Course on E-Business
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Module No 02
Lecture 08: Types Of Business Information System

Welcome back. Today we are going to learn about different types of business information system.

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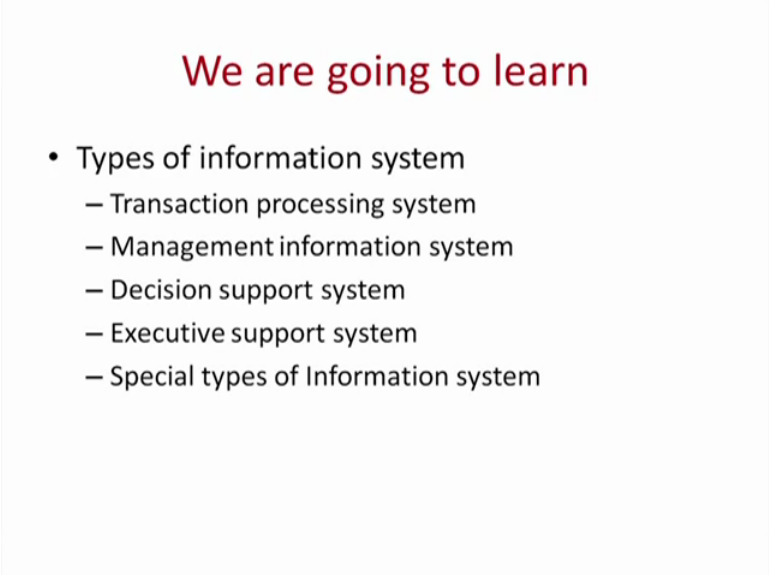

In fact in this lecture, we are going to learn about transaction processing system, decision support system, management information system, executive support system and various special types of information system.

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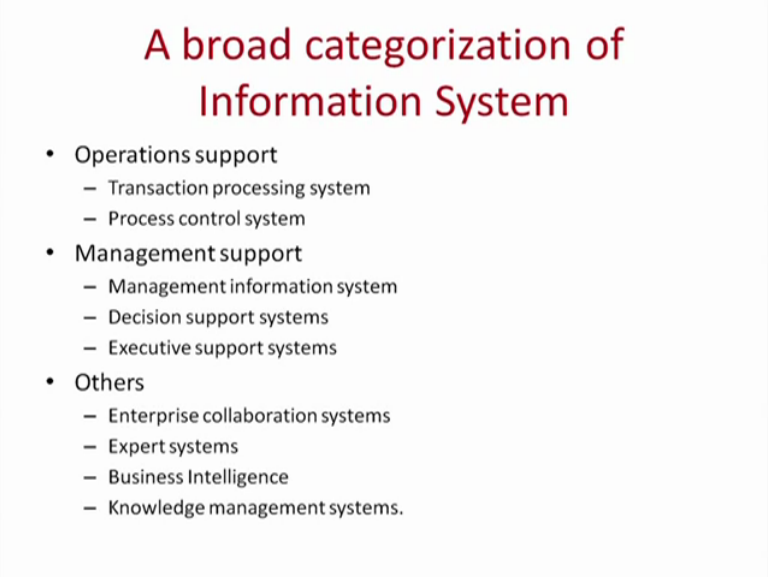

We start with a broad categorisation of this information system and which we divide into 2 parts, one is the information required for operational support and information required for the management support. Under this information required for operational support, we have transaction processing system of which we are going to talk about, then there is process control system for which we are not going to have a very is because they are basically the about controlling the operations and about the technical, getting the technical input we are not going to get a lot of discussion on it.

Then we have for management support, we have 3 types of support systems, management information system, decision support system and executive support system. And there are other types of information system, for enterprise, collaboration, for automatically getting expert opinion about business intelligence, knowledge management system and so on. We are also going to have brief discussion on each of them.

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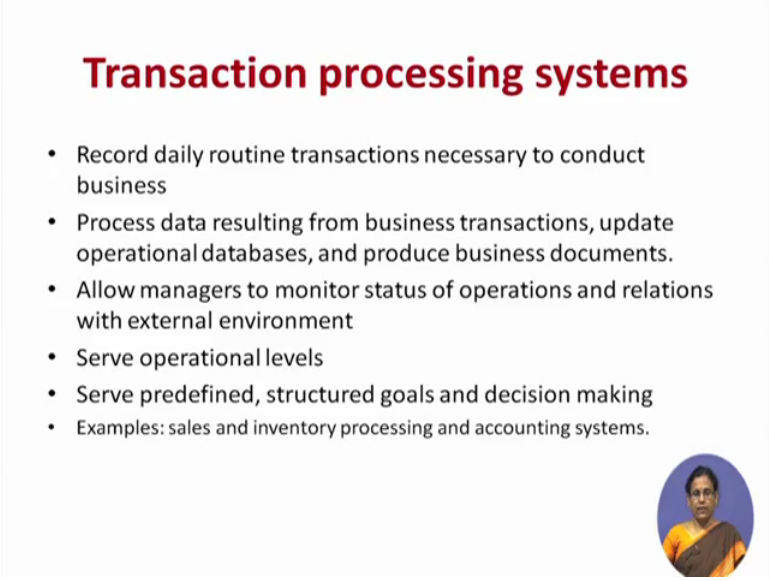

The 1st one is the transaction processing system. Transaction processing system is the one which captures the daily transactions happening in the business model. This particular data gets generated with every transaction. In fact, last class we were talking about this point of sales data and this think about the point of sales data, everyday whenever any sales takes place, consider any store that you are going, every sale takes place, that sale is actually gets captured at the point of sales device and it is stored in your database.

So that is one example of transaction data. So what this transaction data does? This allow the managers to monitor the starters of the operations and their relations to the external environment. And this particular transaction processing system actually helps the operational level. It actually captures the data, it does some kind of raw processing and it provides that output to the operational level people for decision-making.

So it has certain, it serves certain predefined and structured goal towards decision-making. So for example here, there is one example again, point of sales data is one example, then again the sales and inventory processing and accounting system, they are also very you know they do not involve any kind of very complex analytical processing. So they are at the transaction processing level.

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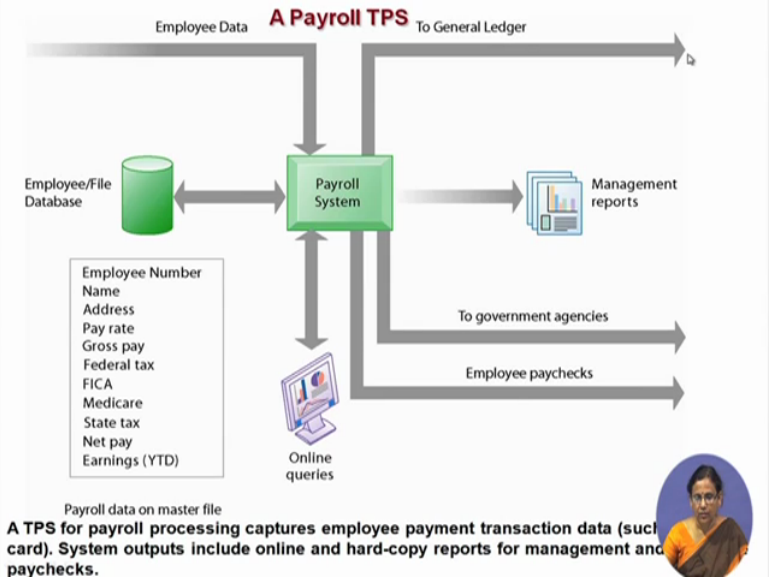

Look, this is one example of a payroll system. But here, payroll system as you know is a transaction processing system but what we are going to trying to show it here that various components of a transaction processing system that exists. Look what this payroll system does? This payroll system gets the employee data, puts it into the database, then from this this database can contain many attributes like employee number, name, address, all the details about the employee.

Then it once this payroll processing is done, the data is sent to the general ledger for further processing. And if you look at this, this general ledger is not any kind of human being or any kind of end user. It is just another software which takes the input from this payroll system. So similarly, the output can go to the management as management report, it can go to the government agency for what? For processing the income tax, et cetera and of this, paycheques get generated.

So basically what is the input to the system? Input to the system is the employee database, employee data and output goes to the general ledger, to the management as management report and it goes to the government employees for tax calculation, tax deduction. Then it also get some kind of physical output that is your employee employee chain. So this is this is something which is you can say this is a predefined output which goes to various entities.

But additionally, a transaction processing systems can handle certain queries which may not be predefined. For example, who are the employees who earn more than Rs. 2 lakh per annum. Maybe you do not have a already existing management report for this. But based on your query, you should be able to get that data from your payroll system. So this TPS for payroll system processing captures employee payment transaction data and it produces the output which includes both online and hardcopy and it can also provide certain answers to some certain kind of online queries.

But here, the point to note is, it is the kind of calculation that happens within this system is actually very rudimentary calculations, they do not involve any kind of complex, analytical statistical models. So this is the characteristics of every transaction processing system.

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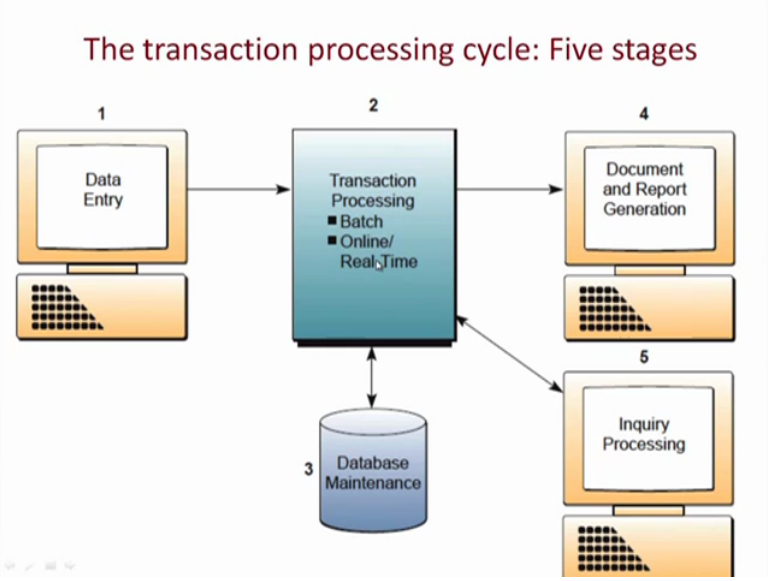

So your every transaction processing, that was one example. Every transaction processing cycle has 5 stages. So what are those stages? Data will be captured, there will be some kind of data entry, this data entry can be either batch, in a group it will in a whole batch, the data will be entered or it can be entered online on a real-time basis. Your point of sales data is one online real-time example data. And how the data entry happens in the point of sales device? It happens using a barcode reader. And if the barcode reader does not work, how the data entry happens?

If by chance the data the barcode label is actually distorted, how the data entry happens? The operator himself, the person who is at the counter he himself will be entering the data. Then, once this data is entered and for this you have, for this data entry, you have one user interface screen from which the data gets entered. Now once this data is entered, where does it go? This data is entered into the database system. So the 1st stage is data entry. Data is captured and processed.

It is put in the database system. Then from the database system, whenever there is any kind of there are certain routine kind of as I have told you in case of payroll system, there we saw last example in the payroll system, there are certain reports which are generated regularly. But there are certain online queries as well. So the 4th stage is generation of these reports.

So these documents and reports, these gets generated at the 4th stage and the 5th one is the online queries. So in this online queries, you do not have any kind of predefined format for within which which has to be generated on everyday basis or weekly basis or in other words in a regular basis. They are not generated in a regular basis. On demand, they are generated on demand. So these are the 5 components of a transaction processing cycle.

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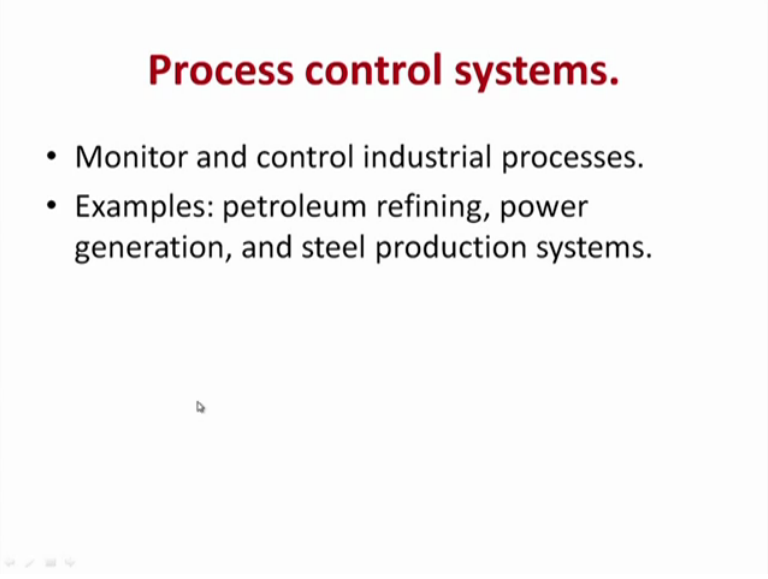

Then as I have told you, your next kind of, to remind you, we broadly classified operation, your information system into 2 categories, the information system which supports at the operational

level and the information systems which support the management. At the operational level, we saw that these transaction business transaction data gets captured through transaction processing system, gets captured and processed through perfection processing system.

So next operational level system is your process control system. As I told you, we are not going to have a huge amount of discussion on this but they are the control system which exists in every industrial process and they monitor and control industrial processes. These examples include petroleum refining, power generation, steel production system and so on. But we are not going to have a number discussions on this.

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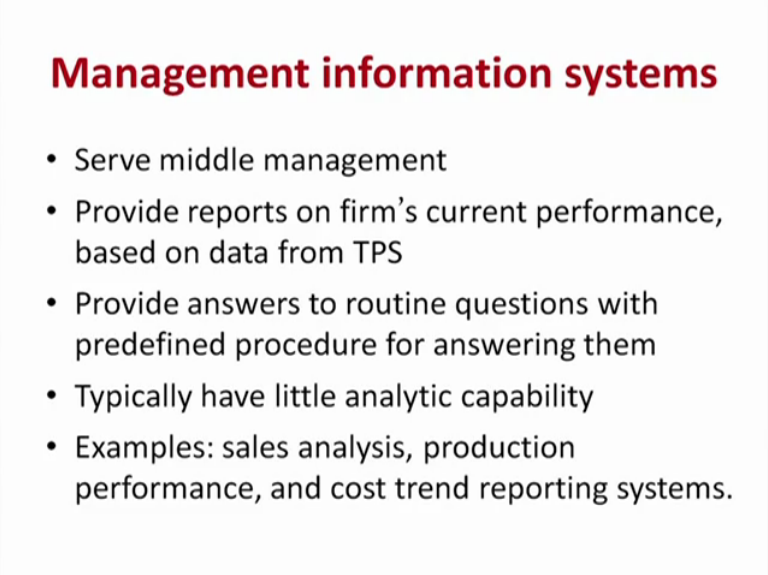

Then the next level of information system that we are going to discuss is about Management support. This management support as I told you, there are 3 categories, Management information system, decision support system, and executive support system. Besides that, there are certain specialised information systems that also we are going to discuss. Now coming to this management information system, this helps the transaction processing system helps the lower level of management but the management information system serves the middle level management.

It provides the reports on firms current performance based on the data available from the transaction processing system. Now the characteristics of the management information system is

it is based on the data under transaction processing system. It does not capture the data on its own. It gets, the data gets captured at the transaction level through the transaction processing system and management information system just summarises and generates various kinds of reports out of this transaction data.

So such systems provide answers to routine questions with predefined procedures for answering them. Typically they have very little analytical capability and here it, examples include sales analysis, production performance and cost trend reporting systems.

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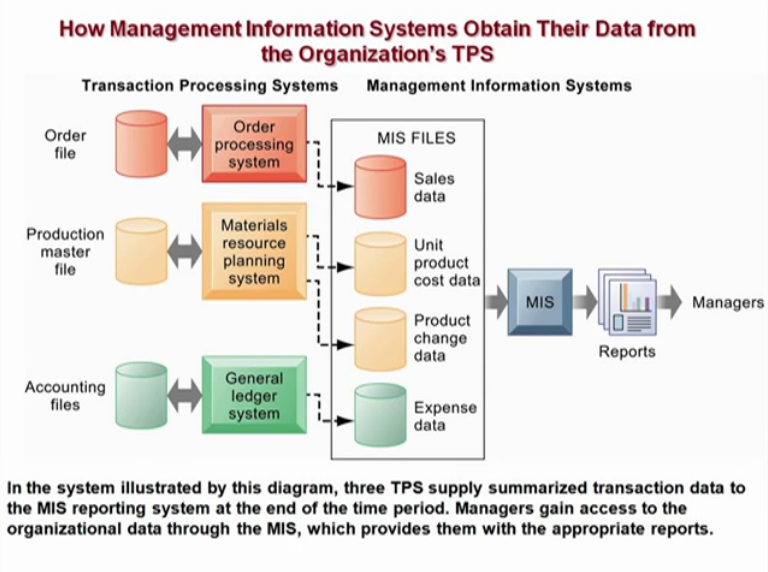

Now this is one example of how this Management information systems captures data for transaction processing system. Look at this transaction processing system, this is about preparing a report, this is about preparing a report for the sales, let us say sales performance of the company. It gets data from various transaction processing systems. Let us say there is one order processing system, there is one , and you have your material planning system, you have your general ledger.

From each of these, the data comes to and stored in the database. Now it is the work of the management information system to organise this data to create management reports.

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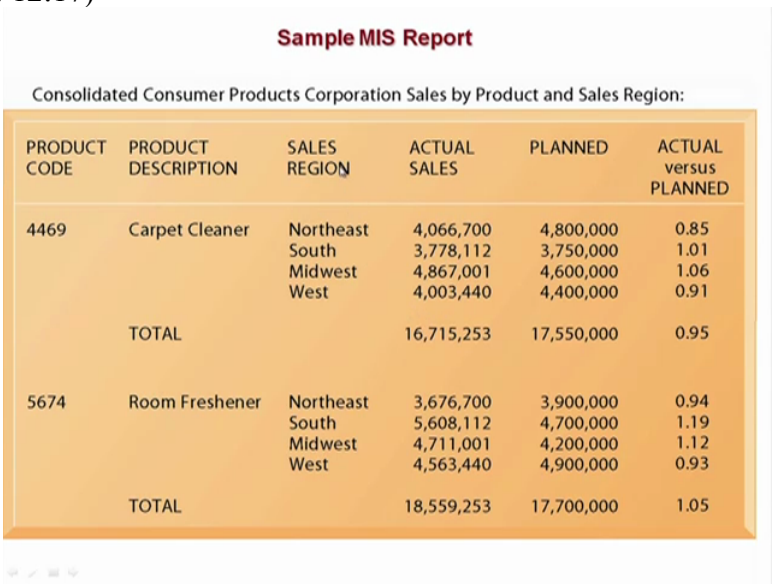

PRODUCT CODE	PRODUCT DESCRIPTION	SALES REGION	ACTUAL SALES	PLANNED	ACTUAL versus PLANNED
4469	Carpet Cleaner	Northeast	4,066,700	4,800,000	0.85
		South	3,778,112	3,750,000	1.01
		Midwest	4,867,001	4,600,000	1.06
		West	4,003,440	4,400,000	0.91
	TOTAL		16,715,253	17,550,000	0.95
5674	Room Freshener	Northeast	3,676,700	3,900,000	0.94
		South	5,608,112	4,700,000	1.19
		Midwest	4,711,001	4,200,000	1.12
		West	4,563,440	4,900,000	0.93
	TOTAL		18,559,253	17,700,000	1.05

This is one typical example of a MIS report. In this particular report, we have the details of the how the sales has happened region wise. Now look, here the sales regions are not, it gives the data about the sales region. Now how this data has come to this? Now there will be various, you need under each of the sales region, the at the transaction level, the data gets captured each of the units and finally it is summarises and comes in form of this management inform MIS report.

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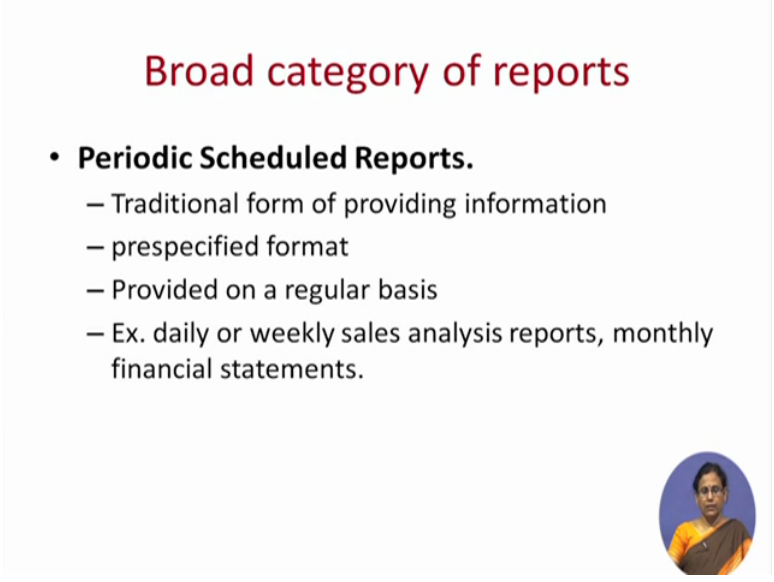

There are 4 broad category of MIS report. 1st one is your periodic or scheduled report. This is the traditional form of providing information. It has a prespecified format and it is provided on a

regular basis, either daily, weekly, monthly and so on. For example, your daily, weekly sales analysis report, monthly financial statement which regularly comes to the table of the managers. So this is, these are actually called periodic scheduled reports.

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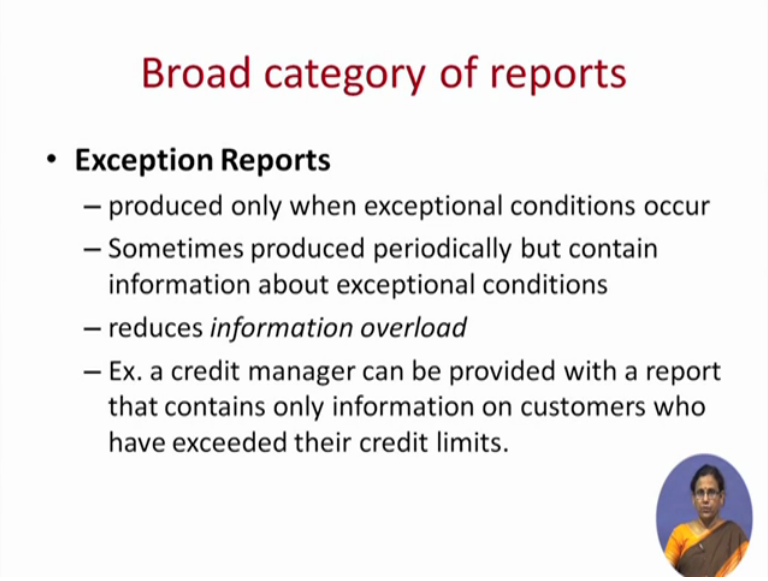

Then the next category reports are exceptions reports. So these reports are produced only when some exceptional conditions happen. These exceptional conditions it is not that they do not are produced periodically. Sometimes they are also periodically periodically collects the exception conditions. So, and why such reports are produced? These reports actually see, if there is some exceptional condition and provide a regular report which contains huge amount of data, now identifying those external conditions is actually difficult for a manager.

So to reduce this information overload on the manager for going through each and every line to find out exceptional condition, so what happens? One exception report is also produced. So for example, a credit manager can provide with a report that contains only information on customers who have exceeded their credit limit. In fact, you can have corresponding regular report in which credit information about all the entities are there but along with that you should have a special report which shows which all customers have exceeded their credit limit.

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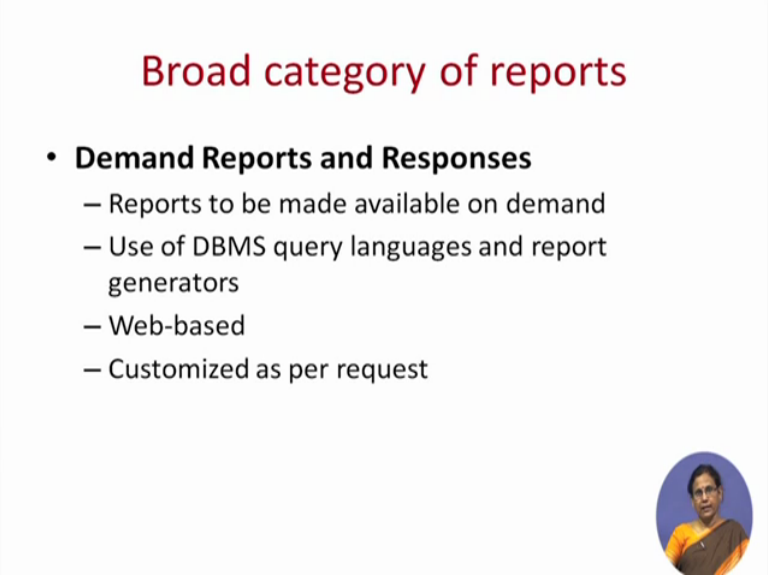

The next report is your demand reports and responses. In case of transaction processing also, we saw there are certain demand reports but those demand deports are not in a very, they are very, at a very low level and they are not, do not have lot of processing involved. So in fact, here we can have some complex DBMS query which can be which can a manager can put to the information system andget the answer of that query.

So now such systems can be either web-based or they can be your client server based. And basically, client server based systems are now not very prevalent, they are mostly web-based and they are they can be customised as per the request of the manager.

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The next category of report is actually push reports. These push reports, the manager in the other 3 categories, the manager knows about those reports and those and sometimes they are gets generated because there is a query put by the management but these push reports are something which are automatically pushed to the desktop of the manager. By automatically pushing means the manager does not consciously ask for these reports. But these reports are important so that they are pushed to the desktop or the workstation of the manager.

And the companies are using using many, for example, what your competitive is doing, what are various news article coming in the web about your competitor and performance of your competitor and your own performance. Now, there can be some software which extracts those kind of news articles and pushed it into the desktop of the manager. So those are called Webcasting software which does such kind of generates broadcast such kind of selective reports to the desks of the managers.

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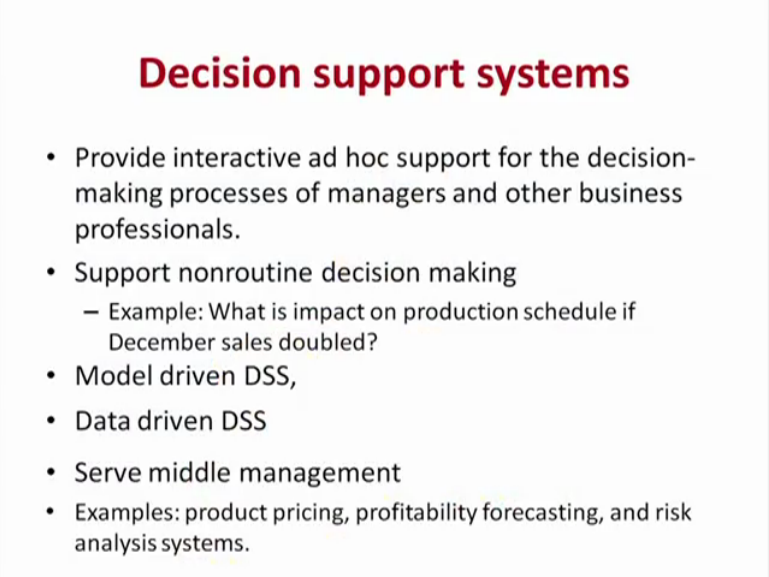

Next category of information system is actually decision support system. Such decision support systems again serve the middle management. Such system decision support the reports coming out of such decision support systems are actually not for routine decision-making. They are for nonroutine decision-making. They provide interactive ad hoc support for decision-making processes of the managers and the other business professionals.

There are 2 broad category of decision support system, one is model driven decision support system which uses analytical models and the 2nd one is your data driven decision support system which is based on the data that gets generated in the transaction processing system or already summarised in the form of MIS reports. The examples include about product pricing.

Look, we are actually pricing when it comes to pricing the product, this product pricing can be made dynamic, is not it? Whenever we buy railway tickets, whenever we buy air tickets, do you think that the price of that particular ticket remains constant? No. It keeps changing. Why it keeps changing? Depending on the time of purchase and the demand for that particular product, the price keeps changing.

Now, who is there to change this price? There might be a there is a system which in case of your airlines, it is called yield management system which actually automatically considering which which runs some kind of stochastic optimisation model which actually gets the data, your

customer demand data and the time remaining, and what is the kind of demand you are getting for your product and the time remaining for the product, your airline tickets are actually, they have a shelflife.

After the shelf life, become useless. So within the shelflife, they try to manage and they try to provide some analytics model so that the price automatically gets changed.

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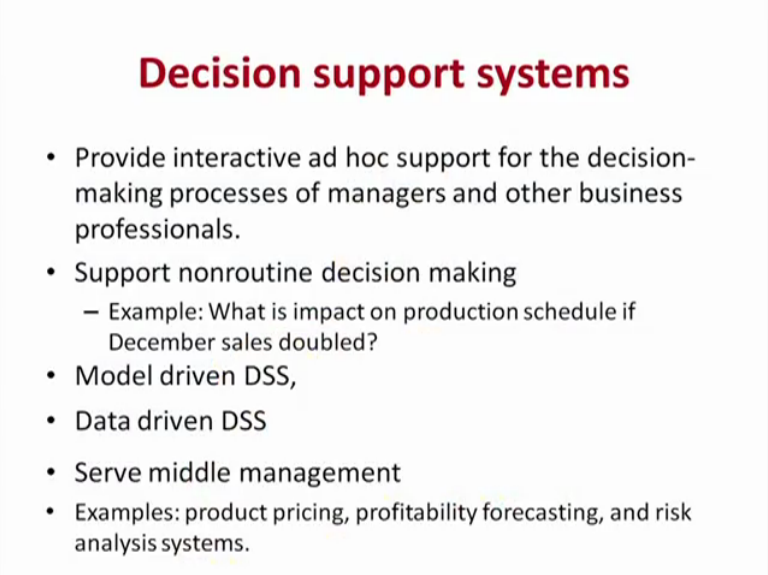

So similarly this profitability forecasting, risk analysis, all these are examples of decision support. Again one example, one more example of the analytical model, how an analytical model can help in doing this voice estimation. So here, what happens?

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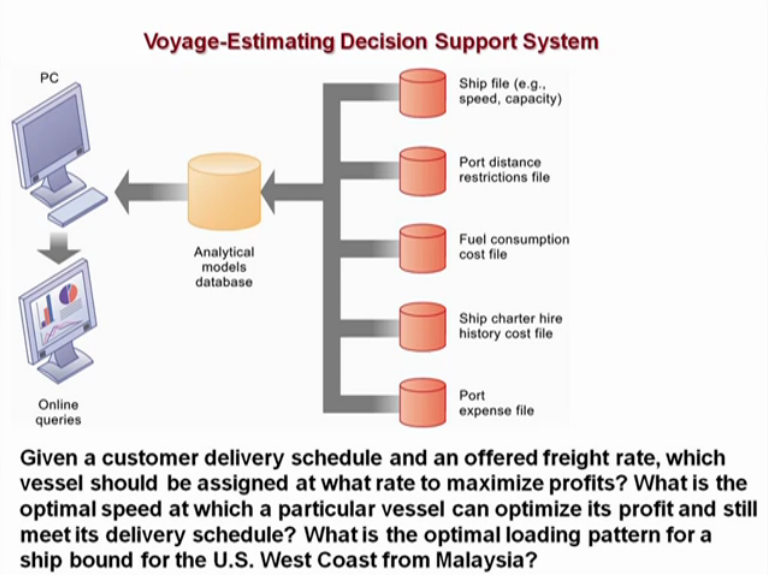

The input to this is given the customer's delivery schedule and offered freight rate, which vessel should be assigned at what rate to maximise the profit. So it is basically a profit maximisation problem and here, the constraints are the customer's delivery schedule and the offered freight rates, so using which, one optimisation model can be made and that optimisation model can be solved to answer various queries.

Now what are the what are the queries? Like what vessel should be hired, now what is the optimal speed at which a particular vessel can run to maximise its profit and still can comply to the delivery schedule? What is the optimal loading pattern for a ship going to certain going to certain area and so on? So basically the point that I am going to make is if you compare one MIS report here also we are getting certain reports of for the management decision support but if you compare one generic report of MIS and one report for DSS, you can see the kind of processing that happen in case of MIS reports is very simple.

Let us say, we saw that example of region wise sales data. So in the region wise sales data, what happens? You simply combine the data from various sales reports of a particular region and you simply summarise that data but in case of this voice estimation system, you are actually running one analytical model, one optimisation model to find out various parameters which you should be using while selecting and running your vessel.

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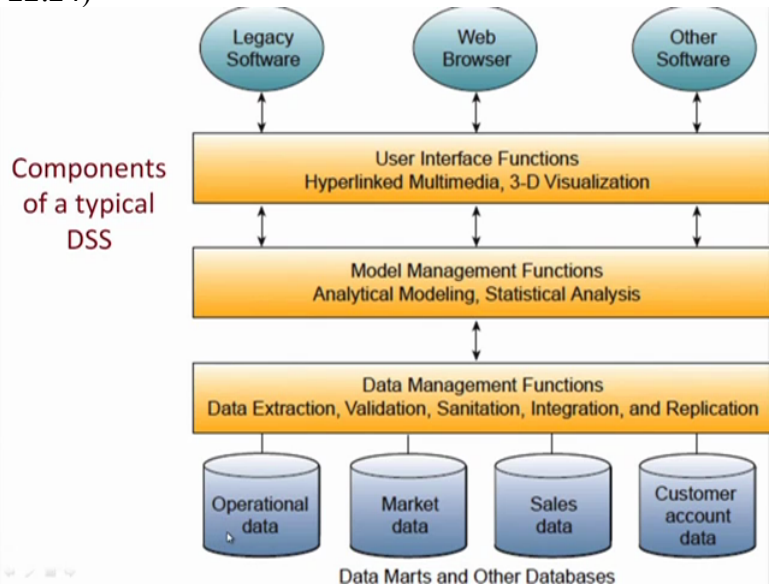

So these are the typical components of a decision support system. You have the data from again here also you get data from various sources and mostly they are at the transaction processing level. Means operational data, market data, sales data and customer data and so on. Then you have many data management functions for data extraction, data validation, data sanitation, integration, replication, et cetera and finally you have something called some models. So these models can be either analytical models or it can be some kind of statistical model.

So using this model, you analyse the certain data, for example last example we saw in that voyage this thing, we were trying to figure out what should be the parameters which maximise the profit. And similarly, in case of forecasting, you can do some kind of, you can use some kind of forecasting module to which is basicallyand to do the statistical analysis for forecasting.

And once the output of the model can be rendered in through certain user interface functions, so these user interface functions, these user interface functions either connect the decision maker to the web browser. It, directly the input from this can go to another software model. It can go to certain legacy system or it can even come in a form of certain report. So whatever may be the case, the major difference here is, with that of management information system, it uses some kind of analytical or statistical model.

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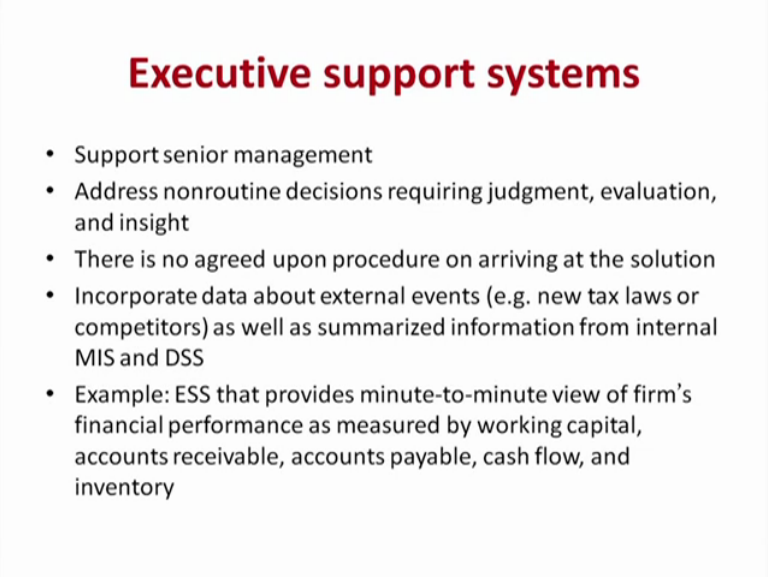

Then the next one is actually your executive support system. This particular support system is meant for senior level management. And this addresses many nonroutine decision which not only involves the input from the organisation but it also involves input which is external to the organisation. And for such kind of thing, there is no agreed-upon procedure for arriving at the solution.

It incorporates the examples include that I mean your minute to minute view of firm's financial performance as measured by the working capital, accounts receivable, accounts payable, cash flow, inventory, et cetera. At a time so that see these information are very rudimentary but suppose the company wants to take a decision, take a strategic level decision, it requires all these inputs.

At a time, the manager requires, strategic level managers require all these input at a time on his desktop or on his screen so that using data from various sources, he can take the decision.

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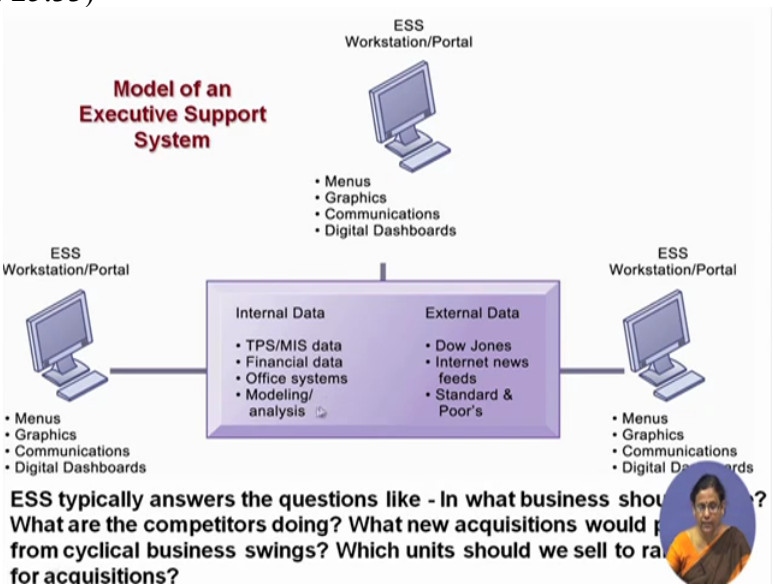

Now look at this. You can say this is a model of an executive support system. And here, you use both external data which is coming from TPS and MIS and sometimes from the various models like you can have your decision support system which runs simulation model, one analytical model or statistical model. Data can come from various external resources. Stock price data, your various indices, financial indices and so on.

And this ESS this particular kind of information system actually answers many strategic level questions like what are the competitors doing? What new acquisitions should protect us from cyclical business swings? Which units should we sell to raise cash for acquisition and so on?

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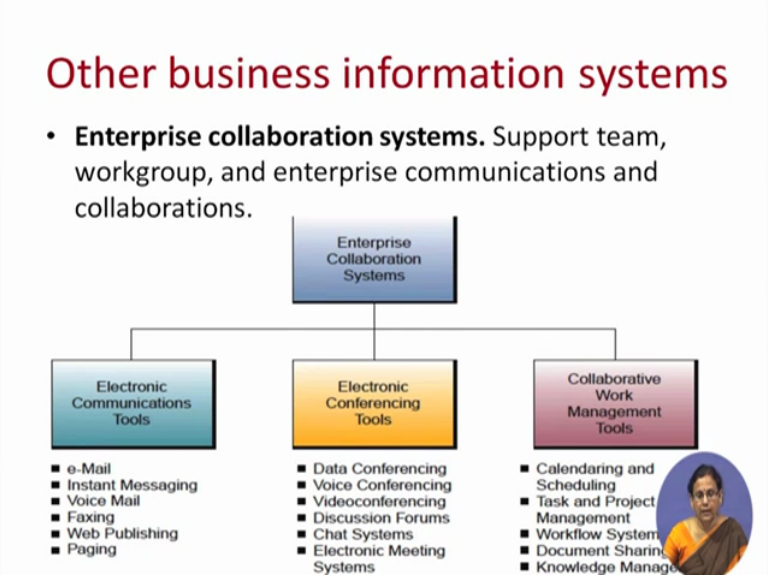

So there are many other information systems as well. So the next category is our enterprise collaboration system which supports teams, workgroups and enterprise, supports enterprise communication. So broadly, it can be classified into 3 categories, electronic communication tools, electronic conferencing tools and it can and the 3rd one is your collaborative work management tools.

And here of course, within this electronic communication tools, you these emails, instant messages, voicemails and so on. And within this, this conference management tools, you have videoconferencing, audio conferencing tools and so on, chatting system, and here, you have this scheduling systems, tax management system, workflow system and so on.

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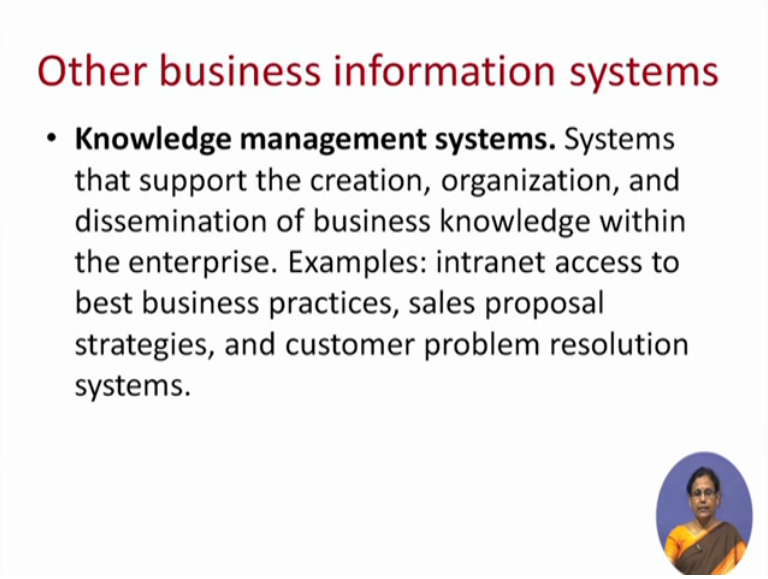

And the next category is your knowledge management system. The system support the creation, organisation and dissemination of business knowledge within the enterprise. And and this comes in again it is not pertaining to any particular level of management. This can, starting from your operational level to your strategic level, everybody can use this knowledge management system at which is appropriate for them and this basically contains the best practices and the previous experiences in support of decision-making.

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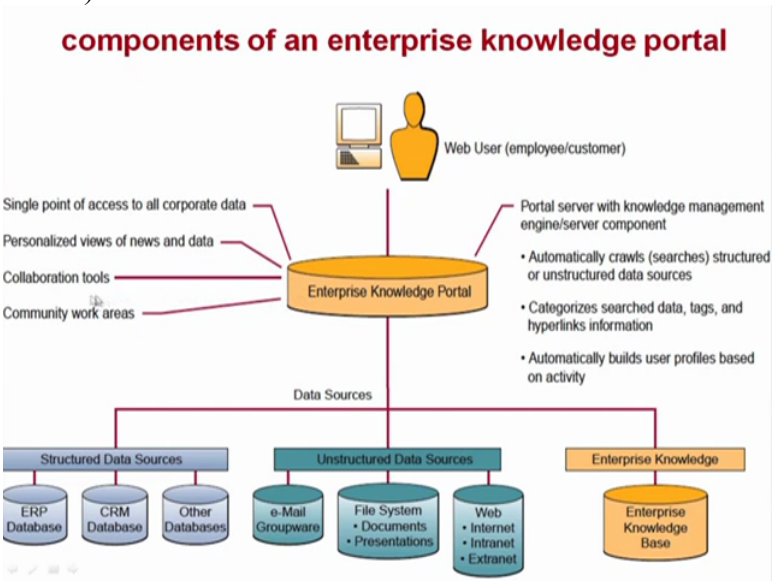

So this is the typical components of an enterprise knowledge portal where you have a typical employee and web user who is searching for the enterprise knowledge portal will be using the data from various sources. It includes your structured data sources, it can include some unstructured data sources like your email and data coming from Internet and web. It can also use the data from enterprise knowledge base which has already stored the experience of other members.

And it provides a single point access to all corporate data, it provides the personal view of news and data. It uses many collaboration tools and communication network. And they actually serve, this portal serves the knowledge management facilities for the engineers and I mean the this particular thing is actually the data which provides support to all the 3 levels starting from engineers, your and top-level management, even the operational level management.

And sometimes, it also uses the data sources which are automatically crawled from the network. They also categorise the source data and the tagged hyperlink structure and they automatically build profiles, the user profiles based on the activity and finally show it to the web user.

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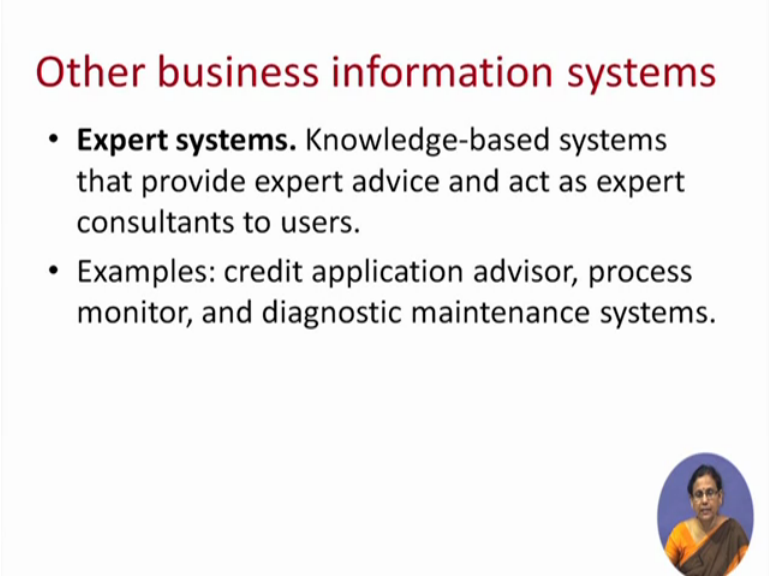

The next level is your expert system. Expert systems are actually knowledge-based systems which acts like that of an expert. Now the difference between your enterprise knowledge management system and your expert system is, in case of knowledge management system, you

get the experience of others, other employees of the organisation at different levels and you store that knowledge in the database in the knowledgebase.

But here in case of expert systems, you require the you actually, the system emulates the activities of an expert. The expert has his his his personal experience and this personal experience is fed to the system and this system in turn helps the decision maker also decision maker who may not be an expert in that field can get help of the expert system to derive the knowledge. The examples include credit application advisor, process monitor, diagnostic maintenance system and so on.

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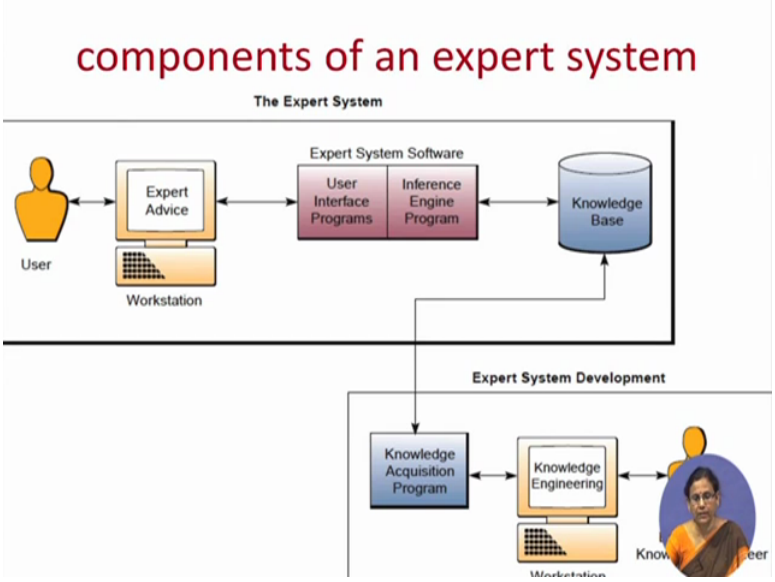

These are the typical components of an expert system. In case of expert system, you have basically 2 broad modules. One module is to collect the data from the experts, this knowledge acquisition system actually asks many questions to the knowledge to the expert and collects the data and put it in the knowledgebase. And this knowledgebase is accessed by the user, there is one inference engine which is accessed by the user interface program and it it accesses this knowledgebase and provides the answers to the queries of the user.

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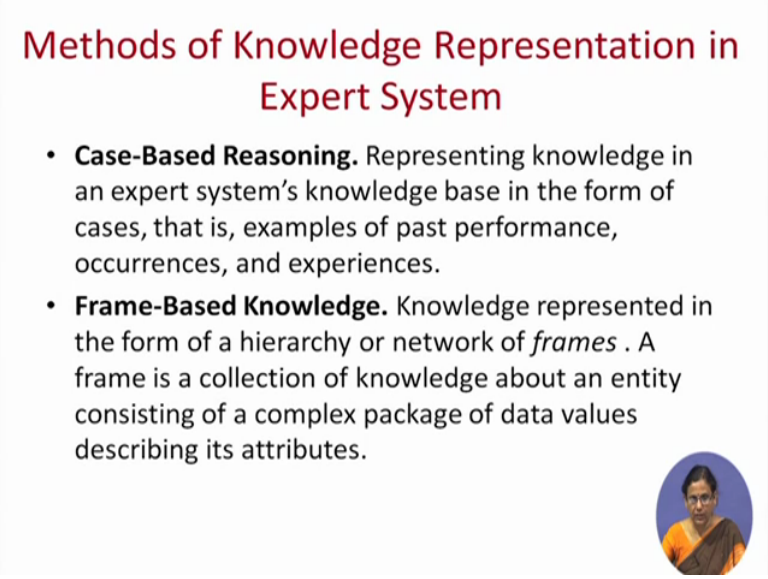

There are 4 different ways in which the knowledge can be represented in the expert system. 1st one is your case-based reasoning which represents knowledge in the form of an expert knowledge depending on the previous cases which the expert has cited and the data is stored in form of cases. The next one is the data, this 4 method of knowledge representation basically main how the knowledge is stored in the knowledgebase.

The 2nd way of storing the knowledge is called the frame-based knowledge. In this knowledge, the in this form, the data knowledge is represented in the form of frames where the frame is basically the collection of knowledge about one entity. And the data values about that entity gets, data values which means the attributes about the entity gets stored in the form of frames in the knowledgebase.

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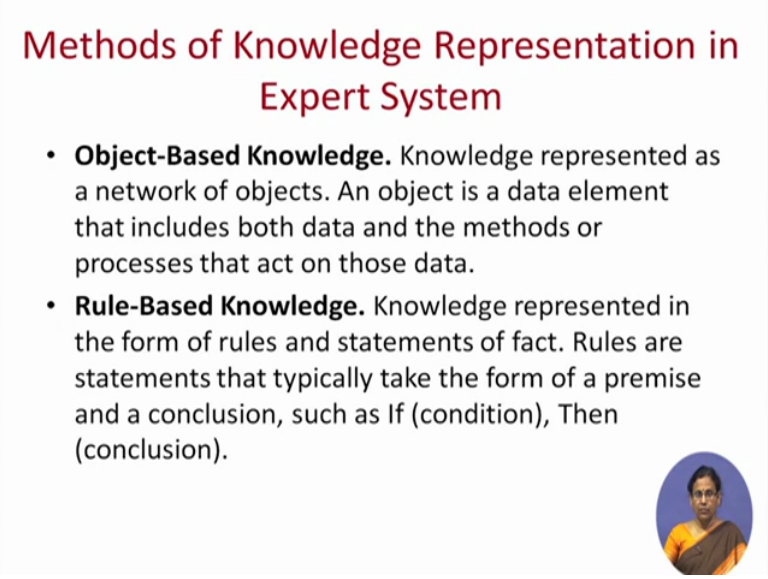

The 3rd one is actually object-based. It not only stores the data about the object, it also stores the relationship about the object. And the knowledge is represented in the form of a network which connect various entities through relationships. Then the 3rd one is actually rule-based knowledge. Here, the knowledge is represented in form of if, then else rules, if then else rules. So there will be certain conditions, if conditions and there will be certain conclusions.

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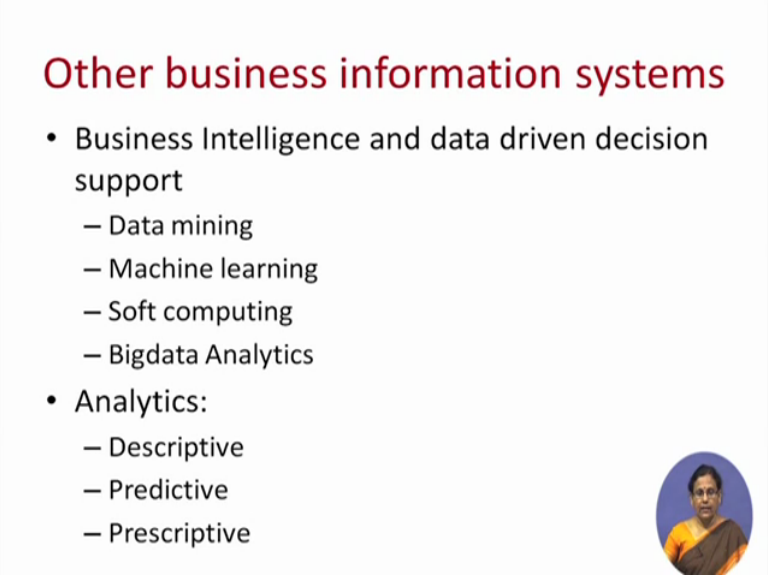

And there are other business Information Systems as well, so which includes this business intelligence, and data driven decision making systems which helps in again in support decision-

making, there can be they use basically data mining, machine learning, soft computing and bigdata analytics. There are again support systems which uses various kinds of analytics, these analytics can be your descriptive analytics which describes the data and helps in visualization, there can be predictive analytics like forecasting, prediction, regression, et cetera or correlation, having certain kind of statistical model. Then the last one is your descriptive kind of analysis which basically have some kind of analytical model to solve the problem and provides the answers. Thank you very much. With this, we finish this lecture.