characteristics

- The computer must support the manager but not replace his/her judgement.
- The main payoff of computer support is for semistructured problems.
- Effective problem solving is interactive & is enhanced by a dialog between user & system. The user explores the problem situation using the analytic & information providing capabilities of the system as well as human experiences & insights.



# DSS Applications

- DSS are used for variety of applications in both Business and Government.
- Institutional DSS:
  - DSS developed to solve large or complex problems faced continually by an organization. E.g. DSS used for strategic corporate planning.
- Adhoc DSS:
  - DSS developed quickly to solve smaller or less complex problems that may be one-time situations faced by a manager.
- DSS are also developed based on type of industry or by specific functional area.



# DSS Applications...

- Airline DSS:

- DSS which are used in airline industry to support variety of airline decisions (seating capacity, traffic statistics etc). E.g. The American Analytical Information Management System (AAIMS), Yield Management System.

- Real Estate DSS:

- DSS which are used in the real estate industry to do complex analysis of investments in commercial real estate. E.g. Realplan.

- Geographic DSS:

- These DSS are used to choose new store locations, optimize distribution, routes or analyze the demographics of their target audiences. E.g. Mapinfo, Atlas GIS



# Components of DSS

## ■ **Hardware & Network Resources:**

- Computer systems, Servers, LAN, DSS Software, Model and Data resources.

## ■ **Software Resources:**

- DSS Software Packages contain software modules to manage DSS databases, decision models and end user/system dialogue.

## ■ **Data Resources:**

- A DSS database contains data and information extracted from the databases of the organization, external databases and a manager's personal databases.

## ■ **Model Resources:**

- The model base includes a library of mathematical models and analytical models and analytical techniques stored as programs, spreadsheets and command files.

## ■ **People Resources:**

- Managers or their Staff Specialists.





# Classes of DSS

- File Drawer Systems
- Data Analysis Systems
- Analysis Information Systems
- Accounting Systems
- Representational Models
- Optimization Models
- Suggestion Models



# Other Systems

- GDSS:
  - It is an interactive computer based system to facilitate the solution of unstructured problems by a set of decision makers working together as a group.
  - GDSS were developed in response to growing concern over the quality and effectiveness of meetings.
- A computer-based system that supports groups of people engaged in a common task (or goal) and that provides an interface to a shared environment.
  - GDSS is used in problem solving.
  - Electronic meeting system (EMS) is used for group interaction of all kinds.



# Other Systems...

## ■ EIS:

- EIS are information systems that combine many of the features of MIS and DSS.
- They are tailored to individual executive users.
- Extract, filter, compress and tack critical data.
- Provide online status access, trend analysis, exception reporting and drill down capabilities.
- Access and integrate a broad range of internal and external data.
- EIS are user friendly and require minimal or no training to use.
- They are used directly by executive without intermediaries.
- They Present Graphical, Tabular and Textual information.



# Other Systems...

## ■ ESS:

- They are EIS with additional capabilities.
- Support electronic communications (E-mail, Computer Conferencing and Word Processing).
- Provide data analysis capabilities (Spreadsheets, Query Languages and DSS).
- Include personal productivity tools (Electronic Calendars, Rolodex and Tickler Files).



# Other Systems...

## ■ AI:

- Artificial Intelligence (AI) is a science and technology based on disciplines such as computer science, biology, psychology, linguistics, mathematics and engineering.
- The goal of AI is to develop computers that can think as well as see, hear, walk, talk and feel.



# Other Systems...

- Expert Systems:

- An ES is a knowledge based IS that uses its knowledge about a specific, complex applications area to act as an expert consultant to end users.

- Knowledge Based Information System

- A Knowledge Based Information System (KBIS) adds a knowledge base to the major components found in other types of computer based IS.