

# **System Analysis Design**

**Week-1: Lesson-1**

## **Data, Information and System**



**Daffodil**  
*International*  
**University**

# Learning Goals

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- ❑ **Distinction between Data and Information**
- ❑ **Description of types of Information: Tactical, Operational, Strategic, Statutory.**
- ❑ **Division of Management into different hierarchical levels.**
- ❑ **Type of Information needed at different levels of management.**
- ❑ **Division of organizations into several functional areas and their information requirements**
- ❑ **Attributes of Information.**

# Data and Information

## Data: Raw material

- Data collection costs money
- Collect only necessary and sufficient data
- Data is generally used by machines
- Data is useless unless it is processed to create INFORMATION

## Information : Processed data

- Data processed by machines giving information
- Information is used to run an organization efficiently
- Information used by managers to initiate actions

# Types of Information

- ❑ **STRATEGIC** : Needed for long range planning and directions. This is less structured.
- ❑ **TACTICAL** : Needed to take short range decisions to improve profitability and performance.
- ❑ **OPERATIONAL** : Needed for day to day operations of the organization.  
Eg: Daily Sales, Billing.
- ❑ **STATUTORY** : Needed by law to sent to government authorities.  
Eg: Sales tax return.

# Example of Information Needed by a Shopkeeper

## □ What are the information needed for daily operations?

- Daily sales account
- List of low stock items to be re-ordered
- List of overstock items
- Long overdue payments
- Profit and loss account

#Information used to streamline day to day operations are Operational information

## □ What are the information needed to enhance his profit?

- Slow or fast moving items
- Reliable supplier of items
- Sales trends

#Information used to improve profitability of shop are Tactical information

# Example of Information Needed by a Shopkeeper

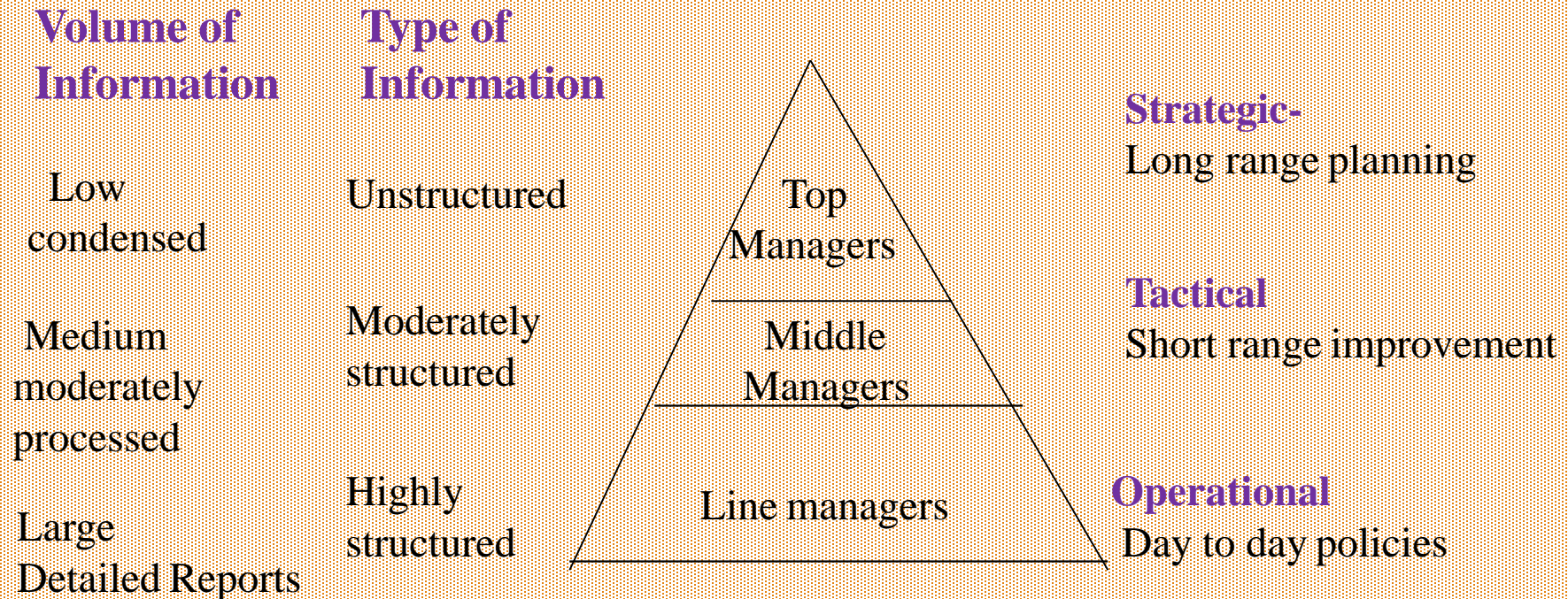
- ❑ **What are the information needed to expand the business?**
  - **Whether to stock different varieties of items**
  - **Whether to diversify**
  - **Whether to start a new branch in a different locality**
  - **Whether to start an e-shop**

#Information to expand business and explore new opportunities are known as Strategic Information

- ❑ **What are the information related to tax/government?**
  - **Income tax account**
  - **Sales tax account**

#Used to provide information to the government known as Statutory Information

# Management Hierarchy and Information Needs

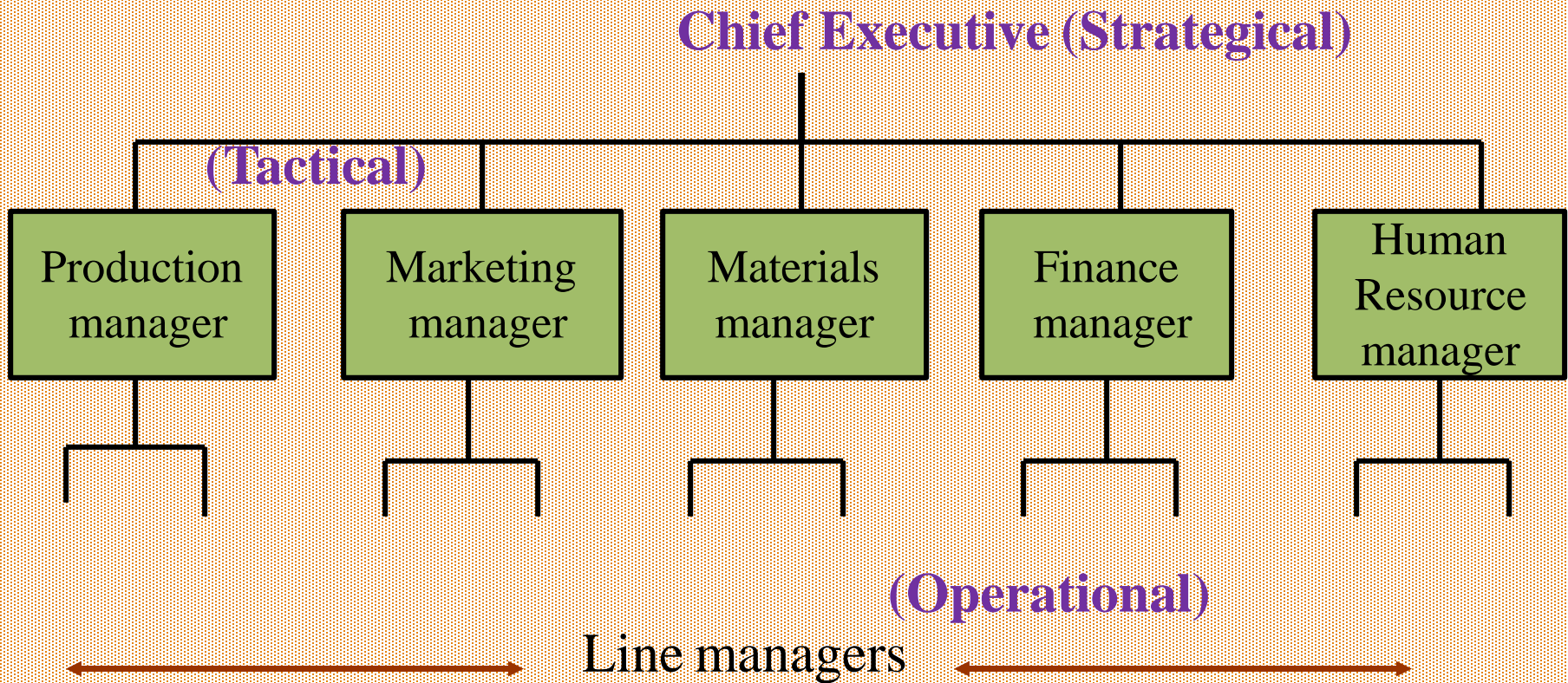


# Need for Information Systems

- ❑ Increasing size of organizations thus data volume increases
- ❑ Timely processing for fast action
- ❑ Better competitiveness with better information
- ❑ Increasing of complexity of organizations require innovative processing
- ❑ Distributed organizations
- ❑ Same data can be processed in different ways



# Management Structure



# Qualities of Information

<u>Quality</u>	<u>How to ensure quality</u>
<b>Accurate</b>	Ensure correct input and processing rules.
<b>Complete</b>	Include all data.
<b>Timely</b>	Give at right time
<b>Trustworthy</b>	Do not hide unpleasant information.
<b>Relevant</b>	Understand user needs.
<b>Brief</b>	Summarize relevant information.
<b>Up-to-date</b>	Include all data up to present time.
<b>Significance</b>	Use attractive format & graphical charts.

# System's Concept and Definition

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- ❑ Term system is derived from the Greek word '*Systema*' which means *an organized relationship among functioning units or components.*
- ❑ A system is an *orderly grouping of interdependent components linked together according to a plan to achieve a specific objective.*

# Characteristics of a System

- ❑ Organization(Order)
- ❑ Interaction
- ❑ Interdependence
- ❑ Integration
- ❑ Central Objective

# Continued...

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## ❑ Organization

- It implies structure and order.

## ❑ Interaction

- It refers to manner in which each component functions with other components of the system.

## ❑ Interdependence

- Units/parts are dependent on each other.

## ❑ Integration

- The parts of a system work together within the system even though each part performs a unique function.

## ❑ Central Objective

- Objective may be real or stated. All the components work together to achieve that particular objective.

# Elements of a System

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- Outputs and Inputs**
- Processor**
- Control**
- Feedback**
- Environment**
- Boundaries and Interface**

# Continued...

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- ❑ **Inputs and Outputs-** Inputs are the elements that enter the system for processing and output is the result of processing.
- ❑ **Processor-** It is the element that involves the actual transformation of input into output
- ❑ **Control-** The control element guides the system.
- ❑ **Feedback-** Output is compared against performance standards.
- ❑ **Environment-** It is the supra system within which an organization operates.
- ❑ **Boundaries and Interface-** A system should be defined by its limits.

# **System Analysis Design**

**Week-1: Lesson-2**

## **Data, Information and System**



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# Types of System

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## ❖ Physical or Abstract System

- ❑ **Physical** – These are tangible entities that may be static or dynamic in operation.
  - **For example-** parts of a computer center are the desks, chairs etc. that facilitate operation of the computer. They are static and a programmed computer is dynamic.
- ❑ **Abstract System** – These are conceptual or non physical entities.
  - **For example-** the abstract conceptualization of physical situations. **A model is a representation of a real or planned system.** A model is used to visualize relationships.

# Types of System(Cont..)

- ❑ **Deterministic System** – It operates in a predictable manner and the interaction between parts is known with certainty.
  - **For example:** Two molecules of hydrogen and one molecule of oxygen makes water.
- ❑ **Probabilistic System** – It shows probable behavior. The exact output is not known.
  - **For example:** weather forecasting, mail delivery.

# Types of System(Cont..)

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❑ **Open System** – It has many interfaces with its environment. It interacts across its boundaries, it receives inputs from and delivers outputs to the outside world. It must adapt to the changing demands of the user.

- **Example:** an open cup of coffee

❑ **Closed System** – It is isolated from the environmental influences. A completely closed system is rare.

- **Example:**

- a cup of coffee with a lid on it,
- or a simple water bottle.

# Types of System(Cont..)

- **Formal Information System** is based on the organization represented by organization chart.
  - The chart is a map of positions and their authority relationships, indicated by boxes and connected by straight lines.
  
- **Informal Information System** is an employee based system designed to meet personnel and vocational needs and to help solve, work related problems.

# Varieties of Computer Based Information System

- ❑ Computer Based Information System relies on computer for handling business applications.
- ❑ Basically three types –
  - **Business Data Processing(BDP)**
    - Deals with operational information
  - **Management information system(MIS)**
    - Deals with tactical information
  - **Decision support system(DSS)**
    - Deals with strategic information

# Categories of Information

Volume of Information	Type of Information	Information Level	Management Level	System Support
Low Consensed	Unstructured	Strategic Information	Upper	DSS
Medium Moderately Processed	Moderately Structured	Management Control Information	Middle	MIS
Large Detail Reports	Highly Structured	Operational Information	Lower	DPS

# Business Data Processing System

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- Enter data to be processed
- Edit, check input data
- Control check to see if the data is correct and reasonable
- Store clean data as an organized data base in a storage

## Some Examples of BDP (Business Data Processing System)

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- **Payroll systems**
- **Order processing systems**
- **Reservation systems**
- **Stock control systems**
- **Systems for payments and funds transfers**



# Business Data Processing

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- There are 2 methods of business data processing
  - **On-line transaction processing(OLTP)**
  - **Batch processing**
  
- **OLTP:** is used for query processing and rapid actions to requests.
  - Example: Finding balance in one's bank account Booking railway tickets
  
- **Batch processing:** used for periodic data processing of massive data
  - Example: Processing university exam results at the end of each semester  
Payroll computation each month

# Management Information System

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- Analyze outputs of routine data processing using statistical or operations research tools
  - Eg: -Observe periodic demands by statistical analysis & use for tactical decisions
  - Use operations research tools to decide product mix using demand and cost data to maximize profit

# Some Examples MIS

## **TYPE OF INFORMATION SYSTEM**

Human Resources Management System

Payroll Management System

Enrolment Management System

Academic & Grading Management System

Order Management System

Library Management System

Project Management System

Learning Management System

Recruitment & Deployment Management System

Preventive Maintenance Management System

# Decision Support System

- ❑ Unstructured and difficult to obtain precise information
- ❑ Use of analytical and simulation models
- ❑ Aids to conceptualize through graphs, animation etc.
- ❑ Use of archival data to infer trends and rules
- ❑ Some artificial intelligence tools may be used

# Decision Support System



# Some Examples of DSS

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- **Clinical Decision Support System(CDSS)**
- **Group Decision Support Systems (GDSS)**
- **Agricultural Production Decision System**
- **Climate Change**
- **Disease Detection**
- **Logistics systems**
- **Financial Planning systems**
- **Spreadsheet Models**

# References

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- 1. System Analysis and Design**, by Elias M. Awad
- 2. Systems Analysis and Design**, Kendall and Kendall, Fifth Edition
- 3. Management Information Systems: Managing the Digital Firm** (11th edition), Pearson/Prentice-Hall