Project and Production Management
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Lecture - 19
Computers in Project Management

All along during our discussion in this course on project management, we have been talking about a variety of procedures for project planning, project scheduling, project monitoring and control and a variety of other computations that are involved. In this entire exercise it is helpful if suitable computational aids are available and computers have come to play a very significant role in practical project management. In today's lecture we are going to look at how computers help in managing projects. What are the kinds of features that are available in commercially available packages? What kinds of packages are available and how do we have to choose a particular computer package? There is a plethora of computer packages available today and therefore one can very easily be overawed by the variety that is available. Nevertheless the core features that are required of a computer package and the kinds of activities that it performs are relatively few and well structured. So we should have a look at some of those features and then try to evaluate the major computer packages that are available.

Before we begin the discussion it is necessary for us to understand as to why we use computers at home? What are the basic advantages of using computers and in the context of project management therefore let us try to answer this question and let us try to identify some of the major advantages of using computers. When we talk about advantages of using computers, there are many advantages. Probably one of the most significant advantages of the use of computers in practical project management is that it permits easy sorting of activities. This by itself is a major advantage because quite often practical projects could run into thousands of activities and quite often the project manager is interested in knowing a variety of things about these activities, the list of which activities are completed and which are not completed at a particular point of time. Making this list itself is a gigantic task and updating this list from time to time is again a very difficult task. The very fact that we have this sorting capacity in the computer makes many management tasks very simple.

For instance we can sort activities according to their floats. This is a very common sorting which is resorted to. What happens here is that you identify the activities which are critical, those which are zero float and then the relatively lesser critical activities and then so on until you find the activities which have the greatest float. This would in fact be equivalent to an A, B, C classification that you have in materials planning. You can sort out the activities according to their floats, identify the activities which are most critical and thereby try to arrange your management effort based upon the degree of criticality of the activities. This kind of sorting out is very, very easy when you are using computer packages. You can sort out activities on the basis of their early and late start dates. This

in fact is very useful because it identifies the time table for the activities. Which are the activities which are due for January? Which are the activities which are due for February? Which are the activities that are due for the next 3 months? All these kinds of questions and all these kinds of lists are very easily obtained and can be very easily done on a computer.

Another very important classification that management finds handy is sorting of activities by their responsibility codes. Different activities in a project are done by different individuals or different agencies. That is different people are responsible for those activities. For instance you want to find out which are all the activities which are the responsibility of the manufacturing department? Out of 3500 activities may be 569 activities are the responsibility of the manufacturing department. You can print out the list of activities by responsibility code and you can let the management know exactly the responsibilities of different individuals and different agencies. This helps in conducting a project in an easy and an efficient way.

Another sorting that is possible using computers is the sorting of activities by their activity numbers. You can number the activities in any order that you feel like 1, 2, 3 and 4. It could be a topologically ordered list or any other list and you could refer to those activities by their numbers and you could also sort out activities by their activity numbers. This sorting of activities can be done by whatever means you want to do. It is useful because these sorted lists tend to simplify management tasks considerably.

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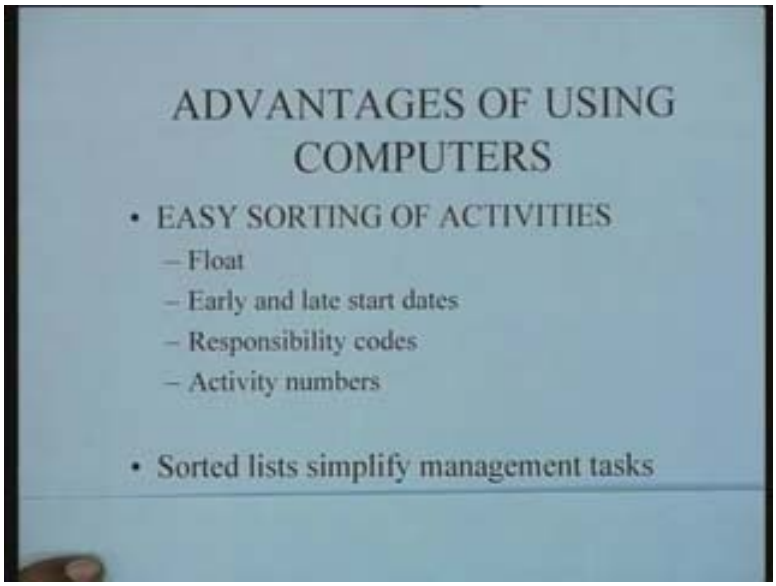

It is because of this simplification that computers have found tremendous use in trying to plan and implement projects because all these routine management tasks can be handled very effectively when one is trying to use a computer. Sorting of activities by float or early/late starts or responsibility codes or the activity numbers could be very, very useful to management.

Apart from this, another very important use of computers is that they permit easy updation and monitoring and this is perhaps the greatest use of the computer in practical project management. In days when computers were not available for instance, the project network would be made by a draftsman. It would be a long, big piece of paper or cloth as the case may be and the entire network would be drawn. It would take may be weeks for the draftsman to draw that figure showing all the activities and the dependencies and everything and may be the network is then hung in the project manager's office and that would be used as a tool. but what would happen is that quite often because of the difficulty of updating that network Actually that network is useful only if you update it. As you keep on getting new information from each review you have to recalculate your critical path. You have to calculate all these things again. If it is manually done then these kinds of things would become difficult and therefore for all practical purposes in the earlier days the project chart once made would be hung and literally hung in the project managers office but now with computers available this kind of updation and monitoring is very, very simple. This makes basically the critical path methods useful throughout a project's lifecycle. This has been perhaps the most significant single contribution of the computer in popularizing project network techniques because you can take a print out of the new critical path at any stage and then get revised reports and it is relatively much easier to keep track of the project with these kinds of methods. Easy updation and monitoring is perhaps the very important use and a very important feature that is available with computers.

Another reason why computers are useful in practical project management is the fact that they facilitate certain kinds of advanced analysis which would become very difficult and tedious if it was done manually and what we mean by these advanced analyses is things like time/cost tradeoffs. If time cost tradeoff was to be done manually on a large network of 500 activities and you were asked to use may be the Fulkerson's algorithm or the heuristic algorithm it would become a very, very tedious affair and especially with the heuristic algorithm there is all the likelihood that you would not be able to pick up the right activities for crashing and you would not be making the right kinds of decisions for crashing. With computers available and these algorithms which are there this kind of thing has now become practical and feasible. All that the manager has to do is to get somebody to input the right kind of data appropriately and then get these kinds of results.

A similar thing is true about resource allocation models. Resource allocation is still not very popular in practice. Perhaps most of the time users are content with getting resource aggregation only and getting the resource usage profiles and most companies refer to that as resource allocation but with the availability of computer software and computers this kind of thing has become possible. It's facilitating these kinds of applications.

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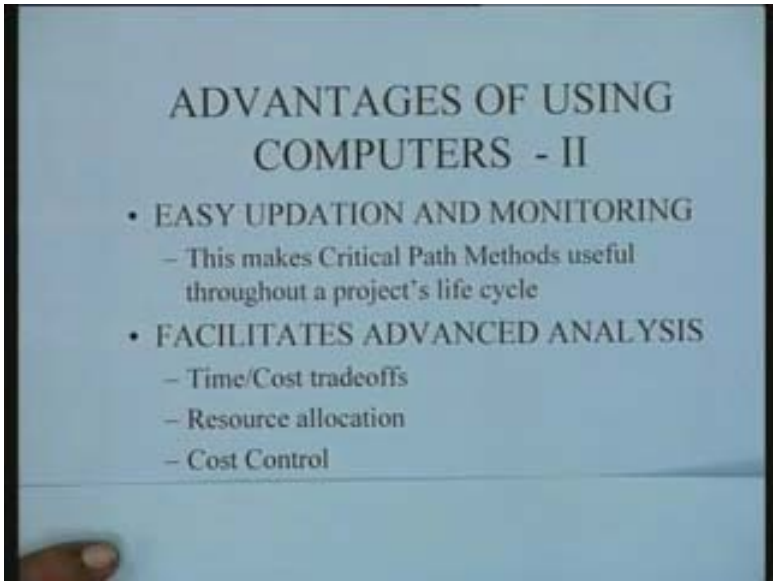

Cost control is another area which has been popularized to a very large extent by the use of computers. For instance if you were to use PERT cost and you were to monitor the status of the project every month, once your initial budgeted cost and value curve is available then all that it requires is that at each review you look at what fraction of the activity has been accomplished? That would be the only input and from that you can calculate what is the value of work completed and similarly you can determine the time and cost overruns from that kind of analysis and keep a physical track of all this. All kinds of reports pertaining to cost and time overruns would become easy by using this kind of advanced analysis. These are some of the major advantages that we get when we talk about using a computer.

Nevertheless let's try to find out when is the computer really needed? What are the factors or what are the features in a project that warrant the use of a computer? The first thing is the size of your network. That's the important thing. If it's a small network of only 10 or 20 jobs it may not be worthwhile to think in terms of putting the whole data on a computer. Depending upon the nature of your project, the size of the project you can easily determine whether a computer is needed. But for practical sized projects which involve more than 100 or 150 activities it's helpful to have a computer which would be able to do all the computations and all the reporting for that particular project. Another very important feature in practice is computer availability. You would tend to use a computer only if it is available. That's important. For instance you are setting up a project at a backward area site where there is no electricity, nothing of the kind and your site is yet to begin the developmental work. It might become difficult for you to have a computer infrastructure in such a site and therefore that would be a reason for you to be able to actually manage all your project management activities either manually or whatever is the way. This is a kind of a prerequisite you can say.

Another very important factor in determining whether a computer is really needed or not, is this fact of the expected frequency of updating. That is how frequently are you going to make your project reviews and based on each review are you really going to update the information pertaining to your network which would mean that if you update your times based on the experience that you have at a particular review date, your entire schedule, your critical pass, the durations of various activities could change based upon your experience and you might have to repeat these computations very often. If this is expected to be done fairly often If you want to do it only once a year then it's a separate thing and may be if you have to do it weekly or monthly even then this frequency of updating actually favors the use of a computer. The higher the frequency of updating the greater the advantage that you have for using a computer.

Another very important factor which determines whether you really need a computer or not, is the kind of desired output listings. What kinds of outputs you would require each time? For instance if you want to know the schedule say every week and you want to make sure that this schedule reaches every individual who is responsible for the project, you would like to have a schedule printed individually by responsibility code for each individual or agency and you would like the relevant part of the schedule to be printed out for that individual. You are really asking for customized reports to be given and this is possible too. Depending upon the kinds of output listing you really want, you can have a computer which can probably do it for you and depending upon the nature of the advanced analysis that you are looking for. By advanced analysis we mean features like time-cost tradeoffs, resource considerations and projects, cost control and all these things; anything other than basic scheduling and the network format.

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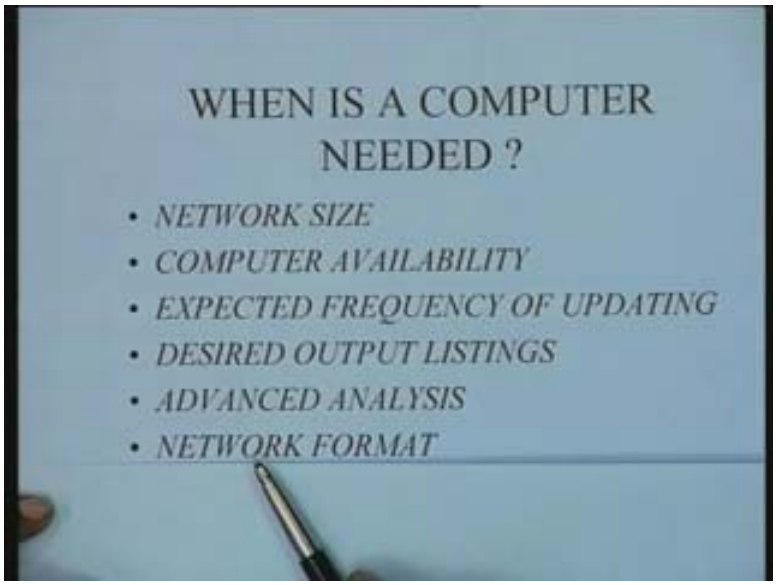

By the network format what we mean is that the network is going to be in the A-O-A mode or A-O-N mode or in the precedence diagramming mode because different computer packages give you various options in terms of dealing with different kinds of

network formats. You have these kinds of features. These are some factors which really determine whether a computer is really needed or not? As I indicated to you there are a very large number of computer packages and options available for handling practical projects and therefore what we need is a systematic set of criteria on which we should evaluate these various factors. This is very much a problem of multi criteria evaluation. We should be clear in making any scientific assessment of various computer packages as to what are the features which different packages can have and how different packages can differ on these …..

We will try to look at some of the comparative features of different software packages and try to see the kind of comparisons or the basis on which we can make the comparisons. When we look at these comparative features of software packages, one by one let's try to identify the attributes which are important. Probably the first attribute which is important is the network format that it handles and the options that are available on this front are either the A-O-A format or the A-O-N format or precedence diagramming. These are the three types of formats which are generally available in different types of software packages for handling. The second factor or the second attribute in the comparative feature of different software packages is the manner in which the events in the network are numbered. By and large there are two options for event numbering. One is numbering the networks according to the Fulkerson's numbering rule; that is i less than j format. That is each activity is numbered in such a way that i, that is the preceding node is strictly less than the succeeding node. However it's not necessary that this be done. Some packages permit random numbering and this gives you much greater flexibility. The greater flexibility comes from the fact that even if you have numbered a network and subsequently you want to insert some new activities with different numbers either you say one activity is let us say (10 20) and in between you can insert an activity (10 15), (10 16) and so on. But suppose your network is numbered like (10 11) and in between you want to insert a number of activities then you cannot conform to the i less than j format without disturbing the numbering of the entire network and the numbering becomes a big issue because when networks are large you probably would not like to disturb the numbering scheme of various other activities in the network. Both these features are available in many packages.

The third factor on which you can compare various kinds of software packages is the capacity and by capacity we mean the number of arcs it can handle or the number of activities that it can handle. This capacity varies from a few hundred to about 5 lakh activities. Packages can comfortably handle activities within this range; starting from couple of hundred activities to about 5 lakh activities easily as far as the overall project is concerned. This is the availability of the capacity.

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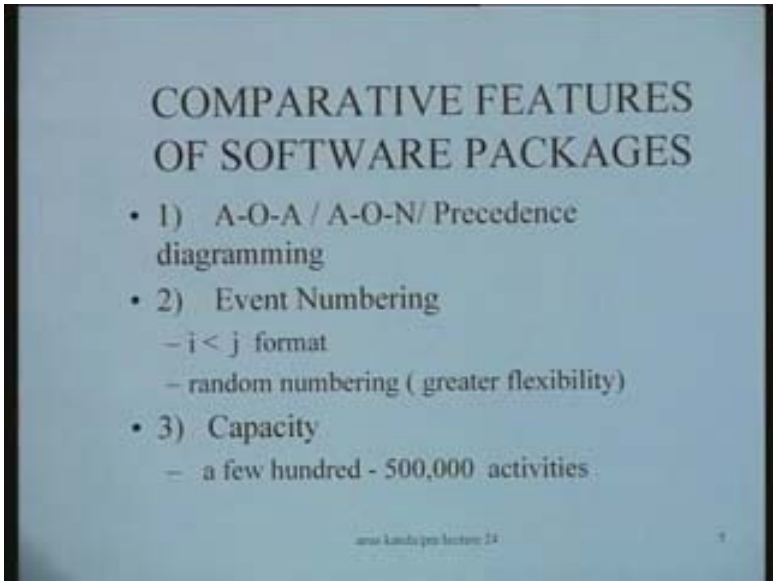

Then we have another feature, the fourth feature which needs to be compared in software packages is what we call calendar dates. Whenever we prepare a schedule we would like that this schedule be translated into working days on the actual calendar that is being followed by the project staff. There is a provision in most of the packages to adopt what is called a base starting date and then depending upon the base starting date you have, you can set either a 5 day working week or a 6 day working week or a 7 day working week as the case may be and you can also feed in provision for holidays. You can feed in the list of holidays for the year and for the next year and for the next year and thereby whatever schedule you get the calendar dating facility in the computer program will basically give you schedule which will specify the exact dates on which each activity is to be done. It only means translating the schedule that you obtain by a forward pass and a backward pass into the number of working days, after allowing for the number of working days and the holidays, etc in a calendar. This is a fairly common feature nowadays in most packages which are available, the capacity to handle calendar dates.

This is another feature which is slightly interesting. I will try to explain this, this way. Does your package have a facility to accommodate scheduled dates? What this means is you know that the total project duration is determined by the length of the critical path anyway. But before you do the analysis you don't know what the duration is? But nevertheless you might want that this project should end by such and such date which is a scheduled date. Many packages have this option of specifying a scheduled date which is the finish date and all the activities in the project are then adjusted so that you try to accommodate the completion of the project within the scheduled date. What basically happens is something very simple. It says that the critical path now may have positive, zero or negative floats. That's what it means. If you have a scheduled date, you calculate the floats with reference to the scheduled date. Normally we calculate the critical path as a zero float. If it has a positive float it means that it is very easy to accommodate the project within the scheduled date. If it has a negative float for the critical path it shows

that you are short. You will have to do some crashing to accommodate the project within the scheduled date.

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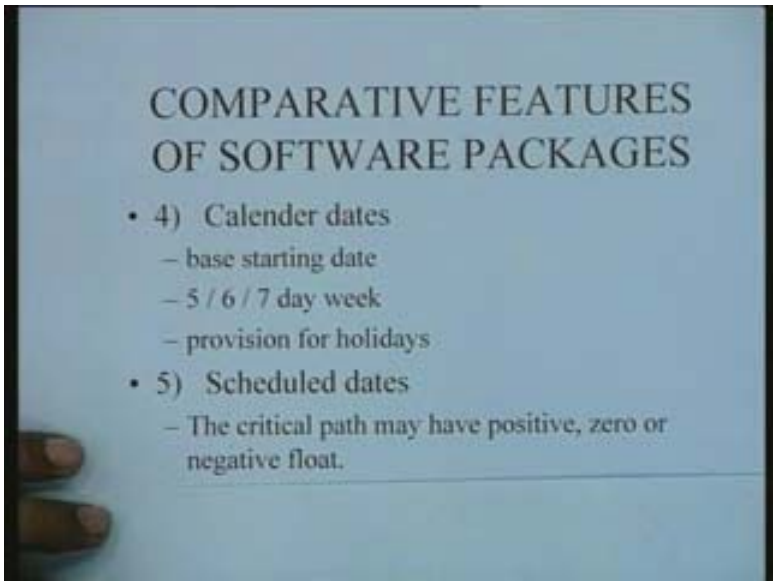

Many packages have this interpretation where they say the critical path can have zero, positive or negative float. It's just a question of trying to understand how the scheduled dates may be accommodated within the framework of the critical path. Many packages have this feature and they can print out and once you know that the critical path is negative float then you try to do something manually. That means you crash some activities and try to get zero float. This is the particular provision that you may have for accommodating the scheduled dates in the project.

Another feature which is important when you are talking about software packages is the capacity to handle multiple initial and terminal events. This is simple in the sense that you can have multiple sources and multiple sinks in a network. But for all purposes of scheduling you can always convert them into a single source single sink network by the use of dummies. But whether a package actually permits this and why this is important from practice is that quite often managers plan a project in terms of parallel projects. The electrical work has to go on. The civil work has to go on and these are more or less practical and there are two connecting nodes at which these parallel networks can be put together. This is advantageous. This helps merging of parallel projects if you know the nodes at which this is done. This could be an interesting feature when one is talking about.

The next feature which is important when you are trying to compare software packages is this facility of error detection and when you are talking about error detection we are basically talking about the ability to detect loops in the project network whether this facility is there or not there. Loops are not permitted by the network logic in the conventional PERT c p m networks although loops can be permitted in …. networks and

various other kinds of networks for other reasons. But in a conventional project network there are no loops. Do you have the facility to basically detect these loops and point them out? There might be improper time estimates. Can your computer package detect and point out that you have not selected the appropriate time estimates for various activities? How do you think this could be done? This could be done very simply by the database within the package which would specify that. May be any particular activity has conventionally been within a certain range of let's say 3 months to 6 months or something like that and if it finds that you have keyed in a data like 20 months for that particular activity it says no check it; something is wrong with that. So improper time estimates which are not outside the normal range which you might have specified within the program or which are available from the experience of past projects which are available in your computer. Does the package have this facility for detecting those improper time estimates and printing out an error signal or something saying that there is something wrong here?

Other thing is the kind of outputs that you want to generate, different types of outputs. What are the various kinds of outputs? Quite often different software varies in terms of the kind of output that they want to generate. In this context there is what is called a report generator. Most packages have a report generator. When all the computations are done in any computer program and you want to generate reports you can have a separate module for report generation which would actually take the values of the various variables which have been computed and will give you the kind of report that you are interested in generating and this kind of report generator has flexibility of reports because depending upon whether you want an activity listing by responsibility code or activity listing by whatever other code you want, you can get this kind of thing by requesting. But it would mostly be menu driven thing. You can specify that we can give you this and we can give you this and we can give you this. But if you want to get something else a report generator would probably have the features and you could with a little bit of programming effort generate the report that you want.

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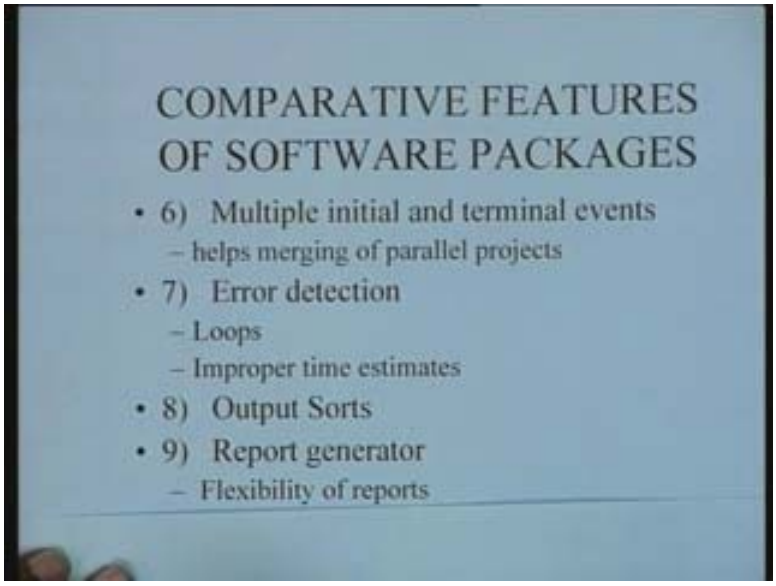

Quite often the structure of the report generator and how it gives you various kinds of reports could be crucial in choosing a package because it would determine what kind of flexibility you are going to have in terms of generating various reports. Lot of computer packages are coming on the scene. They are differing not in terms of their essential structure but in terms of the frills and the other reports that they generate. Essentially internally they give you a graphic display of something and you have various kinds of reports and how the data is presented and you want a graphical display of all the activities which are getting late. You can have a graph plotted and so on. Those kinds of things are also there. It really depends upon what kinds of features you are looking for.

We were talking about reports. The tenth feature is what kind of graphical output does the computer package give you? What is the kind of graphical output? When you are talking about graphical output we are interested in things like bar charts which are useful. because this would specify A common output in any package is a gantt chart of the various activities showing the progress. What is done, where you are, how much is left and so on. You can have various kinds of bar charts with different kinds of color codes for those activities which are behind time, those activities which are ahead of time and things like that. The resource requirement distributions are also basically bar charts. The plotting of a resource requirement distribution or a resource aggregation profile is also this kind of a graph which shows you how the resource requirements will vary over time; network diagram. These are the three kinds of graphical outputs that we require when we are doing project management.

Updating as I told you is something which is very, very important for purposes of identifying what changes when and what is the revised course of action when you are trying to do something else. What does updating really mean? In a physical sense what it means is if I review my project on a certain date, based on that I have to compute what

are the remaining durations for the various activities? Activities which have been accomplished their remaining duration is zero.

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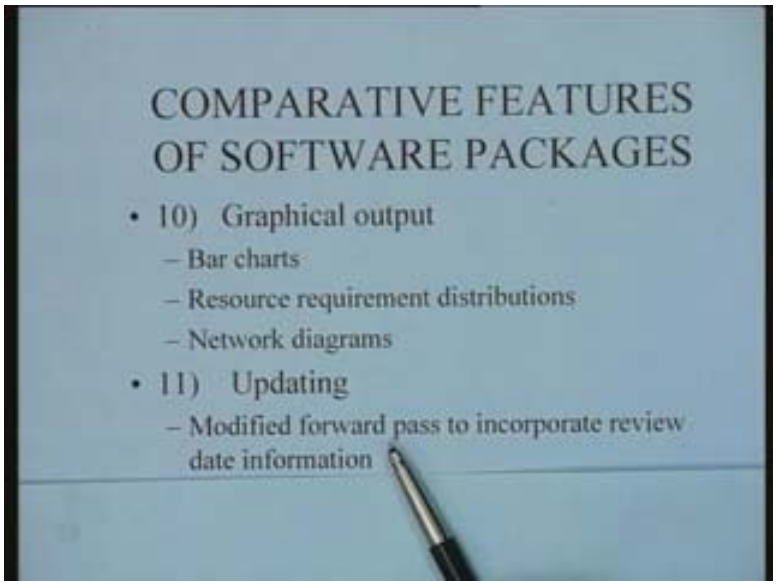

Activities which are going on and activity that was originally scheduled to take 10 days you now estimate that portion of it is done but it's going to take may be 6 more days and activities which have not been touched yet their durations are as they were before or may be if you feel at this stage that they are going to take more or less you can take a revised estimate. With these revised estimates if you just do a modified forward pass to incorporate the review date information, you will have updated information on the critical path and the forecast of the project completion time. This is how you are going to compute the information on the project completion time. The question is do packages have this kind of facility for updation? That is another feature of some of these packages.

The next feature which is there when you talk about software packages is what is called network condensation. Does the package have this feature of network condensation which simply means this; condensation of large to small networks. You have a very large network. You want to condense it into a small one which could probably be fitted somewhere else. Do you have that? It's something like a zooming facility with a camera. You can zoom in and zoom out, make something big and something small. Do you have that facility? It could be useful for not only condensation of large to small networks but it could be useful for integration of two or more condensed networks. It could take a small portion of one network, small portion of another network put it together and make a new network out of that. That kind of facility do you have? That's called network condensation essentially and then the expansion of a condensed to large detailed networks because this would allow people to work in modular. This kind of thing is becoming very, very popular. It might happen. For instance if you are talking of the Boeing aircraft company they have their design office in Seattle. Many of their products are being manufactured in Australia. Many of their products are being manufactured in

other countries and they are all simultaneously developing the designs. What can happen is a design developed by one particular group immediately transmitted on e-mail to the other in a form of a condensed network is put along with the whole network so they have a view of the entire network at the head office and vice versa; this kind of a facility for handling. This would permit essentially different individuals to work independently and come together whenever they like and get apart whenever they like. It's like putting the whole thing together and the project together and then getting their share of the work. This kind of a facility could be very, very important for that application.

The next feature which we talk about and which could be there in project statistical software is ability to do statistical analysis and when they talk about statistical analysis the common thing that is done is the three time estimates of PERT and the normal distribution and the probability estimates for various kinds of project completion times and things.

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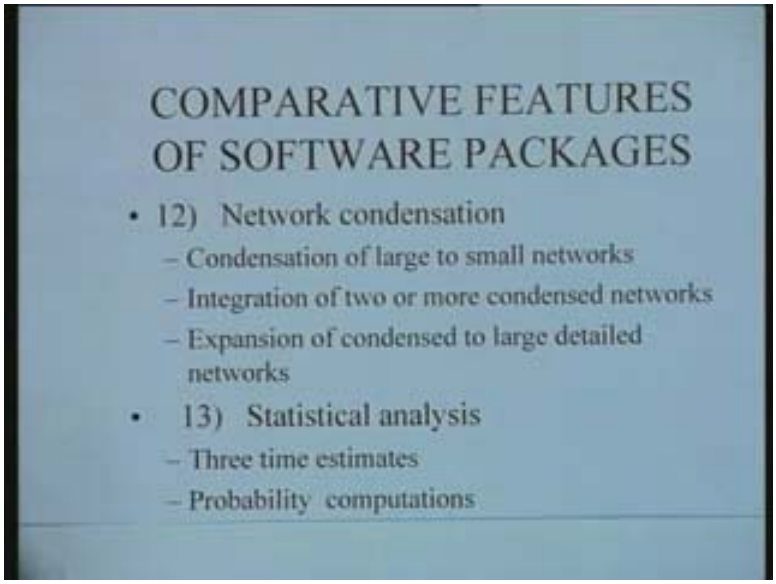

Both these features are available; handling three time estimates and giving you probability computations. This is one of the things which is included in statistical analysis and finally when you are talking about comparative features of software packages does the package have what is known as interactive processing? By interactive processing we mean does it have the ability to check your keyboard entry and it has some in built checks for errors and things of that kind at various stages. There could be a wide variety of such interactive processing checks when you are doing this. We are all familiar with the interactive processing when we are using for instance MS word. If you do something wrong you get messages that something is wrong. You have done this and so on and even this wrong spelling, that line which appears when you are typing something into it is basically something to tell you that there is something wrong; correct it and that's an example of interactive processing.

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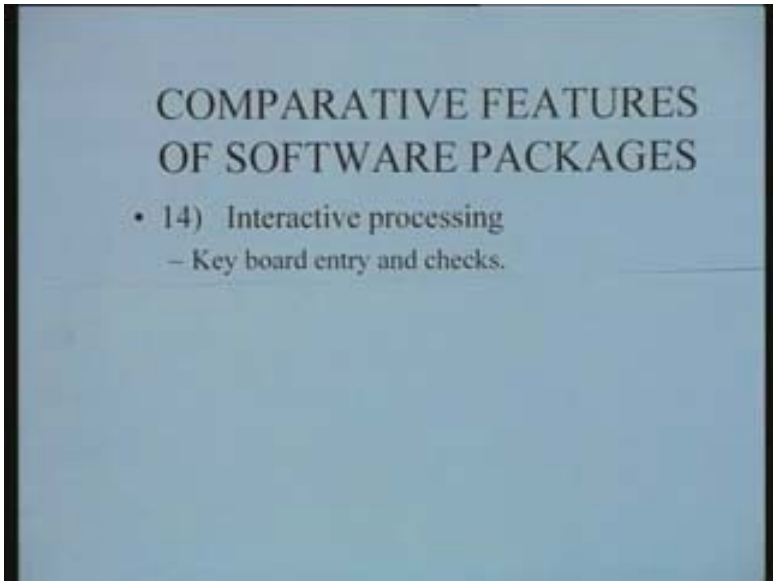

Different packages depending upon their sophistication could have different degrees and different types of these interactive processing checks. This gives you a fair idea of what exactly one could be looking for when you are looking at a package. Wide variety of things could be there, when you are trying to locate various packages.

Let us now try to look at some of the recent trends in computer software. What are the trends? What is happening? Historically what has happened and what is the current status in terms of the trends? I think it is perhaps right to say that the trends in software are both; there is both a proliferation and an evolution in software. By this we mean that yes features have gradually improved. So you get better and better software. That is evolution in that sense. But for any given thing previously there were 3 suppliers. Now there are 20 suppliers; there are 100 suppliers. The number of people, the manufacturers of these softwares has also increased considerably. This is one thing that ought to be kept in mind. Now what we can do is we can look at what was the basic structure of the earlier packages and what is the basic structure of the current packages? That will give you an idea of how packages are varying. The earlier packages that were there were simple. They generally tend to operate with A-O-A networks or arrow networks and the numbering was always done originally with i less than j much simpler and there were no errors; error checks were eliminated and so on. There was generally one output tabulation simply. They would do a forward pass, backward pass, print out the floats and give you the table and that's the end of it and what was assumed was single starting node and a single ending node and there were no resource allocation facilities earlier in packages.

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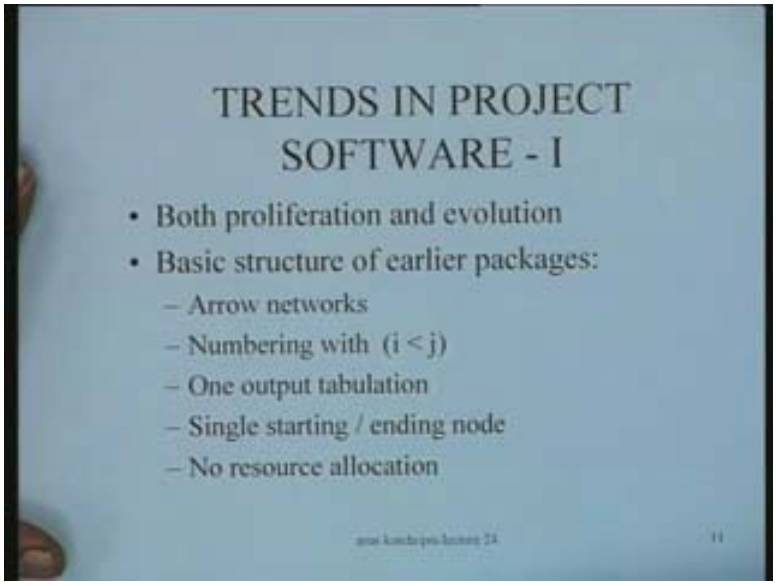

This was the kind of scenario that used to persist in terms of the kinds of software packages which used to be available earlier. Earlier I mean in the 70's even up to the 80's you had these kinds of features which were generally there. What has been happening over the recent thing is that newer versions include some modified features. What are these modified features? First thing is that in the scheme of the network itself there is an increasing trend in most of the commercially available software these days to go in for either an activity on node network representation or a PDM representation. In fact A-O-N is a special case of PDM as we know. Isn't it? That's what it is. If you specify the four types of lags f s, s s, f s and f f then this one reduces to just the A-O-N. There is an increasing trend to use these kinds of network representations rather.

We are aware of some of the advantages of A-O-N representations. We have discussed them. You don't need any logical dummies. So that is no problem in drawing the network. The network can always be drawn and therefore things are much simpler in that sense and there are other simplifications that come about by using this. This has been the trend generally. Then another thing that has been happening is that there has been a plethora of graphic reports which appear along with the output. The same information which you were getting earlier in a table, now you have very nice graphs which show that report and you have choices of different kinds of reports coming. Much of this has happened primarily because of the faster processing speeds of computers but then this is also taken place otherwise.

Resource allocation is another thing which has been happening. It has been included now mostly and this has been possible primarily because of the hardware and the software advances which have been taking place. So you have all these things coming in and another very important thing that has happened is that vendors and the distribution network have grown for software. Earlier if you bought software, you would not know where to take it if you had a problem. You will probably have to go to the single supplier

in the United States for that kind of software. But now you have vendors and their distribution network so that you can refer to them and they will tell you what the updates are? The list of 22 packages with addresses of vendors is listed in this text book by Moder, Phillips and Davis which was published in 1986. You can refer to this list. 22 packages were available and the list of vendors and so on is available.

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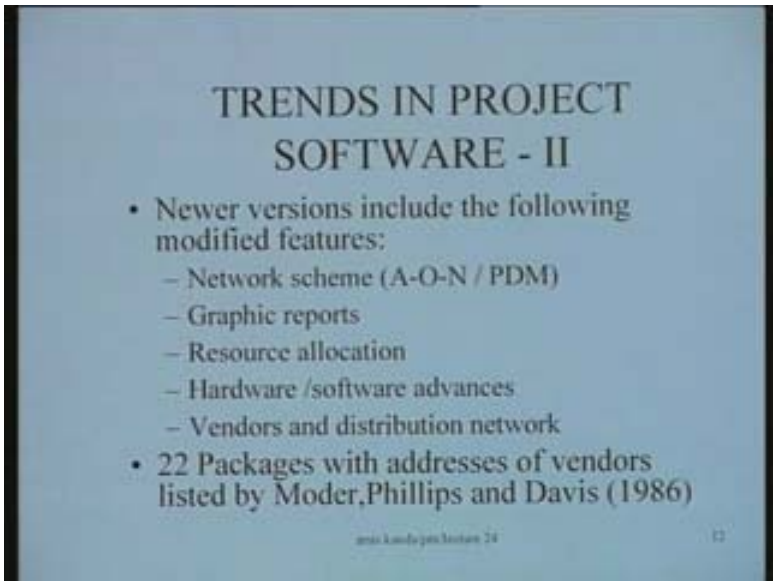

At this point of time, the list is much, much longer and therefore we have not made an attempt to compile it. Another important thing that is happening in terms of the recent trends is this kind of computer networking for multi-site projects.

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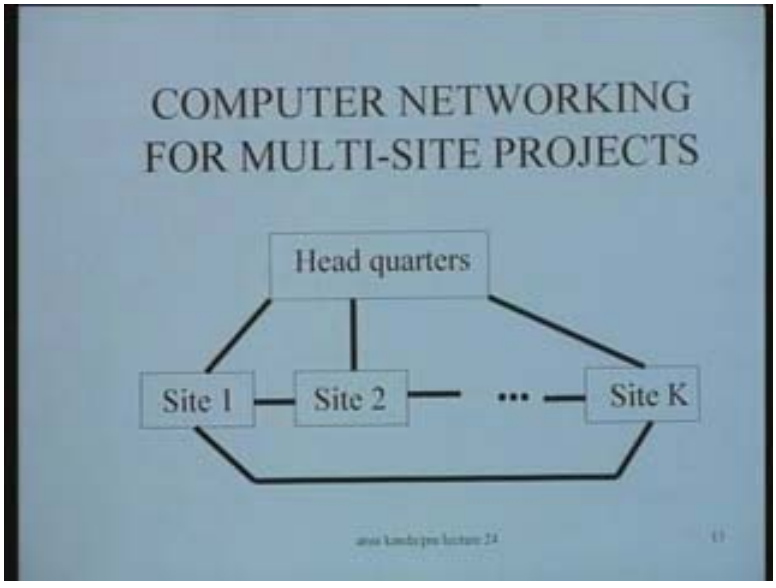

In multi-site projects most projects are invariably done at different sites; first site, second site and site K and because of computer networking all these things are connected on a computer network. The kind of thing that I was referring to you that some project panning is being done here and these projects are either independently developing plants and so on and communicating and then ultimately getting the whole information, this kind of a thing has become very, very popular and both the software and the availability of the computer network which is connecting all these has made this kind of multi-site project management not only a reality, but a big success because you can exploit the advantages of the individual sites; cheap labor in one place, more technology available in another place and so on and then network and then get this kind of thing there.

Let's look at some of the popularly available packages which are there these days; part of them. Some of the old ones, earlier ones in India we had this package called PRISM developed by Tata Consultancy Services. It has been adopted by large number of people. Many firms have been using it. Another package was package by PROMAN developed by M.N. Dastur and company and many companies were using this in practical project management. A very popular package in project management was the Harvard Project Manager and earlier it was called the Harvard Total Project Manager. The new version they call it Harvard Project Manager and this is marketed in India by NIIT. I am listing here only those for whom Indian suppliers are available. This has been marketed in India by NIIT and this has been used. But currently MS project, which is a software developed by Microsoft and which is a sort of a family of the Microsoft family of softwares available in all Windows 95. You can get MS project and use it. This is becoming an user friendly software and is now very popular with many firms. I know at least of Indian oil which had Harvard Project Manager and so many other things in various units, are now going for MS project big way. Another popularly used software today about which you can find information on the internet is the Project Scheduler. Currently they are selling this Project Scheduler 7, PS 7 and this is being marketed by Scitor consultants.

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There is another software which has been very popular. It used to be a massive software, among the very expensive class of softwares PRIMAVERA produced by Primavera systems. I have listed only some of the popular names available in software for project management. But I would say by and large the MS project is now picking up in a very big way because it has facilities for linking up with MS word and EXCEL and …. and that entire family. You can import files from one to the other very easily. This is one of the reasons that it is very popular.

Trying to answer this question of how you select a software we will quickly look at some of the issues which are involved.

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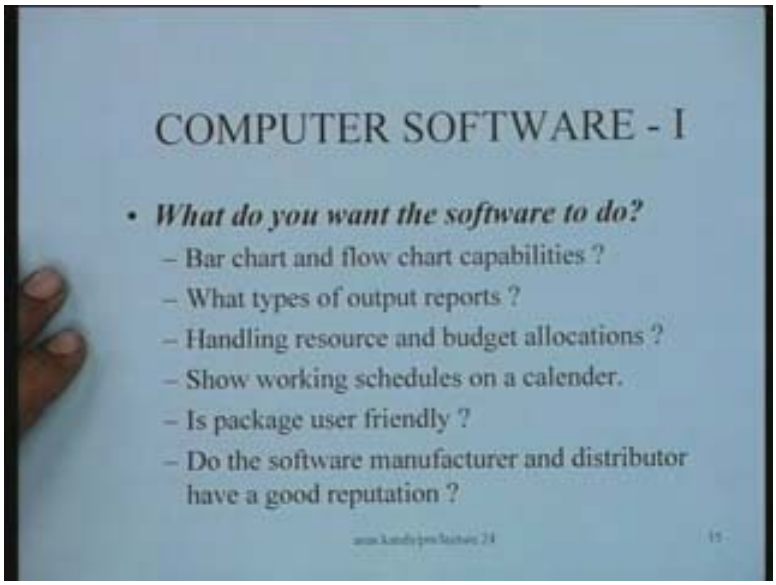

Some of the issues are for instance what do you want the software to do? You should ask yourself this question. It should have bar chart and flow chart capabilities. What types of output reports should it be able to generate? What kind of handling of resource and budget allocation would you like? Should you show working schedules on a calendar? Is the package user friendly? Do the software manufacturer and distributor have a good reputation? These are some of the questions that you would normally be answering when you are trying to answer this question of what do you want the software to do? The second thing that you should be doing is you should ensure that the software package at least performs some minimum basic functions and some of those basic functions have been identified as follows.

A software when you are looking for a software it should Like when you are buying a car it should be able to drive you at least 200 miles and it should be able to go somewhere. What are those basic functions of a software? It should permit easy development and changes in the project bar charts and flow charts and notes the critical path, if you want this to happen. It allows you to see a bar chart or flow chart on the computer screen before printing it and the charts are easy to follow on the screen.

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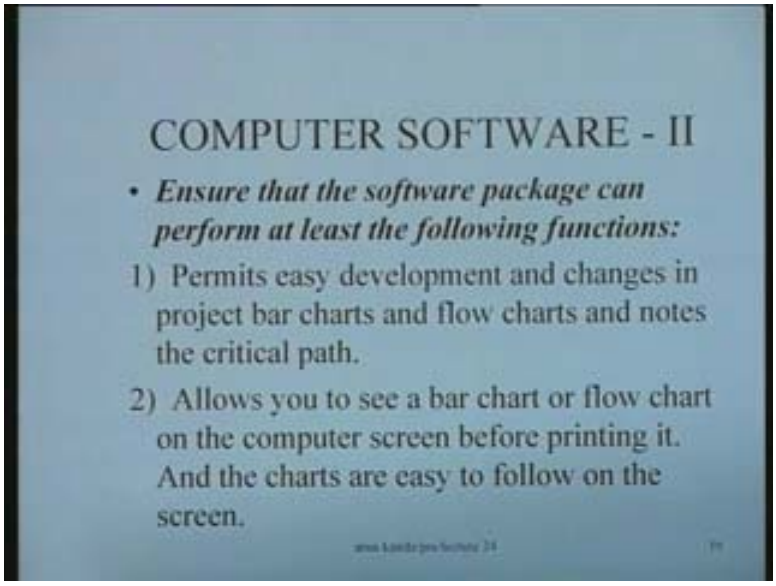

You should be able to do that. Then it should permit you to combine resource and budget information into the project file and to retrieve useful reports on this information; that's what it should be able to do. It should allow you to tie your project plan to a real calendar with allowances for weekends and holidays.

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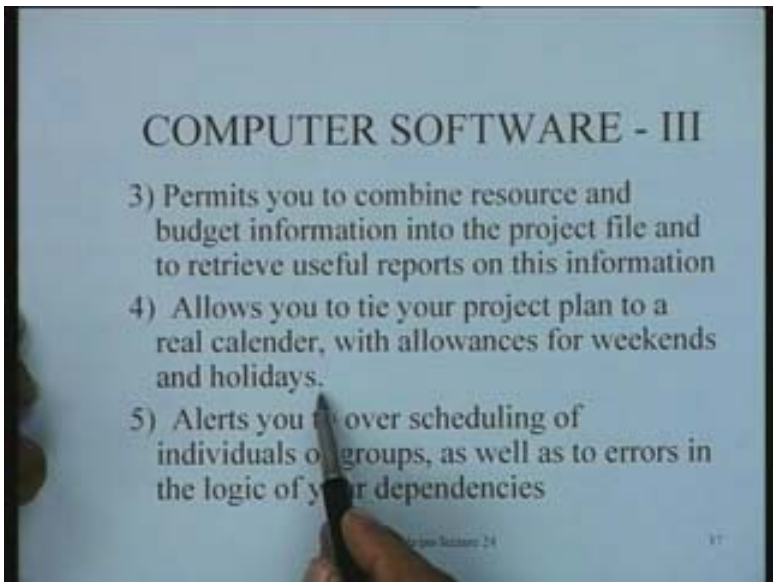

Alerts you to over scheduling of individuals or groups as well as to errors in the logic of your dependencies which means it should make this check. In resource aggregation you have 5 people and if it asks for 6 people it should warn you that you are using more. It should allow you to construct what if scenarios so that you can engage in the contingency

planning and update your modifications. It should have a good demonstration file to show you what the program can do. It also has user friendly user's manual. That's important. After you have done these two things depending on what you want and these are the minimum features. It's a good idea to experiment with the package on a project you have already completed and let the package convince you that it could have helped. This is like the test ride before you drive the car. It's exactly that. Remember that the computer software with its reports and files is only a tool to help you manage the project.

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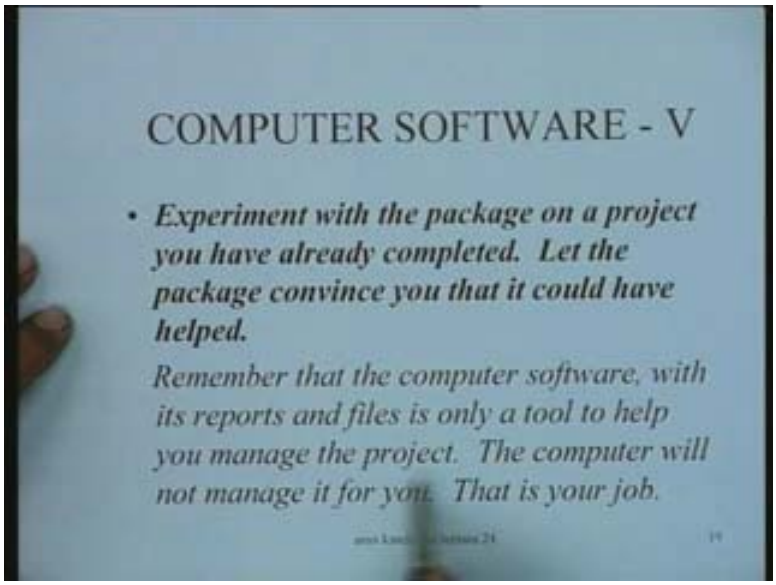

The computer will not manage it for you. That is your job. Remember that it's a tool and when you use or buy software you should make sure that it performs all these various kinds of functions.

Let us summarize what we have tried to do in today's lecture. We have seen that the use of computers in project management leads to easy sorting of project activities, easy updation and monitoring, advanced analysis of time cost tradeoffs, resource analysis and cost control; this is being facilitated.

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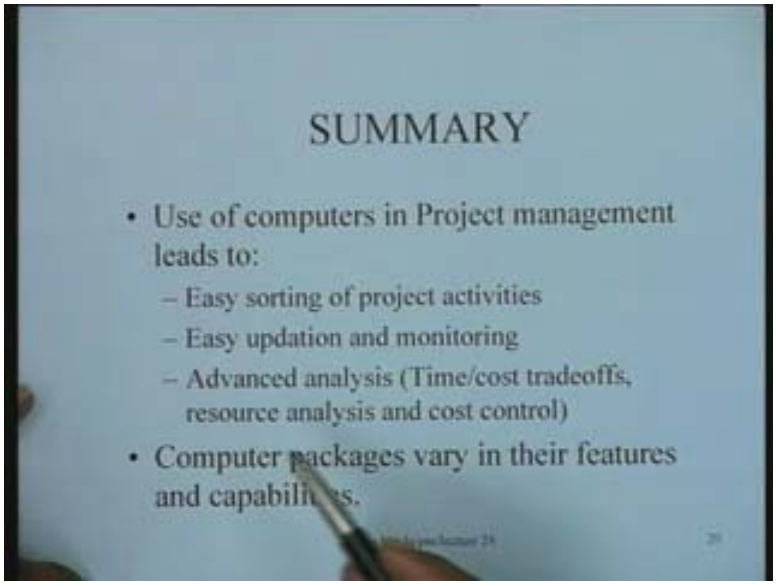

Computer packages vary in their features and capabilities tremendously and we identified some of the features, 14 major features on which we could compare computer packages. There has been a trend towards both proliferation and evolution in the software packages. Networking in the IT revolution can provide useful information sharing and exchange between multi site projects.

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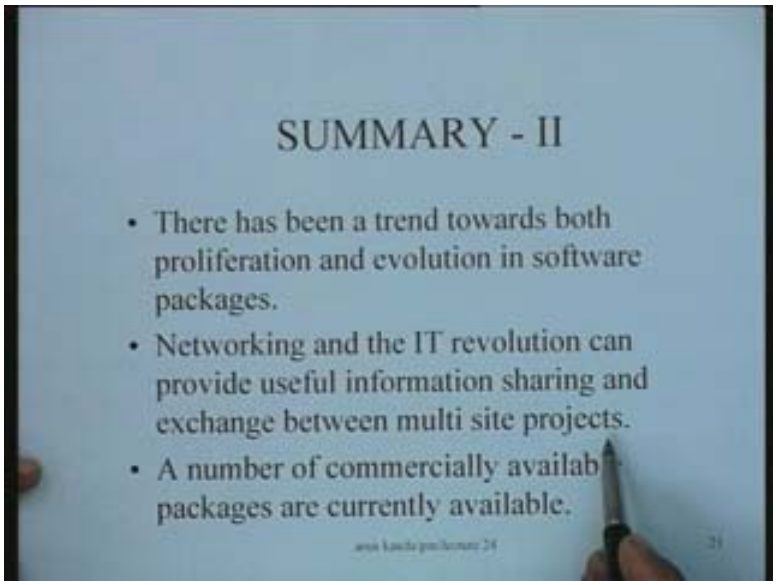

Number of commercially available packages is currently available. ….. From these we can say that the MS project is a widely used user friendly package for planning and

implementing projects from Microsoft and ultimately all computer software are tools available to the project manager. This perspective must be kept in mind.

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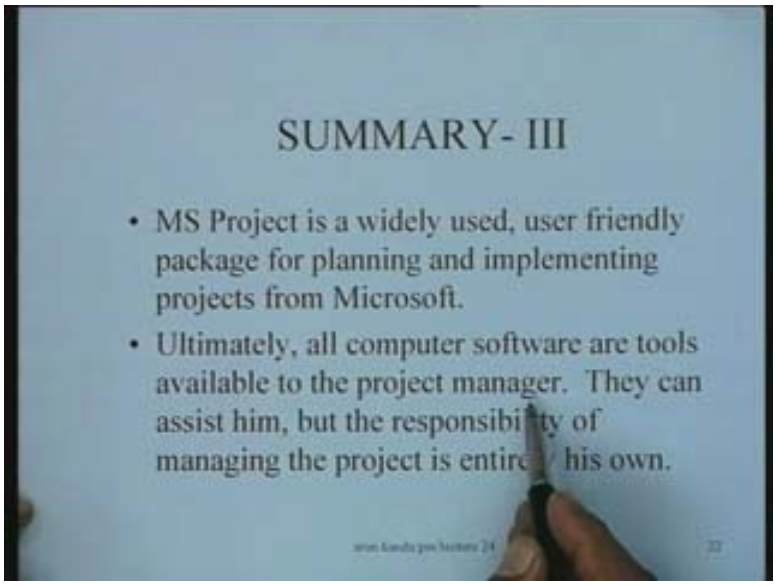

They can assist him but the responsibility of managing the project is entirely his own. Keeping this perspective in mind we must see that the project software which is essentially a tool for managing various kinds of projects must be taken appropriately. Thank you!