Systems Analysis and Design

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Lecture No. # 40

Module No. # 01

Today is the last lecture in this course, and I am going to be talking about case studies. The idea of this last lecture is to consolidate; what all we have learnt in this course, right from the beginning till yesterday. And proof of the reporting as they say, is in terms of actually designing a small system, there are two ways in which we will go about designing a system, because one of the important points we mentioned, right through the course was that the most critical aspect of the design of any information system is the systems requirement specification.

Now, the great difficulty is there particularly among beginners to come up with the system requirement specification, based on interviews; that is what you one ought to do but, sometimes what is given in text books is a small systems definition is given.

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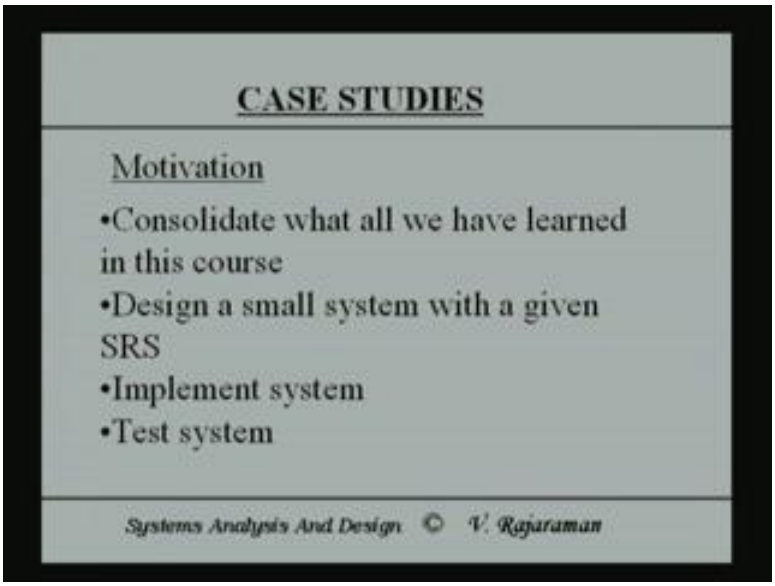

And so the SRS is some what given it is in a brief way, and based on that SRS what is expected to actually design, develop and implement the system and finally, of course test the system whether works correctly or not. Now, as I said it is very difficult in a lecture to talk about a complete case study starting from scratch, particularly because lot of the time want should be really spending in a real life situation, is to be actually able to interview people, understand their needs and come up with the system requirement specification document.

And this cannot be really taught, it is got to be experienced by you, so what I will do the suggest is that, at the end of the course, always are centered of project; this project as part of the project you have to be going on interview some users, and develop a system of appropriate use to them. And at the end of the talk, I will mention some of these things, some of these typical things, typical kind of situations, typical examples, where one could really go and define a short time, which is normally available is the course, one will be able to implement the system.

Of course, there is at variation from university to university, normally in the MCA course we expect the students spends almost a semester, working in industry actually be an understand in a system analyst, in the sense that observed, what the system is does and develop a system along with the system analyst, as may be is resistant or a resistant. But, this even though is ideal does not really happen in practice for a simple reason, that the number of students who are graduating with in MCA is extremely large.

And they find it very difficult to find industries, and various system design companies for accommodating them, they do not accommodate because, the number is to large for them accommodate. And mostly, so it is there in the college itself, in the BE course also,,remember there is the summer training, many place do not have that as compulsory, and so you end up essentially doing it as a part of the course, may be as a project in the course. And that, because of the time constraint necessarily as got to be a small project of course, every student has a BE project, many places they have two project, some minor project and the major project.

A minor project can be something like this, developing a small system for a practical situation, and that we go along way in your understanding where is being taught in this course. Now, in the in the text book we have a been following, then these system

analysis and design, the last chapter the chapter which is chapter 17 in this book is devoted to system design examples, primarily this chapter is concerned with developing a case studies. And one complete example is worked out for a general acquisition in a library, starting from actually interviewing the concerned people, what questions to ask, how to create or how to develop the SRS, and from then on how to do rest of the task, which is part of the system design.

And in the web support material, which accomplish these lectures, there is also another example worked out of a case study of development of a small system. So, I would suggest that you read through these things, to get an idea or what we are in suppose to really do in at in developing a case study and developing a project or coming up with the complete implementation for for a given project.

Now, in this book at the end of these chapter, there are number of exercises where actually a given a total number of about 10 exercises, there are exactly 10 exercises; each one given indifferent situation. And because, it is a book I give skeleton SRS in other words, that is an what are mean by skeleton SRS, is that there is a abstract of the requirements specification, which is not complete in all aspects; and one is expected to go to the appropriate people who are concerned with this and that some further inputs. And refine the SRS, and then try to kind of come up with the few project report including the primary documentation steps, which are necessary when you come up with the project report. So, the primary objective of these chapter and of course, of this lecture is tell you at first of all how to select a project, and having selected the project what about various steps, we have to go through.

And how do you design the documentation, what should be documentation contain, what sections it should contain, and what should be the end product of these project report, which is submitted as a part of your course work just a most most places, are even it is a mini project that gives a guide line, and how to develop a mini project, and the project may be slightly more complicated.

And so there is a primary intention, this lecture the primary intention is to guide you through, the exact steps you have to follow; and time documentation has to prepare, as you go along. So, at the end of the project you are the reasonable report, you can submit to your teacher; many places in the project may not be a single person project, it may be

a team project, may be 2 students working together or 3 students working together more than 3 is too much normally 2 is ideal. But, depending upon the number of students in the class the teacher decides, how many projects can be given, and what should be team size, my suggestion is that 2 would be is nice thing to have but, the worst case you can have 3. So, as a suggestion for team work projects of course, you can look at the book, and the book has a set 10 different projects, in 10 different types of areas for you pick from and give the some pointers of what what you have to do, what you could be doing.

But, if you suppose a good good practice for you would be as I said, not to start with the SRS but, to create an SRS from actually talking to people or talking to groups are organizations, where they really want to develop a system implement a system. Of course, they may not entirely trust the system with you as a student, but at least some of them may accommodate you and spare a little time for you, to talk to them to get at least an idea what problems you are face, which can be which can have a computer based solution.

So, for the sense, if you are going to be looking for projects one, there are several ideas you can go to local medical shop in your neighborhood, and because most medical shop in this country do not have any computer, there actually 1 or 2 men shops; and they can definitely use the machine effectively. Because, a medical shop owner for instance do is the lot of different medicines, wide variety, so recently we went taken system, a system where by in able to reorder while something is below a certain number on the shop automatically by email.

Because, many of the distributor have today email, through email you can send have to request for the items, and when the items go be lows below certain level, you can also look at this expiry dates, and what is coming cross expiry date, he may be able to get the distributor to take back and give fresh items. And because, the end of the day he has to actually create, a total amount of a billing he has made, how much of the cash collection on that day; and besides that, many cases because, the medically bills are reimbursable; he expected to give the bill with the batch number and all that.

And that bill preparation (()) because, small computer with the small printer in it, so there investment have less fair about 30000 rupees are so, a medical shop can really have a very effective equalization of the computer. So, one could really go and try to find out

this is my kind of a statement of requirements, but it may not be the correct one, I do not run a medical shop, so better for you go to medical shop owner, and find out, what are the requirements are and why he does not use the computer, very often they do not use the computer and very very good reasons.

May be because, the power is not very reliable and electricity can fail all the time or may be because he is not place to put the machine or may be because of how to use the machine effectively. So, there are many many reasons why, they may not use it. But, if you are able to tell or convince the person, that the machine is useable and what way can be use, what way it will be cost effective in terms of cost benefit, then may be the person may be convinced to put in an machine. In fact, many groups has started small systems development when we influence such companies, based on catering to small business, because is a very large number of for medical shops.

And so the possibility are using similar system in many shops is quite high, so again it brings out the point that whenever we develop the system, should parameterize it so that, the same kind of a program can be transferred to shop and shop to shop, without too much of rework. Then you will make a profit, otherwise you can even make a product, which is appropriate software product, it is appropriate for the use a medical shops. So, your example, there are many large (( )) shops, which sell cloth clothing is the various types, ready made or cloth which we can buy by meter and so on.

And they have feel in large turn over, what I mean is the end of the day there collection would be around 1000's of rupees, so again they may have a need for a machine and you may able to find out, what the requirements are, and how machine can be useful and where (( )) cause benefit. And you can look at sanitary fitting shop, sanitary fittings is use the number of sanitary fittings shop, tap they sell bathroom fittings and so on; then many of them are very very expensive, and so it turn on turn the total sales in a day may be several 1000 if it is a large shop.

Again it want may kind you look at reasonable cell shops, which have good turn over that means the large sales; and you may go to a local doctor say he may have a very big practice, I am not talking a doctor, who is kind of a verify patients. But, the specialist may be, who and he who has gives appointments to secretary who can have charges reasonable amount for a services, and email able to kind of use the machine for purposes

like the medical record of the patients billing and appointments by these and so on. So, there again, because he is has a clerical staff, it may be the doctor he or she may be able to use a machine effectively; so you may (( )) can be find out, what the requirements are again, some some particular person who have reasonable amount of clientele, and is income is fairly large. And you can go to a local nursing home, which has got say the 30, 40 beds and that s not a big hospital but, small nursing home, still they could they have a lot of possible use of computers.

And you can (()) good restaurants, restaurants (( )) in many of them they use computer, so find out what areas can be restaurants to be able to use machines effectively, and you can go out similar, and I am just giving examples of possibilities. So, when was a few have a middle imagination, you can really find out a lot of possibilities right in your neighborhood where systems may not be very complex, because the operations are fairly straight forward but, still machines can be used very effectively, could us we may supermarket today, machine are used very very effectively.

Because but, super market you got a huge turn over and they got work multiple check out counters, in their many of them are computerized, if we go to a food and the of of fab mall or the food well are such such places, they do you have a computerize system many of them. Because, there turn over is high, the found they found that because, of the huge number of item can the stock stock, they have the inventory control problem and the have the reordering problem and so on. And that is the reason; why they are using it, and then there is also the bar barcode readers have and so on.

So, point out it makes us there is a continuous change which is happening in the environment, and continuously where finding out more and more user computers in all different areas. So, having given this kind of a motivation for you to start looking at, what I would say how to develop a project, how to kind of identify a project, having identified project, what to you do next, and what kind of documentation be prepare that is going to be the rest of the talk.

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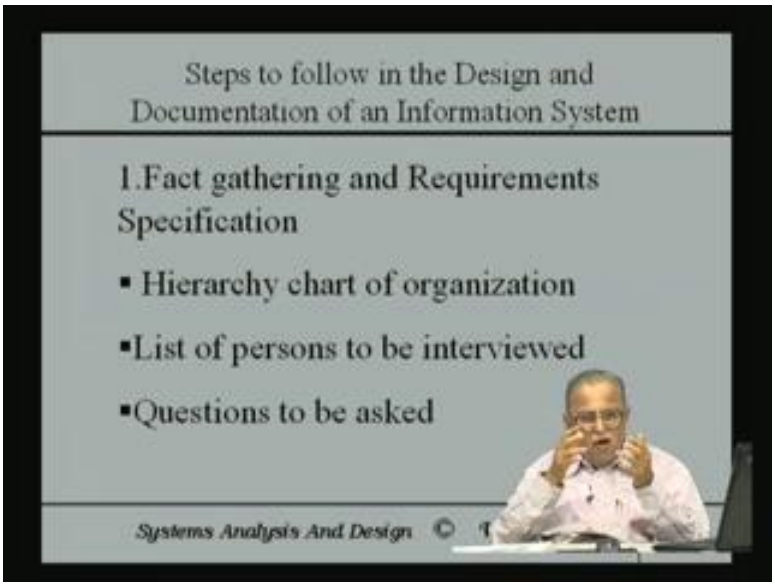

Now, steps to follow in this system design, first of all fact gathering and requirement specification, as I said normally the most important part of this, you actually the interviewer, the interview people and why the interview people you gather facts, and forget a requirement specification. And so the kind of questions you can ask a person, while doing the interview because, first of all we have there are hierarchy chart organization, hierarchy chart large organization have hierarchy; top management, middle management, operational management.

We talked about this hierarchy, early in the lectures, apart from the management there is also actually users clerical staff and so on, who use it. So, all of them have to be interviewed, if it is large organization but, you are talk going to talk to a small company like like like a medical shop, there is no kind of a hierarchy here, its probably a 2 man shop or 2 women shop. So, there is a, it is a the proprietor, proprietary concern might say, proprietary is all now, you have 1 or 2 peoples just take out the medicines and so on.

Buy a large it is number of number of people to be interviewed, in this case very small may be only one, in any case what ever you come up with the in an large organization, you find out the list of process to be be interviewer and what are kind of may list of questions to be asked. Now, the kind of questions you ask is, why should computers based systems, why is it been considered or in the case of, if I try to convince somebody to have computer based system, you can essentially say how computers can be useful to

improve this operations. What are the objective to the system, when I got put a the computer base system, what are the basic objectives it will met meet, what kind of a benefit it will get, what is the value of data to be processed; say that, that is very important that is there is required to size youre computer for the company, so what the volume of data, what is the frequency of processing, it is is it online or is it batch, so what is the kind of frequency of processing.

One more systems are becoming greatly online, what I mean by that is, if you talk about take an example of a medical shop, as men in sales a item, he gives the bill, and he gives the bill automatically, the inventory gets updated; so it is all happening, while the customer is waiting. So, many systems may the emergence of the PCs and networks and so on, this batch has become rarety, rather than the normal thing, in the sense that bad system are used (()), things like the examination processing and so on, which are not all that, which are kind of infrequent.

But, day to day operations are online, it continuously goes on and of course we are talk about the benefits, which you are saying will accrue and that is part of you will ask the questions even ask question, what his what the persons perception is about the benefits which the person, thinks of the manager top manager has have been perception, and middle manager in our certain of the perception, and the operation manager may have other perspective the user may have other perspective from, each one has own point of view. And system designers job, is to take a compromise understanding each persons requirements, and try to meett all of them and also there is kind of conflict, resolve the conflict in come up of something which is satisfactory to all concerned.

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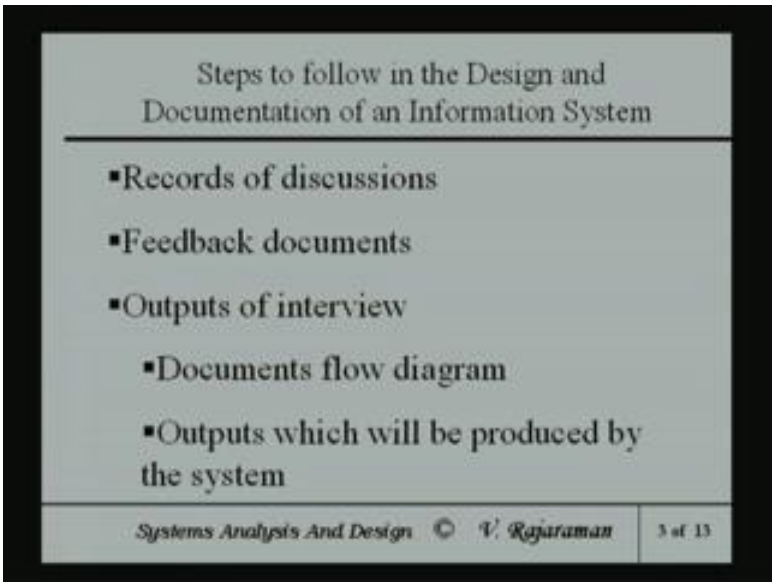

And keep a record of discussions, we are going to interview a people that is were in the documentation should be prepare a hierarchyc chart is the who are to be going the interview and then to be under interview, you have to keep a record discussions, as I pointed out while talking about interviews. Normally, record a discussion is given back to the person whom you interview to find out, whether you understood entirely correctly, what the person said, because very often human language communication is not all the precise.

So, you got to get it authenticated by person who work with you, and so feed back documents there is you get this to get back, get the record back to the person will get feed back from the person, to try to kind of improve. Output documents through out are background is then that the see the SRS is suppose to come up at the end of this face, and document flow diagram, you can be the in have a because, as at the end of the interview as they in your period you understood what are all the documents, which are there in the system.

How they do the documents flow? From where do they flow? What is the volume of documents created? And which are the which are the you might say officers, which are the person persons to whom with this document flows and so on. And output which will be produced by the system, see you kind of give to user the outputs you essentially expect to be produced by system.

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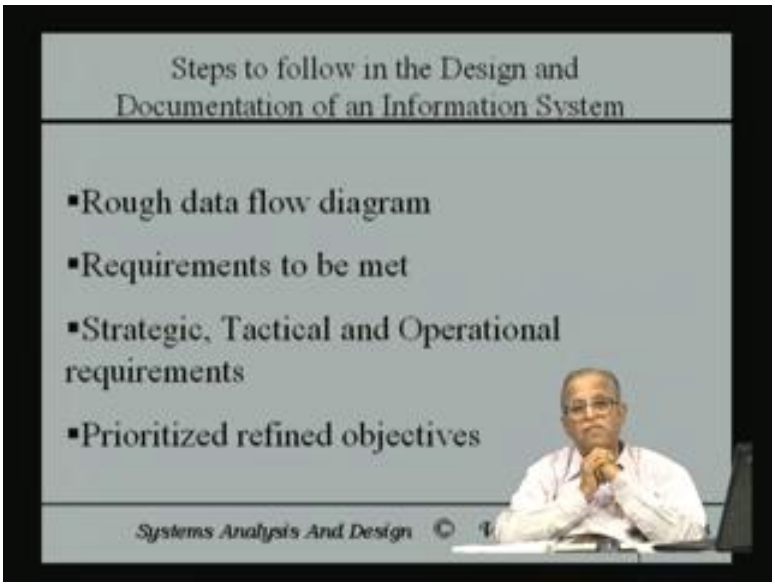

And so that the person can be look look at that outputs, and see whether they are satisfactory or not very often the presentation of the output is very important; and only in fact make a small prototype, for the person to see what the output will look like. And create of course, you have to clear a give the document flow diagram, and something about the way in which then the be processed, you can kind of the rough data flow diagram; you can list the requirements we met by a system, and having list of the requirements. You have to say lot of the strategic requirements, tactical requirements and operational requirements, because the these as I said top management require sent as a information, middle management require some other information, and the operational management requires certain other type of information. And ultimately the data which is created is at the level of the clerical staff; so these are developing creating the data, and authenticating the data also has to be taken care of.

So, come up with the strategic, tactical operational requirements, one may not be able to meet all of them in system; so you have to kind of prioritized and refine the objectives, again based on discussions, so this prioritized, refined objectives are also mentioned on there report. So, at the end of this face effectively you have a requirement specification reasonably well documented, when I said prioritize defined objectives, and strategic tactical on operational requirements essentially it say requirements, which you have perceived based on the discussions or interviews. And what you understood from the documents are talked about and so on, so this document flow diagram can also be often

to get it by given back to the either an asking, the where I said as I said the graphical kind of a a its a graphical tool. So, graphical tool is easily understood by low people low people you not necessarily computer specialist, so this can be actually given back to the to the user or probably he wants the system to be developed; and get the get the feed back to find out really really understood, the requirements or not.

So, prioritized refined objectives are the end product, and once we come up with the very well defined system requirement specification document, that document is the one based on which you going to do the further development. But, before you complete the finalize SRS, you got to also find out some feasibility, feasibility is very important if we are actually gelling are really up computing it to absolute terms, the system requirement . Because, you are to be able to be convinced yourself, and the management also has got be convinced.

That means, management which has given you the job, has to be convinced that this is feasible, let me taken the example of the medical shop, say you may find that it is very very good to have a machine. But, there the may difficulty in feasibility primarily because, the fact that shop may be a one room shop there is no space, to put a machine and because the electricity is very poor to put UPS, and he does not know, he does not have anybody who knows the computers, so may be (()) some what afraid of a ordinary machine.

So, even though in theory, it may be a very good idea in practice, it may not succeed and so you have a real problem in this case, know that is what what may happen is that, the system even though could be developed may ultimately become irrelevant as there as the shop is concerned. In fact I have an interested experience, I went to a sanitary fitting shop and that a guy was sitting down and writing down the every every receipt in long hand and he has huge crowd, and crowd was building up because, he has got a huge turn over, it is big shop the lot of variety of goods and so on.

So, is able to kind of sell lot of items, and when this queue build up people do not like to wait unnecessarily for the bill, they are will go to other shop, which is close by, so I asked the person, why should that you does not use the computer, and he have very interesting answer, so sir I bought a computer and started using it but, now it is in the basement, I am not using it any more. I said why, why you are not using any more, say

sir it it it got into some kind of a bug there was some virus problems came, everytime I had to call the systems person, and I cannot employ a systems person because, is too expensive. And the person whom I call is not willing to come without a reasonable fee, and it is also delayed and in the meanwhile my business suffers, so I found that it is easier to just go back to my old system, using using computer, here primarily problem is, because of unreliability of software. The person who developed the software for them puts unreliable software, did not teach the shop owner, about the precautions he has to take internal virus and so on.

And so even though, the person is convinced of the utility of a machine, he actually found it very, you are not very feasible in terms of day to day use, he is not actually being able to use it effectively, so that is why he bought it but put it in dustbin. Another shop again has similar problem, they said every thing was fine, but then when they were accounting the guy came with an accounting software called tally or something like that, and that cost 15000 rupees something like that, and I cannot afford that much of money and after all my accounting is very small, so I need something very simple to be done.

And so again the problem is that the analyze and person took kind of convince them to buy a machine, did not look at the feasibility from the point of view of the user; so the whole point, which I am try to mention is that you have to kind a be a little bit more practical, to look at the point of view of the person is going to be using the machine. And what type of difficulties they face, and cannot be the reasoning be rugged system which is easy to use, does not require any specialist; so these are the important points you have to keep in mind particularly, when you deal with small and medium size businesses.

In fact, this modern medium size business are the largest in this country, in terms of total number, and so there is a lot of scope there, because large ones like banks and insurance companies and so on, they of course, have used already start already using it extensively. And that is not that is done by large companies, like in all the big big big companies but, if we are going to be a small group doing something, you are look for small business. Any case, the point I am trying to make is feasibility analysis has to be done very carefully, you are covered with quantified goals.

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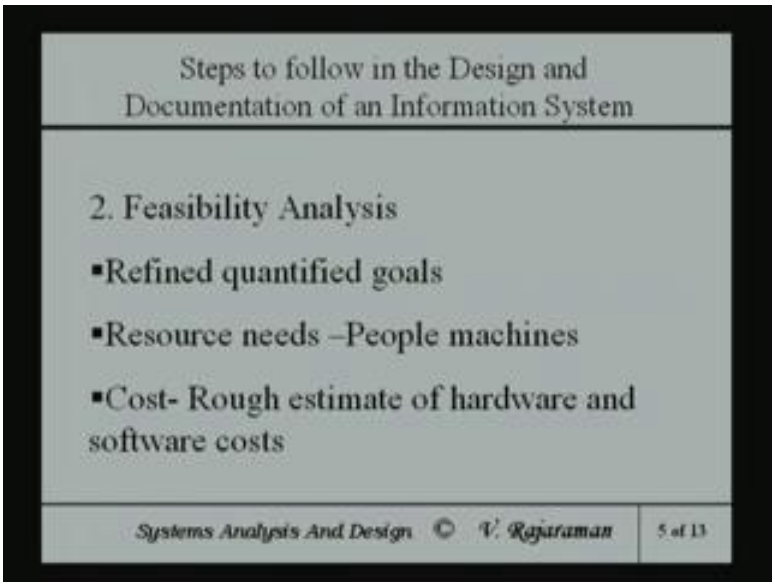

Quantified means, just that is not qualitative but, say that the profit is going to be this much some numbers, what your resource needs people, machines and so on. In the case of a small shop its only one man I mean and he should be able to use that effectively, cost rough rough estimated cost of hard ware and software.

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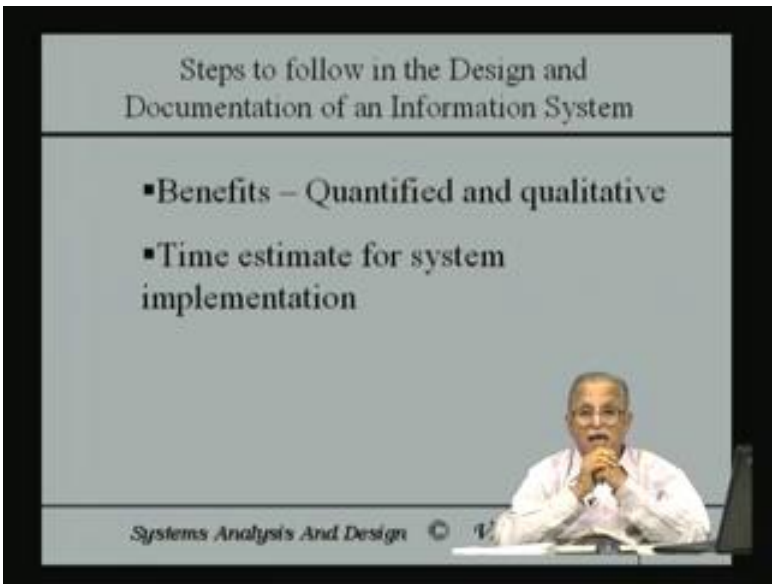

Benefits, quantified and qualitative both, quantified in sense that if if your total points increase, then the profit will go on going to go up, if we need the opportunities to sell, because of crowding and they go to some other place you lost up up opportunity cost. In

other words, you lost the possible money could have gotten the, because of your delay in processing. So, these things are we have to be quantified; time estimate for system implementation, you also be able to say, how much time is will take to implement the system, we talk about few years, they may not be interested. And give a when you give a time estimate and the cost estimate, you got to admit it, very often the (( )) complaint, which is made about internet system development particularly, large projects.

Because, of a lot of in a large time over runs and cost over runs, what I mean by time over runs is, if have promise some thing to be done in about 6 months or 8 months, if it takes an year or year and half the customer is highly dissatisfied, so this called time over run there is you gone beyond the time limit. Cost over run is another which is which in fact the company can can a become (( )) the information system design company, there will be estimate something like which want to cost you x rupees, and find out that the ultimate final cost is something which is double double x 2 x.

Then obviously a customer is not going to pay, and so the question is really in good profitable company is one, which is able to be a reasonable cost estimate to the proper reason profit margin and reasonable time estimate. And so as part of case study, you must really understand the requirement for a time estimate and cost estimate, and be able to adhere to the time estimate and cost estimate; and understand what are the difficulties in, adhering to the time estimates cost estimates.

These things are discussed in much greater length, in software engineering course and we are not going to be, we have not talked about it great length, private management is one big area particularly, large projects because of time over runs and cost over runs can kill a company only in large projects. And very often influence the (( )), because the cost and time over runs, there are so many cases which you find the others communications of (()), why system fail? Where books have been written, and the book by the books called (()) man month.

Why took so long that is somebody is there is going to take 1 year at the end up doing the 10, 4 years that kind of thing say. So, the the point is at the end of this feasibility analysis to refined your SRS, and the refined SRS along the feasibility is a one who get signed by the customer, and he also is committing. The customer is agreeing to its cost he is agreeing to its time, the implication also estimated the cost and time by agreeing to

it, so you cannot increase the cost or you cannot increase the time; if you do that there many companies will have a penalty clause saying that for this month of delay the penalty of so many rupees. And if the penalty builds up, you can very quickly loose your entire entire you know the the estimated cost you are suppose to pay, it is deducted from that cost and give only small amount of money.

So, I think it is very important to reasonably, what I would say confident about your time and cost estimates, and based on this confidence, you get the agreement of the user the user also has to kind of sign off. Once he signs off the systems requirements specification then of course, the rest of the job is yours. In other words you have to you have to allign time and cost but, you cannot change the requirements in the middle, that is the most important things, very often system get delayed, because the user changes his mind and changes the system requirements, that is the reason why prototyping at the very beginning and showing the user what system is look like go along there goes a long way in avoiding misunderstanding between the user and the system developer. And so if you can reduce this misunderstanding, then I think I can also have a contract there is so any any changes from the SRS requested by the user is going to be at the cost of that user. So, any time slippage or any cost cost increase has to be borne by the user, because he changes in mind in the middle; so these are the important points you have to remember.

Because, as of today there is no automatic method of coming on the SRS it is one of those things, which is still an art and a good experienced system analyst is one, we require to be come with the SRS, I hope the ultimately he will become one. So, you got to kind of understand these thing while we working in a in a company. Because you want at very beginning you want to begin this job, because is there is difficult job, but you can understudy understand how it is done.

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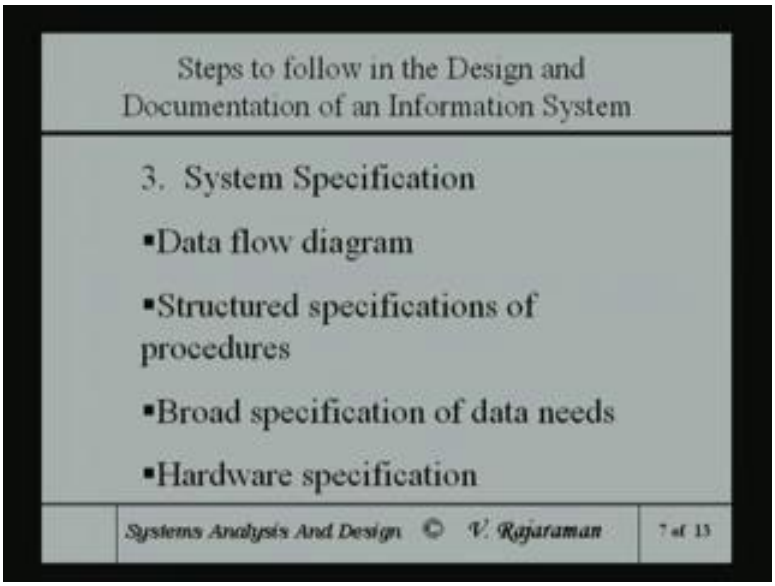

Then, we convert to the system specification as a next step there is, these are all documentation you have to prepare that is each of the steps to be final out, for instance when it is quantified benefits or there it is qualitative benefits, time estimate, all these thing have got to find a place in a report, write the report on your case study. System specification below the dataflow diagram is already had a rough data flow diagram, at the end of the SRS at refined to the end of the feasibility, and then you went back to the user and at that point you have joined SRS, SRS is absolutely formed up.

When they may be formed up, then what you do is you develop the final dataflow diagram, at this time you are already assuming that the system is stably done; and you kind of the data flow diagram structured specification of procedures, structure specification that is structured English specification of procedure. That is each each circle in the dataflow diagram the files of process, the process can be described English and also if it is a complex decision process and a complex business rules have to be implemented, you can be the decision table.

And to extent possible you get the specifications, before while start writing programs checked by the user, then a person who carry this normally, in large companies the put one person in a charge of this entire project from the companies side, with whom you can interact. And you can cyclic interact, and find out whether this is a reasonable understanding of the system, so that specification of data needs, so you have to at the end

of the dataflow, you have at the system specification you have to come up with the making dictionary and so on. And so have a data needs they have require, and of the data needs is very carefully specified you have to make sure, that all the immediate data is actually available, very often you think of a certain data which may not be accessible or may not be available in the company.

So, you got a room check what should the what should the data needs we thought is required if is there available, if it is not available today can it be made available when we go to computerize system, then we come up with hardware specification, what hardware is required now a days there is not a major issue. Because, hardware cost have gone down but, the question in terms of we want to go use servers, then server is you have to kind of the do the sizing of server issue such as, secondary databases do you should you have a system area network for data storage chance are what kind of a file backups, what kind of disaster recovery all these thing got to be looked at when we do a system specification. All these things we talked about, things about disaster recovery archiving and backups of a various types and so on, so hardware specification ncludes the requirements of hardware for all these different things.

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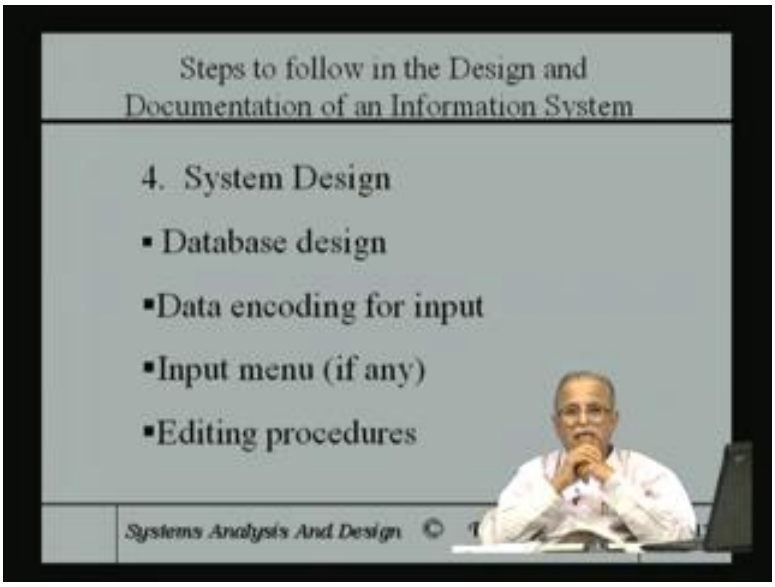

And the next step is the system design face, where you look at database design, here again (()) database design, I talked about the requirement for ER diagram and normalization still important. So, they are normalization and got to a third normal form,

primarily the idea is that, you did not should not get the difficulties while updating or while deleting or while adding, so these are the issues have to worry about, while it is database design. And database design, again if it is a very large system, may be (( )) a specialist want database designers for the lot experience database but, input has to come from the analyst in charge. The project may have many people, one of them may be a reliable designer but, what data has go to database has got be actually given by the system analyst.

So, in your mini project, you have to come up with the database, I have to design a database and in the at least the third normal form, and database there are many tools available, and also if I use an office software, Microsoft that is a database you can store there, and if it is query language like SQL to kind of to a query language database. So, you can also design the queries based on their requirements, and as I said many systems are online systems, where query is become very important like for instance, one of the projects I am suggesting, is in terms of bus reservation system.

The bus reservation system it is all query based, in the sense that the customer asks is their reservation available from Bangalore to Chennai, and by bus leaving at say 10.30 at night on this day, on this particular date? Then the query has to be developed, and the at the terminal one has to ask this query, find out if seat available or not. The seats are available then one has to say what seat, what is the choice of the customer in terms of seat; so essentially it is interactive in that case, so the question will also the use of query languages and long run database. The database in this case will contain database of all seats available and various buses for a certain period, normally for something like ten days, more that that making to there that to much for them.

So, again if you are going to design for a small road transport company, you have to ask a question, how many days ahead do you want the relation to be done, because the sizing will depend upon how many days ahead, if its one month ahead the sizing very large, because for 30 days you are to keep the all the buses going and entire database you can brought up. Because, in trains they allow about two months, but trains are massive in terms of the database they keep they are massive, but for small road transport corporation also most people go by road, decide in the last minute.

There is no point in booking too long back. So there are the point issues, so lot of you for another encoding data data input, we talked about various methods of data input encoding the barcodes, the codes which are the in error correcting code, error detecting codes all these things, but in the keys, key items for key items how do you kind of encode. If you have a input demo input menu for inputting things, like an variation system menu is more important, because in the menu you can enter, its a the clerk you can enter, she is got be a very simple menu, which is should be able to use or is it should be a able to use.

Editing procedures, as I said editing particularly in a system is extremely important, because any wrong data gets in is going to be completely corrupt your system, so editing or cleaning up data before it enters the system or enters the database also very important, (( )) editing procedure are going to use.

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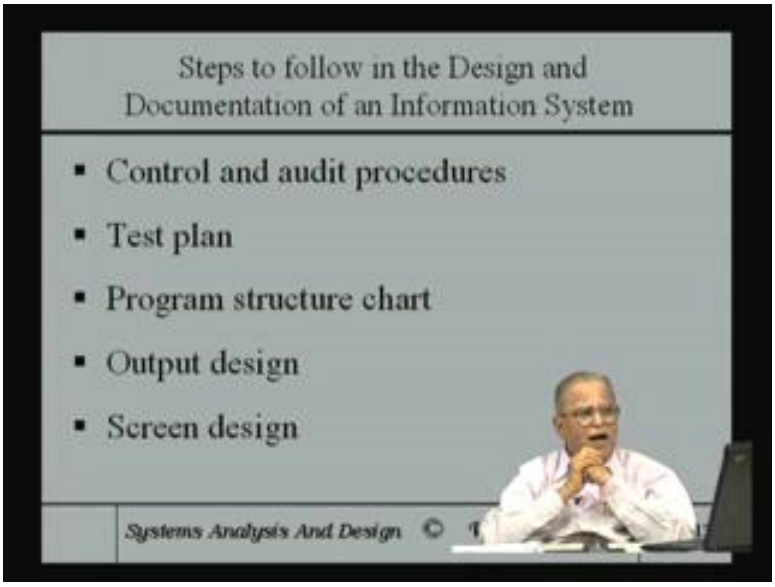

What are the control and audit procedures, I have been emphasizing through out the importance of control, in the sense that you have to have (()) the control (()) make sure that we have the errors were detected, not only errors which are accidental but, even frauds at intentional error changes in data are detected. That requires control, and you also need audit auditory to be kept find finally, it find out who changed what and what time, so these are important.

So, we have to keep auditory or who who is authorized, who is who change anything and to be able to kind of keep up audit tray, audit tray these is what audit tray any words to find out who did it what and it what time, so that you can go back and fix responsibility test plan (( )) the system. So, before any program is written the clear test plan should be there, program is the absolute last step in the system design, you should not plunge ahead with programming at the very beginning that is the mistake which most people do, programming is the last part; amount of time spent to SRS development and system design is worth it. Because, you will save time later on program structure chart, what is the we are going to use a number of modules how are the modules connected, and if you are going to using object oriented design, and ultimately going to use an object oriented language like us like C plus plus, you have decide what objects are going to be used how the objects will be linked how can make the objects which are using reusable, so these are the important parts are the of the system design, so the part of the actual system design part. So, the object oriented design, which is becoming more and more important in prevalent you have to look at the objects which are going to be used.

And if you can be use it are object for the library objects, which your company may already you have, so object in a object oriented design is what I would suggest I should kind look at very carefully; what are the outputs, what are the frequency outputs, when will the output go and is output appropriate, because as I pointed it out strategic management requires very few outputs and most of them must be graphical. The middle management require little bit more but, mostly exception reports, and operation management is one which gets all details, for each level of the hierarchy as per the requirements that has be able to design the outputs and give the outputs.

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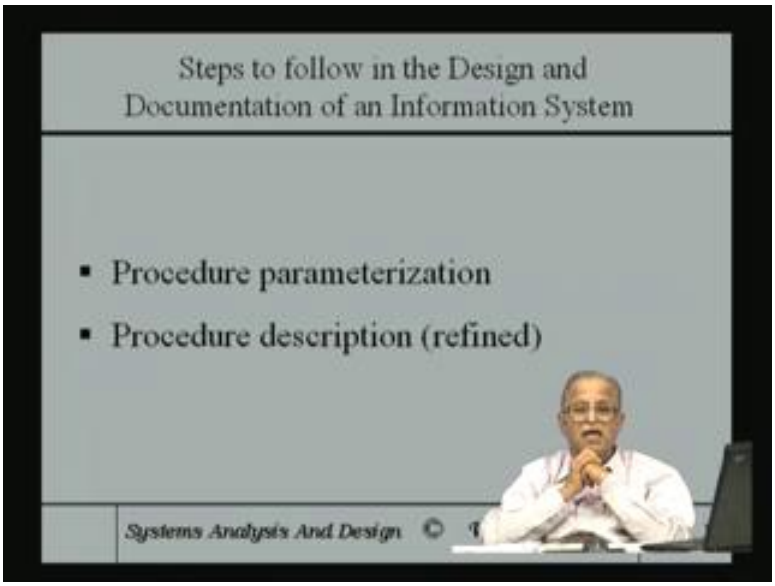

And screen design design the screen parameterized process, so that if you parameterzing object as such a processors, you cannot reuse and find out procedure description refined, because your got through all this process you can refine it now.

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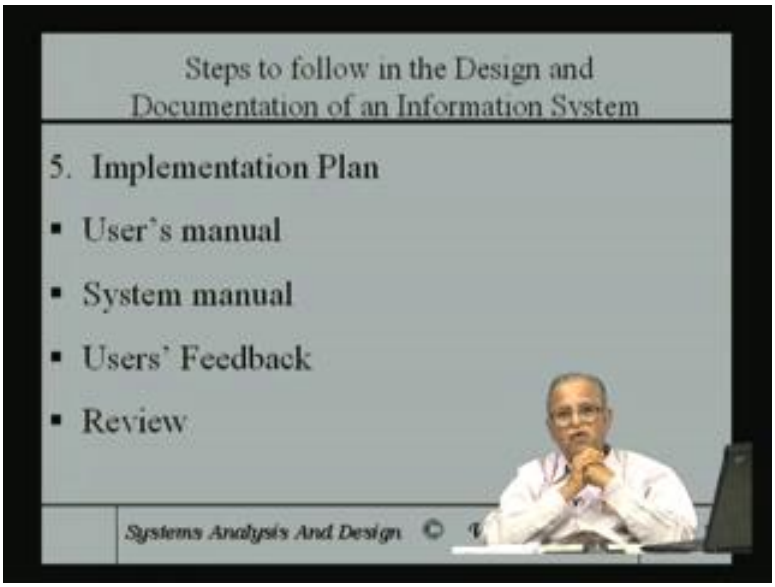

Implementation plan, what use when implement some thing, you have to create a users manual, systems manual users manual is for the user, how to use a system, systems manual is for the person who made the system is there is the alteration changes to be made, he will look at systems manual. And feed back to the user documented, so that you

can improve on it next time around, and review, review of this periodically to be able to kind of go to the next step and improve it.

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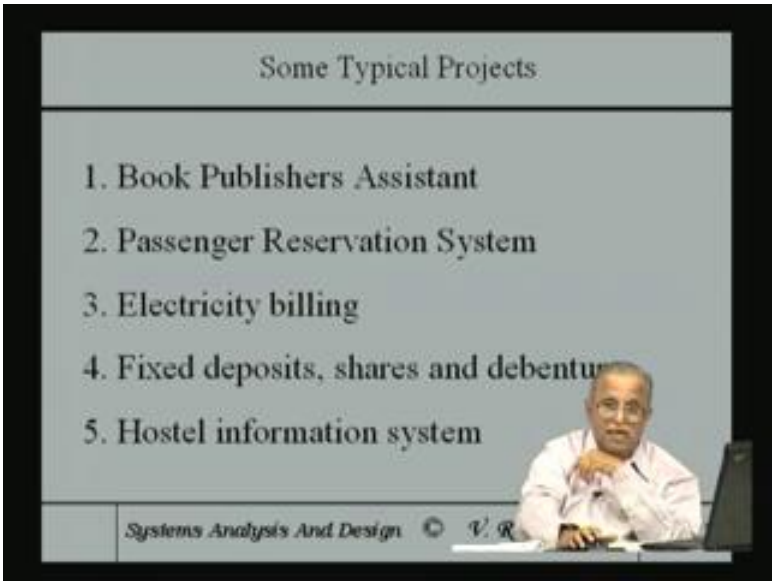

A number of typical projects are given at the end of the book book publisher assistant, the details are given, passenger reservation system for a bus, electricity billing rolls are fairly clear, electricity billing; there is slab rates and so on. Fixed deposits shares and debentures, for a small non banking for financial company, hostel information system in fact, I am taking as the case study right through, but you can do it for your own hostel.

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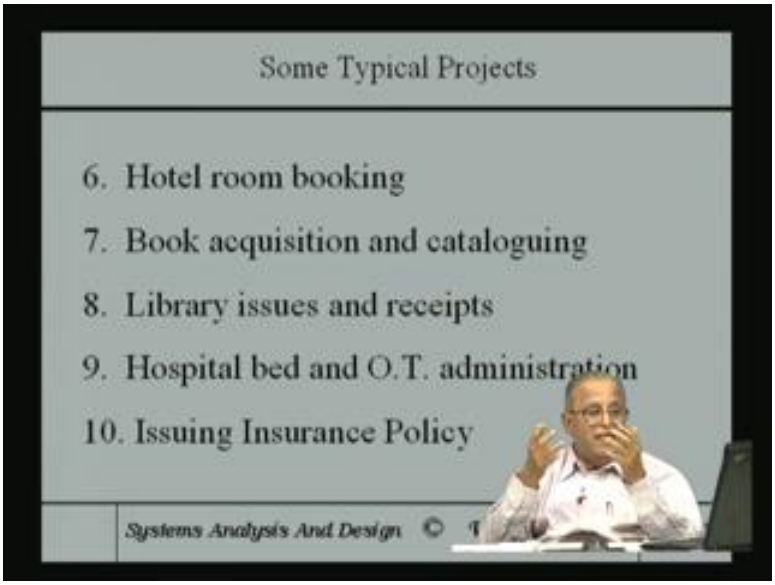

Small hotel room booking, book acquisition and cataloguing for a small library, then what you call library, and find out what is requirements, library issues in the seats, a small library, hospital bed and operation theatre administration, and issuing insurance policy. So, these are the 10 projects which are the given in the book, I will urge you to read that chapter carefully, look at the complete case and try to do some of these thing, one or the other besides the ones I mentioned earlier, to kind of wrap up this course. So, this is the formal end of this course, and I do hope you will actually develop a project on your own, and (( )) up the full system.