Systems Analysis and Design
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Lecture - 12
Systems Analysis and Design

Last time, we were looking at the development of SRS namely system requirement specifications. And various parts of the systems requirement specification, which include the data flow diagrams as well as document flow diagrams. And we explained, how these things are derived.

Now, that is not the end of the development of SRS. Because, as I point out at very beginning, the process of getting at the requirements is not linear process, it is a heteratic process. In other words, you have to turn back and refine system requirement specification, based on some further inputs. Particularly, the method, we are going to use to meet the system requirement, which have been given by the management.

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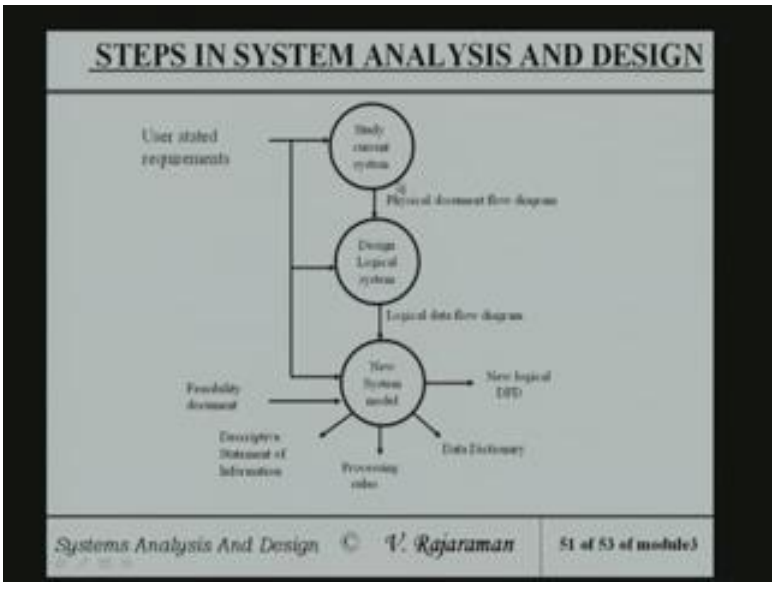

So, to very quickly review, I have put up this picture here, you start with the study of a current system. There is a current system or if it is an existing current system. Then you have start abolish here, the specifications of the system given by the user. Again, you design the logical system, what we have been trying to do. And you get a new system

model. And user stated requirement, which are used in the design and working, new system model.

But, then what happens this, at this stage, you are not complete the whole thing. Because, you really have to look at, whether the system, which you have proposed is feasible. I will explain, what is meant by feasibility? That is going to major part of this lecture and we had modified this system model. And get the new system requirement specifications, which are feasible and which satisfies the requirement of the organization.

So, you have to end up with coming up with new DFD's and new processing rules. And also described statement of what information will provide. Particularly, operational practical and strategy ((Refer Time: 04:17)) is a set of data items require to be able to meet the requirements. So, this is what you finally, end up with.

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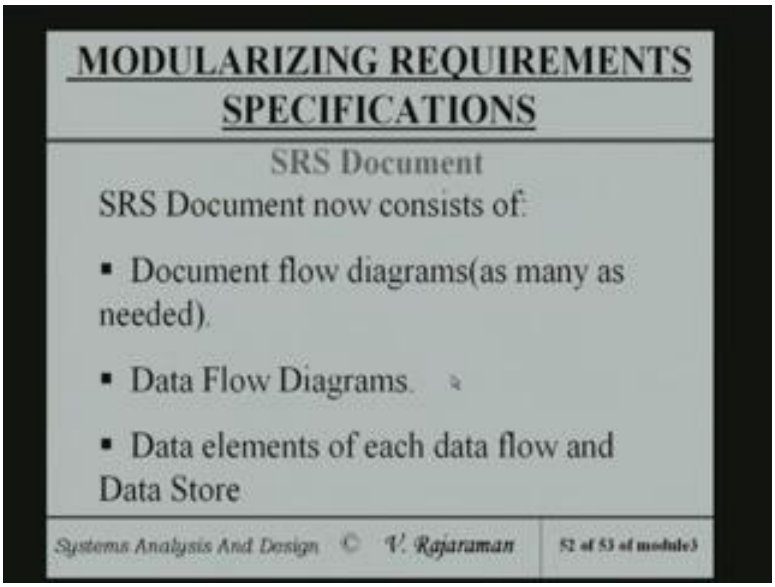

So, the SRS document will consist of document flow diagram as many as needed depending upon the company. I give you one sample, but in a larger case, there will be many sample, which will be require. In fact, I would ((Refer Time: 04:52)) you to read the chapter 4. Chapter 4 of book analysis and design of system has a detailed case study, where number different flow diagram is given. For particular, example or case study of developing a hostel information system.

And we also some details about, what I have given the flavor in terms of the books. And organization receiving goods and then, sending for inspection. And finding out discrepancy between, what you have ordered and what was delivered. And that part is only part of it, because it is a lot of chain, after that. A chain after that is, inspection will inspect the items and that stage also they may reject some items and accept some items.

Whatever is accepted, they will send document to the stores. Saying, that these items have been accepted will come to the store. And for physically, they send items to the store, along with the document, saying what items are going to come to the store. And as soon as things are receiving the store, the store has to intimate accounts. Saying that these items have been taken into stock and so, payment is due to the end.

So, they will send document saying that, this vendor has against this order, given this many items, which have been accepted and found satisfactory, you can go ahead and pay. And accounts officer has to create a proper kind of a sacred case, invoice to the vendor. And there is a prices and so on, which earlier on negotiated based on the order, which is placed. And create a check, nowadays checks are also either printed in the computer. And check sent physically by mail or courier, what have you.

Or nowadays have also have a method of debiting the bank account directly and creating the bank account of the customer, without any paper moving from the company to the vendor. Depends upon ((Refer Time: 07:24)) kind of agreement to the vendor and so on. Because, now-a-days banks also prefer with using so called electronic leading service, where you directly send a debit note to your account and credit note to the vendors account and it is automatically done.

So, these are all successive stages in an entire development. So, for look at the whole pictures, the whole picture you can fairly large in complex. And later on, we will probably look at one such case, with a data flow diagram and giving the processes, which are being done in that. I rarely gave flavors at this time, but the details worked out later, which we will do.

Now, the SRS document consists of the document flow diagram as I said as many as needed. And data flow diagrams also, there will be large set of processes and large set of data flows and so on and it is fairly large. So, there is need to kind of split that part

between the number of parts, these parts have looked at some care. In fact, real systems run into 100's of 1000's of lines of code in a company.

So, the small cases, which we are going to discuss, only give you an idea, how these things are done. Of course, not a single person, will not 100's of 1000's of lines of code and so on, it split between numbers of people in teams. So, we had to have method of splitting, the entire data flow diagram in to a smaller part into a leveling, which we will look at later on. And so that the smaller diagrams are once implemented, then they have got linkages putting all these diagrams.

And data elements, which are there in data flow and data store. Later on, we have to look at, how to organize all those data in the files and what is known as a data base. And there are number of important principles, you have to take into account, while organizing this data in a data base. So, that, when you do an update, there is no errors is keeping unknowingly or when you delete some parts unknowingly, some other a parts or not deleted.

So, these are the issues, which will be important when it comes to the design of the data base. I am only talking about some files, but very large, whenever a company looks at data resources will go into a database. And something known as database management system, which in computer science curriculum. It is a fully fledged course, which is normally taught later on in the curriculum. But, we will give you a general idea of what this all about.

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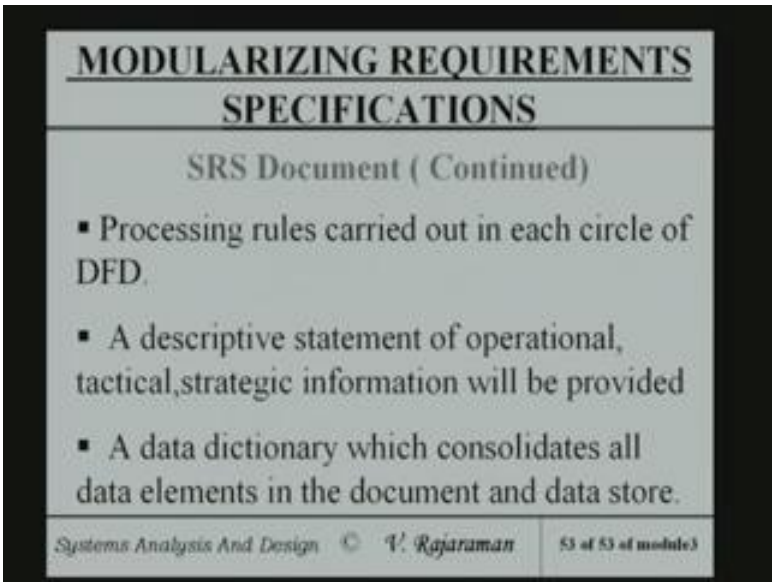

And passing rules carried out with each circle of the data flow diagram as a set the processing rules will give either as a structured English algorithm or as decision table. And we look at them in greater detail, later on. And descriptive, statement of operational tactical and strategic information will be provided. Also in done, we cannot avoid writing some descriptive statement. That means, you have to write carefully, what you have done because of read by mangers.

And pictures that data flow diagram, document flow diagrams are only aids to understanding. But, the word statement or write up is quite important and that is why, I think, we are taught a communication skills, a both written communication and oral communication. Here, we had to able to clearly and precisely specify, the operational tactical and strategic information as a descriptive note.

That means, it is a one or two pages write up, which one has to able to read, data dictionary, which consolidated, all data elements, which the data store.

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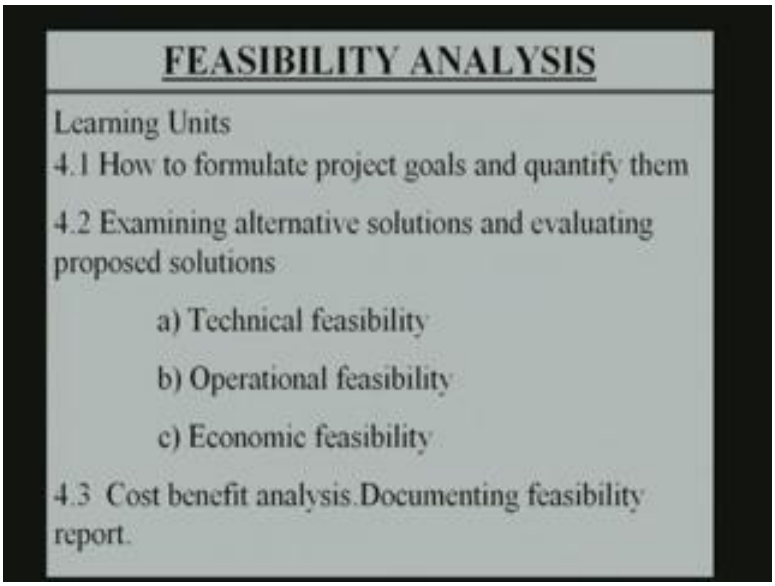

So, the next module, we are going to look at is, what is known as feasibility analysis. Now, I want to first understand, what is feasibility really mean from a dictionary point of view. So, normally, when a new word comes up, it is good idea to go and look at the dictionary. Because, all the general meaning, lot of people are described. So, I went and looked at the dictionary and the dictionary, feasibility is explained.

The mean is given the investigation to determine, whether a particular system is desirable. And can also be actually made, in other words, weather it is desirable or it is practical. So, there are two issues, feasibility at the end of feasibility, weather deriving the system, the idea is able to tell the management. That what you have designing is practical, it can be implemented.

And that, it is also desirable, what you are going to do is, can be useful. And not only useful, it can be implemented. The end of this feasibility study has to make sure; you have to convince the management. That whatever system you have proposing is practical and can be implemented and it will be a desirable system as the company is concerned. So, this particular module, we look at the question, I said there are two keywords, which I used. One is desirable practical and other is practical.

And the question of desirability is based on what kind of goals you want to attain. So, you have to look at, how to formulate the project goals and of the goals also have to be quantified. What you meant by quantified is qualitative statement will not always do. I

will explain in wider length in these lectures, the difference between, what is meant by a quantification and qualitative description. As an engineer, we normally always look at numbers or something, which is quantifiable, because that gives us more confident.

Quantification is very important also from the management point of view to attainment by that the system is practical. And you have to look at the alternative solution, because many ways of obtain the solution. Americans say that, there are many ways getting the cat. But, I do not like that term, there are many ways are cooking potatoes, I might say. There are so many ways are cooking potatoes, each one has got some good features and some bad features.

So, you have to pick the particular right way of the cooking to get, what you deserve. Some people may desire setting method of cooking, because their goal may be different. If a person is looking at very low oil content or fat content in what you cook the potatoes, then he will normally steam it and not putting the oil in it. Somebody is looking something which is crisp and so on and he will fry it and put a lot of oil.

So, that may be alright for some people, it may not be alright for some people. So, the point, we are going to make is, what is good, what is considered good. In certain situation, may not be good in some other situation. So, that is what we looked at sometime. Ultimate, decision maker is the person is going to eat the potato. Similarly, the ultimate decision maker, in the case of a system, they are going to develop is that the person is going to use that system.

So, he has to tell you, which of these alternate solutions is preferable, based on number of factors, like feasibility, technical feasibility. Technically, to be able to implement it. Operationally, can I do that and economically; that means, do I have a money drew it. In fact, I have to explain in length, what is meant by technical feasibility. What is meant by operational feasibility? And what is meant by economic feasibility. These are the things you are going to learn.

And the cost benefit analysis, what is meant by cost benefit analysis is there could be many ways of cooking potatoes. Each one may require a different cost. We just steam it, it does not need oil or things like that. But, if you fry it, you can use oil and masala and stuff like that. So, the cost is going to go up. So, the benefit one has to decide. So, the

question of cost benefit is in terms of, how much is going to cost. And what benefit is, I am going to get.

Again, benefit is going to be quantified. And just, if you say that, it will be good for you, that do not satisfy people. So, you have to look at the quantification of the cost benefit is generally regarding the quantification, cost is known. So, many fees, we are paying for doing the system and what is the profit, I am going to get. Benefit is normally in terms of savings.

There are many types benefit is one can thing about and I look at what benefits, because sometimes, money may not be only issue. It could be customer satisfaction, may be an issue. So, certain terms benefits are not entirely quantifiable, but you can generally understand, but ultimately you try to do. Ultimately, you bring up the point, where you try as soon as possible quantified, because people do not like unquantified specifications of benefits.

And what are the documents, feasibility report the end of this phase. And once the document, at the end of the game, at the end of feasibility analysis, we really come up with the particular method of meeting the requirement system. For SRS is already developed and the particular method, you have come now. So, you may in the process find its end requirements can be met, but only met at very high cost.

And so you may not decide to do that or you may find out, that certain requirement is specified, may not be possible to make it technically. Because, of lack of equipment or technology is not at there to do it. Similarly, operational, we may not have people to do it or you may not have program ability to do it. So, all these issues again have to look at, so that, ultimately, you go back to SRS and only come up with what is feasible and what document also cost benefit.

So, then the development phase, when you develop the system, the user can compare, what you promise, against what you actually gets doing the evaluation phase and beside weather you have done a good job or not. And that is the whole idea of reworking the SRS, after the feasibility.

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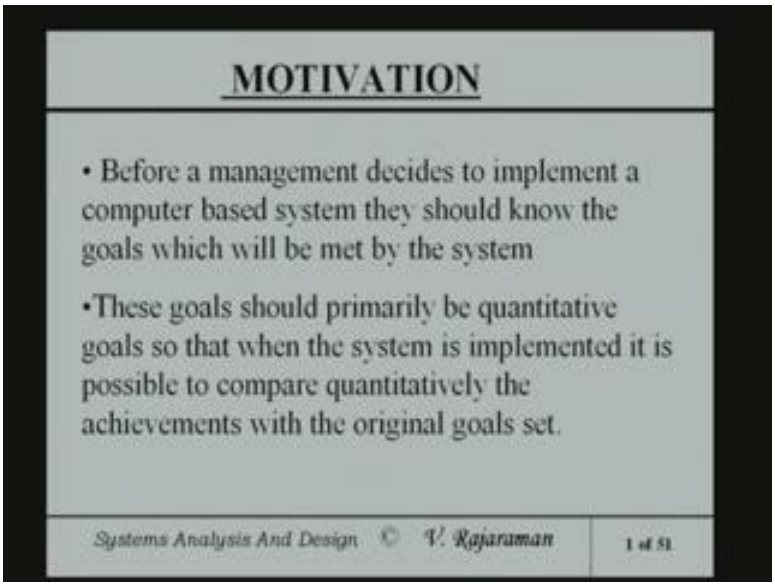

The motivation for looking at the feasibility study is before management decides to implement a computer based system. They should know the goals, which will be met by the system. What will be the goals met by the system and I cannot describe this entirely in a vacuum. You have to take specific cases; I look at particular case, with some details to really talk about the goals, because goals depend on system.

These goals must be quantitative goals. So, that when the system is implemented, it is possible to compare quantitatively, the achievements. That is the goals, which are set.

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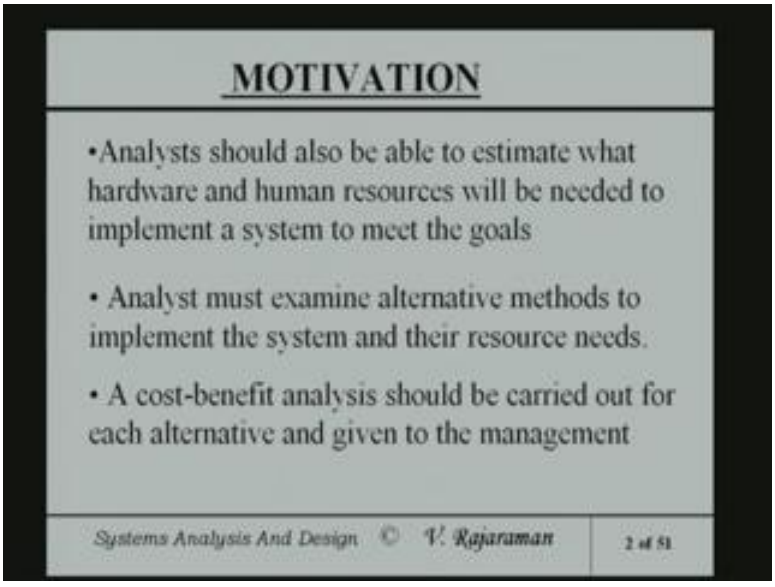

So, the achievement is of goals. That comparison is that much, which adds essentially, explains to you, how it is done. The analyst should able to estimate, what hardware and human resources will be needed to implement a system to meet the goals. So, that is essentially required to be able to find about cost, because the cost of people, cost of equipment and so on.

Analyst must examine methods to implement system and the resource needs. Because, different methods have said or possible and each one may cost different amount. And the cost benefit analysis should be carried out for each alternative. You got multiple alternatives, 3 or 4 ways of doing it. You say this way is going to cost this much and this going to benefit. And you compare and based on the cost benefit, the ultimately the user will decide, which one he wants.

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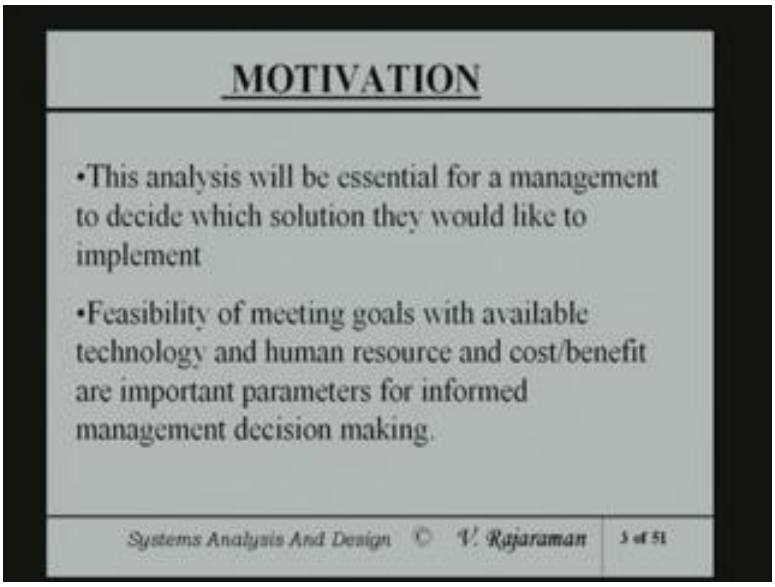

This analysis will be essential for a management to decide, which solution, they would like to implement. So, that they said the multiple solutions are given, which one, they can actually implement. And the feasibility of meeting goals with the available technology and human resources cost benefit are important parameters for informed management decision making.

So, the determination of feasibility meeting the goals. And also, as I said human resource requirement and available technology. And there are various parameters, which ultimately go to make up this study, feasibility study.

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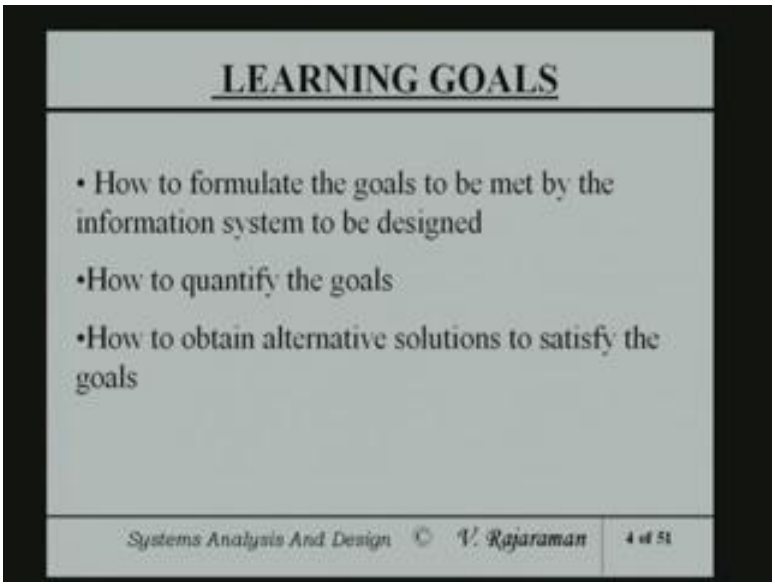

So, the primarily, we are going to learn, how to formulate the goals to be met by the information system to be designed. How do you come up with the goals? How do quantify the goals and how to obtain the alternative solutions to satisfy the goals. So, these are three important learning goals.

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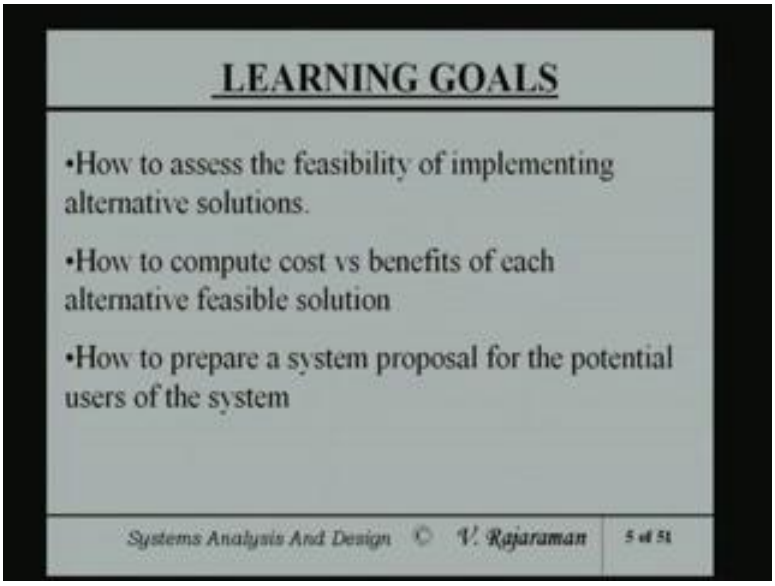

And besides that, how to access the feasibility of implementing alternative solution, thus many solution are there to look at the feasibility or of each of those. How to compute the cost benefits of which alternative feasible solution. And then, how to prepare the system

proposal of potential user of a system. So, these are the primarily learning goals of this particular module.

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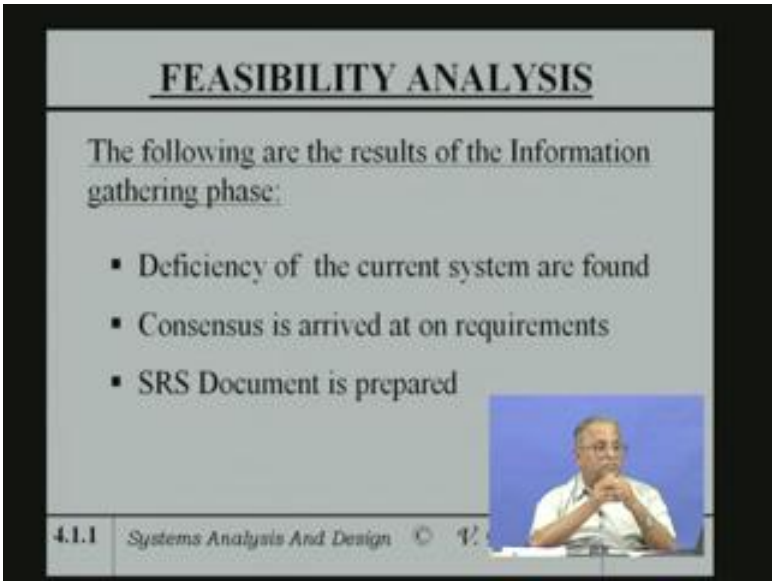

Now, at the end of the information gathering phase, which we discussed earlier, you find out the deficiency of current system. And consensus arrived at on requirements and SRS document is prepared. That is what, we saw. And the deficiency of the current system, the example, I took was, that of a hostel information system. Where, I said the warden felt that the deficiency of current system is that the daily rate for the student is going.

Because, there is no proper control for inventories or the amount of purchase, which is made and vegetables and so on perishable, if they buy excess, they go waste. So, the actual cost of student of goes up. So, he only says that, the reference the cost is too high. The other reference he says is that, the students do not pay their bills in time. When, they do not pay the bills in time, we have perpetual problem of trying to meet our budget. We do not have money to go buy things so on.

So, we had some methods of being showed is the student being on time. So, these are the things kind of problems, which he pointed out. And he pointed out, one more thing he pointed out. That is we do not consolidate our requirements. So, that, we can reduce the number of trips to go and buy it. If we consolidate, then we can reduce the number of trips and that will reduce the total cost.

So, number of these efficiencies in the current system was pointed out. And urge you to go back and study chapter 4 in detail to where the interview the wardens are given at the end of that the deficiency is pointed out. More in terms of a certain statements of anything, which is in terms of the quantification and the consensus, is arrived at. The consensus, which is arrived at in that particular case; that means, agreement arrived at is that, it is important to be able to do two things One is that reduce inventory. And reduce the daily rate. And make sure the daily rates do not vary from month to month.

Suppose the daily rate about 15 rupees this month, per day 15 rupees per day. Next month, it should not become 25 rupees, because student cannot budget. So, you really have to have something which is plus or minus 2 or 3 percent, within that it should keep it. And one more consensus was that, one should be able to actually find out, these students are perpetually delaying payments.

So, the warden should be able to have a list in front of him. Saying these students are delayed payment beyond 5 days or 10 days or whatever. That decision has to be made about number of days about number of days. So, you can call the student and request him to pay or take some action. So, the payment is made. The consensus is also found that the important part is in terms of the mess. There is a cost of the daily rate, the prom collection of bills and so on.

But, it is not very important this time to have a database of students and room allotments and so on that is the later priority and said to transfer about the case study. So, based on that prioritization, you arrive at what you want to implement. That is what meant by consensus and system requirement specification documents prepared.

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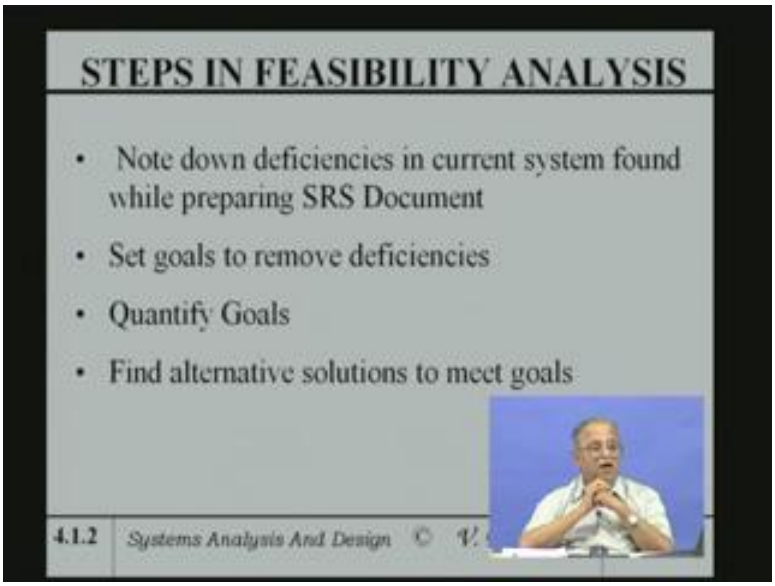

So, note down deficiencies in the current system, found while preparing the SRS document and set the goals to remove deficiencies and quantify this goals. And find alternative solutions to meet these goals. So, this is actually, what we have discussed and we have to follow.

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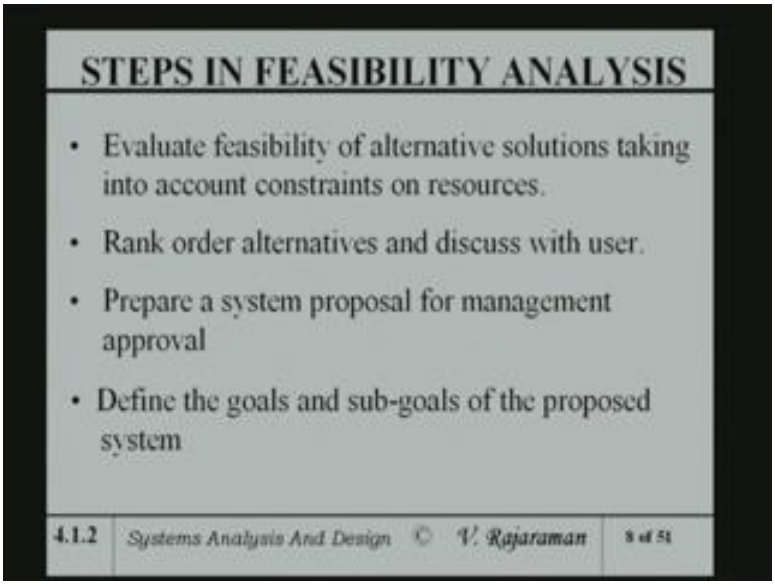

And evaluate feasibility of alternative solution, taking into account constrain the resources. Rank orders all the alternatives and discuss with user. Prepare a system

proposal by management approval, based on the rank order. Define the goals and sub goals of the proposed system.

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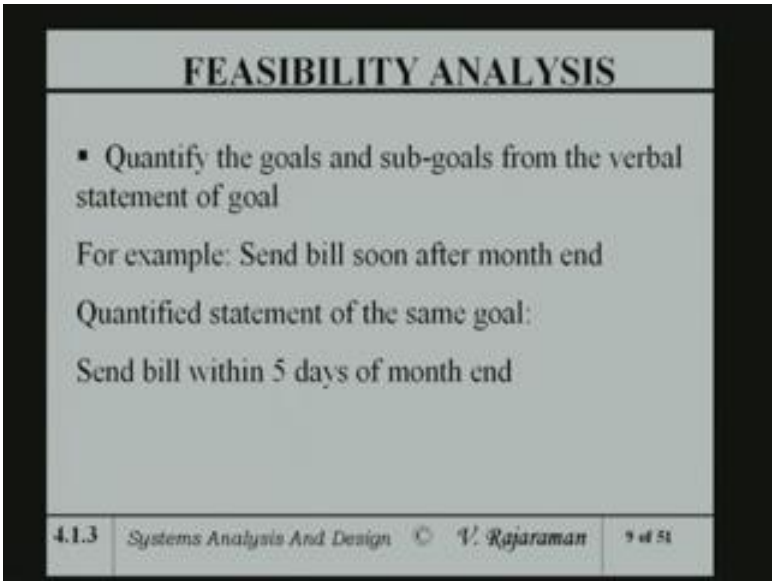

So, verbal statement, you have to quantify into goals, example, given here send a bill soon after a month end is unquantified. Whereas, quantified statement is send bill within five days or the end of the month and unquantified things, is what keeps the mess bill reasonably constant from month to month. Quantified thing would be keep the mess bill at 15 rupees per day plus minus 1 rupee.

That is quantified plus minus 1 rupee is the quantification of a reasonably close to 15 rupees. Because, reasonably close mean 50 paisa or 5 rupees says, that is not unquantified. So, quantified means exactly what you try to achieve in terms of numbers. So in fact, in every example, you have to able to come with specific numbers. And that is meant by quantification of goals.

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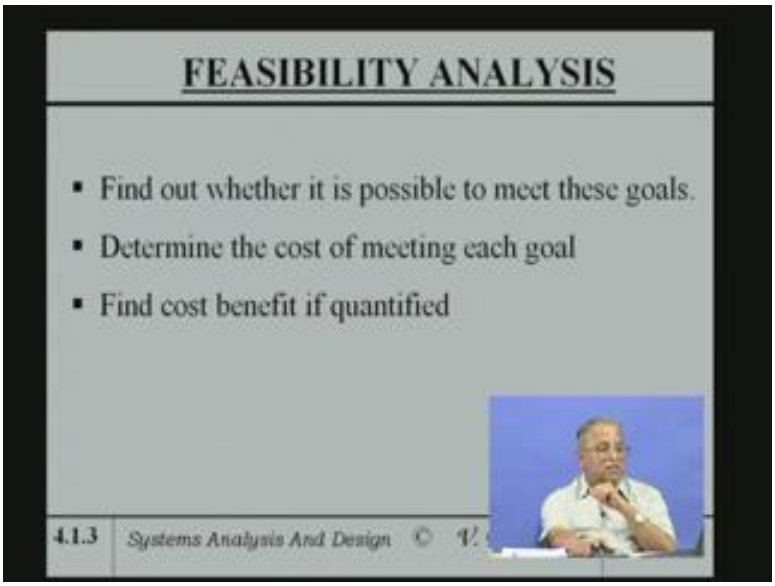

Find out, whether it is possible to meet these goals. Find out the cost of meeting each goal. And find the cost benefit analysis. And benefit is going to be quantified also, what is the game name by benefit quantify. In the case of mess bill 15 rupees approximately plus minus 1 rupee is a quantified goal. What is the benefit, only benefit, you can say, as the intangible benefits. Intangible in the sense that, students are happy, bills do not vary widely, what other benefit is there, which can be quantified.

Only other quantification of the benefit, may be there, because of a control of inventory and so on. The mess bill itself it come down. So, if you say that the mess bill, being 20 rupees to in a month has come down to 15 rupees. That is you can say quantifying the benefit means of the 20 rupees, I will bring it down to 15 rupees by the method, I am going to follow.

So; that means, I have benefited 5 rupees for every 20 rupees. And whatever money I spend to achieve this, must be compensate with the reduction in 5 rupees of the bill. So, this is the kind of point. So, the one can be just satisfaction, once it can come 15 rupees satisfied. But, then quantification is in terms of the fact that the total cost of the system inventory and so on, it kept come down.

((Refer Time: 32:37)) the pinpointing missing functions, unsatisfactory performance and excessive cost of operations. What we really mean by these things a missing functions unsatisfactory performance, excessive cost of operations. Missing function in a existing

system, a missing function may be in the case of hostel information system. The function which has missed was the fact that the current system does not have any means of filing out, who are the habitual offenders of not giving their bills in time. So, there is missing one.

Current system has no way in which you can find out, otherwise it does not have the means of finding out, who has not paid, so this function is missing. Unsatisfactory performance me be that, the current system of mess bill is not being kept cost at 15 rupees. It is widely varying. So, performance is not satisfactory. So, I want to have performance, which is to keep that bill within a certain range, excessive cost of operation, again it is related.

Excessive cost of operation against instead of spending, say 5000 rupees and buying vegetables every month, which I estimate, I come out, I am spending 700 rupees, because lot of vegetable is being wasted. So, excessive cost of operations is because of the fact that, there is no proper control. So, the whole idea of the new system must be remove the missing functions. There is have some means of sending out the bill in time and this getting the list of students not paid and so on.

And to remove the unsatisfactory performance, you need to have to keep the mess bill cost plus minus 1 rupee as I said and extra cost of operation bring down the mess bill. Because, the vegetable cost is gone down, your bill rate is also going down. That is what meant by excessive cost of operation reduced.

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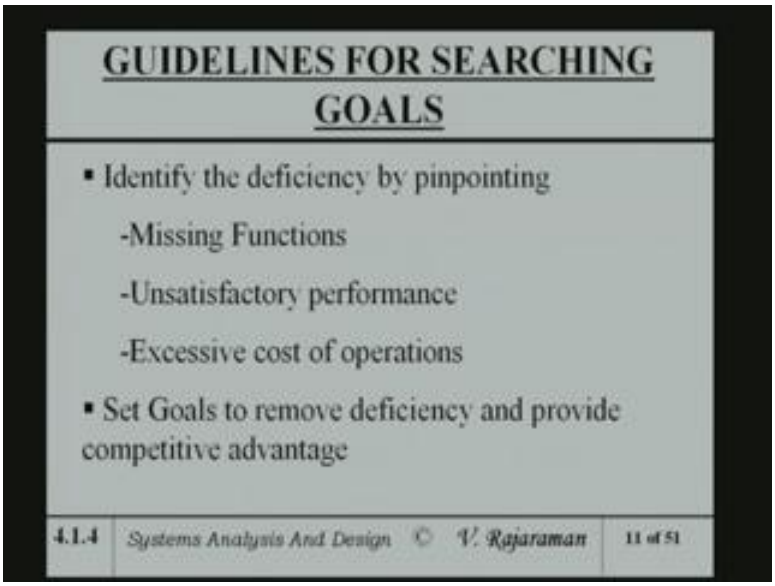

Set goals to remove deficiency and provide competitive advantage. So, the goals this case, may be the quantitative goals may be to bring down the mess bill 25 rupees to 15 rupees. That is a quantified goals, a quantified goal may be that bring down to a vegetable cost from 7000 rupees to 5000 rupees a month. So, these are all goals, which is required to meet and to meet these deficiencies, which are given there.

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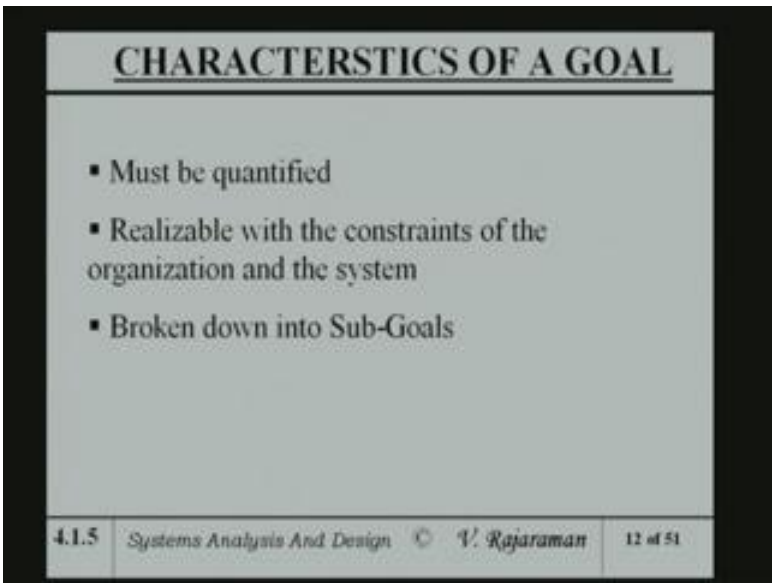

As I said goal the characteristics of goal are should be quantified, it should not be just lazy. Actually, realizable within constrain and organization system. What you mean the

realizable; that means, you have the methodology of being able to meet this goal. For instance, suppose you say, I want to bring down the mess bill to 25 rupees to 10 rupees, it may not be realizable.

Because, here if you take minimal amount of menu reduced menu and variety and so on. Basic cost of the items, which you buy may such that, it is impossible bring down to 10 rupees. So, it is unrealizable goal, so that all the goal which within the constraints of cost of items in the market. Cost of milk cost of vegetable and so on is something, which you can meet.

So, the level which has been realistic, you cannot just say, because the analyst in the beginning, tells the warden that they computerization or bring down the mess bill from 25 rupees to 10 rupees. First of all, we would not believe you. Just by computerize, how can bring down the bill, basic cost is so much all the items. And every day, the items cost are going up, so always inflation.

The point is that, one should not promise something, which is not realizable. And then, you had break in to up sub goals regards, what is meant by sub goals is that, a major goal may be bring down the mess bill. But, how to achieve it. You have to have sub goals, one way of achieving that is that, you had to reduce the inventory. There is a reduce inventory, again you have to quantify the reducing the inventory.

That means, you say that, current inventory cost is x rupees. I will bring down the inventory cost to 0.9 x rupees, 10 percent, I will reduce it. So, it is sub goal, which will ultimately lead to main goal of reduce to daily rate. Similarly, I can say which is total vegetable cost is 5 rupees; I will bring down vegetable cost from 5 rupees to may be 0.8 y.

And these are points, what is meant by breaking down the major goal into sub goal and you can meet each of sub goals. Each sub goal must also be quantified.

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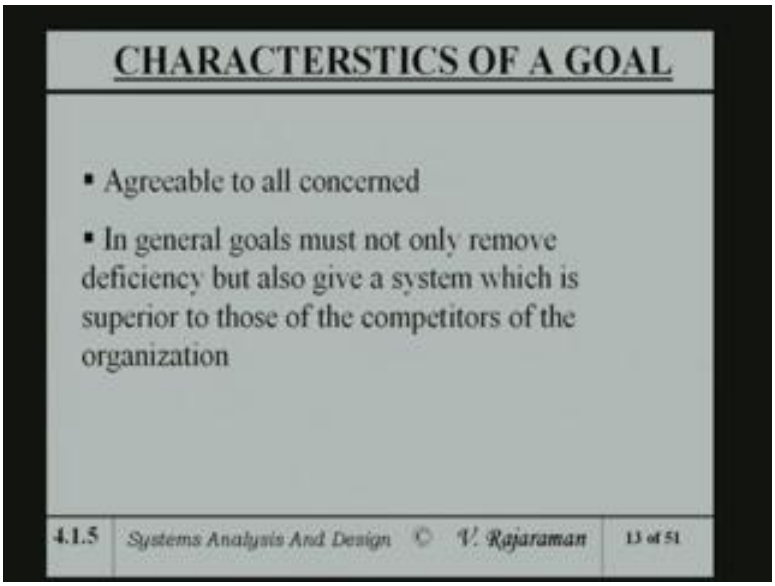

And it should agreeable to all concerned. There is, suppose bring down to mess bill 15 rupees from 25 rupees. But, I end up giving everyday potatoes and no other vegetables and so on. It may not be agreeable, see if you keep your menu balanced and not much of a change, the original menu just given in the hostel. And yet be able to meet the reduce cost. So, that is a point, it will be agreeable.

So, you must have the consensus, also from the ultimate consumers. In this case, students saying that, I will give you the balance menu. And I will not going on repeating menus going on day after day. I will have proper kind of menu planning and yet I will bring down the cost. So, that is essentially what you meant by something which agreed to everybody.

In general goals, must not only remove a deficiency, but also give a system, which is superior to those of the competitors of the organization. In other words, because this is a general point. So, I am now going little bit beyond my simple case study. When you are in the real field in go to company. Like for us, you are going to a hotel and say I am going to implement a hotel management system.

You will have some method of doing it, you get goals and sub goals and you essentially say, at the time of proposal, you give only a brief proposal. Because, you do not want to spend, lot of money and time and doing that. Here, doing proposal based on the

conversation you had your competitor also giving pre proposal. So, ultimately many competitors will be there for the particular contract of computerize in the hotel system.

So, your goals must your system must not only meet all the goals, which are quantified. But, also meet it in a superior way, compare to the competitors who are given. What have you mean by superior way, there are two way in which you can talk about superiority and so on. So, in any situation like many people go to a hotel and say that, they will implement their computerized system for their management to the hotel.

There are many issue in a hotel, like booking the rooms, planning the menus and preparing bills, collecting, reservations, whole lot of issues are involved. And you have to give goals of each of them. And after giving each of them, you have to able to quantify by putting that computer, how much are they are going to save. In terms of operations of the hotel and you also have to specify. What is the cost, you are going to, what charges, you are going to charge to that hotel, will be able to implement the system.

There are two cost involved here. One is the cost of equipment they have to buy. May be PC's and so on, which the hotel may have to buy and the networking all not come, all infrastructure, they have to buy. All above that, they also have to buy the software things like Microsoft some accounting systems or some other accounting system must, may be there in the market.

So, that, software cost also included is there, hardware cost and then software cost, that is resulting, what company has to pay, that the hotel has to pay. Besides that, they have to allocate people to work with you doing the system development. So, their cost is also involved. So, that there is all the cost of company plus they have to pay you, your fees for you analysis, your programming, your Effort, your implementation, making satisfactory to them and so on.

So, give a certain quotation and also certain time constraints, you say that, I will charge you x rupee and I will finish the job in 4 months time or something like that. Your competitor may charge something else and finish the job in 3 months time. His charge may be higher, but he finishes faster. So, the benefit the hotel may think that, they want it faster, they willing to pay more.

So, the point really is, you had to have system, which is superior, superiority can be in terms of the function, which it means. And the flexibility it has got, apart from the cost and quality. Many software companies win contracts based on not only the cost, but based on their quality, which you assure and the special goals the meet, which some other competitor cannot meet.

So, the point is that, a good system analyst must be able to very clearly determine. The important goals and sub goals and make a quotation to meet the goals and sub goals, which are somewhat better than his competitor. So, even if your costs are little higher they may be willing to give the contract, because your system is superior. So, this is what meant by a document generally remove deficiency, but a superior system. To compare, to what is being given by your competitors.

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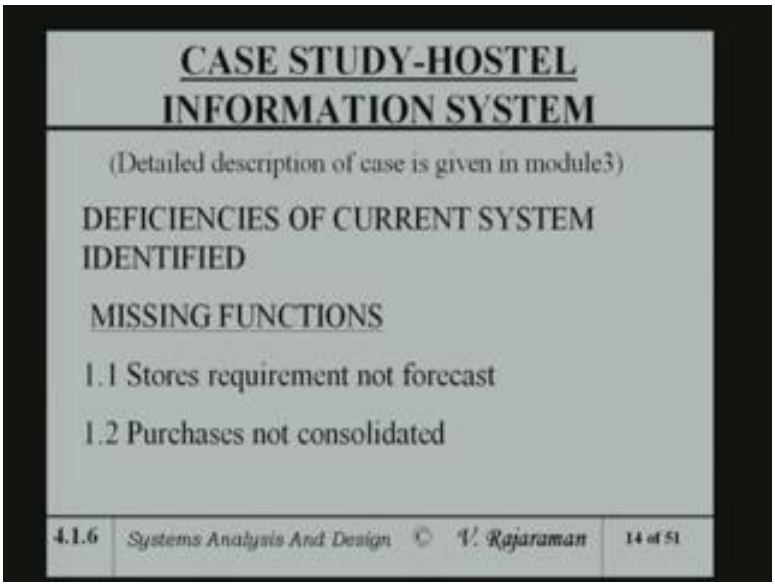

So, now, let me get back to my case. In the case, we said that the miss expenses are divided among students on a daily rate of derived. This is what I have been saying all along and there is student chief warden, who kind of managing the entire hostel. But, there is a student committee, which besides in the menu and besides on what should be a daily rate stuff like that, student can afford. I am taking example of our institution, where the mess is run by students and not by contractors.

Many of the good organization our students running it, reason why student run it is normally, it is lower cost and they get better food. And it is also a good idea for students

run the mess. Because, they get experience of the real life system of how the mess operates, how to deal with people and different levels so on. And it is also good idea for computer science students to kind of get involved themselves. In this activity to be able to computerize, in fact, many of the IIT is and so on.

The mess system is actually implemented by the students, computer science students. And they give a good service. That is a good experience for them of developing a system. And mess bill has to be prepared and to send of promptly to the end of each month. So, when they say promptly, there is something which is not quantified. And in the case of mistake stores requirement not forecast. The inventory not only says inventory levels are very high.

So, cost is going up and so the missing function is that the requirement of stores is not forecast, that you can buy an amount, which is necessary and sufficient. And you do not run out of items and you do not have excess items. In fact, inventory control is very important in all companies, because inventory is dead investment. What you meant by dead invest meant it is there, you do not have to paid for it and we do not use it. That means your interest cost for that is gone.

So, you always try to reduce the total inventory, within the constraint being able to meet the meet the requirements and purchases are not consolidated. Many trips are made to the city and that increases the cost of system and so on. It is another point, which is during the discussion with the students.

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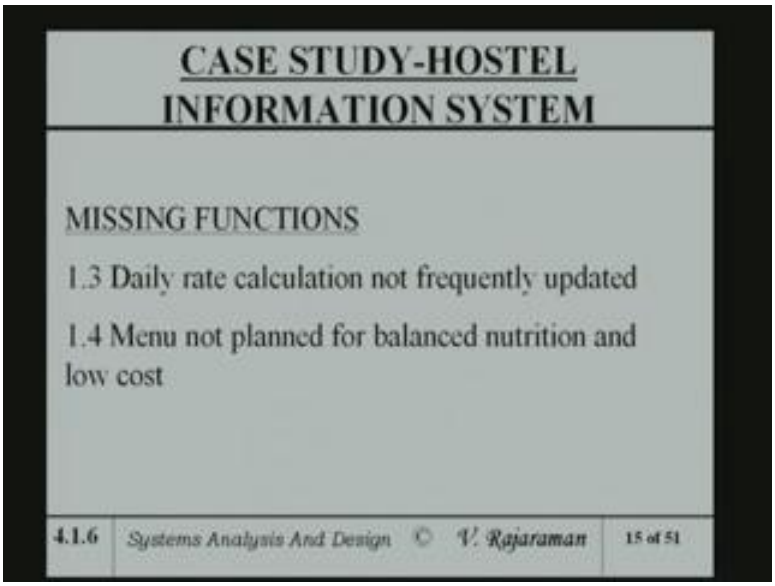

And daily rate calculation not frequently updated. In other words, see the daily rate, one of the goals was to keep the daily rate at 15 rupees plus minus 1. If you wait, till the end of the month to calculate the daily rate, it may turn out that certain things are gone out of control. Whereas, if you update day by day, you find about one week, your daily rate is gone up beyond 1 rupee. Then, you may try reducing or buying cheaper vegetables or reduce inventory and so on and go on an economy dry to try to bring down the cost.

So, at the end of the month, you meet your goal. So, you have frequent update, while you are actually buying and so on. That is the missing function currently. Menu not planned for balanced nutrition and low cost, currently menu has occurred arbitrary. And we would like to use a computer have a balanced nutrition and low cost.

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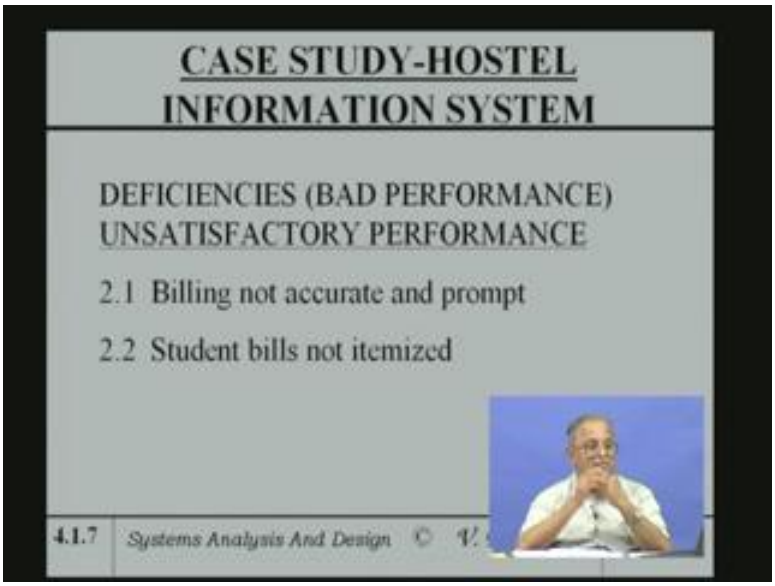

Deficiencies are bad performance and unsatisfactory performance. Billing is not accurate and prompt, that is one thing, which is having mention again and again. Student bills are not itemized. That is student is giving bills, but it better to itemize. And what is meant by itemization, students may bring guest on a certain date, so you say that, you brought two guest an 16th of March and this amount of money which is for that guest.

You got something extra on this day; you ordered extra milk or extra eggs and so on, on this day. So, that is itemized. Student also kind of knows, that extras, which has been charged in his mess bill is as per what he actually get. There is a saying amount of itemization giving a confidence to student is not being overcharged.

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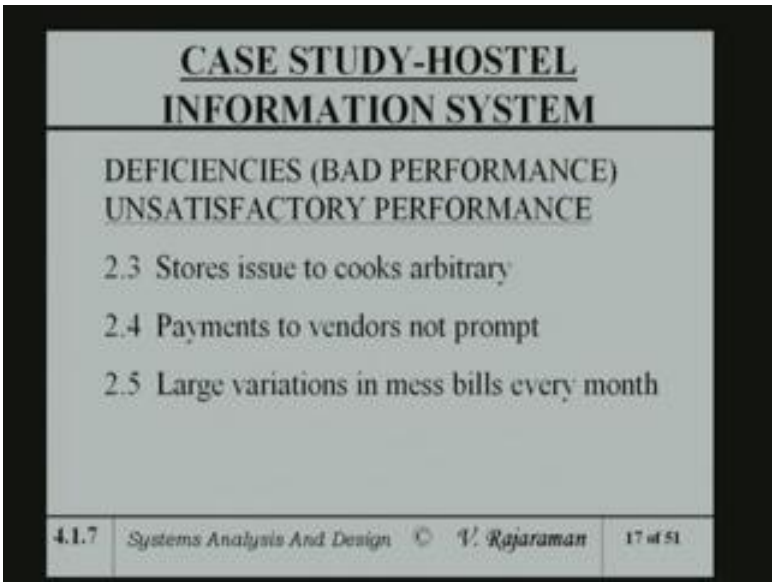

Stores are issued to cooks arbitrary. In other words that current system the stores are the items are given to the cooks in a not in control way. Suppose, he is going to cook for 100 students, there is requirement of certain amount of rice. If you give currently, it has to the apparently cooks were being taking out, whatever they require. But, if you want to control the bill, you have to have clear idea of how much of rice is require for 100 students, only issue that.

And make sure that, the rice the total rice does not go down or you know, there is wastages are not there. So, that again, we have the quantification in the computer, you can date the exact issue of items, based on the number. Number may vary. In fact, the example, I have given is that, the student is going to be not using the mess for 5 days at a stretch, he is given a rebate.

So, at the even time all 100 students need not be there. Particularly, if it is a holidays, some 3, 4 holidays coming together, many may have to gone off. In this case, reduction must be there, in what is an issue, on based on the number of people there. In fact, many hotels and other organiasations, we will make sure about the number of guests and only issue, based on that, because, otherwise there is no control. That means, that the possibility of preference, which is always there in a system.

Payment to vendors are not prompt, if vendors are paid in time, after you buy items within 10 days you pay, then your cost will not be high. If you do not pay for the month

is going to increase your cost. Saying that, this is not a good fellow, he has to pay so. Because, his money is tied up, large variation in the mess bill every month. These are deficiencies is which I have been pointing out 15 rupees or on month or 20 rupees, next month and thinks like that.

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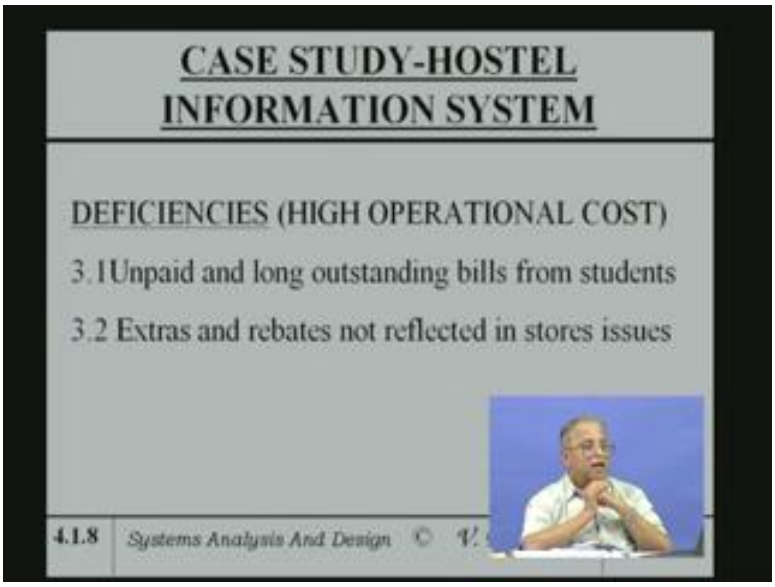

Unpaid and long, outstanding bills from students, students are not paying in time. Extras and rebates not reflected in the stores issues. Otherwise, the extra guest on particular day, then you had issue more. So, of course, normally in some hostels, they are going to bring a number of guests, you had to inform them one day ahead of time. That tomorrow I am going to bring, 5 guests or 6 guests. So, that they can actually plan on that and issue.

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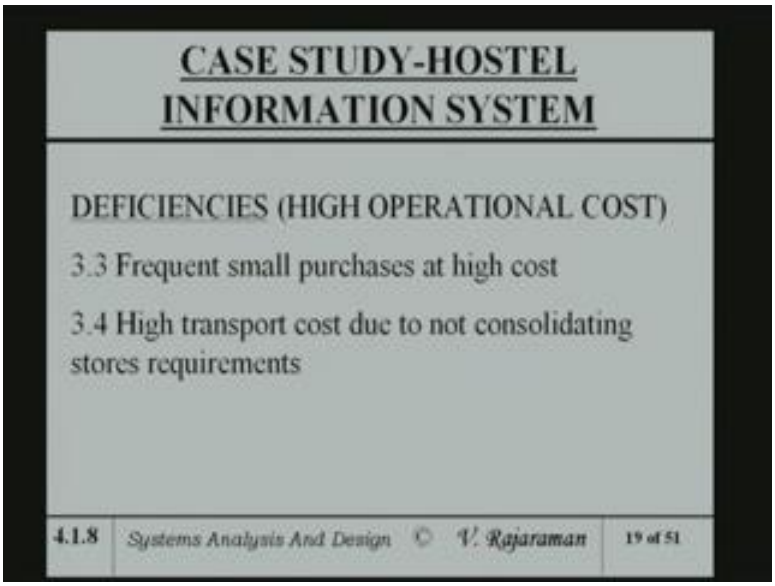

So, these are items, which are deficiencies, high operational cost and frequent small purchases, due to high cost. High transport cost, due to not consolidating stores requirements.

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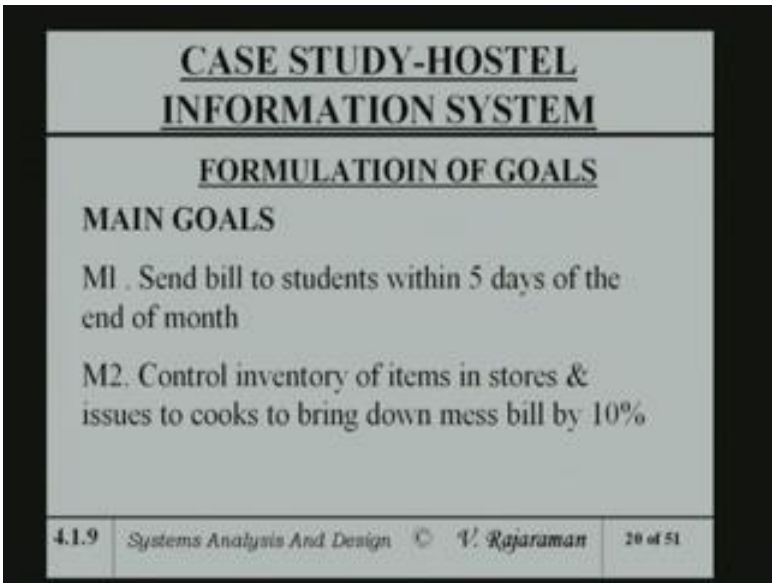

So, once, you have the all deficiencies, I just not then as you know, 1, 2, 3, 4, starting with 1 and you can see, 1.1 and 1.2 and so on. There is the reason, why I have done that, one it is going to lead to certain methodology are certain goal. And to meet deficiency of

2.1, 2.2, as I have to set another goal. To meet 3 and so on, I got to meet 3rd goal. That is a way in which we note down 1, 2, 3 and sub goals within that.

And then, we go to formulation of the essential main goals based on this deficiency. The main goals are based on medium deficiencies and that essentially, what we will be doing; I think I will go in to a much greater detail, next time. Before that, I would like you to read chapter 4, again. Refresh your mind about that hostel case study, because many of things, I am going to saying, may look very strange to you, unless you studied it. And the advantage having a book like this, there is description of this case is there in great length.

So, chapter 4; have this book analysis and design of inventory system. If you read this, then next lecture will be able to follow much better. And also could read chapter 6 or feasibility analysis. So, that you prepared, when you come to this lectures.

Thank you.