Systems Analysis and Design

Prof. V. Rajaraman
Department of Super Computer Education & Research
Indian Institute of Science, Bangalore

Introduction
Lecture - 1

Where students this course, you are going to attend is an entitled systems analysis and design. It is also variously known as intermate system design also known as management information systems, data processing, business data processing the many varying names are in it. But generally, they are all concerned about, how we design systems for use by organizations, what I mean by organizations, there are for instance railways, railways uses informative systems with effectively.

Therefore, you want to buy a ticket, you book a ticket by going to a reservation office. And, giving you requirements in terms of a sheet of paper and then they do a computerized booking. And, once they do a computerized booking, before the trains starts they able to produce a list of people, who have reserved seats in particular compartment. And seats which are still vacant and so on. So, this information is used by both the railways and the passengers.

Apart from reservation of course, there are a number of other things they use the information for. Similarly, there are many other organizations for instance banks. When you go to a bank, you now a day's always go to teller, who was a computer. And, whatever you want to withdraw or deposit so on. The entered directly in the computer and it goes into their database. Insurance companies, RTO office, government, income tax returns, everything nowadays is computerized.

There is no part of our day to day existence in this country, which is not as by computer. If you want to go by bus, bus reservations are done now a day's using computer. So, 90 percent of the user computers in organizations is in the area of system design, for use by you and me. And, if you take for instance the companies in India, like Infosys or Wipro or TCS or many other companies. All are them are really in the area of a developing conveying systems for various organizations.

The organizations may be banks, may be insurance companies may be a motor car company they also develop a systems primarily not only for Indian organizations, but

also organizations for out outside the country. For, instance one of the major areas are work they do is in passing information, which they have about the credit card companies. So, there are credit card passing soon they are all done, by many of our large IT companies.

So, IT companies in general are mostly doing this and that means that the employment opportunity, for all of you is in general area of system analysis and design. Of course, you do not start up, as system analyst or system designer. You, normally start out by programming or by testing programs by gradually you understand, the kind of work they do you graduate to become a system analyst or system designer. So, this course is generally about, how organizations function and what appropriate system you have to make to satisfy the requirements of organization.

And, what way it help the organization to improve their profits, to improve their efficiency. And, generally to improve their day to day functioning, that is the primary objective of this course. This course of course, is got a number of previous questions. I am assuming, when I teach this course this to you, that you already have heard a course in programming. Normally, these programming courses are now a day's either in c or in java. And, in some places you also teach some other languages such as cobal and so on.

But, by in large it is expected, that when you come to this course you know programming. This course of course, is not the only course, there are number of other course, which follow this course. Particularly, for instance the course is on software engineering, almost every college has got a compulsory course on soft ware engineering. And, software engineering is also somewhat overlaps with this course system analysis and design. You might consider, this as a base course system engineering, software engineering course is built.

Software engineering course is also more concerned about projects, about how to monitor projects, how to determine the cost of projects and of that type. You do not really we are not been concerned too much about project management and area of that type. But, is a part of system analysis and design you also will be concerned with subjects like designing data bases, some aspects of object oriented system design, because most systems as you know today, are used so called objects.

We will give you a introduction, what these objects are of course, as you know later on there will be a full phased course on object oriented programming. And, in some places also something to object oriented design. Now, apart from that, you also this this course, also will going to talk about the aspect of electronic commerce. Electronic commerce is may be also an elective course. But, in as much as lots of organizations today are using the online computers for the operations the areas of e commerce becomes an important part of system design today.

So, we will also concerned about e commerce as part of this course. So, you can see, the course is purely broad based. And, it is also a course, which is a foundation course for many future courses to come. So, that extend this is something which, you have to pay attention to and understand various topics and a level which is the basic level. That is level which lays the foundation on which you can build the other super structures, which come up in the other courses.

So, this course of course, I am going to divide up into a number of different modules. And, as you know these some of the modules in the webs, web also. The web material which supports this course, there are transparencies, there are also multiple choice questions, there are worked examples and as a question bank. And, there is a lot of support material for you to learn this material of course. And, so listening to this lecture only gives you some kind of a background and motivation. And, what we are suppose to do.

We are actually, have solved problems, in order to design small system of your own to be able to understand this course in a much deeper step. So, I would urge you, to do go to the computer look at the support material. And, go through the support material also concurrently, whatever you hear in this lecture. The lecture only clarify, some of the points, which probably are not very clear, from the transparencies which are there as the part of the web, web presentation.

So, there is no need to take down, whatever shown in the transparencies in this class room. Because, all these are available in the web material, which accompany support material which you can always use. So, let us, get an overview what are all the various topics, I am going to talk about. As you may start of talking about the needful

information in the management. The distance between data and information and the requirement of information by various level in the management.

In any organization the levels of people, there is a chief executive there is a general manager, there is something like a branch manager or a lower level manager. And, there are also the people, who do their day to day work like the executive assistance or the clerical staff and so on. Each of them has a role to play in the organization. And, each of them requires some kind of information. So, we will essentially say, what type of measure to support to it, from people in this different levels in the organization.

Apart from that organizations are not monolith. They are divided up into a number of parts like there will be a everywhere, you will find a finance section you will find a section, which deals with human resource development there will be people, who will be concerned about supplies and supplied chains. How, to get supplies in the organization, there will be marketing people, who will find out how to sell whatever, they produce and there will be some research and development.

So, there will be a number of different parts of an organization. And organization as I said is not a monolith. Because, all these different parts in organizations, they require specialized information their views. So, we have understand, what are these different types of what I would say, some part of organization. And, what these sub parts or what these individual groups require and the nature of the information we have to present to them.

Unless you present the information which is appropriate to them, they will find it not very useful. So, you have got always present something, which is necessary and efficient for that particular management to function effectively. So, it is important to understand, from the point of view of organization, what each section requires. So, it is going to be a fair amount of time in talking about, the functional levels of the organization and for each function, what the requirements have information.

And, then the very important part of the complete system analysis and design is something called system analysis and design life cycle. What we mean by life cycle is the steps, you go through in coming up with the entire system. You go through a step number of steps as you know any large problem you have to divide the problem into

number of steps. And, you have to follow each steps and each step you can conclude some part of the requirement of the design.

So, effectively each step more or less got a self contained. And, the future steps depend upon the past steps in some sense. So, you really have to talk about, the various sub parts of a entire system and this is called the life cycle. In other words you go through different parts and complete the cycle and of course, no organization is static. So, whatever you do, do not remain prominent forever, it will change from time to time to time.

So, organizations are not static, human systems are not static so, there is a requirement and also what they call maintenance. More than maintenance really means, not only correction of errors you made in the earlier systems, but also enhancement depending upon, what the management pursues as a new need which, organization has had. So, there are these aspects of a life cycle, which kind of makes you go through a feedback loop and goes through a loop in some sense, you had refine your systems as you go along.

And, many organ one of the most important part of desiring in a system is to understand, what the requirements are of of the person going to use it. So, to determine the requirements of the organization is the most crucial part. And, many of the systems have failed, because people have not understood the requirements. And, understanding the requirements and clarifying, whether you understood correctly, the requirements with personal any other requirement, those are important part of the entire life cycle of system analysis and design.

So, requirement specification is still something of a, you might say an art the sense that requires, you to talk to a number of people ((Refer Time: 15:55)) whatever they told you, not misunderstand and gather as much of the facts, as you can from the person and shift out what is facts and what is not facts, and what is assumed and what is not assumed. Is a whole lot of nuances, when it comes to requirements gathering and of course, people have been looking at various tools for requirements gathering.

But, many of these tools are not really worked very effectively. Even, today requirements determination is a human intensive activity, which very often is done by ((Refer Time: 16:39)) done by experienced people, who rare afraid to ask questions.

And, get the answers in the people, whenever they have a doubt. And, following this ((Refer Time: 16:53)) requirement, you have to find out at all it is feasible to meet the requirements to a computer based system.

To what extend does the current technology allow you to do it, to what extend what will be the cost. And, what will be the cost benefit, will it be in other words all managements are really interested in finding out, ((Refer Time: 17:16)) spends, so much money on my computerization is it going to give me the return and that. If I am going to make a profit based on this system you have ((Refer Time: 17:27)). Because designing and implementing computer based information system is fairly expensive.

Many companies spend hundreds and thousands of rupees in building systems very often at the end of it, they are not always satisfied. And, so there is a requirement we are able to find out, what benefit you get and very clearly tell the user, what benefits you get and what expect. And, how much approximately it is going to cost it. So, then the management has to decide on a cost benefit basis, whether it is worth going ahead computer based information system or doing it whole way the person is being doing always.

But of course, now a day's what is happening is that to the reduction in cost of computers, which are quenched as you know. The computer itself is not a very expensive, expensive machine. But the people, who are designing the systems, are quite expensive. So, the overall time, which takes the overall cost is the people's cost. Not, the computer cost. So, what are we concerned about the time as well as the cost and the benefit. So, all these things have to be triggered in a topic in felt in detail about feasibility analysis.

So, because one has to payable to quantify cost, one has to quantify benefit. And, it is not always able to quantify a benefit. You say your organization work better, what do you mean by better, sometimes they have said it is not able to quantify benefit simple example, is a railway reservation. The reservation for you, the only benefit you can see it is not probably reducing the costing a ticket. But the benefit is that it is you are assured of your ticket, you can book at book ahead of time.

And, it gives much better comfort you are standing in a queue for a shorter period, than you were before when the manual system was operational. And similarly, when you are

in a bank in before the computerization, you have to spend a lot of times standing in queues. Now, with computers the amount time you spend standing in queues is reduced. So, you feel there is a benefit. But, it is not quantifiable in the sense, you do not quantify what is the money value of the time I have saved by standing in the queue. But, still you know that it is benefited to you.

Everybody will agree with you that computer based reservation of trains are really made a difference to our traveling in this country. So, there is a benefit is sometimes, what about is called subjective. And, it is not always objective. So, one has also to way the what, I would say is intangible benefits and also tangible benefits. Tangible is something which you can measure as rupees, where intangible is something which is better comfort for you or better better methods of managing a system and so on.

And apart from, then we had a really locate some of the tools, which are required used in system design. One of the most important tool is called data flow diagrams. How does data enter an organization, how does it flow from one part of organization to other part of organization? And, this part of organization what is done and all these things become important. And, that is all put in a graphical form for people to understand, because I say as I say picture is worth a thousand words.

So, a pictorial form representing, how data moves an organization is what is the topic we covered in data flow diagrams. And once you understand data flows, you have to be concerned about, how to process this data to get information. So, the process specifications, how to specify processes and that will be one major topic and there are number of methods of specifying processes. The traditional method used over algorithmic technique. The algorithmic technique not the sounds of writing a program.

But the sounds of writing in a plane English, but in a step by step manner using structures, which are somewhat similar for programming. Like for instance repeat something or do while something those kind of structures or decisions, if something is true to something else. So, these all are the ones which are effective in one of the methods of process specification is to use, what they call structure demolish. The other is a ((Refer Time: 22:37)) for complex decision making, where the number of conditions to be tested, there is something called decision tables.

So, I explain for a some amount of time, describing what decision tables are and how they are useful. What is the important parts of decision aspects decision table is that you can determine using this tool, whether the there is the specification have been correctly made. Whereas incorrect specification or incomplete specifications which very often happens, you could detect it at the stage of design. And, something which is detected at a state of design is much easier to fix.

Then after that it goes to the field. After something goes to the field and people find a error in that, then it cause a lot more. And, it also creates a lot of bad feelings about the system. So, it is better to very important remove as many, what I what they call backs or mistakes and so on at the designed stage. And, to the extend decision tables are extremely useful in removing this backs. Then of course, you have to talk about how to input data. What are the methods of inputting data? There are as you know was as time passes new methods of inputting data are always coming.

The one of the things people use very effectively now a day's is bar code, bar coding, where you go to a super market they swipe the bar, bar code. And, get all the data about the product in that bar code. And that barcode is being now a day's replaces something called a RFI e tag. That is radio frequency identification tag which is a semiconductor with a wireless, where the entire data about an item is embedded. And, that tag is embedded into a item. In fact, some of the clothing stores, where say the the cloth is extremely expensive they embed this tag in belt or something.

So, when you take it to the counter automatically the counter has a reading device to find out what the the property this particular item, which the customer has bought. And so immediately it can create the bill. So, there are number of users of this new kind of ((Refer Time: 25.16)). So, we have to be concerned about the various methods of detect positions and for instance RFI e tag was not there 5 years ago. But, today it is becoming important and tomorrow something else may come.

So, you have to continuously lie on as you go along newer methods of how to acquire data and how to use data. So, using a central processing and acquiring is as important. And, acquiring also you have to find out appropriate method of acquiring, different types of data. Having acquired the data, you are going to organize the data in a proper way for processing and that is what is the concern of so called data base management.

The data base management course, which is normally there in all computer science curriculum, which goes into great detail about data base design. But in this course we will give you, why database and give you basic idea of how to organize data, in a data base. You also will be concerned about the appropriate way of organizing. Without losing data, without being duplicating data and so on. So, that is the topic has been covered in the data base management module of this course.

And, the once you do process the information so on, you have to present the information to the management. There is a result of whatever data process is done is the information, which is used by the managers. So, the presentation becomes quite important very often the presentation is by reports. But report may themselves, may not convey too much information.

So, sometimes they depending upon situations, you would use for instance bar chart or a pi chart like for instance when a budget is presented the finance minister shows a big circle, where there are number of pi's. Saying that, are the revenue of 100 rupees they collect, 40 rupees is going to defense, 10 rupees is going to education, 10 rupees is going through towards health and so on. So, you can by a glance from that bar pi chart, you can find how the money being collected is going in other words, how your tax money is used by the government to probably give a better service.

And in fact, one of these will find in current budget is that big part of pi is spend by government in servicing date. Because, they have taken date from the people ((Refer Time: 27:59)) and they are giving interest. So, interest payment itself a fair amount of what you earn. And, these are because very obvious with some efforts of presentation of data. So, data presentation methods are also as important as data processing methods.

Because, the presentation is one which triggers action and the part of a manager and better the presentation the better will be the way in which you understand. What this what the implication of these results, which the computer produced. And, there is always a concern in a computer based systems, about whether the results are can be lied on. Very often generally the public there is a feeling that the computer makes lots of errors, which is not true.

In fact, I heard one lady saying my girl did extremely well in the examination. But, I think she got a second class, because computer made a mistake, which of course, is not

true. When the kind of blame they put on the computer not the blame where it belongs. And, that time the point of view of designer. He has to make sure, that he does not subject himself to blame. And he can more or less be able to guarantee, that whatever results come out of the computer are correct, there is no error in processing.

So, there is something called in some organizations they also have a separate audit. In other words whatever system is designed the auditor looks of it independently. And, say whether this system does what is suppose to do wherever is designed. In other words, the requirements, system is required to meet the requirements and whether does really need the requirements is what the auditor is suppose to look at. So, there is a in audit revolved errors or minimize errors is whole a lot of controls, which one puts into the information system.

In terms of control and data, data input controls on passing steps, controls on the outputs and all these controls. And how these controls are to be designed is an important aspect of designing any large computer system. These control are not you know very obvious to you, when you write small programs. But, when you with billions of lines of code also when you are doing with large populations or like large ((Refer Time: 31:01)). It becomes important, because this question of sphere volume.

When you use volume these is always a possibility of error, like simple example is even if you take an examination processing, the if there are you know in the CET for instance, there are probably more than about lakh of students who takes the CET exam. And, so there is a all the results that had tabulated and they normally entered very often manually. And, there could be manual errors and when you enter so much there is always a manual error.

To some extend ladies complaint that her daughter did not do well may be correct, because by chance the data for her may have been incorrectly put in. So, there is a deal to make sure, if when data is put in, it is correctly put in. In other words, there is a control and detecting the errors at the right stage. And, correcting them at that stage rather waiting till the end. So, these are parts of the control system, one has to have in place particularly for large system, which deals with huge number of data and so on.

And, as I said control is quite important always important and also security is important. What do you mean by security is many organization very important data regarding their

functioning is storing data bases on a computer. Now a day's you know, that no computer is isolated. Every computer is connected to every other computer. And, there is some kind of ((Refer Time: 32:40)) internet to which everybody is connected. And, when you have an internet there are hackers, there are people to find out get into your system and spy on your system.

And, I have to find out what data you have stored in system. So, you have to prevent you have some method of ensuring security of data, which you have stored. So, that they do not leak out. And also, that they are not gorible or intensely changed by somebody from outside. Sometime, even dismantle employees change data and you have to make sure that data is available only to employees on a neat based, new based not very wise widely available.

And, there is also got to be audit ring. In other words, if somebody got into the data and change the data, one has to know who changed it and he changed it. So, he can always track down, whenever mischief took place. So, the audit rings control the security, they are extremely important aspects of designing large information system. And, that is one one important topic, we will be talking about in this course. The last part of this course, deals with electronic commerce.

The reason which, see many of the traditional system analysis and design courses electronic commerce is not really taught in great length. But, I felt that with gaining importance of e business. So, called e business and designing information systems. we have to be concerned about also designing systems for use in e commerce, where new types of problem arise. So, e commerce has e commerce deals also with a huge of security of it is own type.

Because, all documents exchange electronically, they need to make sure that the it is not correct code on the way. And it is authenticated and there are many, many issues which come in wake of that in e commerce, you are using the internet which is a public, that work which can be entered by anybody. So, electronic commerce has a number of issues not only that of designing system.

But, designing system of security, designing system so that payments are realized appropriately and also that the secrecy of transaction is maintained, secrecy individuals what they bought is maintained. Secrecy of their credit card are maintained. These

aspects become too important, when you come to e commerce. So, e commerce system also are an important part of a overall information system today and so there is a reason why this subject is one of the modules in this course.

Many colleges of course, now have a separate e commerce course, which is an elective, which will follow this course. But, this course, this module will give you the background and understanding the higher level e commerce course. All these primarily what I would call within this course is the theoretical aspect of this course. There is also some part which is practical. The practical is taught to course confided in this lecture. The practical has been done by you.

So, there is you got to design a system yourself to be able to understand the various bits and pieces, what you have learned in this course. So, you have to integrate all these together in designing a real system. And the real system of course, could be very large. So, by you know in a class like this or course like this, we can only talk about smaller systems. And, so I have given a number of examples of smaller systems at the end of the course, which is in the web, web course.

So, in the lecture I cannot really talk too much about it. But, I will give you the steps which are required to design a system. But, we have to go back and look at the web material, to be able to understand how you design a full system. So, that will conclude the course. So far, we have seen why we should learn this course. Now, we will start on the main subject matter of this course. This course is as I told you is divided into many parts, many modules and now you are going to start with the first module.

And, first module is titled information and management. The major reasons, why we want to discuss this topic is that as I said most organizations, require information systems to effectively manage their organizations.

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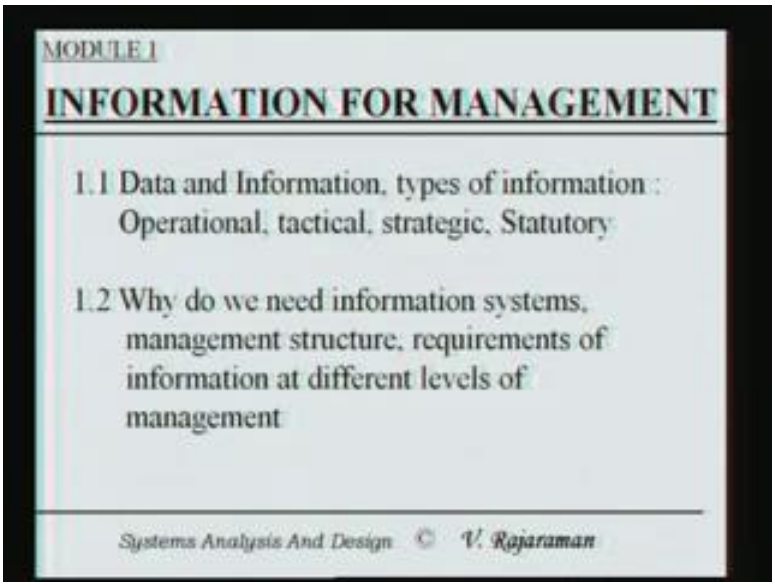

Also large number of IT companies in India, are in the job of actually, designing information system, for various types of organizations. So, when you go to work for these organizations, you find the organizations are really their major business is to design such an, informative systems. Of course, you may not putting charge of designing one such system at the very beginning, But, you first have a clear understanding of what an overall system, looks like and how to design such a system.

So, the various topics, which are going to be discussed, are data and in what way data is different from information. And, once you get information various types of information. there are three, actually four types of information which organizations use. One of them is called operational, the other is called tactical, the third is called strategic and the fourth is called statutory. We have defined each of them and we also have to say, why each them are required.

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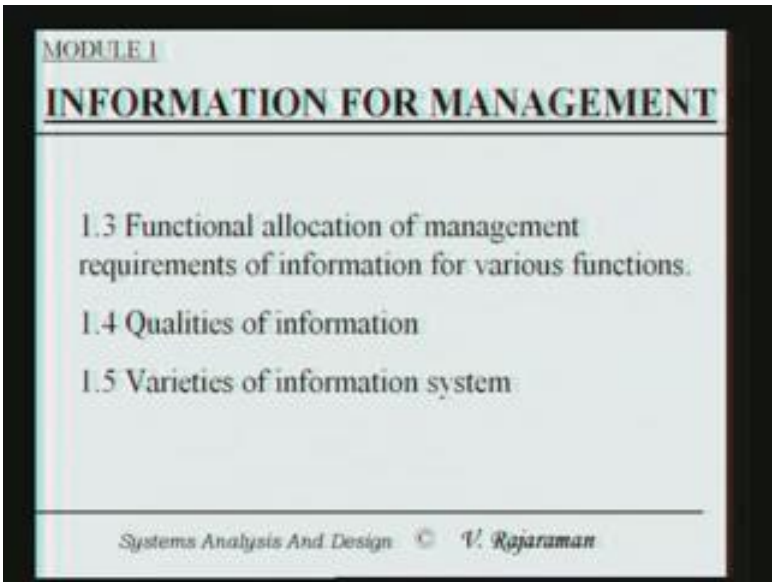

Then, we have to effectively talk about, why do companies require this management information systems. And, the requirements of information at varying levels of the management of the company. What is conclude and in the rest of the module, we have to talk about the allocation of management requirements. And, what type of information we have to give to each type of management and on a neat need basis.

And, once we allocate and give the appropriate information, because the more major idea here is that, we had to able to give what is appropriate for a particular level of management. There is no point in giving certain types of in information to the top management, which has much much lower amount of time available to it, because their jobs are of different nature. Depending upon the nature of the job of different persons in organization, you have to really give what is appropriate for them. And, that is essentially what, we will be discussing in this part.

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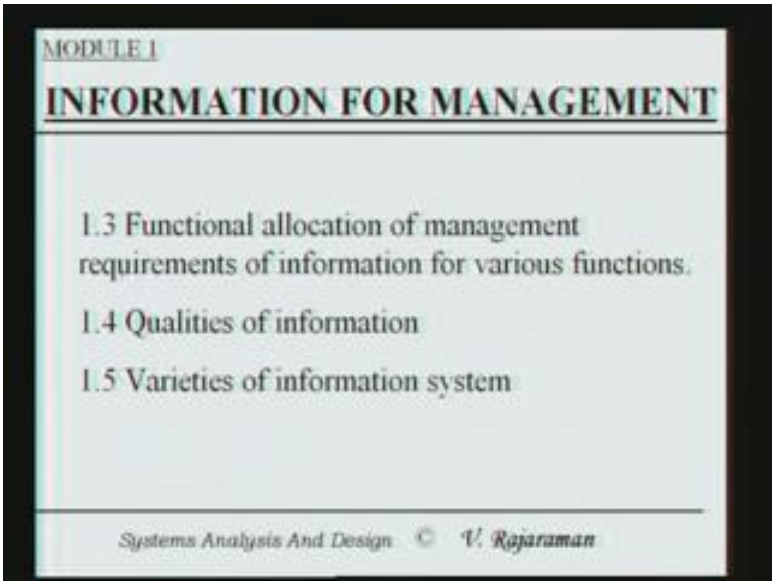

And then, when you give information to various levels of people, then you have to also to be concerned about, whether what we are giving is correct and is complete. So, that more than this, there are number of qualities of information, which you make sure is actually given as I said, on a need to have or a need to know bases. And then, when you design information system there are many types of information system. And, you have also to understand what these types of information systems are.

What I mean by that is there are certain systems, like railway reservation and so on, which are online reservation system. There is when the customer is waiting for the reservation to be done, system goes ahead and does the reservation. But, others which are not online, that is which are so called back systems. For example, if you are passing information the results of examination of say CET candidates, which is ones into lakhs of candidates.

The entire system runs as a batch and the result come out as a printed output. So, this is a different type of a information system compared to system for a real time reservation.

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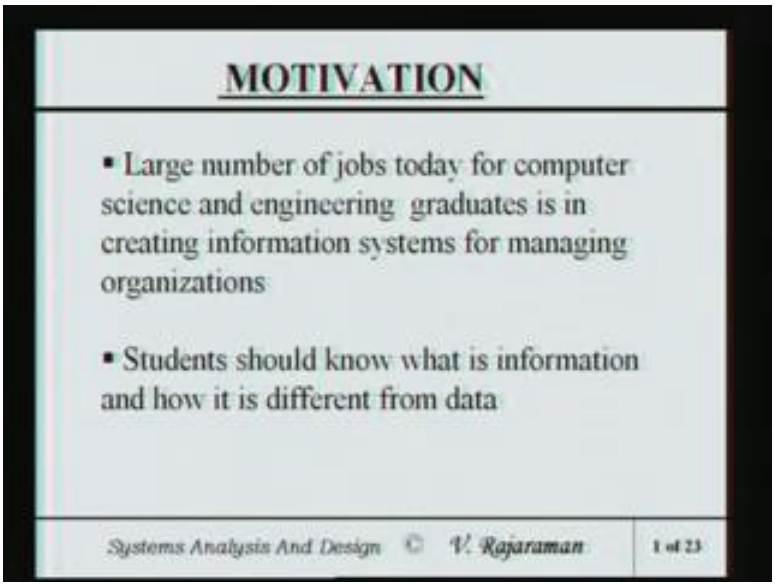

As I said major motivation is that most of jobs are really in this area. And, you should know and what this types of information required and who requires them.

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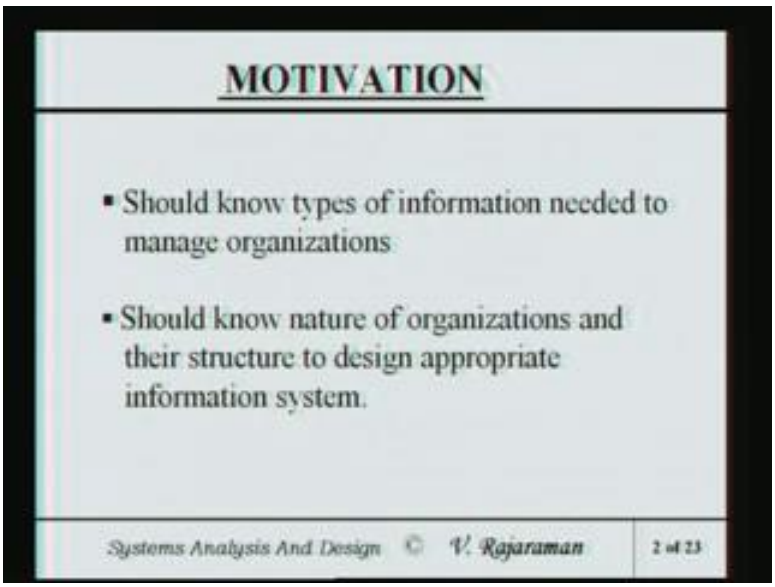

And, you also should know the nature of organization and the structure to design appropriate information system. Because, different organization have different structures hospital for instance has a certain structure. When you go to hotel the hotel is a different structure. And, if you go to a manufacturing company, the way they operate is quite

different from the way hospital operates. So, each of them have a different structure and different method of managing their affairs.

So, as a system analyst, now you are a person how to program, how to design system and so on. Of course, you are not a specialist in hospital management. And, you are not specialist in running a manufacturing company and so on. But, in your life time, you have to be, you will be called upon to design systems for different varieties. Someday you will ask to design a system for a bank, may be a few months and then ask to design a system for an insurance company.

Later on in your career you may be asked to go and look at the hospital and design a hospital information system. So, you get a variety of jobs depending upon the variety of organizations from which the contracts are given to the company where you work. So, from your, from the point of view of the company, you have to really understand. What, these different types of organization do and based on what they do, you really have to train up.

The information system you design, which are appropriate for them and this is great challenge, because you as I said you are a generalist, you are not a specialist. You do not understand, you do not know to begin with all about hospital. But, hopefully by the time you finish writing an information system, you know lot about how organizations like hospital functions. And, what this person requires so on. Because, you are the major job is to create or design system with appropriate for the people, who are working in the hospital.

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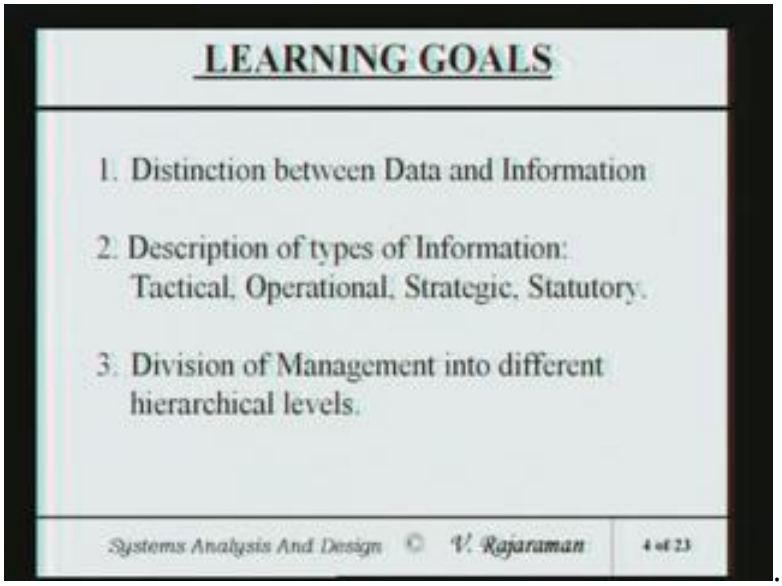

In this module, we are going to talk about the distinction between data and information. That, is the first major topic. Then, we will talk about the types of information; I said there are four types. And, we will talk about the division of management into different hierarchal structures.

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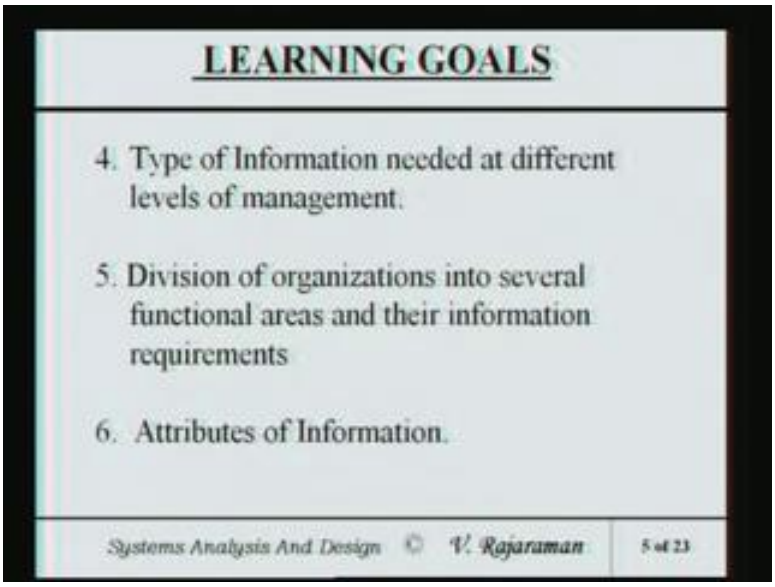

And types of information needed at various level of management. And, the functional areas of organizations and I said functional area will differ from organization to

organization to organization, attributes of information. And, all these things are essential topics to be covered.

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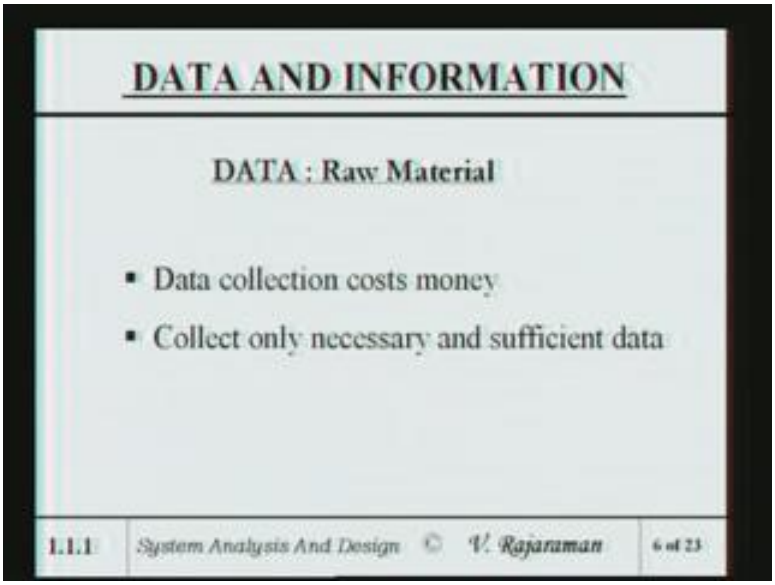

So, will start the first topic namely, what is the, what is data and what is information. In a ((Refer Time: 45:57)) day to day affairs, they normally use them interchangeably. In fact, in many books in computer science, they use more or less data information synonymously. They somehow, have distinguishable information somewhere along the line lost. If you look at the old early beginnings of computers, there the literature would have made a very clear distinction between data information. And, that information has to be kept in mind while designing systems.

Now, data is something which is a raw material, which you access and you go into a computer based system. The information is a process data, which is used for triggering actions of people, who actually manage a company or raw a company in different ways. So, the point I want to make is that data is something which is used by the machines. Raw data are more used by human beings. Whereas, information is processed data, they have to get processed by machine and passing them in different ways.

And passes, the information the data which come in depending upon the requirements of different levels of people and different people of organization. So, from that point of view processed data is really what I would call is information. And, one has to understand clearly that this distinction. Now, if you look at data in general it as I said,

data is a raw material to begin. And, it causes a lot of money to collect data. It is not let me explain, what I mean by cause a lot of money to collect data.

Suppose, you are trying to find out the preference for the particular kind of a soft drink. You are starting a soft drink company or some other soft drink company is there they want to find out, how are the competition is doing. And, you want to find out the preferences, then you have to go to large number of people in different parts of the country. You have to go to not only to cities, but you have to go to the villages. And, you go to different part of cities and villages. And, India is ((Refer Time: 48:38)) very vast country.

There is no point in just doing a survey, just in one part of India. And, thinking it will a kind of a also apply to other parts of India. So, you have to really look at almost all states may be a sample from all states. And, send people out to ask question collect this data and so on. So, the amount of time and effort spend in collecting all the data is considerable. So, you really have to be careful about what data you collect. And, whether the data you collect is a, you can put lie on it. Whether, what are you going to use this data?

Very often people go ahead and collect data with asking the question, what am I going to do with this data. So, you have to really work backwards. So, you have to first ask the question. What is this data going to be used for? In other word, what information does you want to generate out of the data I am going to collect and based on that only go and collect necessary and sufficient data. In other words, you should not leave out the important data at the same time, you should not go and collect all kinds of useless unnecessary data that going only to cost you money.

Not only, you collect later on when you try to un relate on a computer, you have to give to data entry operators and they also cost money and so on. So, you have to be very careful about collecting only necessary and sufficient data. Now, the distinguish between data and information is also something which, occurs in day to day affairs. Let me make a very homely example. If you look at a house wife, she would be buying milk every day for the family. And normally, they do not families do not buy exactly same amount of milk day after day after day.

Some days, they may require more milk. Some other days they require less milk. Some days they go out and leave and may not require milk at all. So, what you do, what should us is effectively write down on a note book may be daily, how much she bought. So, this is essentially nothing but, raw data. So, she collects all this she notes down all these data just to make sure. The purpose of this collection is to effectively give the money to the milkman at the end of the month for all the milk she is bought. So, at the end of the month she processes the data.

This processing the data, you actually one, one step is to add all these amount of milk she bought. So, addition is one processing step and having added all these she multiplies this sum by the cost per liter milk. And, she gets the total money to be paid. So, this is the result, the result or information which is the amount of money to be paid. And, this money is what she pays to the milkman at the end of the month. So, you can understand that the just what is entered in diary is no use. Unless, she uses it to find out how much money she has to pay.

Now, one need not stop at this stage. And, suppose there is a, you are a more careful house wife. And, you want to find a balance the budget so on. For the house hold and you may be having say a certain number of rupees given as your monthly budget for expenses on milk, on clothing, on provisions and so on. And, what you may like to find out is it out of the total amount of money, which you have spend in a given month what proportional is that money is spend on milk.

So, you can divide the amount of money spend on milk by total amount of money available to find out the fraction, money you are spending on milk. Now, here is a very interesting kind of a thing comes. Because, input here is already the money aspect, that is in one one sense it is the information which you use to give the milk man. Now, it will be used as data to find out the percentage of your budget, which milk is taking up. So, the information itself becomes the input to another processing step. So, that is the reason why the certain difference between data and information is not very clear.

What may be data at some time would become information. And, what are the information, would sometime really becomes data for another step. So, there is the case, why people are not able to make such very clear distinction between these two. Any case, from our point of view, you have to be very clear that what data is collected and

being input in computer is really the raw data. And, what the result of passing the data which is used to trigger actions. To have to take certain like in the case house wife the action, which you take just to give money to a milk man.

So, the effectively the question is one of what action does it triggers. Once, the triggers are auctioned essentially information, which triggers action.

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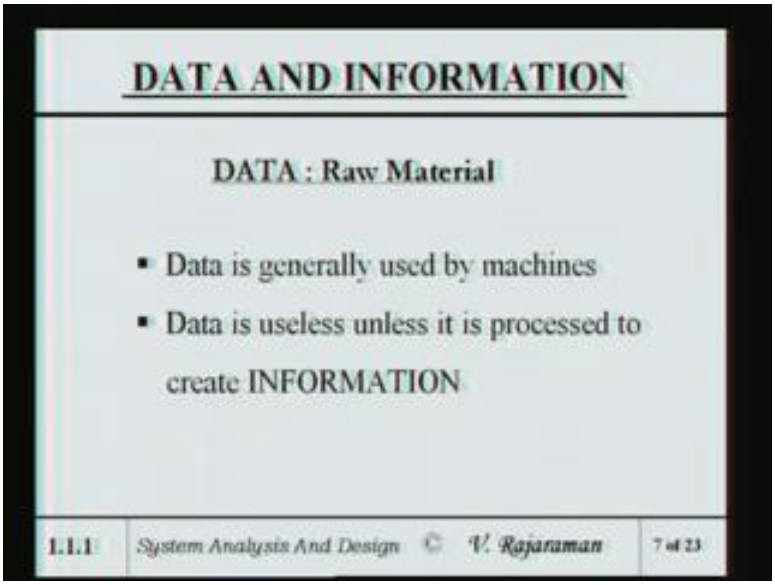

As I said, to repeat, data is used by machines and data is useless, unless it is processed to create information.

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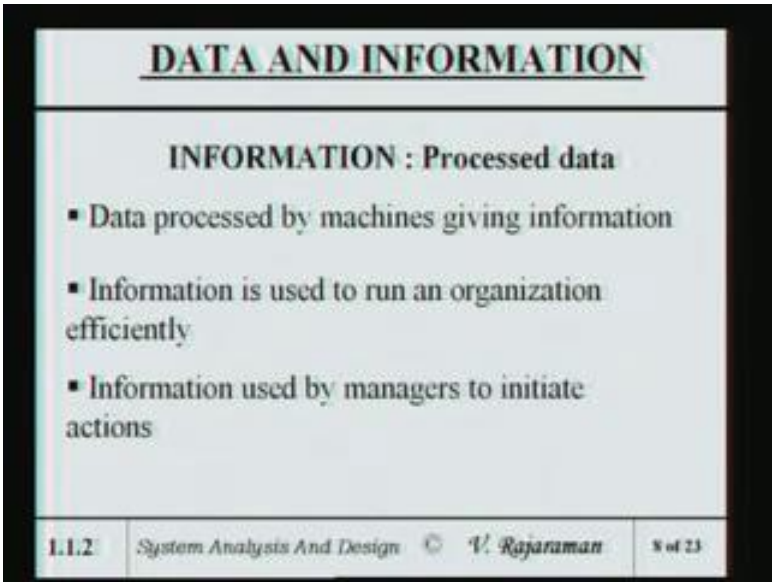

Information is processed data and information is used in one organization efficiently. Efficient running of organizations depends upon the quality of information they get. If poor quality the running of organization may also will not be ((Refer Time: 55.16)) in a poor state. Even in the case of a house wife, if she makes an error in addition and multiplication. And, gives wrong amount to the milk man, there can be either quarrel. If, she gives lower amount to the milk man or she have given more, she has given more money. If she has given higher amount the milk man does not tell anything.

The point is that one has to be careful in the way you process the data. Your processing step must be must be correct. You have made any error in the processing step; it will reflect itself in a incorrect output, which will in turn trigger incorrect action. In fact, one of the very common terminology used in data processing is what they call gigo. Garbage in garbage out, another way of looking it. The data say the garbage need not only be the data, but garbage can also be the incorrect programs you write.

So, if you have incorrect programs you write, then also you get what you get out is only garbage. The important thing is to have to make sure the data is correct at the same time also the processing steps are correct. As I said information is used by the managers to keep their actions.

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Now, let us take a more serious example. I took a example for a house wife, which is a very, very I would call a trivial example. I take a example of a shopkeeper. What I mean

by shopkeeper of course, there are shops and shops and shops. There are shops, which are run by single person. There are shops which are essentially few supermarkets and there are different types of shops. The medical shops or provision stores and car shops and so on.

But, by in large all the shops have common functions. And, let us take as for an example, a provision store or even medical store. I think many may be medical store is slightly better example for me, so we will medical store. Medical store, you all of you know sales medicine. So, when the, what is the store keeper. Many of the medical store are in fact, run by one or two people.

There is a single room, where you keep all the medicines and then effectively go there and you he gives you medicine. And, you know if you give the prescription he gives the medicine. And, he makes a bill, if you insist a bill and collects the money from you. From the point view of the medical store owner, what he requires is at the end of the day he must know, how much money has collected. So, you must know some idea of how much sales he has made per day.

So, that you he has a understanding about his monthly income and how much he can spend in things like that. And more important is that, the particular medicine goes out of stock is low in stock then he should reorder. That medicine and keep medicines in the shop for people to come and buy. Because, if he has no stock when somebody comes and ask for that medicine. Then, he is loosing an opportunity for selling that item. They, will go to neighboring medical shop and then buy from neighboring medical shop.

So, he lost an opportunity of not being able to, so it very important for the shopkeeper to make sure, that there is enough medicine for stock, for in the store. And, he has to keep track of whenever something is going little below level, where he has to order. Now, normally those medical shops are see what they do is they have little note book. And, when he goes and look at the shelf and picks up lot bottles of medicine and only two bottles are left something. He immediately comes down and note down the, in the note book. Saying that, this is going below stock and so he notes it down.

And next time medical representative comes, he orders the medical rep orders the medical representative the item. So, that is the kind of manual system. If, suppose is a computerized system, then the computer should able to essentially have an inventory of

all the medicines he had distributed to order the medicines. So, this process in a computer based system to some extend it can be automated. Or suppose, if you want a human intervention that he feels that his profit is not very high or this medicine may be at the end of the day.

You, can give a list of items, which are going below the so called the reorder level at which he has to reorder. So, he may decide, that he would like to reorder certain things he may not like to reorder something. So, in other words there is also in danger in automating the entire thing, because in which case during human intervention and things go on without human's knowledge. That, he may order and things get delivered, and so on.

So, one has to be also concerned about to what extend it should automate. So, he also should be concerned about how much is an over stocked item. In a medical shop it is particularly it is a worry, because the medicines have fixed life. If he have something which is overstocked and is not selling then it would expire. Expiry date may be there. And so you may not even it may be a better stock. He has to which he has lost money. So, he has to make sure that there is not over stocking or items.

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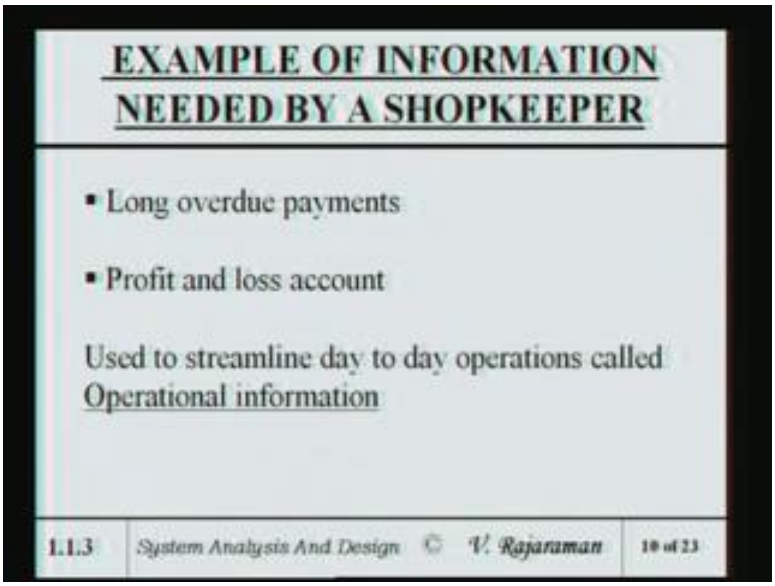

He has to understand what payments, if he gives credit what payment over long over due. He must have an idea of profit loss account. that is how much he has to pay. how much he has got. So, he must have clarity about the profit loss account. And, primarily all these

are required to streamline the day to day operation of a medical shop. This what is when the amounts, you can say when the amount of inform data, which he has to collect. And, the amount at immediate he gets is fairly detailed at the level of the inventory at the level of profit and loss and so on.

So, this is what is called operational information. For operating medical shop from day to day to day, he requires all this operational information to what I would say efficiently run a shop. And, there is the first basic necessary information you requires he requires to able to run this shop. Once, he get his operational, information that can be used further. It can be massaged to get other types of information, which have a better I might say pay off in the long run. And, that better pay off we come from what is known as tactical and strategical information, which we will discuss in the next next lecture.

So, this to conclude in this lecture actually, we learned about the why this, why we should learn about organizations and information requirements of organizations. What is data and what is information, distinguish between these two. And, what is operational information and how do we make sure, how do we actually fit. Examples are looked at how to convert data information and, how, what is really meant by operational information.