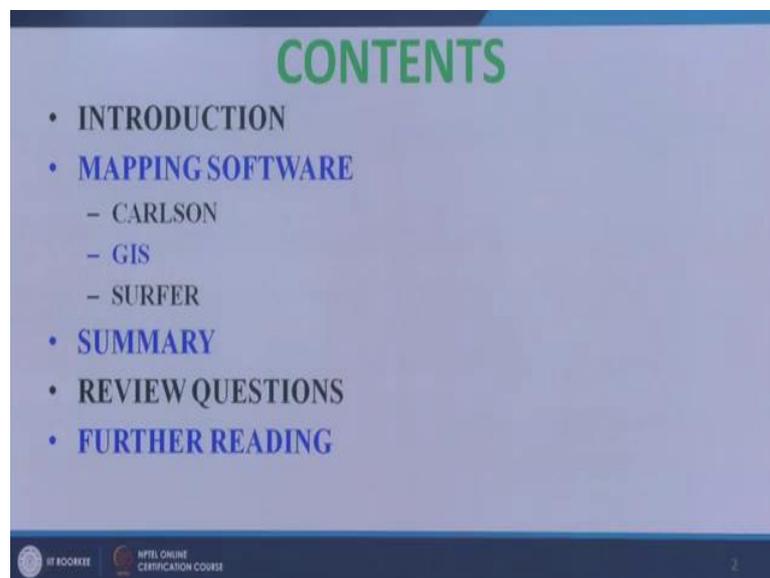


Digital Land Surveying and Mapping
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Department of Civil Engineering
Indian Institute of Technology, Roorkee

Lecture - 33
Mapping Software

Welcome students. This is the thirty third class on Digital Land Surveying and Mapping. Today I am going to discuss in this class on the software to be used for mapping.

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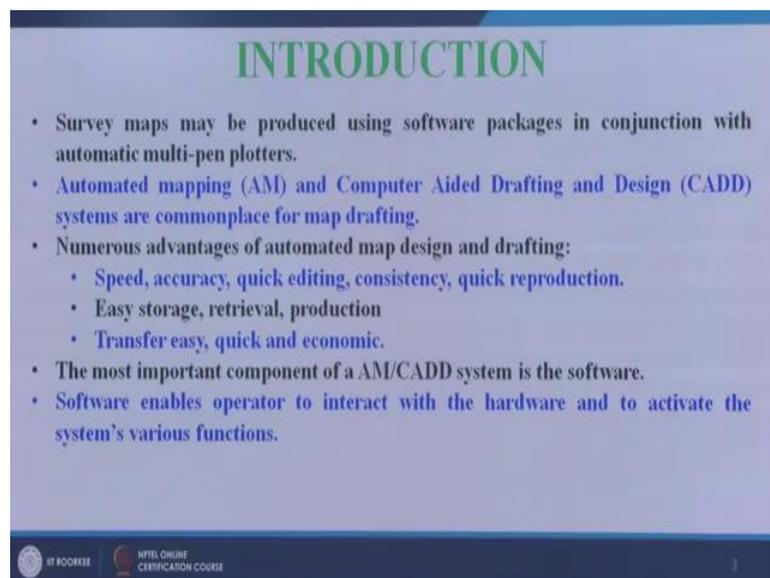
Now, the class will be discussed under the following heads introduction, followed by mapping software and I will take up on the 3 softwares because there are so many softwares available it is very difficult to discuss all the softwares as example I have taken 3 softwares which may be used for mapping purpose then followed the summary and review question.

Now, the objective of surveying is to prepare the plan on map as we all know and the map may be drafted by making use of computer, software as well as a plotter having multiple trends. Nowadays it is a very common place to get the map prepared through automated software. So, an automated mapping and computed draft design and drafting systems are common placed for map drafting. Nowadays the real name is that there we will have many advantage in going for automated mapping the most important advantage is that we can carry out the mapping very quickly the speed of preparation of map will be

very high as well as the accuracy of mapping will be more than what we can achieve using the manual method we can edit our map or during preparation of map editing work can be done very quickly and easily.

Then the output from automated mapping will be consistent because once all the parameters and all the issues have been resolved and we go for mapping then the replica of mapping will be same and so, the quick reproduction we can do even it will be very easy to store and to retrieve for production it is easy we can transfer the digital map from one place to another very easily, quickly and economically. So, all these make them use of computer software for mapping (Refer Time: 03:17) actually we make use of a system consisting of the computer display on it then input unit like keyboard or mouse then our output plotter all these make along with the different softwares all these make the system for automated mapping; however, for mapping it is the software which is most important.

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INTRODUCTION

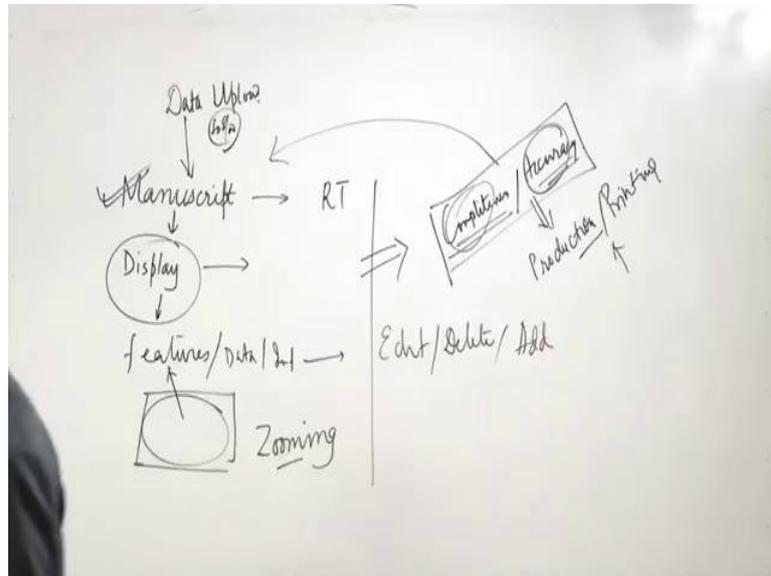
- Survey maps may be produced using software packages in conjunction with automatic multi-pen plotters.
- Automated mapping (AM) and Computer Aided Drafting and Design (CADD) systems are commonplace for map drafting.
- Numerous advantages of automated map design and drafting:
 - Speed, accuracy, quick editing, consistency, quick reproduction.
 - Easy storage, retrieval, production
 - Transfer easy, quick and economic.
- The most important component of a AM/CADD system is the software.
- Software enables operator to interact with the hardware and to activate the system's various functions.

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So, we are trying to process on the part software in this class because software is the part or soft software only we will be able to we means software will be able to interact with the hardware and to activate the different functions of the system. So, it is the software packages for mapping which are important and that has to be discussed known properly. So, we are having this class the automated mapping or the computer aided drafting

software enables drafting of manuscript; now, the different things which our automated mapping or drafting software a large has to do.

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First we can go for the preparation of the manuscript; as soon as we will get the data or we can go for a rough map from the data and that may be prepare also in real time.

So, once the manuscript has been done then we can go for display of it then display we should we can go for display of it then throw software now by displaying will be able to know really what is the quality what is the representation whether it is representation is for our purpose or not whether really what we like to have is satisfied or not or all the data available or not. So, or everything will be able to have a feeling about the map to be prepared and if we need to edit if you want to add if you want to delete any of the features, any of the data or the any of the information features data information. If we want to edit or delete or add, we can do as easily using our software. And then if any or any part of the manuscript has to be taken care no one we can take care of that through zooming.

So, we can do the zooming and then we can see whether that particular part for which you need more attention information features or data editing or enlargement everything can be done. Then, and this thing we can do repeatedly easily that is the most important thing and then we can check what are all is the final whether is meeting to our need or not or whether it is complete whether it is a quit. So, all those testing completeness

accuracy everything we can check from that now once we see that if it is not complete or the it is not accurate than also we can again redo all our work quite easily and with little trouble and ultimately we will be satisfied with that our map preparation is complete and accurate if it is complete and accurate then we will go for its production or printing and that can be done production or printing that that it can be done by using multiple plotter.

So, all these steps whatever; that means, manuscript; that means, first data the upload or data to the software upload software and then from the find available we have to go for manuscript preparation then to display to fold out whether our manuscript has been prepared is or not all the data has been displayed or not all the information are available or not all the features are available or not if not if you are there may be some excess information. So, we can delete it if there is lit little information we can edit if you want to change the information its font its size its colour, and so many other thing then we can edit if we want to take the special care of certain portion of the manuscript then we can zoom it. And then we do that thing whatever you want to do and this thing we can do repeatedly till we are satisfied with its completeness. And, also we should see whether our map is accurate or not if we find that the map is accurate and it is completely what we are expected to help then we go for production.

So, all these steps can be done by using software and more or less all the softwares which will make use will help all these facilities. So, all these activities are done by each software.

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MAPPING SOFTWARE...

- Many commercially produced software packages are available for production of engineering surveying drawings.
- Some of them are produced specifically for the purpose of mapping.
- Some of them include module for mapping.
- Some of them may be used for generation of map using different functionalities.
- However, all have their advantages and limitations.
- Each one has its domain of applications.
- Some of these software packages are SURFER, AUTOCAD 3D CIVIL, CARLSON, GIS

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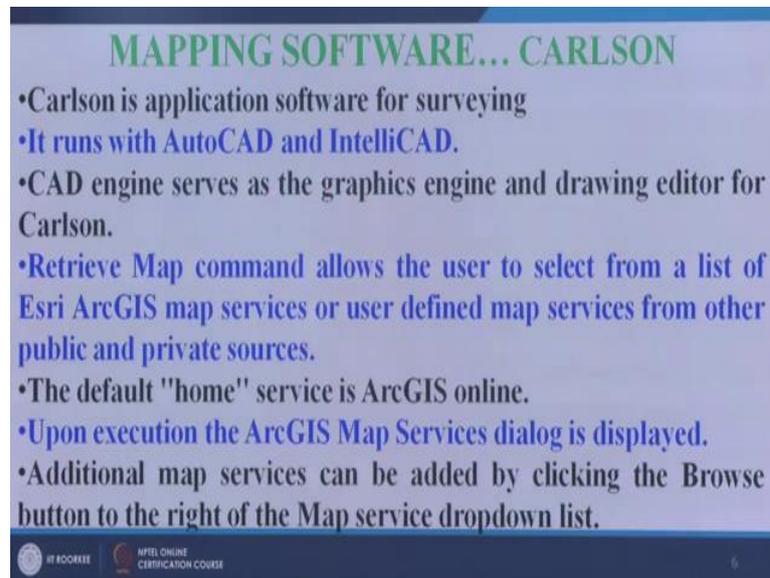
With this type of facilities and many other extra facilities many integration and many other ways how different ways how it can be done. So, in that way there are. So, many softwares are available. So, nowadays we will find that there are. So, many softwares available which may be useful for drafting or purpose for mapping purpose and or the many software specifically produced for drafting of map some of them only partially include the modular map it also done does some other work like design work sometimes some other work.

Some software which we may use to generate map using defined functionality, but finally, all the software will be useful for mapping making a map and of course, each software will have its own advantages and disadvantages and every software have its own domain of applications where it will be more useful or convenient to use. So, we need to know before we go for any software to be chosen for making a map we should know what are the possibilities available what are the which software is having what type of functionalities what is the need for our work and then we should match which software should be the best for our particular purpose, but there is no such review we can really get which you will give us a comparative evaluation for all the softwares available.

However there are some basic categories of software as I told you that some softwares are directly useful only for mapping purpose you will carry out some other works also do the mapping work (Refer Time: 11:22) for some it is the generation road map from

different modules available and these are maybe there are some popular software which we generally make use for making the map in the survey map like surfer AutoCAD, 3D civil Carlson, GIS, etcetera.

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MAPPING SOFTWARE... CARLSON

- Carlson is application software for surveying
- It runs with AutoCAD and IntelliCAD.
- CAD engine serves as the graphics engine and drawing editor for Carlson.
- Retrieve Map command allows the user to select from a list of Esri ArcGIS map services or user defined map services from other public and private sources.
- The default "home" service is ArcGIS online.
- Upon execution the ArcGIS Map Services dialog is displayed.
- Additional map services can be added by clicking the Browse button to the right of the Map service dropdown list.

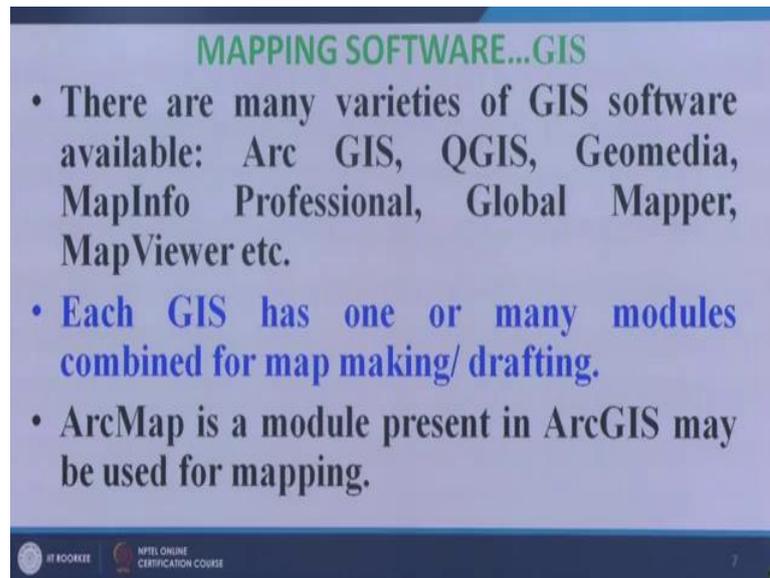
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So, mapping software I will like to discuss on these softwares little bit just to have a feeling about the type of software, but one thing is that most of the software basically have the capability or the based on the AutoCAD; that means, of the how to an AutoCAD is the software which basically helps us to plot point line polygon and we can make use of these 3 primary unit to do so many other work. So, AutoCAD actually basically software which is used for design purpose, but also AutoCAD can be used for our mapping work.

So, many of the soft many software we have found we can found that basically if the has borrowed the working of AutoCAD principle like one of them is like Carlson; Carlson is the software application software for surveying and a it is basically runs with AutoCAD and intelligent cad. So, these are AutoCAD is the basis of Carlson software where cad engine serves as the graphics engine and drawing editor for Carlson. So, you can see that cad engine is the basics basis for Carlson software which we will make we can make use for surveying mapping work survey mapping work and also within the Carlson there is a command called retrieve map command through which we can select from a list of ArcGIS map services or user defined map services from other public and private sources.

So, using this retrieve map commands we can make use of some facilities already available around and using that we can do our automated mapping work. So, Carlson is one of the popular software among the civil engineers which we make use for mapping work.

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MAPPING SOFTWARE...GIS

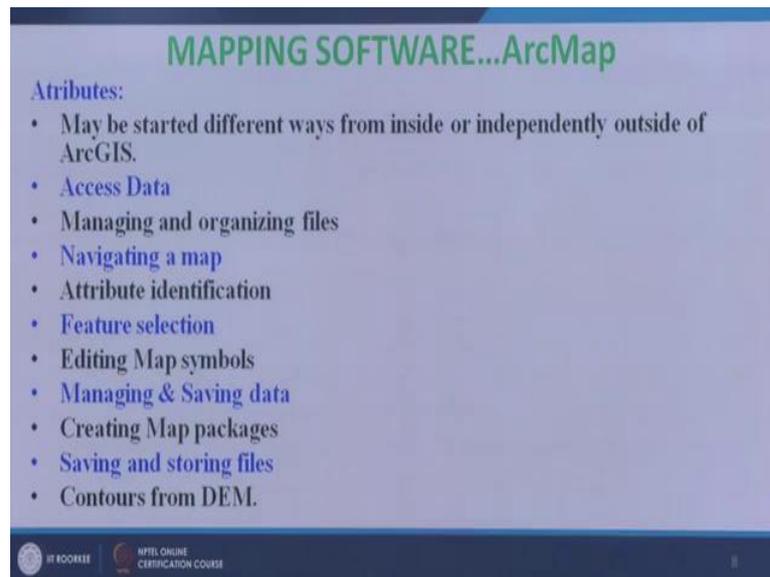
- There are many varieties of GIS software available: Arc GIS, QGIS, Geomedia, MapInfo Professional, Global Mapper, MapViewer etc.
- Each GIS has one or many modules combined for map making/ drafting.
- ArcMap is a module present in ArcGIS may be used for mapping.

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Another software which you can be used indirectly for our mapping purpose that is the GIS software, we now that there are many GIS software available in the market like Arc GIS, QGIS, Geomedia, MapInfo professional, Global Mapper, MapViewer, etcetera, etcetera. So, a plethora of GIS softwares available these GIS software actually had the layers of information and if we put together all the layers of information that itself will generate the map. So, GIS software is a very powerful tool for making maps and GIS may have independent tool to prepare a map or they are maybe combination of tools to prepare a map.

So, in case of arc GIS ArcMap is a module present in arc GIS which may be used for mapping. So, this is an example I have taken how ArcMap or how m single module or how a module from a GIS matrices may be useful.

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So, about the ArcMap or there are the different attributes which we define in ArcMap that ArcMap may be started in different ways. So, you can see that inside the ArcMap GIS software we may activate the ArcMap or from outside the ArcMap GIS also we may retrieve activate the ArcMap.

So, it may be independent of GIS module or it may be an integral part of the GIS. So, this is a very important facility then the map (Refer Time: 15:54) software can access the data automatically. So, for data we need not to prepare independently or it can be anywhere. So, and the mapping software can get access to the data directly then it can manage and organize different files also we can categorize our data as for our need or as for our observation or many other criteria we can take and we can keep it in different files and all those files can be managed as well as organized by the mapping software.

Now, once the data has been uploaded and that our manuscript type of map has been prepared then we can display and once it is display we can navigate in the map to see to test whether the map is of our desired quality or not or all that attributes are available there or whatever features we want to show as there or not. So, to navigate in the map is possible through the ArcMap then we can identify the different attributes also.

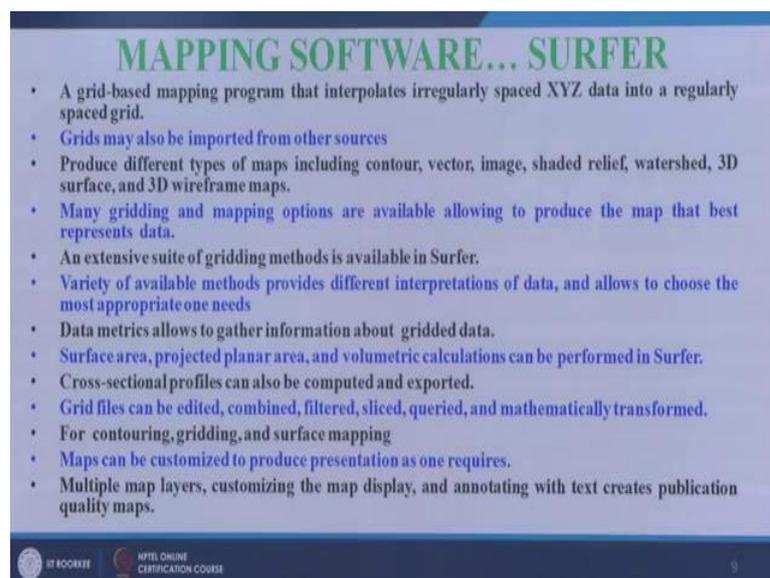
So, there is an automatic process there is a some functionalities available which we will help us to identify attribute, we can select the mapping software has the capability to select some features, then editing map symbols, we can edit the different symbols of the

map (Refer Time: 17:41) then we can manage and save data then we can create map packages then we can save and store files.

So, all these things we can do by using the mapping ArcMap software; that means, which is a simple type of module I had taken into care of. So, in which most of the GIS software that type of modules are available; that means, using that modules we can do all these works are using a GIS software and in many times also we can prepare the contour map by simply preparing the DEM of the area because DEM is a parameter which a GIS software easily forms. So, from DEM we can directly get the control of the area which is quite popular among the servers. So, we can do it

So, ArcMap is mapping software that is available with the arc GIS similar type of mapping modules for software is available also in other type of GIS. So, we can make use of GIS for mapping of our survey (Refer Time: 19:00).

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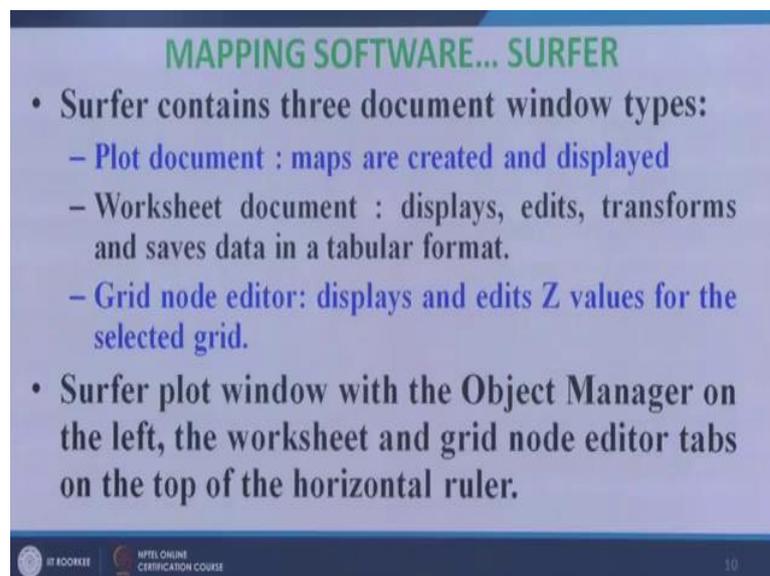


Another software which is also very popular among the servers or scientists is the surfer actually a surfer is does not provide us the map, but it provides us the surface of the map (Refer Time: 19:17) it provides the contours. So, suppose a very powerful upperscale to represent the outer surface of the earth and from there we can also get the contours now if this software actually a grid based grid based mapping program that interpolates regularly spaced x y z data in a regular space grid actually it is a grid based software.

Now, grids may also be imported from other sources. So, to prepare the map or contour map or the surface of the earth map we may import the grid from somewhere else and then on that grid we may place our data points and now it helps in preparing different types of map like contour map vector map image shaded relief and all these things many gridding and mapping options are available allowing to produce the map that best represents the data means whenever we go for grid preparation there will be different ways we need many times we need defined ways to be represented it and this software has the options. So, we can go for it and extensive suit of gridding method is available in the surfer variety of available methods also available for interpreting the data and allows to choose the most appropriate coordinates, interpolation is another important thing which can be done by making use of this surfers.

Data matrix allows to gather information about the gridded data now from the using the software the surface area, projected planar, area of chrometric conclusion, all can be performed directly then we can also get the cross sectional profile which is also important in many cases then we can also surfer can also edit combined filtered slashed queried mathematically transformed grid files. And as I already told that surfer is used for contouring gridding and surface mapping and the maps can be customized to produce presentation as one request also surfer has the multiple map layers customizing the map display and annotating with text of publication quality maps. So, all these capabilities have surfers.

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MAPPING SOFTWARE... SURFER

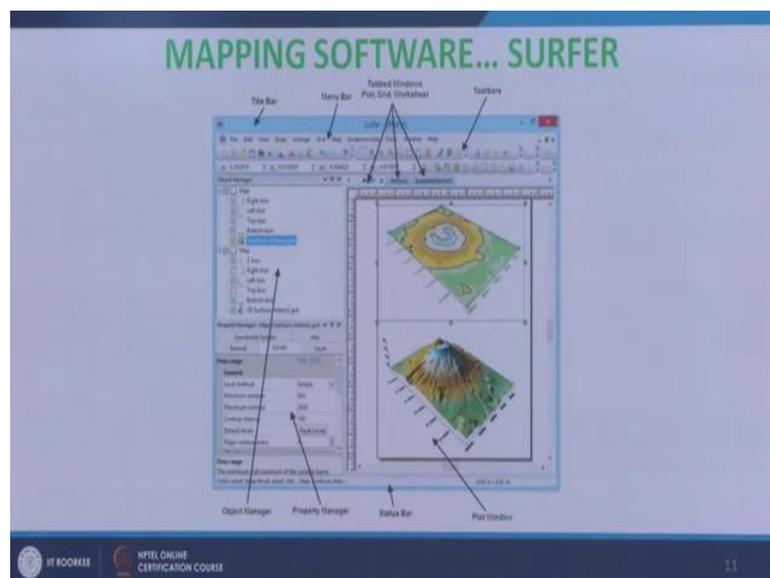
- Surfer contains three document window types:
 - Plot document : maps are created and displayed
 - Worksheet document : displays, edits, transforms and saves data in a tabular format.
 - Grid node editor: displays and edits Z values for the selected grid.
- Surfer plot window with the Object Manager on the left, the worksheet and grid node editor tabs on the top of the horizontal ruler.

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So, surfer we can also think of surfer to you used for our mapping purpose now the surfer packages contains basically 3 document window type one is that word document where the maps are created and displayed worksheet document which displays edits transforms and saves data in tabular format and grid node editor displays and edits z values for the selected grid. So, these are the 3 modes or 3 document windows that the surfer displays. So, we can depending upon what type of work we want to do we can open that window or also sometimes we can also open 2 or 3 all the 3 windows together for a work.

Now, surfer plot window with the object manager on the left and worksheet and grid nodes editor tab on the top of the horizontal ruler is as shown in figure.

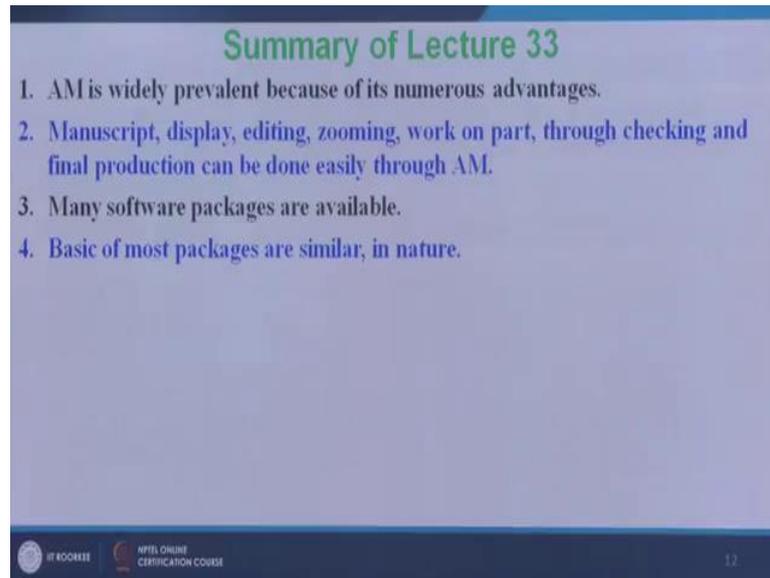
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So, here is the a typical surfer packages open windows open now here you can see that object manager this is the object manager and this is the property manager this is the status bar and this is the plot window as I told you plot window plot documents window maps are created and displayed. So, this is the plot document window then worksheet documents. So, you can see a worksheet documents worksheet documents.

So, this is a typical window open. So, I have shown you this is the surfer. So, we can make use of this tool for our contouring.

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So, with this I like to conclude today's class after we have collected the data from the field during surveying we need to first reduce it and they reduce data has to be displayed in the form of a map. So, before we go for map preparation actually we need to go for identification of the mapping software through which we will like to prepare our map because the data to be reduced from field observation should be in the format that the software to be used for mapping compatible. So, and also you know that the automated mapping is a very popular nowadays because of its advantages like we can prepare the map very quickly we can get the; we can edit our map easily we can add delete or change the features easily we can reproduce the data easily it can be stored easily. So, there are so many facilities which are the automated mapping perhaps over the mineral mapping. So, nowadays we go for automated mapping.

Now, most of the automobile maybe have the same more or less similar type of functional abilities like first it prepares once the data has been given to the data has to put to the software it prepares the manuscript then the manuscript get displayed to find out whether the prepared initial prepared; map is prepared map is of our quality or not or whether all the data to be displayed is present there while all the features which we will want to go a get is there is available there or not. So, once all those thing comes up then we may if we need to add more information we may you need to delete some information we may edit need to it edit some information all those thing can be done easily in case of automated mapping and this process can be done repeatedly till we find

that the map prepared is of our quality as well as it is complete whatever we want to represent it is there.

So, once it is there then we can go for its printing or plotting. So, this is the basic cycles of working of any software packages which most of the packages can do, but in spite of that that the most of the packages software packages has developed with its own (Refer Time: 26:59) some packages are for only mapping purpose some for some carries out the mapping, but that is as an as an as an additive module using some packages we can do we can prepare the map indirectly. However, each and every package has its own advantages and disadvantages.

So, before we start mapping work we need to know really which mapping software we will like to have and accordingly we should go for our map data preparation and we end up with a good solution with automated mapping. So, this I like to conclude today's class and the next class I will like to discuss about the different steps that has to be taken or done in automated mapping.

Thank you.