Systems Analysis and Design
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Lecture - 06

Last time, we were comparing online transaction processing and batch processing. And we said under what situations, we use batch processing. And under what situations, we use on-line processing. The major difference between online transaction processing and batch processing, as I pointed out was that in online transaction processing, we have to emphasize response type.

While the person is being waiting some person is being serviced. So, the response must be very fast. Whereas, in batch processing, because it is done periodically. The more important criterion, from the point of view of the person who is managing the server, is to get throughput. That is as many programs, as possible in the given unit of time, one should able to run. And this effectively reduces, the ideal time of the computer.

And reduce ideal time is what effectively gives; you might say, the best performance for the cost of the machine, which has been investing. There is lot of confusion in general, in people's mind between, what is on-line transaction processing and what is real time processing. It is in fact, very often used synonymously, but it is not correct. To use real time processing and on-line processing are synonymous.

Because, in real time processing, the primary aim is to be able to meet a certain dead line, in finishing a particular task. If the dead line is missed, then the task has to be aborted. That means, it does not work properly. To give a simple example, if you are actually controlling, the motion of a space vehicle. You got to be able to give commands, to space vehicle in real time, while it is moving.

Similarly, if you are having a system, to control the landing of an air craft. The landing of air craft now a days is in fact, controlled by a on board computer. And the landing is a very short period, because of plane is coming and at a very fast rate. So, you have to be able to give correct commands. In terms of height, what height it should come, what speed it should have, for him to land correctly. If there is an error or if there is a delay, particularly if a delay, then there could be a air crash.

So, in real time processing, not building the dead line. Then, meaning the difference between the life and death. So, the actual constraints are requirements on real time systems, is much more severe, than on on-line systems. Online systems does not really matters, if a customer has to wait for one extra minute. Only thing is the customer will become little impatience. But, does not really mean any life of that kind of a problem.

So, on-line processing is somewhat similar than real time processing. Another point, one should realize is, with the coming of personal computers in large numbers. And with the coming of networks, both local area networks within organizations. And the internet connecting networks, local networks, to a world-wide network of computers. Such a system, were more or less everything is connected to everything else. Most of the systems are really on-line systems.

Primarily, because the connection is available. And online system has become more or less very common. And batch is used only, when you have a lot of period is this, there once in a while processing.

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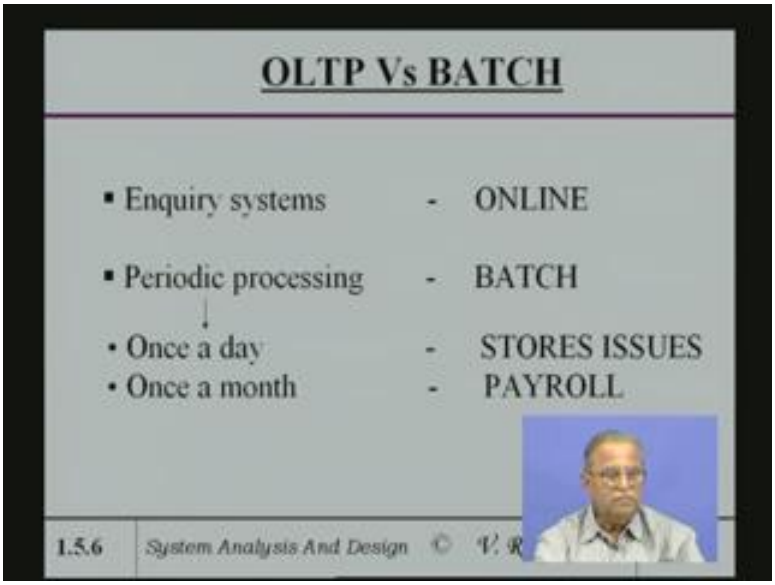

For instance, all enquiry systems are on-line. If you want to do any enquiry on your bank account, or if you want to make an enquiry about ticket status in a train or a bus, all these things are on-line. Not real time of course. And whereas, batch system always periodic. I am just re-emphasizing the point. That it is periodic, the periodicity may vary from depending upon that application.

It can be once a month like pay roll, it can be once a year like in CET. Or it can be once a day, if you are at the end of a day, you try to find out how much of goods are sold, say in a retail shop. Or how much of money was collected at the end of the day, so these are periodic. So, the periodicity depends upon the application.

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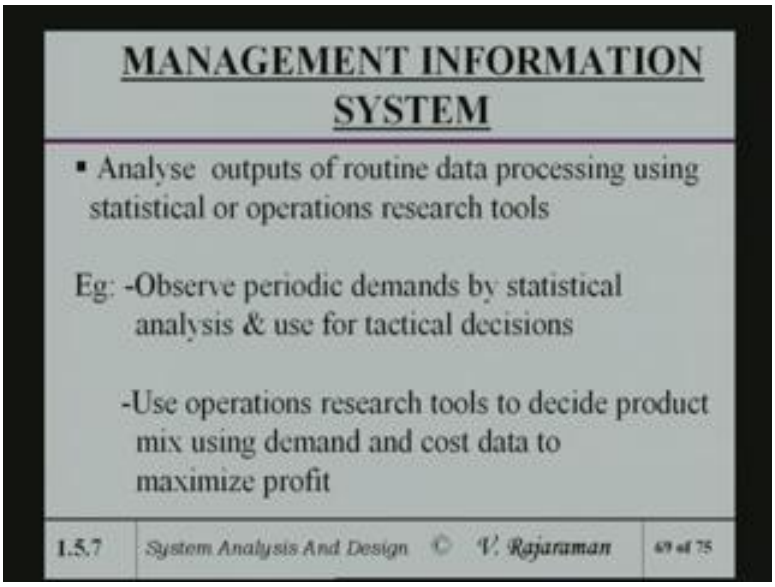

Now, we have been talking about, the three broad classifications of information systems. We said that, the routine data processing system, is the one which is very commonly used. And then, management information systems, are the ones which pay for themselves. In other words, they are the ones which leads to profit in the organizations. And decision support systems, which are used by top management, for strategic decision making.

So, the operational information comes from routine data processing. Tactical information comes from MIS or Management Information System. And strategic information comes from decision support systems. Now, if you look at the MIS, the input for MIS is always the output of the routine data processing. In other words, routine data processing is necessary. In order to be able to do anything further, with management information system.

In the earlier days of computers, when computer is slow and computer is also restricted to, in terms of memory and so on. Many organizations start data processing, with only routine data processing. Because, the machines are not powerful enough, to run more

complex programs. Because, of lack a memory and so on. And also data collection and data storage, in the 60's and 70's were quite small.

Because, the steric devices, which are available in fact, the maximum size I remember, in the early 70's was only 2 megabytes. Today nobody talks about less than 80 GIGA bytes on a PC. So, storage size have increased considerably now, the cost is not gone up. And this is made it much more important to emphasize MIS. Because, passing power is no more a constraint.

The only constraint is your own method of imagining, coming up with a proper idea of working. The operational information, as I said leads to the raw material, on which you can work to get the MIS or tactical decisions. Let me take a very simple example. Some years ago, I was consulting for a truck company. And the truck company, they are proposing a lot of trucks as usual, because that is what they do.

And they were actually also keeping record of how many trucks are produced every day. And after the trucks are produced, they also produce some spare parts, for the trucks. Because, unless there are spare parts available, like for instance shock absorbers, springs, pistons and so on. Spare parts become an essential part of the sale of a truck. If a truck company has a reputation, that their spare parts are available with no difficulty at all.

Then, they says of the truck will increase. Therefore, they are all the fine that you bought a truck. And you cannot get a spare part easily, then naturally the people prefer, the truck which where the spare parts, as well as the service centers are available in plenty. So, in fact the most of the current companies have realized that. And there are both workshops, for repairing your cars and trucks and so on. As well as the workshop stock a lot of spare parts.

So, the company found that spare parts, what some what they innovative had a idea, how much of spare parts are being consumed. The production was in a different time. And is costing more money to produce. Further apart from that, in most of these areas, whether it be motor cars or trucks or even computers. When you buy the product, like computer or truck or motor car, they try to sell you. And keep the car very competitive with all the competitors.

But, when it comes to spare parts, there is where they make the money. The spare parts are the ones, which are quite expensive. And so that profitability of spare parts, is normally higher than the profitability and the truck itself. So, in that based on their operation data, you are computing the probability of spare parts, versus profitability of trucks. They found that, for the same amount of money invested, spare parts is giving more profit than trucks.

So, the question which immediately arise is that, in order to make sure, that I do not run up with spare parts. If I run out of spare parts, when it is needed by workshop. Then, spurious spare parts will come into the market. And not only you will lose your money, but you will also lose your reputation. Because, various spare parts will not have the same strength, or same quality of spare parts you produce.

So, one of the important things company have to do, was a predict. And the prediction is based on what, the past. So, they look at the consumption over a period of time, in the project the consumption. And say what the consumption will be at different periodic intervals. So, they use an operation research technique, which is primarily a method of using mathematics, to do things like prediction statistical study and so on. So, they have a prediction of these things.

And then, they decided that, there is no point in having a separate time for making spare parts. Why not combine making the spare parts along with the making of the parts, for the assembly line. In other words, they effectively try to make some of this parts, which are made in the company. And make those parts as an extra set, along with the production of the regular items, which going to the truck.

So, there is no separate requirement of schedule and so on. The same schedule is used, but you have larger number coming out. Some of it goes in to a truck, some of it goes in to the spare parts. So, this way they are able to optimize, the production of spare parts. And also not to overstock or under stock, get the correct level. So, the probability of not having a spare part, is made low. And effectively the profitability, really went up in they also calculated. What the profitability will be, with a ((Refer Time: 16:09)).

So, to convince the management, that there is a right method of doing things. They have to one all the simulations on the computer, with the real operational data, which they are collected over a period of time. And then, show graphs and curves and so on, to the

managers to convince them, that is a good policy. So, the policy changes in a company take place. Because of the fact that, the operational information has used effectively to improve the method of working of the company, is one example.

Many many such example, one more example I would take is that of inventory. Inventory control is one of major applications of MIS, where the two basic ideas in inventory control, is you should be able to keep. Like if you are running say a, if you are running a store of a food mart or even a medical shop. It is important to be able to not lose to customize, because you did not stock that item. And you should not over stock. The over stock of course, things are lost.

Things are in the shelf without making any money. That means, you are losing money, on whatever you invested. So, it is very important to be able to decide the time, or the volume of a particular product at which time you got to reorder. So, when you go, that is called reorder point. That is you go on finding out, the current stock position of somewhat particular item. And stock position is getting to a limit you reorder.

And the amount of quantitative reordered, depends very much on the, as I said the time taken to get the goods into a shop. Other un forcing reasons and so on. And again OR or operation research techniques are used, based on passed data. To be able to come up with a reasonable reorder point and the reorder quantity. So, that the overall the particular shop, does not run out of the item, neither to the over stock. So, this is the primary aim.

So, these are the some typical examples of the use of MIS. I can go on and on with examples, but I made the point, namely that the raw material is input. And input you have to correct the right input. You will not correct the right input, unless you know what you are looking for. So, it is all this more to be important, to be able to look at what the item objectives are, and trying to get necessary data and operational information system. But, MIS by in large is an very important area of application.

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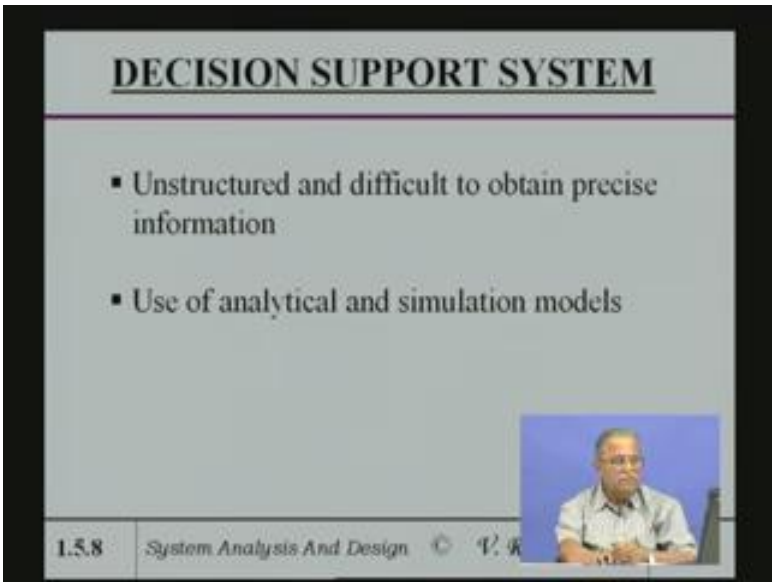

And there are other decision, support system is one level beyond. That is done by the, as I said the top management. And it is very unstructured. And it is very difficult to obtain precise information. Because, and the fact that as I, saying earlier many of these decisions are based on your general knowledge. And knowledge of the field, and what is going on and things like that.

And also depends upon the what kind of a strategy you want to take. And you have to again use analytical and simulation models, to be able to come up with a reasonable decision support system.

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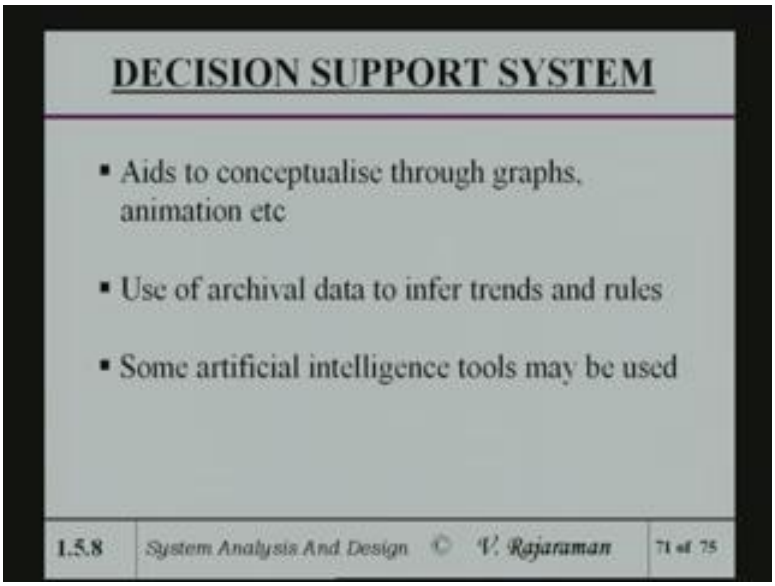

Actually there are many aids, which are used in decision support systems. To conceptualize the problem, through graphs animations etcetera, to understand what it is. And you also use archival data, to infer trends. And there are some artificial intelligence tools, also we use. What I mean is, certain kind of heuristic rules, are use which you work on, based on your assumption that this may take place.

Let me give an example of a what this implies. Very often in decision support systems, you use a what if question. What is meant by what if question is, suppose you have a choice, that you are running a retail shop. And you want to find out, whether it is worth wise starting a another shop, in a new area. And you want to find out what investment will be on that. And what you expect to be on return of investments, whether starting this is going to be profitable or not.

So, what if question is, if I did not start, will some other competitors come there and start. And I lose my potential customers. If I do start, am I going to profitable right away, or am I going to profitable little later. Is it better to prevent and do it earlier than your competitor does. So, these are questions, which are what are known as what if questions.

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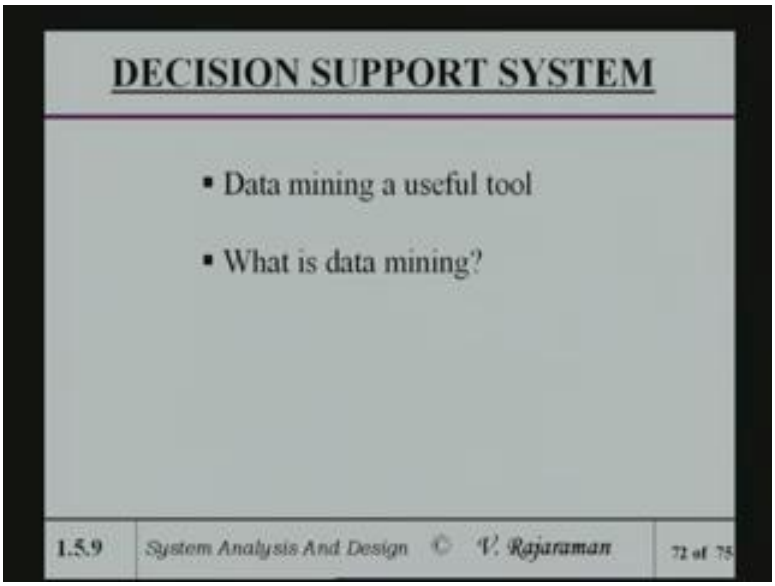

And what if questions, in fact regain by the use of very common tool by the Microsoft office, namely spread sheet. In spread sheet you have a number of rows and columns, you can put as you know formally. And you can change values around, percentages around and so on. And instantly you find the effect of that. In other words, you can use spread sheets to ask questions like, if the sales goes up by this amount; how much will be the profitability give up.

Or if you are warning the pricing policy. Pricing policy is very important, like for instance book publisher, publishes a book. At what price should he sell it. If he sells at a high cost, may be the number of people who buy will be small. But, profit ((Refer Time: 23:55)) quite large. But, if it is a huge sales, because the cost is reasonably low. Then, the total amount of profit I have made, because of the volume may be very high.

So, the pricing decisions of most products is crucial. In fact, it is a very interesting area. And many companies, intentionally price their products very high, to give the feeling among people that their product is superior. It may not be at all. But, then there is a certain small volume, in thinking that I bought a very very expensive piece of item. It may not have all that high quality.

But, it is again they are to a certain segment of a market, which has money to throw away. So, these are pricing decisions, which the decision support system, allows you to take in terms of getting a strategical idea of what is the population, which you are

catering to. Is there a population, which is got disposal income, high income, which they can essentially spend on expensive items and so on. In fact, one of the reasons why, many of the multinational companies selling multiple products. Likes shoes and hand bags and so on, are coming to India.

Is that we have now fairly large middle class of almost 200 million people, who have reasonably good disposal income. And so there is a possibility of making some profit on this income. So, that is another reason, why they do that. Another kind of a important tool used in decision support systems. And also in MIS is called data mining. What is data mining?

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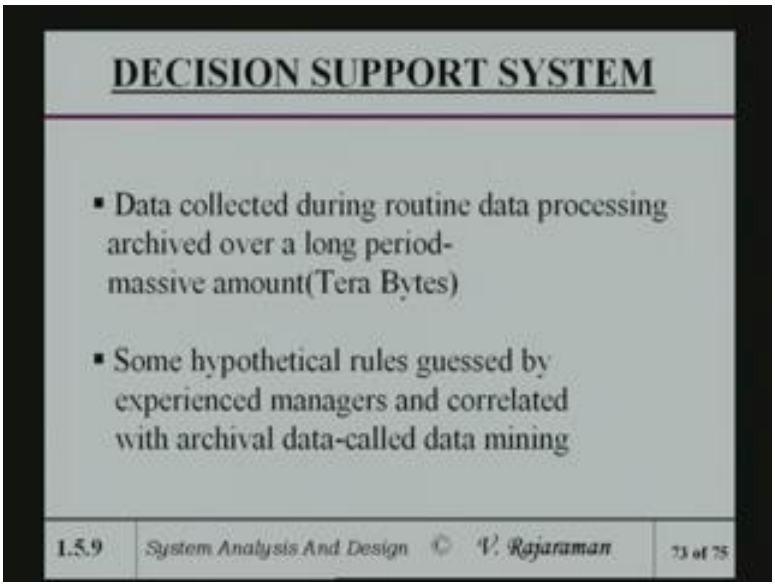

See we collect data, over a large period of time routine data. Now, huge disc are available, tera bytes worth of disc are available. So, huge amount of data can be collected and stored and organized and so on. And previously all that so called archival data was just kept for legal purposes. That means, over period of time auditors will come and check your what happened to the company. And they may like to look at the archival data.

So, it is primarily used as a historical data. Used only when some auditors come around and so on. That reason was, in the earlier days many tapes are available for archival. And tapes are painfully difficult to process, because your sequentially data is stored. Whereas, now terabytes can be stored on disc. That are so called disc network of storage devices,

giving you tera bytes of data. For disc, you can access data in a much more easy way, through indexing and so on.

To searching a disc and getting some actual processing, based on the search use, becomes feasible, which is not feasible earlier. The data mining is coming in it is own, because of this huge increase in disc sizes. So, you create some hypothetical rules, to guess some hypothetical rules. And try to see, whether the rules are really valid or invalid. For instance, a manager of a railway system, may know through experience over years.

That the traffic on certain routes is very high. And there is also seasonal change in traffic pattern. There is in some where the traffic goes up very much. In Deepavali time it goes up, in Dasara time it goes up and so on. But, to actually verify the operational data can be found out, to see how many people are there, there in the waiting list. The huge waiting list that means, always people wanted to go. But, they could not go, because a non availability of seats and so they took alternate transport.

May be a bus they went by, or if they are richer they went by plane, so you have lost your ((Refer Time: 29:38)). But, this is when you hunch. So, based on data mining, they can formulate rules. Saying that over this period, the traffic is expected to this much. And compare their rules with the real fact based on data, which is being collected. And the rules adhere in fact, kind of match, then the rules can be used. And you can take an action, like for instance, you can increase in number of sleeper coaches at that time and so on.

Or you can also take other kind of decisions, like for instance recently what is happened is that. Many budget airlines has come. And they reduce the cost of air tickets. They are trying to almost compete with the second AC two tier with trains. So, the railways got a little jerky, saying that our client is being lost to compete in career. So, the two ways of solving this problem. One way of solving the problem is of course, to reduce your AC compartments.

But, then you make a lot of profit on those, so there is no point in reducing. Otherwise, reduce the price, you have to some extent they have reduce the price. You try to make more people come. And sometimes they find that, in spite of reduction of price based on data collected with operational information system, which is as in the reservation data.

That lots of berths are empty in second AC, but there are big waiting list for sleeper. So, what the minister said, as a strategic decision is that, we upgrade the people, who are kind of frequent traveler by train, I would like to give a little bonus.

And instead of that those seat going empty, I upgrade him sending him to the second AC. And the empty seats in the sleeper, can be used by the people in the waiting list. So, going empty means no money. But, going with some costless means, some profit. So, it also gives some good feelings among travelers, that is frequently traveled by train, I get some bonus.

So, this kind of a strategic decision is taken based on data collected in the recent past. If the same thing, same question you ask to the railways 5 years ago, They would say, what non sense you are talking off, because everything is going full. Only when the planes came and started competing, then this problem arose. So, the point is that strategic decisions improve the profitability. And it is actually comes out of data mining. And some of tactical decision also come out of data mining, looking at what happened.

Like the spare parts as I pointed out inventory and so on. And lot of things are come out of data mining. So, whole lot of what if questions, what if the data is correct, what would be the data like? And that can be kind of predicting.

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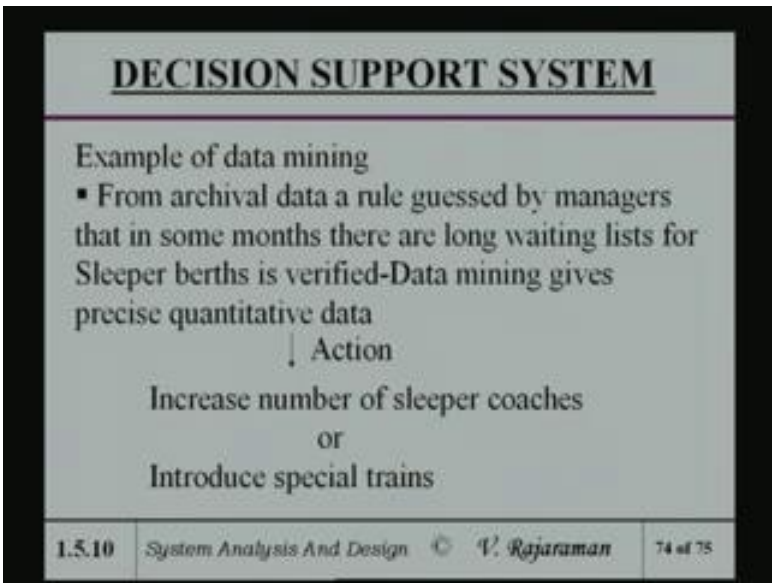

So, this is about waiting list and increasing sleeper coaches, I give an example which is essentially transparency.

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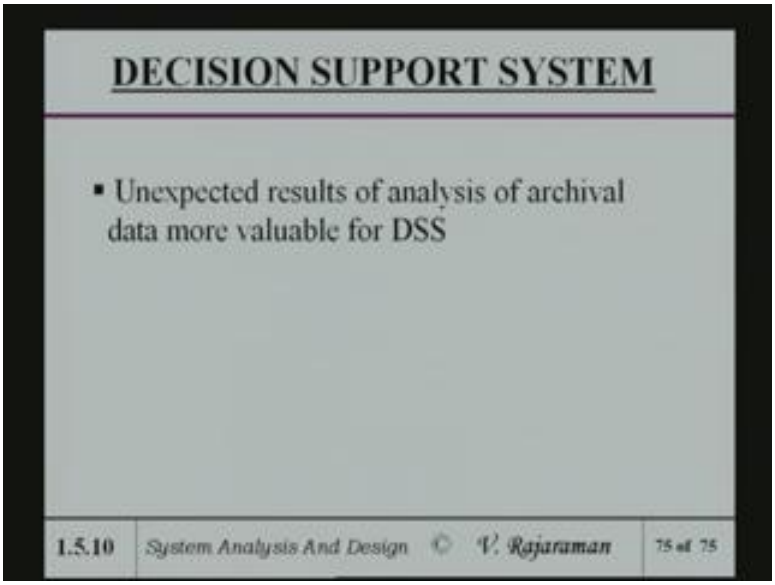

The most interesting point is, sometimes unexpected results come out from the analysis of orthogonal data. Something comes out unexpected, that is lot more valuable. Because, you never have guessed it. But, it gave valuable information to you. So, very often unexpected results do lead to new marketing strategies. And one interesting example of this. Is in terms of the marketing data, which people collected over a period of time about the demand.

For certain types of consumer items in rural and semi urban areas, where people do not have that much of disposable income. But, they still as per to buy some of these new items like shampoo, like tooth paste and stuff like that. So, the strategy which has taken was that, make small circuits of shampoo or small tubes of tooth paste. So, that the onetime expense is quite low and people start buying. Once they buy, if the volume is very high the profitability will go very high.

So, these an unexpected thing, in other words people are ignoring so called poor people. But, the poor people have a lot of money to spend also, where if given the opportunity to spend it. So, this is the kind of unexpected result, which comes out of analysis of archival data and also lot of marketing things. As well as certain amount of strategic ideas. So, in

this module you have laid the ground work, for the design of generally information systems, for used by organizations.

And I talked about various types of information systems. And functions of various functional division of organizations. So, we have some kind of an overview now, of what organizations are like, how do they function, what kind of information are they looking for? In what types of information can lead to good operation, as well as good profit for the company. So, these are very very important parts, when you are think about an overview of the design.

These transparencies are also available in the website, which goes along with this course. So, you do not have to really copy down these things. That is there in the website for you. And over and above, this in the web support material, for this course. And also lot of examples, exercises, solved examples, some notes, some multiple choice questions and so on. And I will urge you to go and look at the website. And go through this material in the website, preferably as you are listening to the lecture.

But, at least if not at the same time, at least revise or go later and look at it. So that, you know you understand better lecture. Or in fact, it is preferable to kind of really before ahead, before you come to the lecture. But, I could say that, but nobody does it. I mean no body would really ahead of time. They even reading after they event is important, but many students do not do that. Because, they only study at the end of the semester at the exam time.

But then, if you want to really learn this subject, you got continuously also look at the web, try to solve the problems and so on. That way you learn the subject. Learning is lot more important than passing the examination, any how... So, the have not finish the this module, I am going on to the next module.

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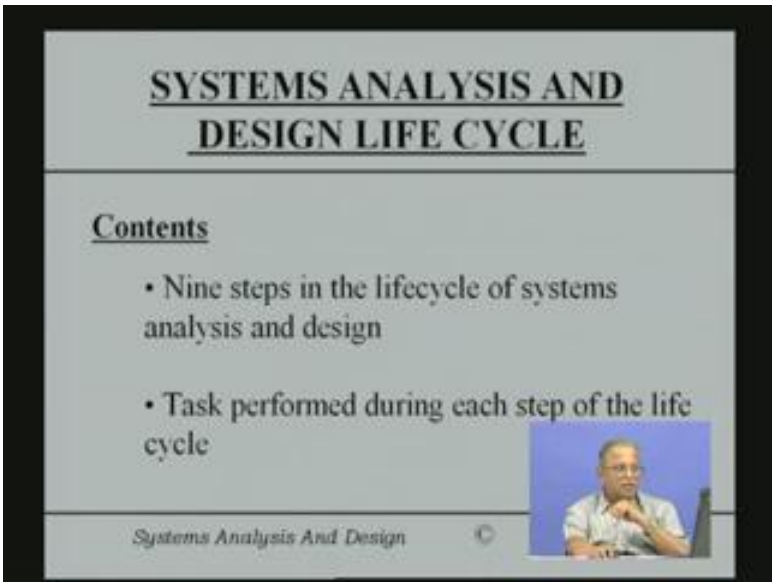

As the next module is about, how to get into the methodology of designing a system. As analyzing and designing a system, this is the core of this course. So, the core itself named systems analysis and design. So, the core of the subject you are really starting now. And system analysis and design, we are going to look at number of issues. First I will talk about, so called steps in the life cycle of a systems analysis and design. Now, the question is what I really mean by life cycle.

Life cycle is a common terminology, which is used in books and software engineering. As well as system analysis and design and MIS and all that, all the books use this. And you may wonder what is this terminology is used. Actually terminology is borrowed from in fact, the life cycle of a human being. Every human being has certain stages in his life. There is a infancy, there is a little, there is a child hood part, then you go to school, then you go to high school and plus 2. Then you go to college, then you go to work and then, you retire inevitably also you will also die.

So, there are stages in the life of any person. Similarly, there are stages in a design of a system. There is also stages in the life of a system. No system is going to be alive for an indefinite period. Just like human beings are mortal, computer based systems are also mortal. The reason why computer based systems are mortal. That means, what is meant by mortal in this case is that, a working system which is being working for some years; they may decide to throw it away and to remove a system.

And say the whole system is died. And whole system will die, when people find that it is usefulness is no more there. And it may arise, because of many reasons, like system may be reasonably. But, may be implemented in computers, which are completely absolutes. And you cannot get any replacement spare parts for it. So, you are perforce required to update your computer system to a new system.

And concomitantly also come up with a new system analysis cycle, which is appropriate for the new environment, hearing by the new system. I know a many companies, which you do not want to do this change. Namely because of it is very expensive to change. And also it is painful, because you go again through all the bucks, all the difficulties and so on. In fact, one of my cousin who is working in America, she said that, well I am working in a banking system, they are still using PDP 11.

PDP 11 was machine which is build, in 19 may be late 60's, early 70's, is not made any more. Then I asked why is the banks trying to use the same system. She said well top managers are quite comfortable with it. And programs are running and you gain more or work done anyhow. So, the question they ask is, if I am trying to invest more money, am I going to get some return. And I have to go through a lot of pain in this changing, is it worth it.

So, these are points which one has to consider in the long run. By in large it turns out, that managers are conservative. They say let if the things are working, let it work. Why not this, why this term and why as I say, why wake up a sleeping dog. That is a little just go on routinely. And unfortunately some of the things, which are routinely going on, will not lead to a certain better profitability.

They be forced to change, only when they certainly find, that the competition is come up with better information system. And they are able to carry out to the customers better, and making higher profit. So, then they will be broken up from their slumber. Or their sleep and then, it will come to their attention, that is necessary to change, even if it is painful. The point is life cycle is a number of stages. And each stage certain tasks are performed as a system analyst.

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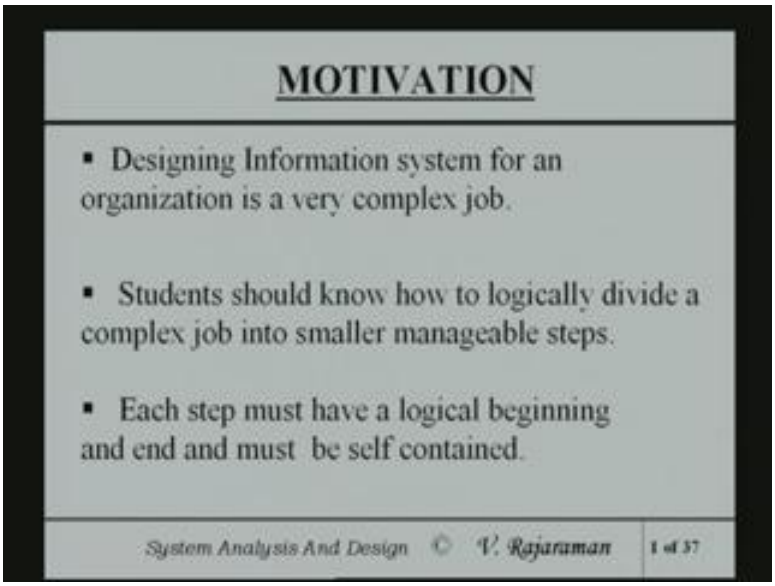

The reason why we talk about the life cycle, is because designing information system of an organization is a very complex job. It requires a lot of conversation with people, determining the requirements and so on. It is a very long run out job and very often, it takes a very long time to cover with a good system. So, whenever you have a very complex system, you should be able to divide the complex system into smaller parts.

And designing parts somewhat separately, in programming they call it modular designing. In other words, some people also use the term divide and conquer. For a very complex problem is there, divide it. Now, if I divide it by smaller parts, each one becomes simpler to solve. So, I will be able to look at the simpler smaller part and solve it better. So, ((Refer Time: 46:55)) conquer or model a design, you also should know what to break it up, you can arbitrarily break it up.

So, the logical decisions, had not looked at. Each step when you divide this complex part, the smaller parts must have a logical beginning and logical end. And so you should be able to say, when the tape has been started, when it is ended.

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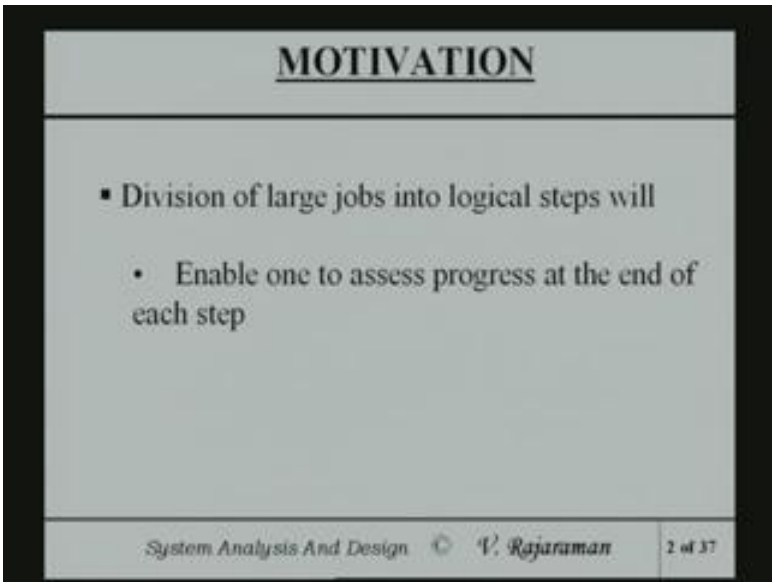

And apart from the fact that the end, the time at ends, you have to be able to say that whether it successfully ended. And at the end of each step, you have to access progress. That is, in other words you gave a certain amount of time for the whole project. You may given something like say 4 months to finish a project. And if you are 8 steps, you may given some, earlier some time chart for each part.

And as soon as you finish that part, you compare the time you have taken with the projected time. And if the projected time is much lower than the time you actually took. That means, a slippage in the schedule, you have delayed some way you have to makeup, to be able to meet the ultimate dead line. So, I may have to put more people on it, or have to follow a different path. So, in other words, it is important to be able to assess progress periodically.

Otherwise, you end up in a situation where deadlines are slipped, everybody becomes unhappy. They work a long hours without really being very productive. So, these things have to be prevented.

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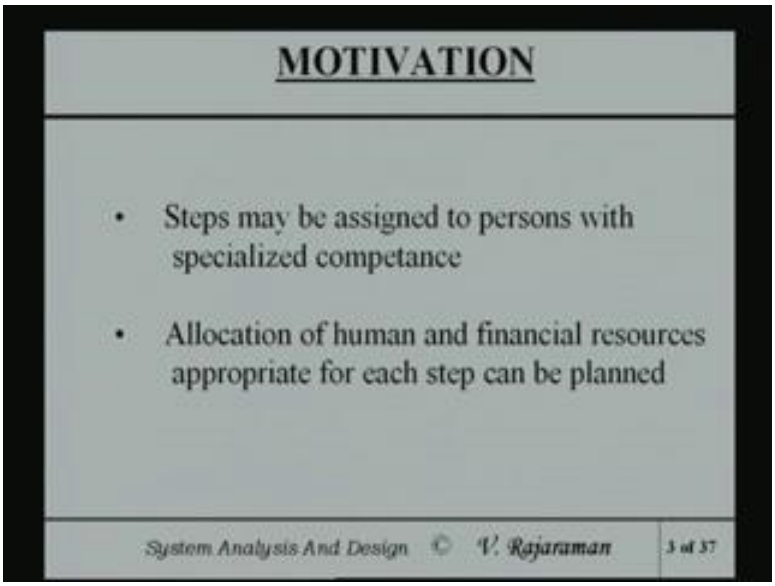

And the method which one has to follow, also that when you use divide and conquer. Or divide a particular long process into small processes, you have to assign people with special competence in that area. If it is a design stage, where you are going to design, people have design competence in that area. Like for instance, if you are doing for a insurance company. If the designer has done it for other insurance companies, which are similar, then you assign that person to this.

Because, he will take lesser time, his learning time will be lower. So, he may be, you have to assign correct people, to the correct job and also at the right time. In allocate of proper financial resources for each steps. So, these steps are necessary to allocate resources that human and financial

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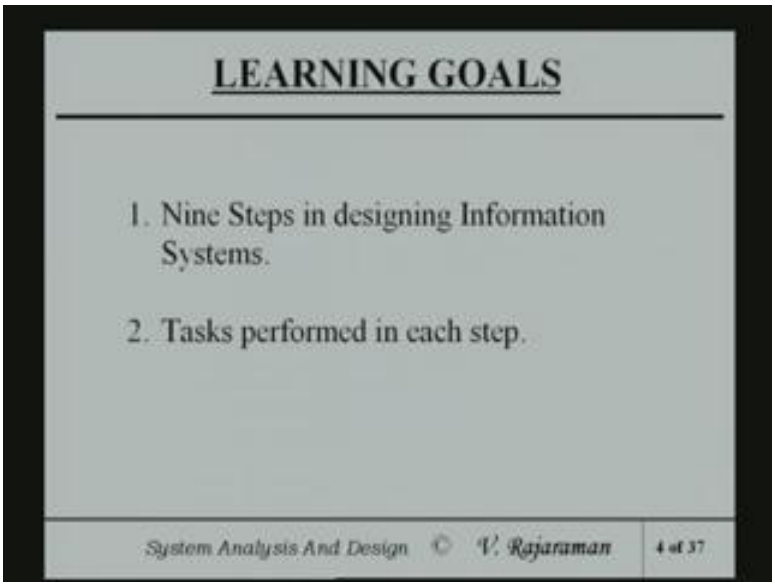

So, we are going to look at 9 different steps in this analysis. And the 9 steps which I am going to use, are not secret. What I mean by it is not secret, not every author will use 9 steps, some use 7 steps or even less. But, in my view 9 steps are required and each step is somewhat independent to the other step. When you design a system step by step and go along. Some of software engineering books called this kind of a design, where you step by step by step, as a water fall model.

It is not arregant, I mean what it really means is that, you have step by step by step solution. If you finish one step, then you go to second step. It is called waterfalls model, because water falls in a step by step I would say, bur whatever it is, that terminology has stuck. And so first time, sometime first heard the term turn waterfall model, I do not know what it was. Then I have to ask what it is, and the guy said step by step, why do you use the term waterfall. That is essentially make simply superior, because I have to ask coordinators.

So, it turns out that many other organ terms, in computing are invented for a particular purpose. And very often, when these terms are used to lay people, or even the people who are new to the field. You suddenly feel you do not know it. But, actually the concepts are actually simple. Now, the fashionable thing they say, your waterfall model is not the right model. You need to have a spiral model. Now, what is it spiral model and how is it different from so called water model.

The whole idea is that, if you go step by step and do not review progress, ((Refer Time: 52:44)) step. At the end if you come up with a mistake, then you have to replace everything. So, instead of that, the common sense dictates, that as soon as I finish some part and second part, I revisit the first part. I just do not go with the third part. Reusing the first part and see if any modifications are required in part 1 or step 1. Having done step 2, in order to be able to do step 3 better.

So, you assess progress, you modify and you proceed. There is a certain kind of feedback, at every step you are try to use. And the feed backs, essentially are you might say spiraling, the one step to the other. Of course, you should not spiral forever, you should kind of design, when the spiral ends and go from step to step. But, by in large these are all organ people, but generally the ideas are fairly simple, in terms of what it really means.

And so the, if you look at this so called 9 steps in the analysis. And task perform in each step.

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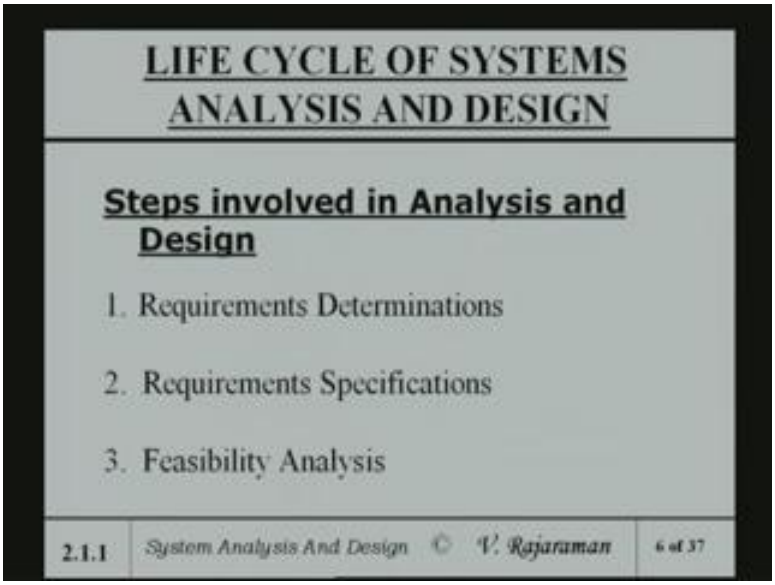

The steps are requirement determination, I first talk about first three steps. I will go on to other steps in the following talks. Once first type is called requirement determination. What is meant by requirement determination is that. When a company wants to have information system to improve their operations. There could be two types of situations

one may encounter. One situation is encounter is that, there is a new nursing home which has started. And this nursing home wants to use computer to improve their operations.

So, start from scratch, then you can go and talk to people over there. And try to find out what their requirements are. And before that requiring determination means, what is it they require it for? Do they require it for admitting patients, allocating beds or do they require it for diagnosis. Or do you require it for to teaching give some kind of the lessons of the doctors, who come there to update them So, the requirements may vary.

Is it only allocation of beds or also you want to look at the pricing how should be charged. Creating a bill billing customers things like that So, there are number of possible requirements. Among these you have to find out what is the important requirement, which you have to determine. I will take an example i mean day to day example. You want to you suddenly if your family says let us go and build a house.

Let us build a house, because I have a plot somewhere. Now, the requirement determination is means there are willing to build a house. Should I really build a house of this type, even though I have a plot or should I continue with where I am. Because I am quite comfortable where I am. It may be in centre of town where my plot may be way out somewhere. There is no transportation available.

So, the requirement determination phase decide. Whether to build the house or not the house or to build the house at the later stage. Postponed the issue. So, this kind of a thing company has also to take. That is why do just now why a computer based system for a nursing home or my operations are large enough to make it necessary to have machines. And I do not want to make the investment at this time

So, the decision is that time is either to go with it or not with it. Even if I go with it what aspect of it I go with it. That is the determination, specification only after I determine. So, i talk about specifications next time and talk about detail. Specifications are extremely important in many if you have to any design particularly of information system and so, requirement specification is still an art. And we need to discuss it at fair length which I will do next time.