Decision Support System for Managers
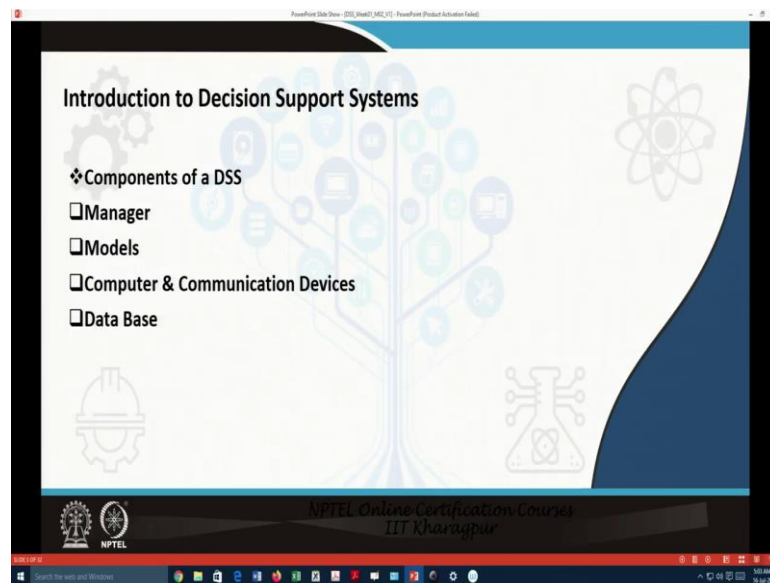**Prof. Kunal Kanti Ghosh**
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Indian Institute of Technology, Kharagpur

Module – 02
Components of a Decision Support Systems
Lecture – 02
Components of a Decision Support Systems

Hi, welcome to our module 2 of Decision Support Systems! Today, we are going to discuss about the "Components of a Decision Support System".
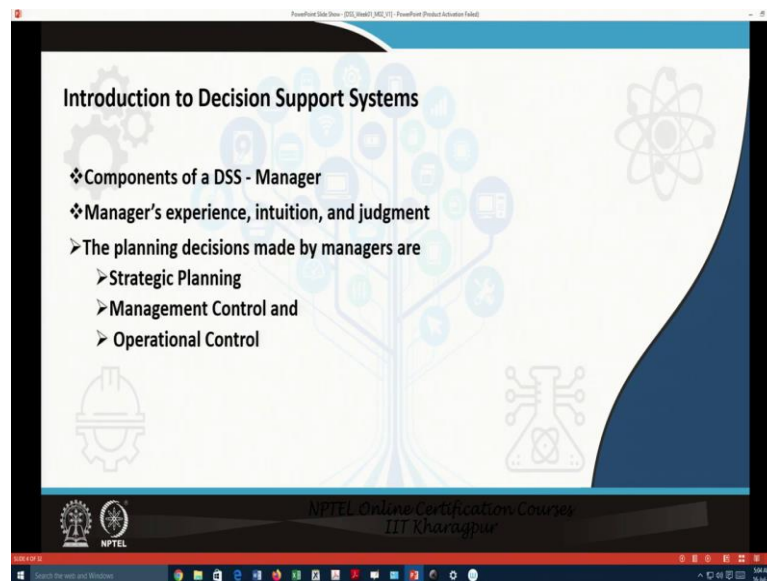
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We have basically discussed that decision support systems are basically a man computer interactive system, mainly suited for solving semi structured problems. In here, the manager interacts with the computer. The models inside the computer will help the managers to give an initial output, which the manager will revise based on his interpretation of the output.

Manager might give a fresh set of data, he might asks new questions. So, you see two important components of a decision support systems are the manager and the model and then the manager has to communicate with the computer, that is why it is an interactive system and in an iterative manner.

So, computer and communication devices is a third component and the data which are basically needed to solve the problem must reside in the computer data base. So, the components of a decision support system are the manager, the models, the computer and communication devices and as well as the data base. Components of a decision support systems manager.

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So, what we found out that the managers, they use their experience, intuition and judgement to interpret the model output and also to provide a new set of input if it requires. So, manager's experience, intuition and judgement, they are very much required. Along with that the planning decisions that are made by the managers are strategic planning, management control and operational control.

So, we need to know, what is meant by that strategic planning, what is meant by management control and what are the different aspects of operational control; because manager is the primary component of a decision support system.

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So, the planning decisions made by managers must be understood in totality. Strategic planning, basically deals with long range plans, it is identifying or setting goals or objectives, it might also involve changing the goals and also deciding or setting policies for acquisition of resources to achieve the accomplished goal.

Management control deals with the decisions to ensure that those resources are obtained and used effectively and in an efficient manner towards accomplishment of those company objectives and goals. And in operational control, the manager is concerned with efficient and effective execution of specific tasks. So, in operational control we are bothered about efficient and effective execution of tasks specific tasks.

In the management control, we are basically trying to find out or ensure that the resources which are needed they have been obtained and used in an effective and efficient manner. And strategic planning deals with setting long range goals, changing the goals if required, and setting the different kinds of policies for acquisition of resources to solve the problem.

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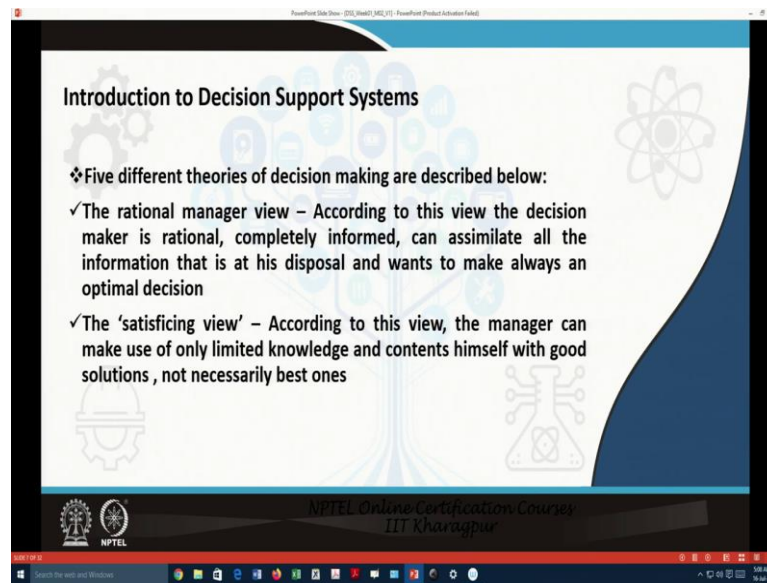
In each of these three classes of planning problems, the problem can again be classified as structured, unstructured or semi-structured. Now, we had earlier discussed that in any decision making problem we are trying to find out or select the best alternative among the several set of alternatives that are available to solve a problem.

Now, several theories exist on the way, these particular alternative among that set of alternatives is chosen that is the way the decisions are made in organizations depend on several theories. Now, a knowledge of these theories may be of help to the designers of a Decision Support System in planning their strategy of design and implementation.

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Five different theories of decision making we are going to discuss. First one is the rational manager view. According to this view the decision maker is rational, he is completely informed of the various factors that are influencing the problem, he can assimilate all the information that is at his disposal and wants to make always an optimal decision.

So, in rational manager's view, optimal decision making is the focus. Here, we are assuming the decision maker is completely rational, he is well informed, he can assimilate all the information that are there at his disposal and he will always try to make an optimal decision.

Next, the satisficing view. According to this view, the manager can make use of only limited knowledge and satisfies himself with good solutions, not necessarily the best ones. He is not bothered about finding the optimal solution. He is trying to find out more or less a good solution which will serve the purpose, because at a given point in time, the manager has got only limited knowledge of the environment which basically govern the problem.

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Next, the organizational procedures view. According to this view the decisions made in an organization can be understood as the culmination or output of certain led down standard procedures invoked by those organizational units where the decision is been taken.

The next theory on decision making is the political view. According to this view, the outcomes of decisions in organizations are largely influenced by power of the individuals who are involved in the decision making process.

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And, then the last view or the class theory is that individual differences perspective. Here, it is assumed that each individual has a different style of decision making and hence, in designing a system, the DSS designer must understand its specific user; he must try to understand the mental makeup of the manager who is taking the decision rather than following some general assumptions.

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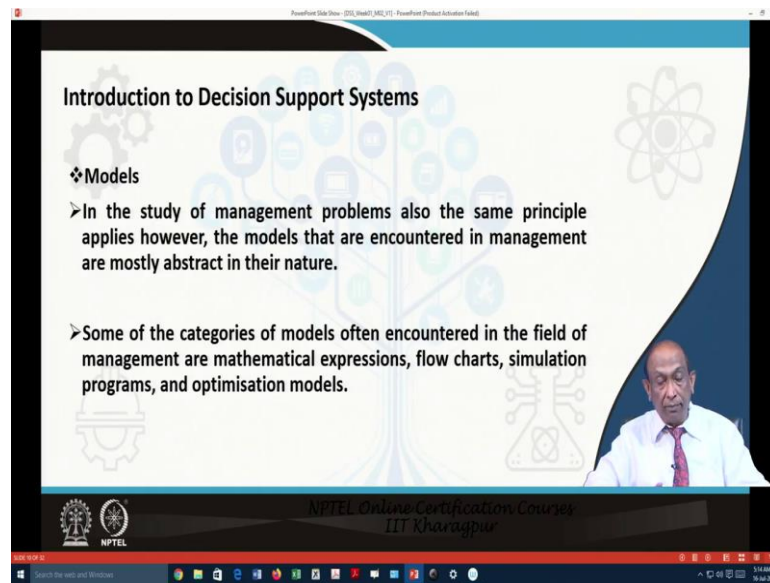
The next component of any decision support system is another very important one that is the models. Broadly speaking, anything that is used to represent something else is called a model. Anything that is used to represent something else is called a model.

Models have been widely used in the field of science and engineering for conducting several experiments, because models can be manipulated more easily than changing real systems. Moreover, models do not contain all those unnecessarily details of the real system and hence, we can understand the models much better.

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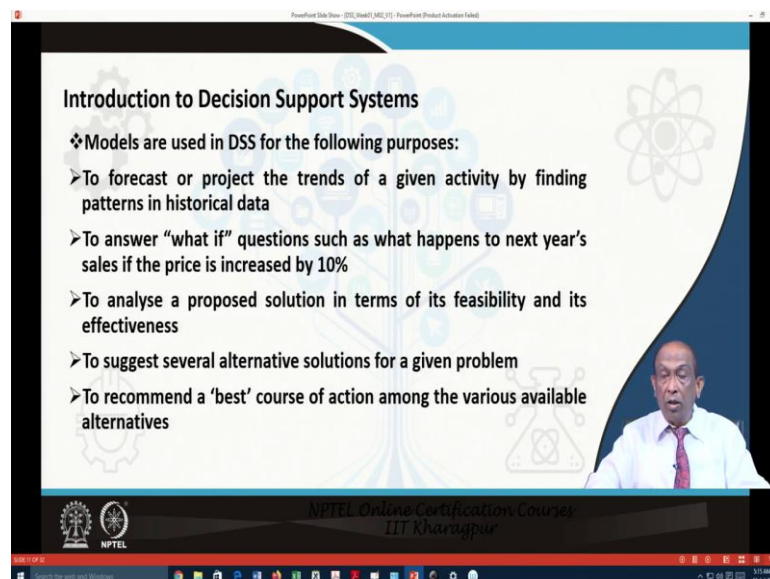
In the study of management problems also, the same principle applies; however, the models that are encountered in the field of management are mostly abstract in their nature. Some of the categories of models often encountered in the field of management are mathematical expressions, flow charts, simulation programs, and optimization models.

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Models that are used in Decision Support System solve the following purposes: number 1; to forecast or project the trends of a given activity by finding patterns in historical data.

All those forecasting models they basically try to find out the relationship or the pattern in data. To answer what if questions such as what happens to next year's sales if we increase the price by 10 percent. This class of problems are sometimes known as sensitivity analysis problem. How sensitive is thus, total volume of sales when the price is increased by some percentage.

Models are used to analyze a proposed solution in terms of its feasibility and its effectiveness. Models sometimes suggest several alternative solutions for a given problem and thereby, models they recommend a best course of action among the various available alternatives.

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So, in an interactive system where the managers in the process of communicating with the computers, they are basically taking the help of these models to solve the problems and hence, models must be easy to communicate with models must be very simple to understand. The nature of models must be extremely simple so that the working managers really understand what this model is about? How this model is working?

Simple models, may not always be very capable, but they have the advantage of being comprehensible means managers can understand those models and hence the acceptance rate of those models go up. Decision makers accept those models which they can understand.

Models should be robust. What do we mean by robustness of a model? In case some invalid conditions arise at any phase in the execution of that model, it should be able to detect such conditions and then take meaningful action. For example, in a model sometimes division by 0 comes in.

So, in that case under this exception condition what should be the recommended course of action is in built into it? So, models robust models must take care of invalid conditions, if they arise at any phase in the execution of a model.

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A model should not be. So, rigid that if a small change occurs in the structure of the original system, then it necessitates the building of the model completely from scratch then the purpose gets defeated.

A model should be flexible enough such that you do not need to build another model from scratch, if there is any change in the structure of the original system. A model should be complete in all respect and for the issue being studied all major variables should be incorporated in the model otherwise; the purpose will not be served.

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Models define the relations between several important entities of the system and as we have already discussed, these are valid only under some assumptions. The price determination example that I was described earlier uses the set of four equations, as we are showing it in this slides; Y 1 1 minus K 1 1 into X 1 minus K 1 2 equals K 1 3 that is the first equation.

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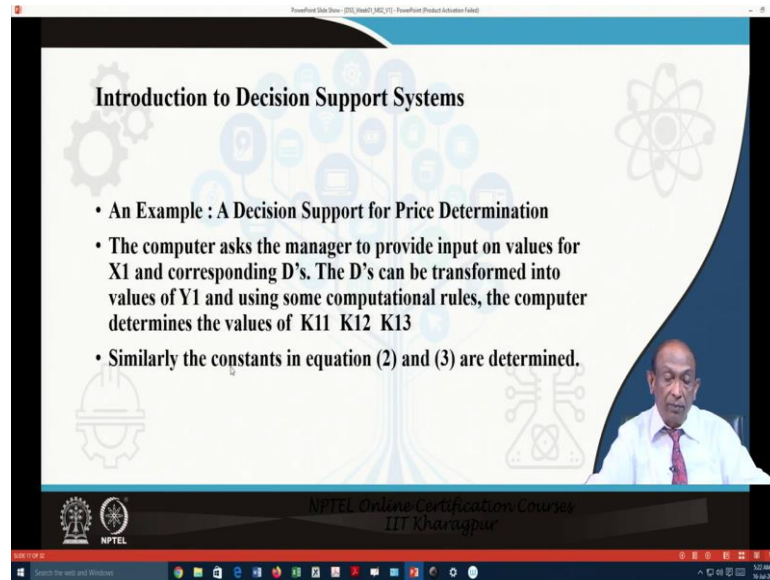
In this manner all these three equations and the last three questions the last equation fourth equation the demand is related to all these three indices Y1, Y2 and Y3 with their respective weights a, b and c.

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In here, the computer asked the manager to provide input on values for X1 and corresponding these, that is a demand price index or demand quality index or demand advertising index, those are all Y1, Y2, Y3. These are overall demand for the product and these D's can be transformed into values of Y 1 and using some computational rules, the computer determines the values of K11, K12, K13 as well as other constants.

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Similarly, the constants in equation 2 and 3 are determined. These three equations define the relation between a demand index and one independent variable while holding the other independent variables constant. And the computer makes use of equation 4, the last equation to determine the demand when more than one of the independent variables change. And in that equation a, b and c are weights that determine the relative importance of the three indices Y1, Y2 and Y3.

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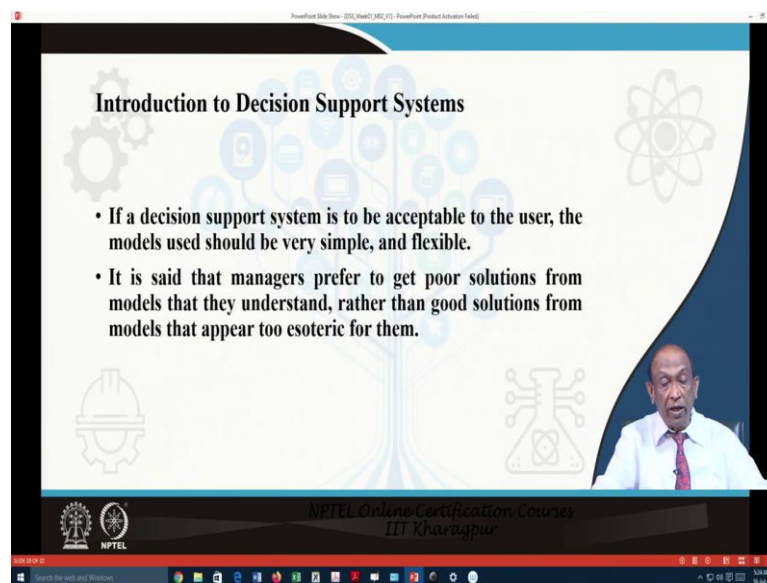
Using equations 1, 2 and 3, the weights a, b and c are determined by the computer and for certain levels of the three variables and for certain changes in two of the three variables, the demand is computed and output.

The manager can have the values of this weights revised, if the value given above does not agree with what he intuitively expects.

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So, that is why we want to say that the most important thing is that any decision support system has to be acceptable to the user, the models used should be very simple, and flexible. It is said that managers prefer to get poor solutions from models that they understand, rather than good solutions from models that they do not understand. Models that appear too esoteric for them, those models are never accepted by the managers.

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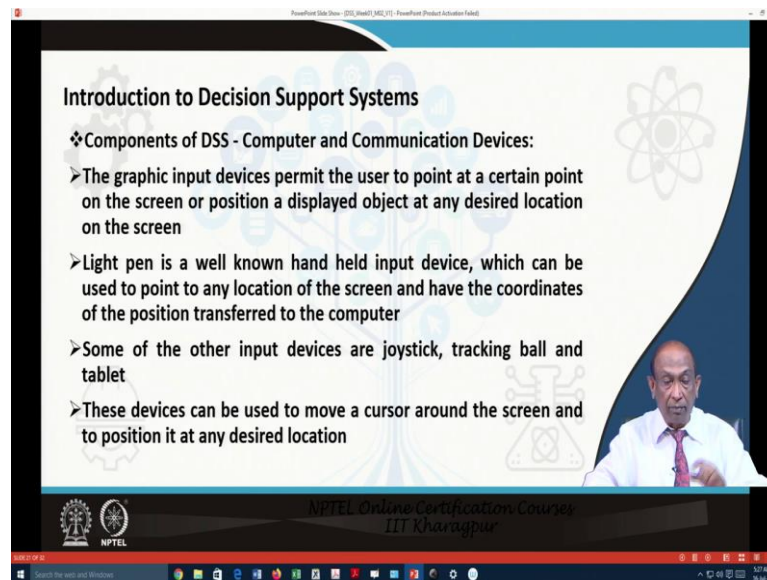
In discussing the components of decision support system, the third one is the computer and communication devices. The ability to interact with computer in an online mode is the essence of conversational characteristics of any DSS. The information content of any data is grasped by humans much more rapidly if it is displayed in the form of a diagram rather than as a table of numbers. A picture is much more worth than a set of numbers.

In many decision support system, we find display of pictures through graphic terminals. The user can specify positional input more easily and naturally through those graphic terminals, through those graphic a, because he can position the mouse pointer there and the coordinates get captured. So, these were can specify positional input more easily and naturally and those coordinates will be captured by the model.

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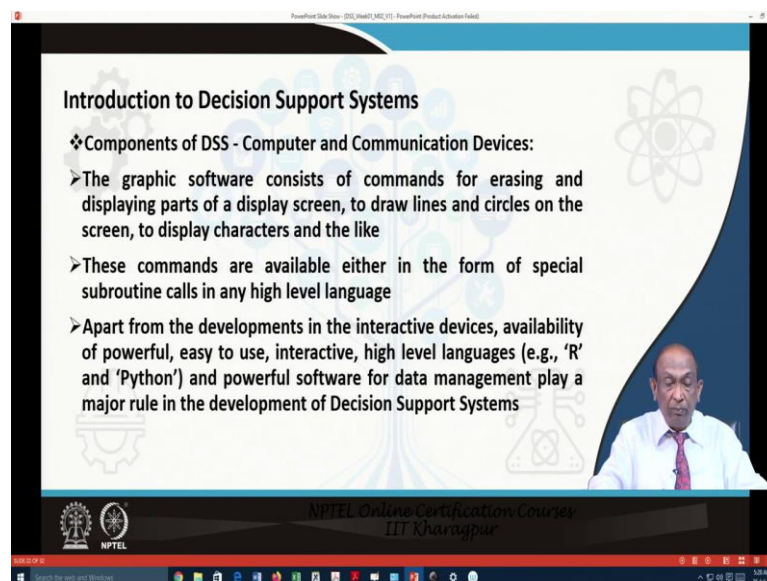
The graphic input devices permit the user to point at a certain point on the screen or position a displayed object at any desired location on the screen, as I had rightly told you earlier. And the you see, light pen is a well known hand held input device, which can be used to point to any location of the screen and have the coordinates of that position transferred to the computer. Some of the other input devices are joystick, tracking ball and tablet. These devices can be used to move a cursor around that screen and to position it at any desired location.

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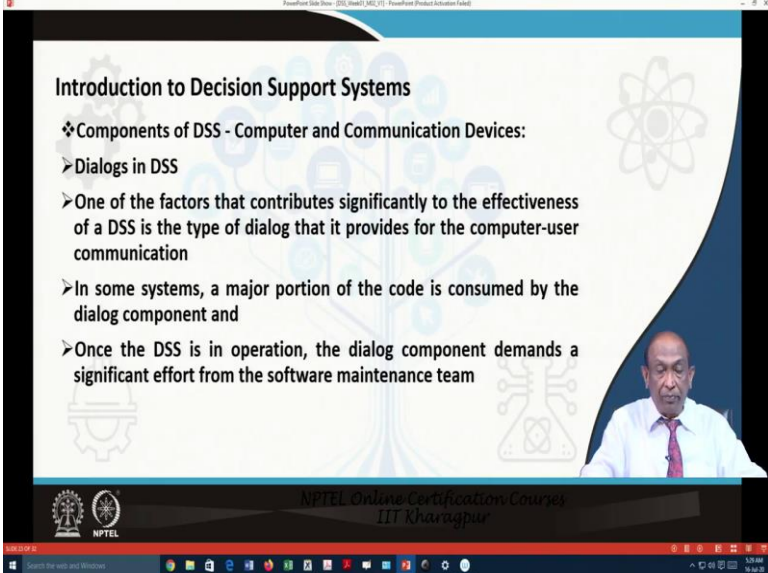
The graphic software consists of commands for erasing and displaying parts of a display screen, to draw lines and circles on the screen, to display characters and the like. These commands are available either in the form of special subroutine calls in any high level language.

Apart from the developments in the interactive devices availability of powerful, easy to use, interactive, high level languages. For example, R and Python and powerful software for data management systems play a very important role in the development of Decision Support Systems.
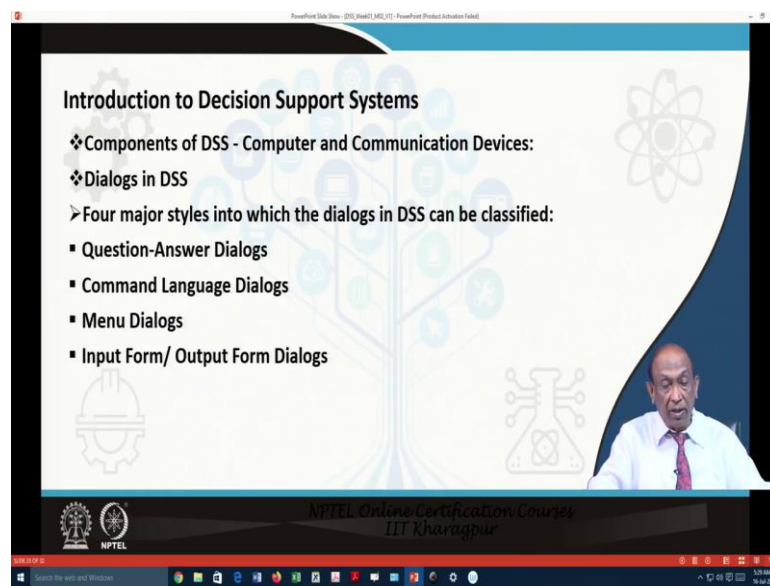
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Another important thing is that the dialogs in DSS. One of the factors that contribute significantly to the effectiveness of a DSS is the type of dialog that it provides for the computer user communication. In some systems, a major portion of the code is consumed by the dialog component and once the DSS is in operation, the dialog component demands a significant effort from the software maintenance team.
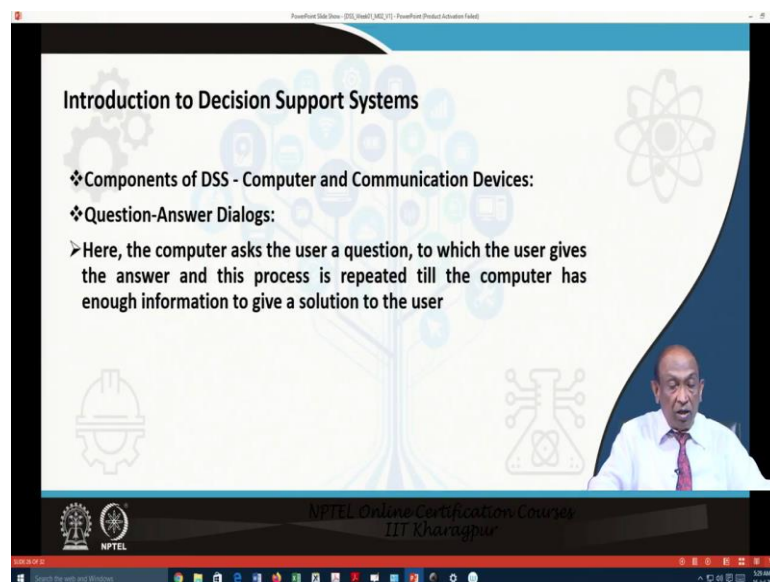
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Four major styles into which the dialogs in DSS can be classified are the question and answer dialogs, command language dialogs, menu dialogs input form and output form dialogs. All of you are familiar with all these four major styles of dialogs.
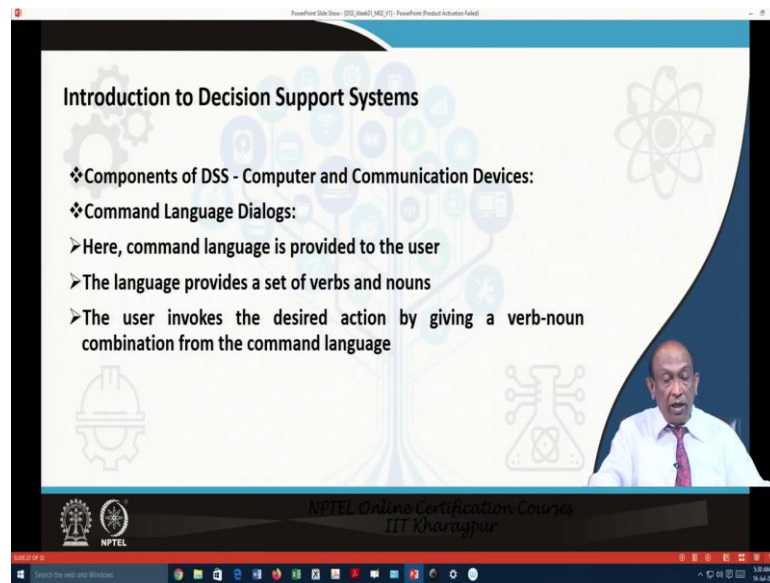
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Question answer dialogs here; the computer asks the user a question to which the user gives the answer and this process is repeated till the computer has enough information to give a solution to the user.

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In the command language dialog, the language provides a set of verbs and nouns. User invokes the desired action by giving a verb-noun combination from the command language.

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In menu dialogs, the user points at a desired alternative out of the set of alternatives available to him and the advantage here is that the user does not have to type in anything, but as to merely select from the displayed alternatives.

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And the input form and output form dialogs here, the computer displays an input form similar to the paper forms familiar to the user. The user can enter values in the input form; the output is also displayed in a form, familiar to the user. Then the user can request for and fill in another input form to continue the dialog.
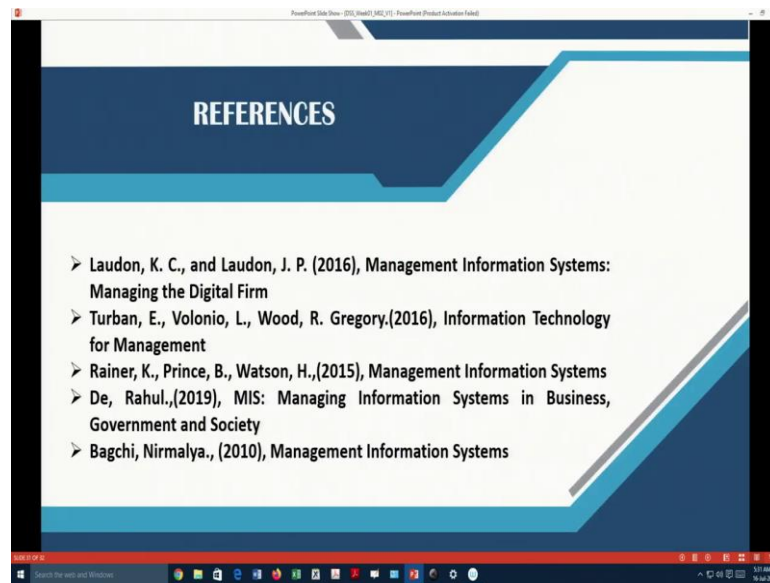
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It has been observed that several of the systems use the dialog styles not belonging exclusively to any of those above styles that I have mentioned, but combine features from one or more of them.

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These are the references we have used for this particular module.

Thank you all!