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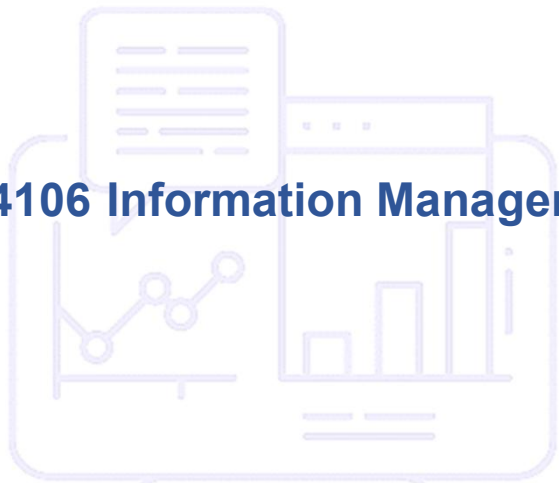
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Department of Management Studies

MBA – I Semester

BA4106 Information Management

Dr.Jackson Daniel
Professor/ECE Department

UNIT –IV

INTEGRATED SYSTEMS, SECURITY AND CONTROL

Knowledge Based Decision Support System (DSS)

1. Knowledge Based Decision Support System (DSS)

❑ Definition

❑ Parts of DSS

❑ Characteristics of Decision Support System

❑ Components of Decision Support System

❑ Classification of DSS

❑ Steps involved in Constructing a DSS

❑ Functions/ of DSS

❑ DSS Models

❑ Advantages of DSS/ Disadvantages of DSS/Applications of DSS

Definition:

❑ A system which supports **the process of decision-making** is known as Decision Support System (DSS)

❑ DSS – Helps manager in all stages of decision-making like
- ✓ problem identification,
- ✓ selection of relevant data,
- ✓ picking up right approach and
- ✓ examining alternatives.

❑ According to Scott Mortan, " Decision Support System (DSS) is **interactive computer-based systems**, which help decision-makers utilize data and models to solve unstructured problems"

❑ Knowledge based DSS – designed to ensure more precise decision making by using

- ✓ Appropriate data
- ✓ Information
- ✓ Knowledge management (AI, Information and communication technology)

❑ Applications of Intelligent Systems include **Expert Systems** (ES), **natural language processing** (NLP), **speech understanding**, **robotics and sensory systems**, **fuzzy logic**, neural computing**, computer vision** and scene recognition, and **intelligent computer-aided instruction.**

❑ KBDSS - helpful to managers because it performs **tasks faster than** a human might.

Parts of DSS:

Knowledge Base
- Information from Internal/External Sources
- Library of Information

Software System
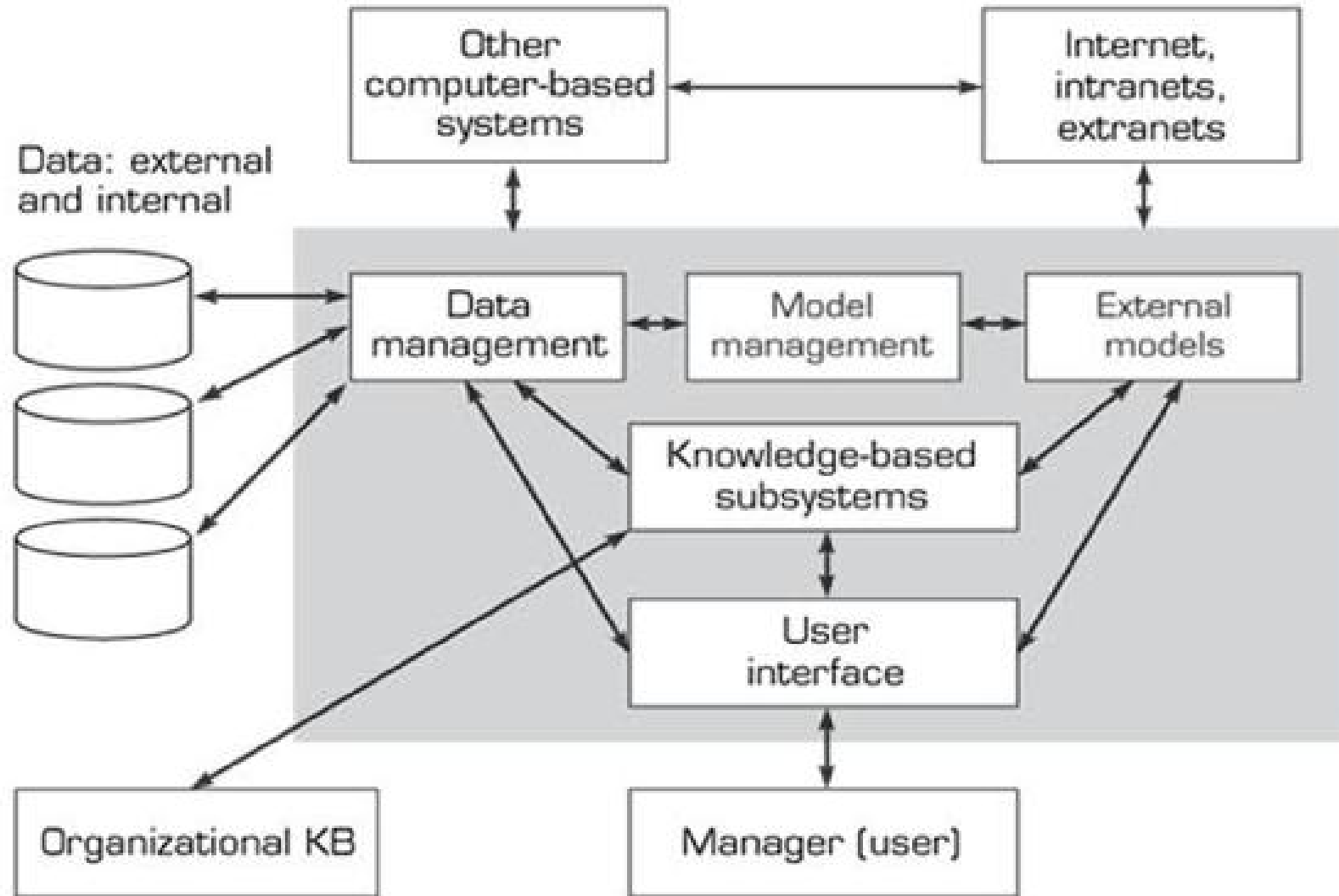- Model management system
- Computer simulations
- Predict Outcome

User Interface
- Easy system navigation
- User-manipulate data
- Include simple windows, complex menu-driven interfaces

Characteristics of Decision Support System:

1. Provides Rapid Access to Information:

2. Handles Large Amount of Data from Different Sources:

3. Provides Report and Presentation Flexibility:

4. Offers both Textual and Graphical Orientation:

5. Supports Drill-Down Analysis:

6. Performs Complex, Sophisticated Analysis and Comparisons Using advanced Software Packages:

Components of Decision Support System:

Components of Decision Support System: Cont'd …

i. Data Management Sub-System

- ❑ Contains appropriate data + DBMS software
- ❑ Connected to corporate data warehouse
- ❑ The elements are
- ✓ DSS Data base
- ✓ Data Base Management System
- ✓ Data Directory and
- ✓ Query facility

ii. Model Management Sub-System

- ❑ Contains software packages includes Statistical, financial, management models
- ❑ Modelling Language –for building custom models.(Corporate or external models)
- ❑ The elements are
- ✓ Model base
- ✓ Model Base Management System
- ✓ Modelling Language
- ✓ Model Directory
- ✓ Model Execution, Integration and command processor
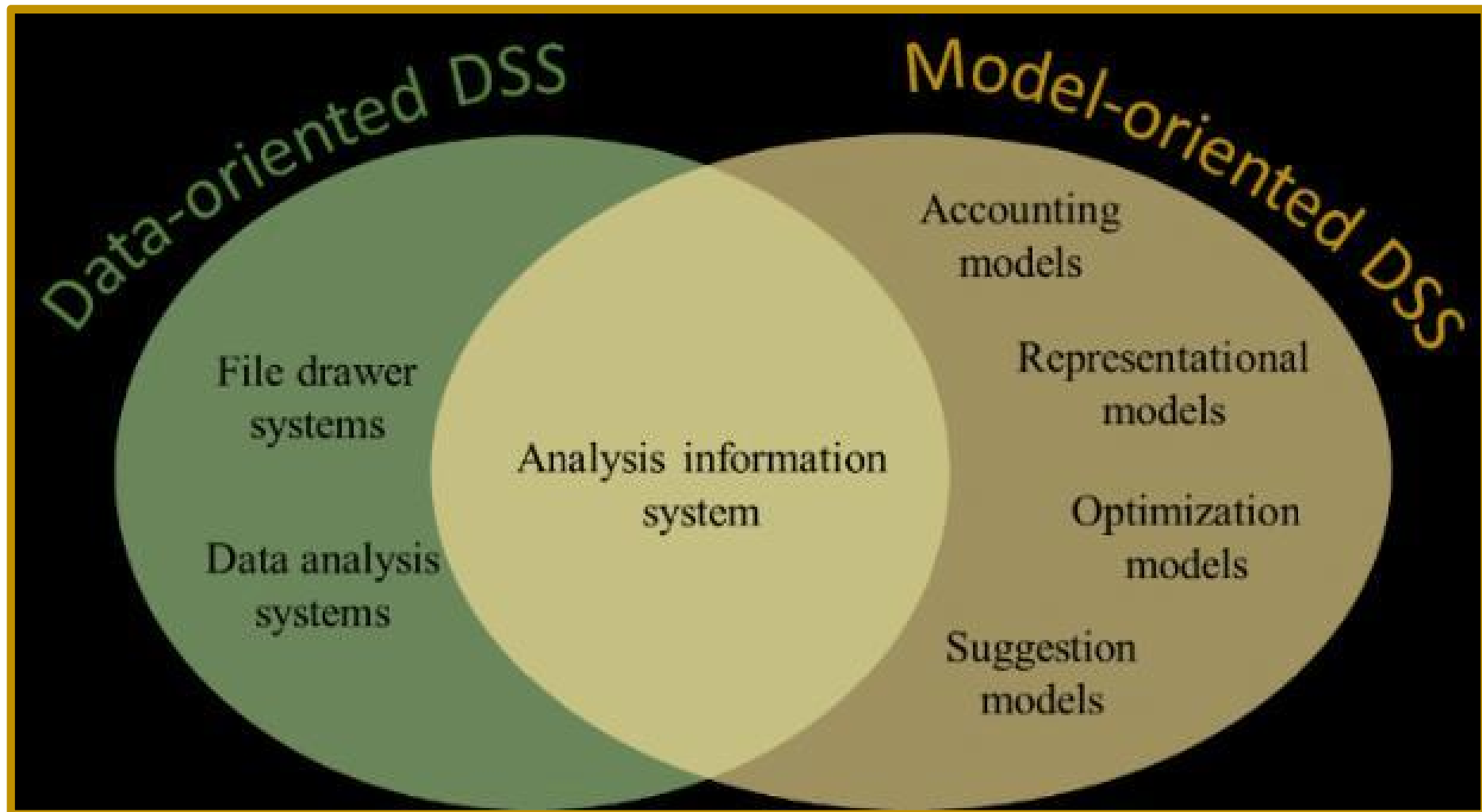
Components of Decision Support System: Cont'd ...

iii. User Interface Sub-System:

- ❑ Helps user to communicate with DSS

- ❑ User friendly

- ❑ Reliable graphical user interface structure

iv. Knowledge based Management Sub-system

- ❑ Act as independent component

- ❑ Can provide support to any other Sub-system

- ❑ Easily Integrates with other DSS components.

- ❑ The knowledge is provided via Web Servers

- ❑ Enhances decision –maker's intelligence

Classification of Decision Support System

Classification of Decision Support System Cont'd …

File Drawer Systems:

- ❏ Mechanised version of manual filing system
- ❏ Allows immediate access to data
- ❏ Example : Enquiries for inventory information, Airline reservation request

Analysis Information Systems:

- ❏ Gives access to a series of database and small models
- ❏ Example : A marketing DSS (internal sales data, promotion and pricing data)

Data Analysis Systems:

- ❏ Manipulation of Data by analysis.
- ❏ Used by non-managerial personnel
- ❏ Example : Budget Analysis system

Accounting Models:

- ❏ Consequences of actions are calculated.
- ❏ Example : Monthly Budgeting system for operational decision making

Classification of Decision Support System Cont'd …

Representational Models

- ❑ Estimation of consequences
- ❑ These models help users understand complex data and relationships, facilitating better analysis and decision-making.
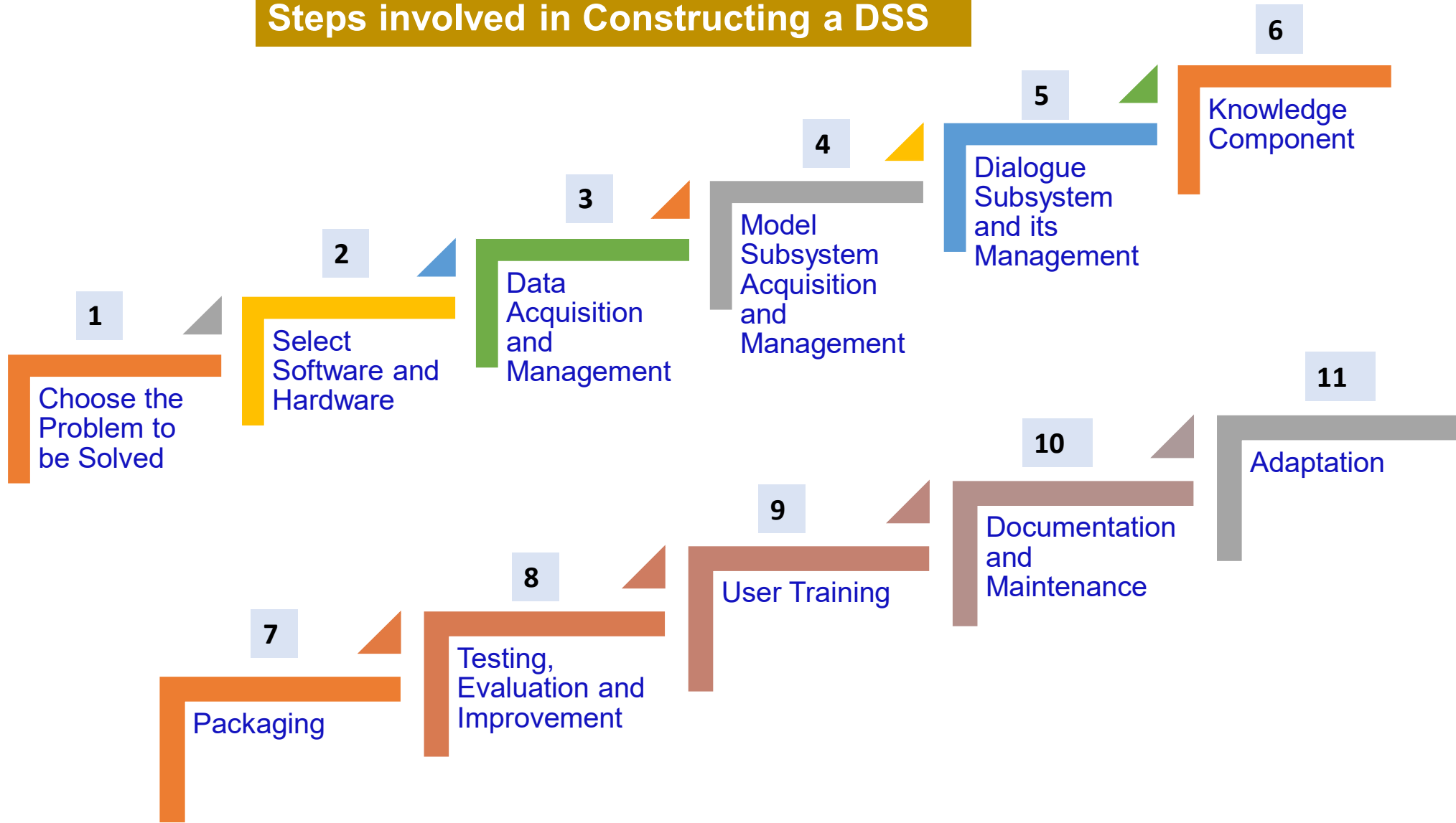
Optimization Models:

- ❑ Generates optimal solutions
- ❑ Represented in mathematical form
- ❑ Example : Arranging training classes and material usage system under some constraints.

Suggestion Models:

- ❑ Used in where decisions are repetitive in nature
- ❑ Provides a specific suggested decision and bypasses other decisions.
- ❑ Example: Insurance renewal rate calculator

Steps involved in Constructing a DSS

1 Choose the Problem to be Solved

2 Select Software and Hardware

3 Data Acquisition and Management

4 Model Subsystem Acquisition and Management

5 Dialogue Subsystem and its Management

6 Knowledge Component

7 Packaging

8 Testing, Evaluation and Improvement

9 User Training

10 Documentation and Maintenance

11 Adaptation

1. Choose the Problem to be solved : Concerned department are made to participate in the process of identifying the problem.

↓

2. Select Software and Hardware : Concerned department are made to participate in the process of identifying the problem.

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3. Data Acquisition and Management : Data must be acquired and maintained by forming knowledge base to solve the problem.

↓

4. Data Acquisition and Management : A model base is identified, acquired or developed and subsequently included relevant models are added up to the model base.

5. Dialogue sub system and its Management : User interface is need to be developed for DSSS

6. Knowledge Component : Knowledge Engineering is performed using knowledge base to create DSS.

7. Packaging : All required software components are put together to make a system. Each component must be tested in isolation as well as integrated in the system.

8. Testing, Evaluation and Improvement :

❑ The DSS is undergone an integration testing as well as system testing with suitable test cases.

❑ After Evaluation of the system further improvement requirements are identified

9. User Training : User must be properly trained so that efficient utilization of DSS is possible

10. Documentation and Maintenance : Proper documentation must be done for future maintenance of the DSS.

11.Adaptation : Due to Dynamic need of users, DSS must be adaptable to cater them.

Functions/Activities of DSS

| Sl. No.	Type of Analytical Modelling	Activities	Examples
1.	What-if Analysis	What-if-analysis is structured as What will happen to the solution if an input variable, an assumption, or a parameter value is changed?	If Advertising cost is cut by 10 % what would be the corresponding impact on sales?
2.	Goal Oriented	Procedure of determining the value of input that is required to succeed a particular goal	While decided to buy a house, a person first calculates the equated monthly instalments that he can afford and for how long?
3.	Risk Analysis	DSS helps in assessment of risk of various alternatives by managers. DSS is helpful while taking medium and high risk decisions.	The director of a multinational shipping company is anxious about the impact an upcoming storm will have on business operations

Type of Analytical Modeling	Activities	examples
What-if analysis	Observing, hoc changes to selected variables affect other variables	What if we cut fertilizers by 10%? What would happen to yield.
Sensitivity analysis	Observing how repeated changes to a single variable affect other variables	Let's cut fertilizers by 100% repeatedly so we can see its relationship to yield
Goal-seeking analysis	Making repeated changes to selected variables until a chosen variable reaches to a target value.	Let's try increases in fertilizers
Optimization analysis	Finding an optimum value for selected variables, given certain constraints	What's the best amount of fertilizers to have, our budget and choice ?

Sl. No.	Type of Analytical Modelling	Activities	Examples
4.	Model Building	DSS identifies most appropriate model for solving problems. It Considers input, inter-relationship, problem assumptions.	Television manufacturing company has given the responsibility to its marketing manager, to develop a sales forecasting model for colour T.V. sets
5.	Graphical Analysis	It provides large volume of data in graphical format to visualize it easily and quickly. Managers can also view the impact of various course of action.	✓ Quick summary of data is required ✓ Forecasting ✓ Detecting trends over time ✓ Composing points and patterns at different variables

DSS Models

Main purpose of using DSS model is to predict about the impact in real world if particular alternatives are selected by decision-maker or DSS.
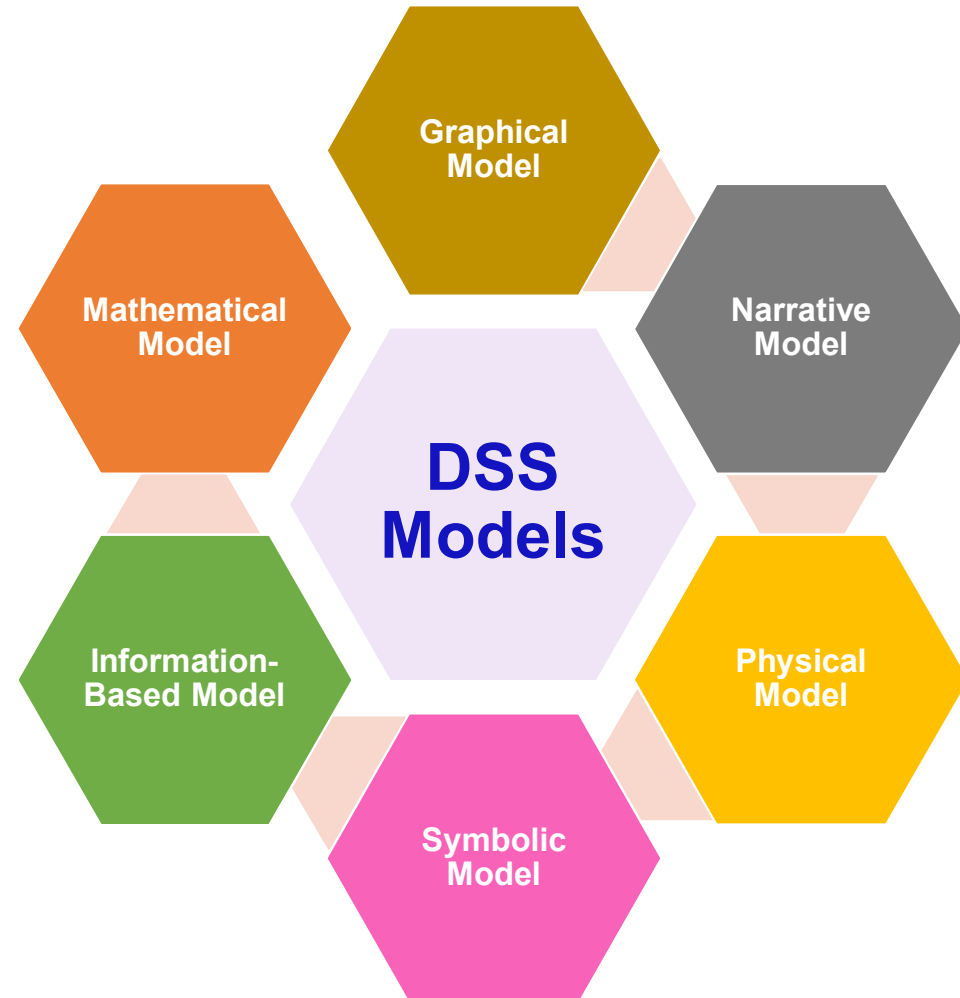
Graphical Model

❑ DFD and map are the two common examples of graphical models.

❑ Map shows the relationship like "Bangladesh is located to the East of Gujarat"

❑ "Rajasthan is about two times far from the Lucknow as compared to Delhi"

❑ "A bus can reach to NH25 from the street by moving towards east of Lucknow"

❑ The map provides actual images about locations and distances.

❑ When the part of images are joined on a display screen then they represent the map.

Narrative Model

A system can be described in a natural language (e.g.; English) using narrative model. The DSS system can be defined with a highly simplified narrative model.

Physical Model

It shows simulated or smaller demonstration of actual or real system.

Example: A model of railroad or architectural model of a company that is to be designed.