**GEOGRAPHIC INFORMATION SYSTEMS**

**Prof. Bharath H Aithal**
**Ranbir and Chitra Gupta School of Infrastructure Design and Management Indian Institute of Technology - Kharagpur**

**Module No # 08**
**Lecture No # 36**
**Creating And Maintaining A Database**

Hello Namaste welcome back to the course on geographic information systems now let us see about the module 8 I would be speaking about I will continue the database system. But I will this module is specifically designed for everyone to understand how to you actually create maintain edit and how well you can use a database. What are the different types of database? How the querying can be done? How basically there are certain issue that you can address when you are creating a database though I will give a very common issues that has to be addressed but it would be more intact well it is not the over the queries that you may during your operations with the database.

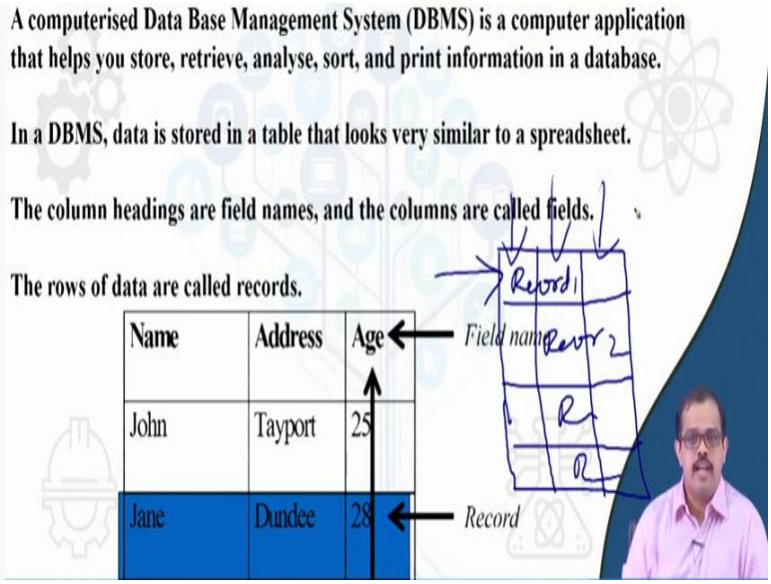
So let us as far as this I will be corner to understand it with MS access I will you some introduction with the MS excel but more ways of how database can be created. How you can modify in terms of MS access? So Microsoft access is one of those very good systems where you can handle your database very efficiently. So there are many other systems but I would be showing you about the Microsoft access.

**(Refer Slide Time: 01:44)**

So in today's class we would first just revise what do we mean by a database management system and how a relational database management system works then we would look at what I excel first then look at what is MS access. How MS access the Microsoft access is useful for analysis then planning and designing a database. So how do we plan a database? How do we design a database? What are the necessities that you need to in order to design a database?

Then we would look at operation data base operation how will we do a database operation then very important concepts of compacting repairing and encrypting which may be important. Encrypting is very important today's scenario wherein it would help you in storing a database in much more security. Then the last part is how you secure your database so that is also another thing that we have to learn so that we are up to date with whatever things that we have to build it with the database.

**(Refer Slide Time: 02:53)**



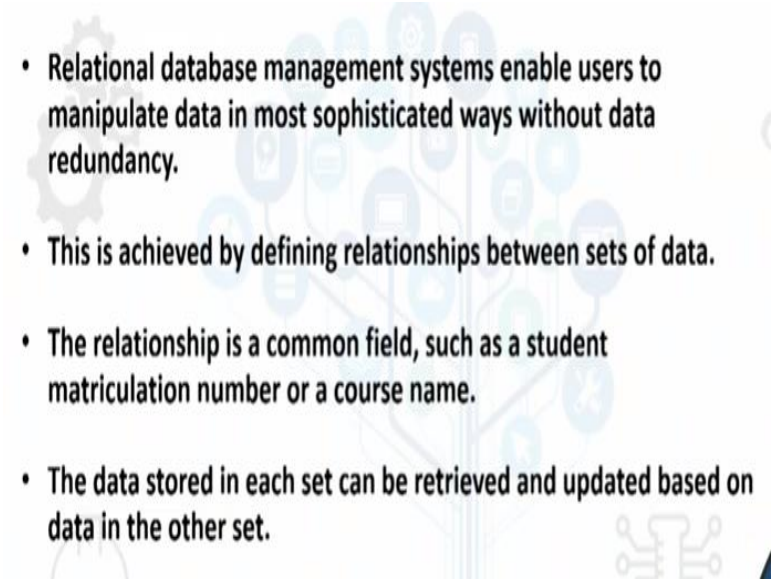

Now as I pervious defined at database is just a computerized database management system is just an computerized application that helps you store, retrieve, analyzes, sort and print information that is stored in the database you have data that is stored in the database or in a form of a database that application database management system is application that can help you retrieve, analyze, sort and print okay. And also in case if you have very big database it also helps you in grouping the data in much easier way.

So when you look at DBMS data is basically stored in a table that looks very similar to normal spreadsheet. So most of you would have seen excel very basic excel or let us say mathematics or handwriting book okay wherein you have numerical mathematics book wherein you write 1, 2, 3, 4 it is a similar kind of sheet that there in the database management system okay. In columns heading is the field names and the columns are called fields.

When you are handling a database columns that when you say columns these are the vertical boxes that are called columns. Whereas rows are called records these are called horizontal boxes. So when you look at a normal spreadsheet you have something like this right if you have a square box your spreadsheet is something like this. So when you are looking at this these are called records record 1, record 2, record 3, record 4 and so on.

Whereas this as called field 1, field 2, field 3 okay so this is how the basic database structure is okay exactly like excel. If you have seen excel it is a exactly like an excel also is a good application in order to create a database.

**(Refer Slide Time: 05:08)**



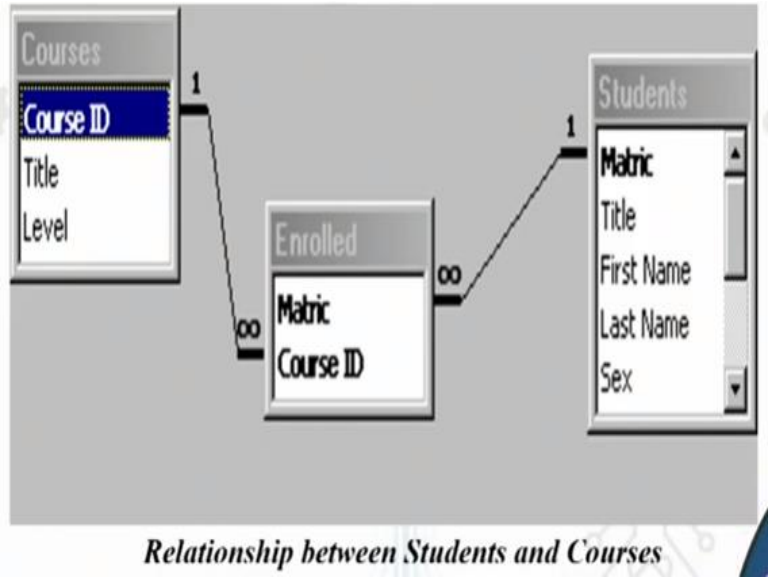

And when you are looking at relational database management system this enables user to manipulate data in most sophisticated way this we have discussed how sophisticated it is without data redundancy. This is extremely important I gave an example of an hospital and the records and police. So that is how an avoids the redundancy so it gives you different tables and specific tables have specific connections only specific people can access it. So that is how it gives you it

can easily quickly access the data and most importantly it removes the data redundancy in your database.

So this is achieved how when you look at data redundancy it is because of the relationship between the sets of data or it is based on relationship between the data and the sets of data. The relationship is common field such as student matriculation number or course number or when we are looking at that patient it is a patient ID which is the common relation and even the license number can be your common relationship number that's actually looking at all the entire database.

The data is then each stored in retrieved updated based on data in the other set also okay. So which means to say that if there is a small change in other set which is our reflecting it to your main database. So there will be a change in the entire space if they are dependent okay.

**(Refer Slide Time: 06:42)**

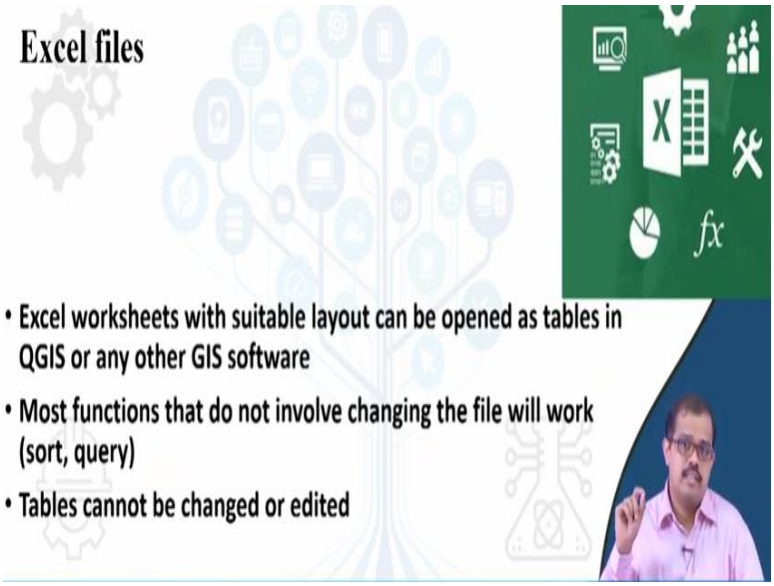


*Relationship between Students and Courses*

So just to give an example of relationship between a student and courses how the relational database is okay. So just a very very basic example of how relationship between student and course so you have a course ID that is linked to how many number of students have been enrolled. So then again the course ID is linked with the matrix which tells you that what is the title? What is the first name? What is the last name? And any other details that of a student that is necessary okay.

So course ID is then you can have specific table again with the course ID and representing number of students so and what is the average of the class what is the highest of the class lowest of the class all of this can be based on course ID itself. So this gives you chain of how relational database management actually works.

**(Refer Slide Time: 07:44)**




So let us start with the first application that is excel most of you would have known but if you do not know please just go back have just Google it out to just see what is just Microsoft excel okay. When I say excel worksheet these are basically a worksheets or it is just I can say it as a mathematical tables okay we can do mathematical statistical any kind of analytical issues it can look at quantitative data it can hold any number of data into those sheets there are infinite number of sheets until you are virtual memories almost done otherwise have infinite number of sheets.

You can look at sorting different data in different sheets access different data different point of time. So excel is one which can give you both quantitative information visualization also look at analytical numerical part of analysis of that particular data that would have collected. Now excel worksheets are extremely suitable and can be opened as tables in QGIS or any of the GIS software's.

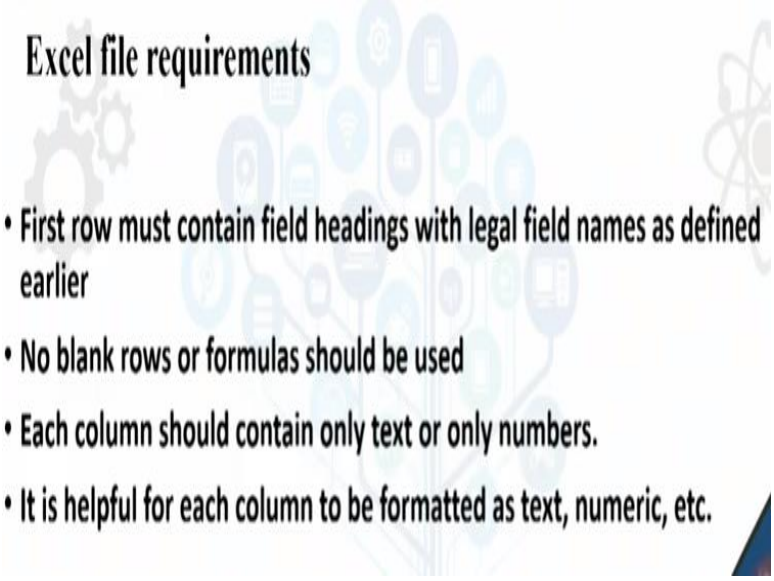
So now excel see once you have collect the data you can put either the excel or Microsoft access or in any of those sheets which can actually handle even you have lot of open office stuff also.

For example when if you have a open office stuff that is also stored as similar to that of a excel and is a good option alternative to what excel is. So now once you have stored it in the form of excel so you have collected data from the field maybe let us say that someone one of my student as gone and collected all the temperature data from the field.

So he used the laser temperature sensing gun to collect some of the surface temperatures so he comes back ones he comes back he knows because of the GPS location he know where exactly he has collected the data and also he knows certain attribute information that he would have collected and also using those sensors he would have collected the temperature data also. So now he comes back he puts it in the excel sheet. So you have the name of the place you have temperature sense the lat long XY values and any other attributes stuff that is corrected.

So that is nothing but a sheet it is just like your vapor that is printed in number of boxes so most functions that involves changing the file will work as far as excel is concerned that is sorting querying etc., Tables cannot be changed or edited once it is performed okay.

**(Refer Slide Time: 10:25)**



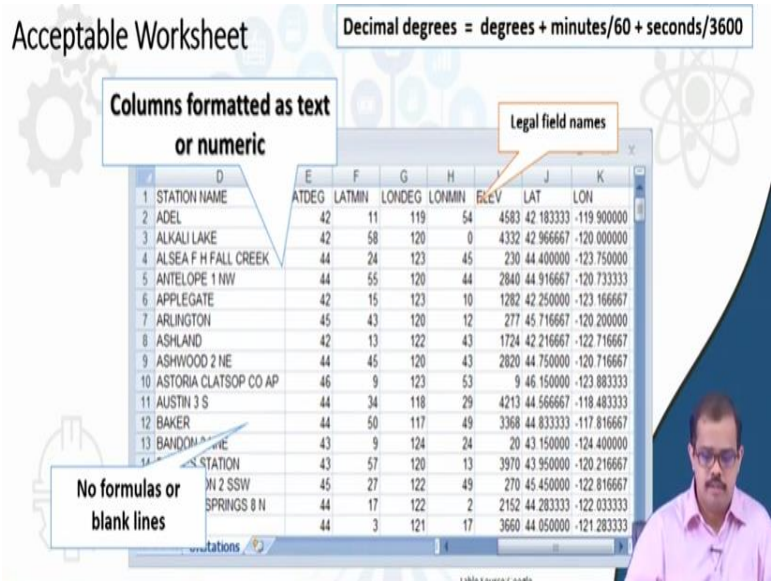

So when you look at excel file there are certain requirement for it to be in order if you want to import it as a attribute data into your database. Now if the first row must contain field headings with legal field name as defined earlier. So I will tell you what are those legal field names so when I say field names these have to be in maximum of 13 characters and this the characters and this field name cannot have only numerical or only it can have words it can have partly

numerical partly words and these headings have to be sufficient length so that it is either easily identifiable.

So you cannot have no blank rows or formulas that should be used each column should contain only text or only numbers okay. So keep that in mind if you are defining a data if it is a qualitative data put at qualitative form if it has quantitative data put it quantitative form but make sure that either it is number or it is text you cannot combine both okay if you are if are finding out whether it is a red or blue color that you have looked at in the field in different locations.

Now it should be red should be one and blue should be 0 or it should be R or B okay. So either one of this context has to be used when you are actually entering into the database it is helpful for each column to be formatted as text or numeric so keep that in mind normally.

**(Refer Slide Time: 12:05)**

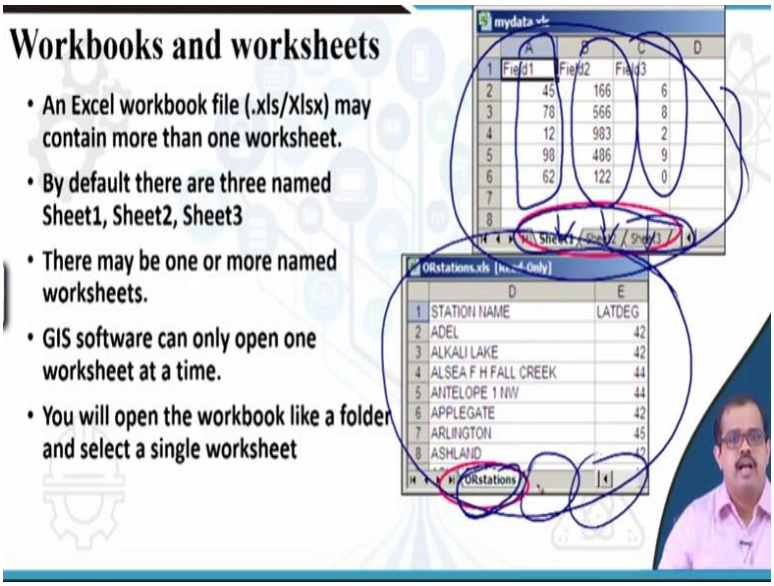



You can format it basically when you are looking at that particular thing so when the excel sheet looks something like this so you have columns that are formatted as text or numeric so if you look at this these are all numeric this is he field name okay both in x and y and if you look at these are most of them are numeric forms okay. So you cannot have in the first line that is the first column and the first row you cannot have any blank lines no formulas basically you cannot use a formula in the first lines okay.

And try to avoid having formulas here so that if there are certain formulas it can be worked out in other excel sheet and copy pasted as numerous here okay. And always have a legal field name okay do not use a field name that may not be understandable. So and when you normally enter I would suggest that most of them enter it in form of decimal degrees. So whenever you go to field normally you collect the data or when you looking at any of the applications it has degree, minutes and seconds.

So if you have convert it to degree decimal degrees or degree decimals so it is as simple as this you have a degree so add minutes by 60 + seconds by 3600. So combining all this is nothing gives you degree the same reading in a degree decimals. So I would suggest that most of the things that would be entered here would be in degree decimals. It would rather give you more effective way of usage of this database rather than any of the other forms where there may be certain confusions when you are actually picking up the data from the database.

**(Refer Slide Time: 14:00)**




Then work books and work sheets so this is concepts that excel users so when you look at this if you look at this is one of the excel sheets. So these are number of field this is field 1, field 2 and field 3 and when you are looking at this I have just taking this as example okay. So this is if you look at this all of this 3 are different fields but if you look at here there are 3 sheets normally when you open a excel sheet normally in the previous version it used to be 3 different sheets would open.

But in the newer version 2 sheet open at a time okay so when you look at these are called as worksheets 1, work sheet 2, worksheet 3 okay this entire book is called as nothing but an work book okay. So whatever you have this is called as a workbook now when you look at excel actually stores either in 2 formats you have the older format which is at dot XLS and newer format is dot XLSX okay.

Other than that you can even store it in dot csv form okay so comma separated value format which would be much easier for importing in many of the GIS software's okay. By default there are 3 name sheets as I said there may be one or more named worksheets so always I would suggest everyone who start looking at worksheet you are storing data for example the first data is about different recording stations the next worksheet is about temperature next worksheet is about rainfall.

So keep the name of the worksheet much easier because when you open your application and try to import these work sheets it when you open that workbook it does not mean it does not take all the data that is there in the work book it takes work sheet by worksheet. So which means to say that that there is a work sheet by name rainfall only that worksheet is considered for your analysis first.

Next you can reiterate the temperature worksheet similarly it is easier if rather having sheet 1, sheet2, sheet 3 which you may not remember as whether it is temperature rainfall data say it is better to always rename the work sheet so that it is easier to access GIS cause software can only open one sheet at a time that is what I explained and when you are opening a workbook it is normally like a folder.

So in a folder you can use one file you can open one file at a time okay and select a single box sheet okay. So I hope everyone has understood how and the data is stored in the excel and how we can actually access the worksheets.

**(Refer Slide Time: 16:53)**


Now let us go into Microsoft access I have just given an simple small introduction to excel when we start looking at data in one of those classes you may look at how do you use an extract data for your analysis. So using an excel sheet so let us look at MS access Microsoft access is relational database application in Microsoft office professional. So if you have used any of the office that is office after office 2003 the Microsoft access is extremely developed as a compact relational database management application in the Microsoft package.

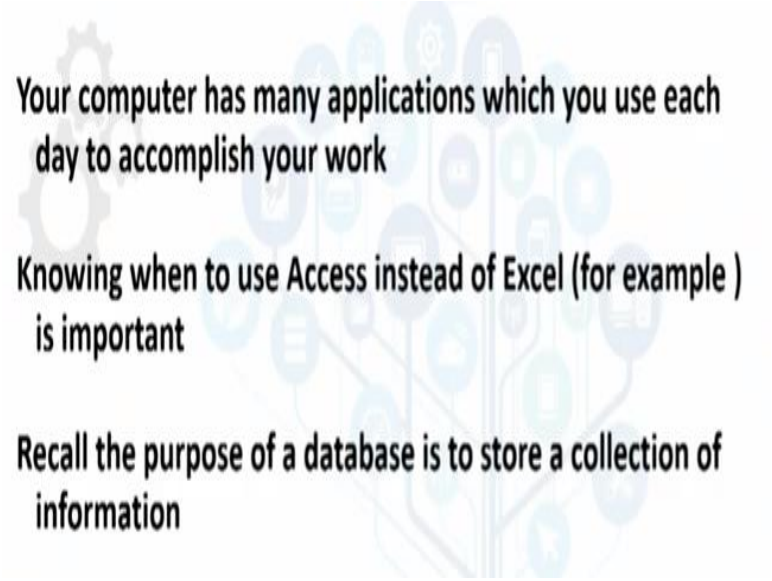
So before we explore ourselves we should understand that database and also we should review some of the very basic database concepts. So otherwise you will not be able to understand access. So in case you guys have I mean have forgotten some of the database concepts what is the relational database how is works etc., though I have given introduction in this class please go back have a look at that particular video and then understand how a Microsoft access works it will be easy for you to just organize it in much better way.

A database is an organized collection of information okay so or data that is process as information a telephone directory is a good example of a database. So most of you at least in my this people have seen a what is a telephone directory I do not know whether with the advent of mobile phones if you guys have looked at what is telephone directory but if you can come across please look at a telephone directory has a extensive information so with just a telephone you could have tracked a person's address and a lot of other issues.

But it is you should appreciate the way the telephone directory used to be built it is extremely good in terms of having a collection of telephone numbers. Even today you can access a lot of telephone directory using Google such as B2B you would find you would probably find the telephone numbers of your house and also your friend's house. So that is extremely good so if you can really get an hold on the old telephone directories you will love looking at it because it is one of the best databases that anyone can come across.

So this is a very good practice of developing a hard database that used to be the their earlier now it is more of having a digital data okay.

**(Refer Slide Time: 19:39)**

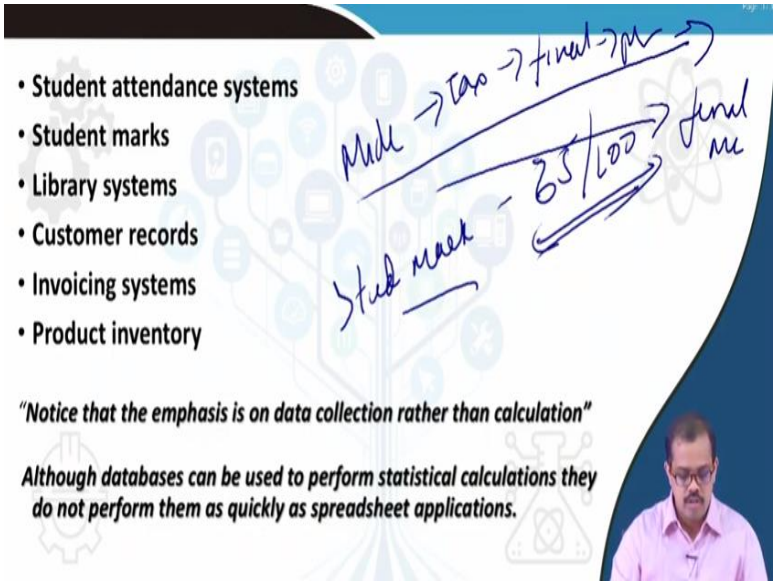



So when you are looking at your computer as many application which each and every day accomplish particular work so knowing when access instead of excel is important is very necessary when you are looking at the database point of view okay. So not that every time you need to take up excel in order to have a database ready or nor you should always take up access for your database.

So look at why you need access and why you need excel now I did show you that excel is one of those applications which can actually populate all your data that you have collected from the database. Now you once you have populated that in the excel cannot really develop a database engine by default so it cannot look at the database system it cannot look at a database management.

Whereas access can look at the database management so you can have data in a excel whereas looking at the database management can be done by Microsoft access. So these that is why you have 2 applications instead of 1 okay. So when you are looking a the database the most important store a collection of information or process information or collection of data. So that is exactly why you need access okay.

**(Refer Slide Time: 21:00)**

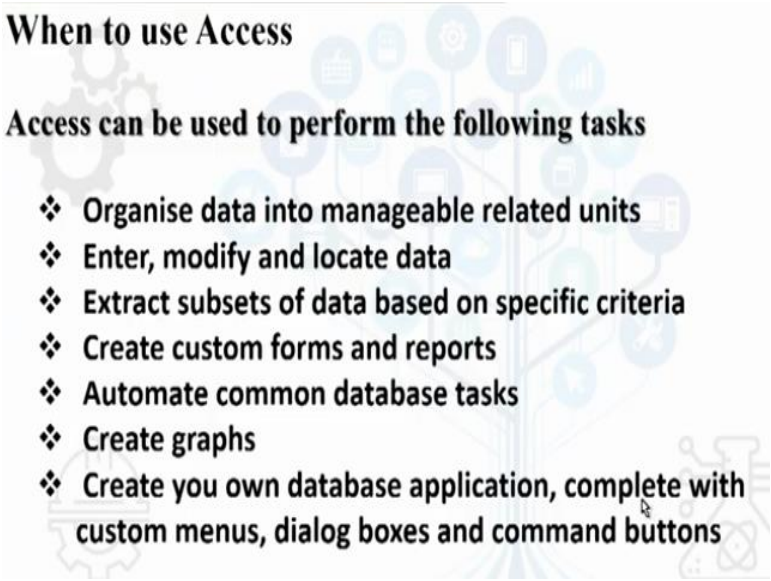



So for example you have student attendant system, student marks, library systems, customer records, invoicing systems, product inventory so when you are looking at all of these so whether it is student attendance system, library system, invoicing or any of these things the main emphasis is on data collection than calculation right. If it is on calculation for examples student marks if you want to store let us say there is 2 things if you are just storing it has students marks okay student marks is 65 overall of 100 let us say.

So these is a overall marks you do not need to do any calculations but if you looking at mid term exam then the take home exam then you have final exam then you have presentations surprise test. So all of these have certain marks associated with it so you want to calculate the final marks out of all of these then you need an excel. Whereas here it is only collection of data which student as how much marks that is all.

So that is a different between an excel and then access fine so that is access as more of data collection and management whereas excel is for calculation it can also do the collection part but as emphasis is more on calculation and maintenance okay. So when you are looking at database most of the database can perform databases can perform statistical calculations by themselves but it does not calculate as fast as a spreadsheet or as excel sheet that is why you need excel okay. So if you want to calculate basically look at statistical information then you need excel otherwise your Microsoft access would help in database management.

**(Refer Slide Time: 23:00)**




So the next question is okay so now I understand what a access is more of collecting data than the final data then storing it in database etc., excel is more of a the calculative stuff like a statistical analytical issues that it can look at but again when do we use access. So now you know the difference between software's but you do not know what when do you use access.

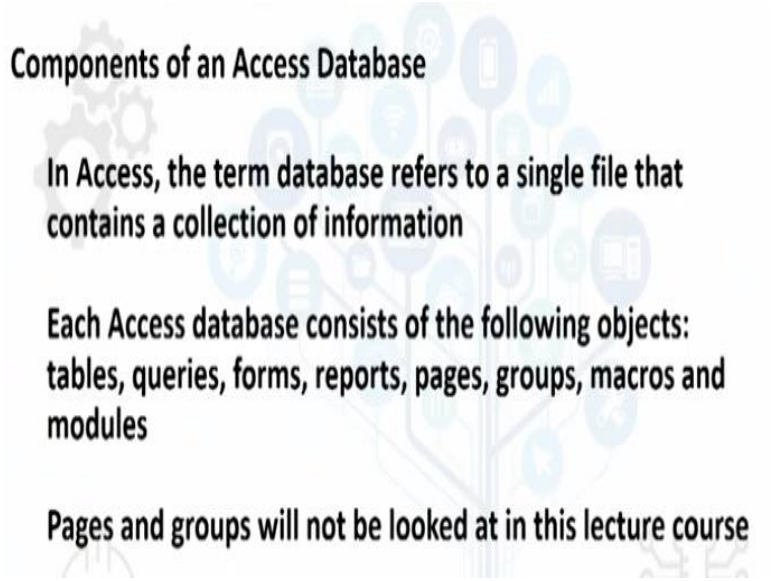
So you need to use access when you want to organize data into manageable related units okay so entire modify and locate data. For example you have lot of information that is a lot of information process information lot of data that you have collected so you have to actually enter it modify it locate it when you are looking at excel you will not be able to locate the information that is our relation information that is already existing whereas when you looking at access it has more of an how do you enter how do you modify how do you locate data?

Locate data is extremely important in terms of Microsoft access then extract subsets of data so I gave you an example of hospital and then police men. So police men does not need details of that or what a doctor needs whereas the doctor does not need the details what the police man is. So you need to have subset of data so create subsets of data can be easily done using access. So the specific data user will be given certain access and others will be curtailed with the access of that those data which are unnecessary okay.

Then custom forms and reports this is a very important point at the end of the day you need custom forms custom reports in order to generate the final output then look at automating common database task which is very important in today's word the automation is the major important aspect when you looking at the task when you have a huge database the it as not easy to maintain instead if it can automate and look at the entire database it is good that is why you need to use access and today is if you look at Microsoft office 2019 is extremely useful in terms of giving you good software package in terms of Microsoft access.

Then you can create graphs when I say graphs even excel can do it but you can create it more visually linked to the data that is running behind then you can create your own database applications this is very important this is what it majorly differs from excel you can create your own database application complete the custom menus then look at the dialogue box and the command button. So most importantly you can build an overall application in terms of user interface for an user who would be using that data and the database effectively.

**(Refer Slide Time: 26:04)**

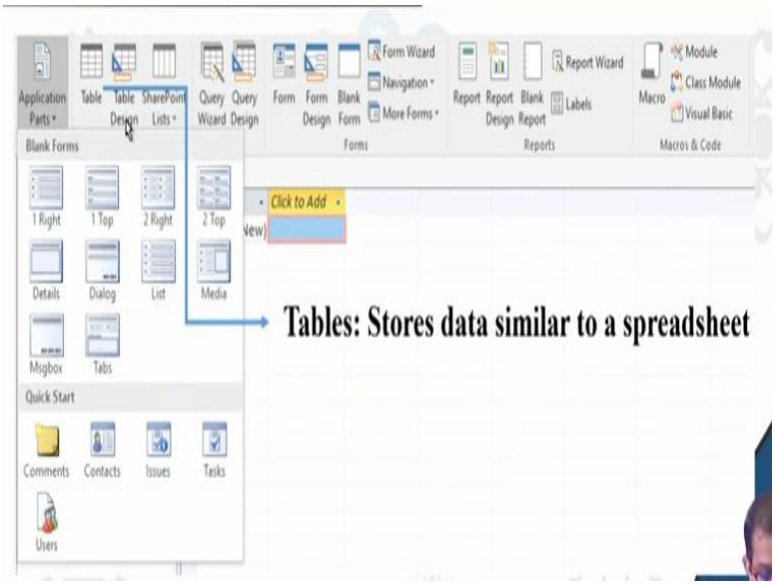



Then when you are looking at the entire access database you have different components of access database in access the term database refers to single flat file okay or single file that contains collections of information. So each access database consist of the different objects when you look at objects it can be tables it can be queries it can be forms it can be reports, pages, groups, macros, modules okay.

I will come to each of these I will show you how you access each of these your Microsoft access I will give you some examples of it. So when you look at pages and groups will not be looked at when you are looking at this we will look what all these things mean but I am not going to into details of what do you mean by different pages how to maintain groups? How do you populate group? How the groups are combined? So I will just give you a flavor of what a table means what a query means how do you create a query?

How do you create a table what are different form why you should use a form queries etc., but I would not go into details dive details into pages and groups okay. But we would look at different components.

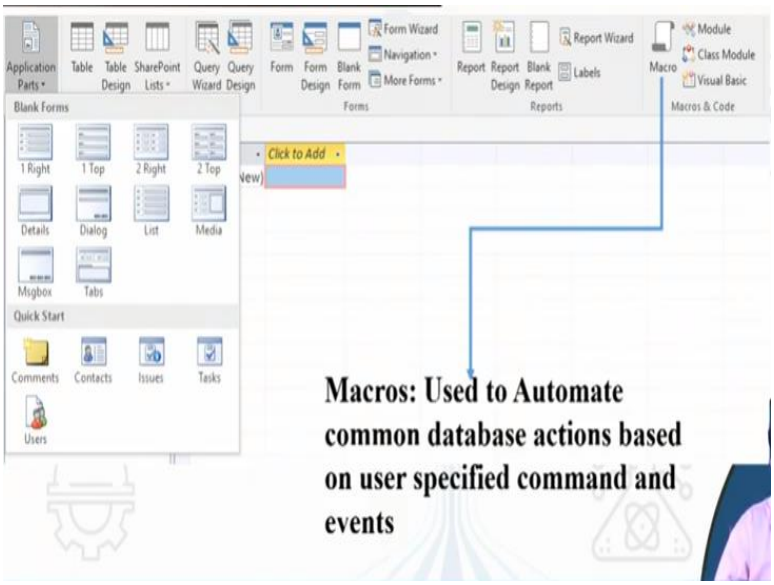
**(Refer Slide Time: 27:20)**




So when you are looking at excel so if you open up excel and click on create a new database or so this particular thing open so once you say you create a new database you have to provide it with the name okay. So once you have provided with the name you can you get this particular interface so if you click on this it will give you different parts of an application okay whether you want to look at the contacts you want to look at a issue you want to look at task you want to look at user etc., then the next tab is nothing but tables.

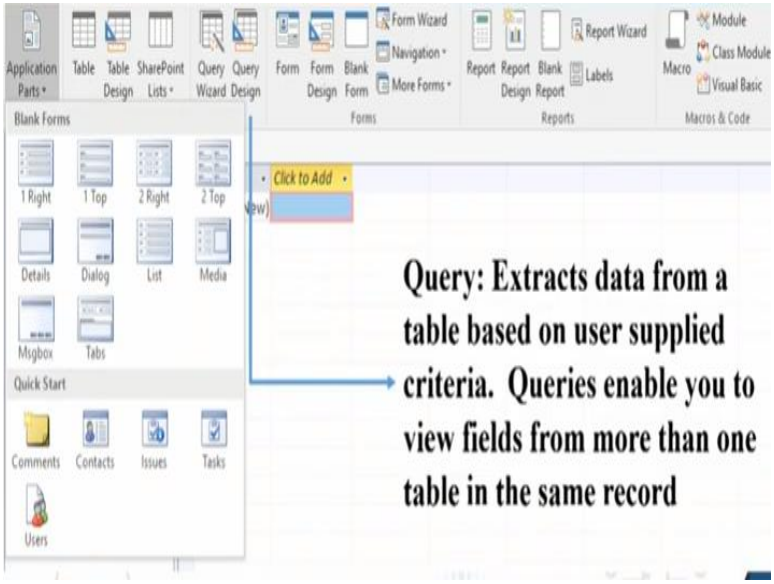
This is it actually exactly similar to the that of an spreadsheet or an excel sheet and it is stores all the data or information you can see just behind here there are number of columns number of rows that is stored if you go and see here there is one column and one row. So this is where your data is actually show this gives you a tables.

**(Refer Slide Time: 28:24)**




So the next thing is macro is as similar as that in excel so macros used to automate your common database actions okay. So these are based on very specific command and download by the users so macros are extremely very good tools that Microsoft has in terms of its applications and the same macros has been embedded into a Microsoft access just to automate data I mean database maintenance data I mean there is certain calculation that has to be done and any other issues in the database that can be handled time to time to macros works on it.

**(Refer Slide Time: 29:03)**



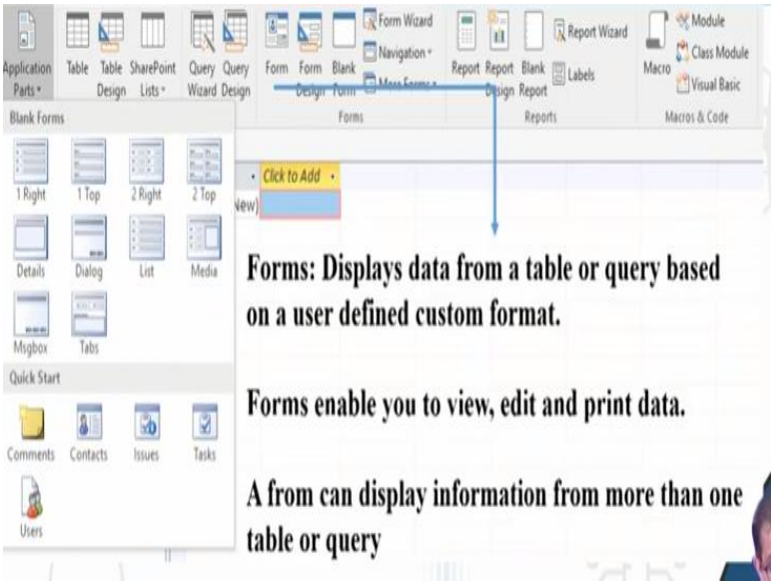

Then you have query so query is one of them for example when you populate your entire database let us say that there is class of students I have the students name in my I mean in the rows and columns gives me their height their probably their different classes, different marks for

example 10 marks, twelveth marks and their bachelor's marks that they would have or under graduate marks okay so all the 3 marks.

Now I want to look at who in this particular student pool has scored the best is consistent overall or has been scoring in consistent way. So in that time I use the this particular thing called as query so what is query do it extracts data from the table so the first thing is if I say the query is tenth marks equal to twelveth marks equal to BE marks or in the range of these marks okay then say it is let us say group 1 otherwise if it is more or less or it is too less make it group 2 if it is not equivalent very variable then make it group 3 that is my query.

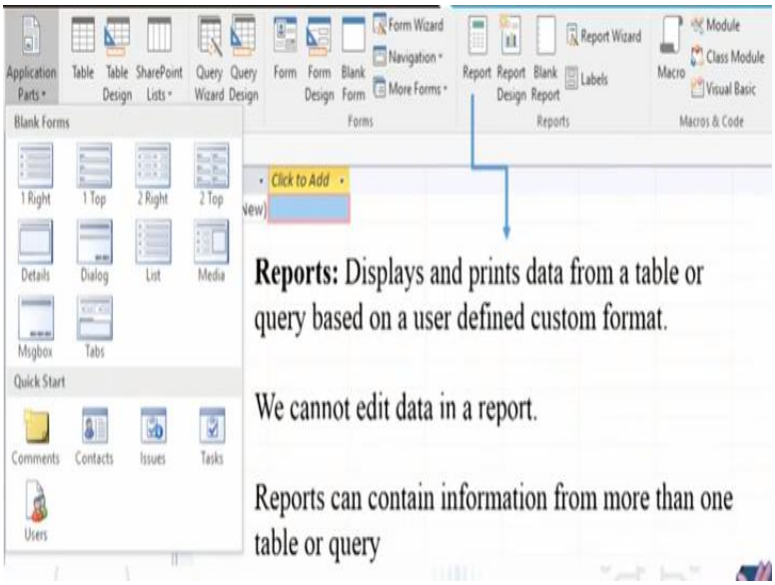
So that queries enable us to view fields from more than 1 table in same record so if you have 10 different tables in the relational database so you can extract all the information from those by just usage of query only thing is that you should know what are the different fields of columns that are there or the attribute information that is already embedded into the database.

**(Refer Slide Time: 30:56)**




The next thing is forms this displays that data from the table or query based on the user defined in the custom format okay. It is based on user that how I need what kind of data output I need that is how the forms are displaying. So the forms enable us to view, edit and print data basically edit and print data okay. Form can display information from more than 1 table or a query that is what most of the database operations to.

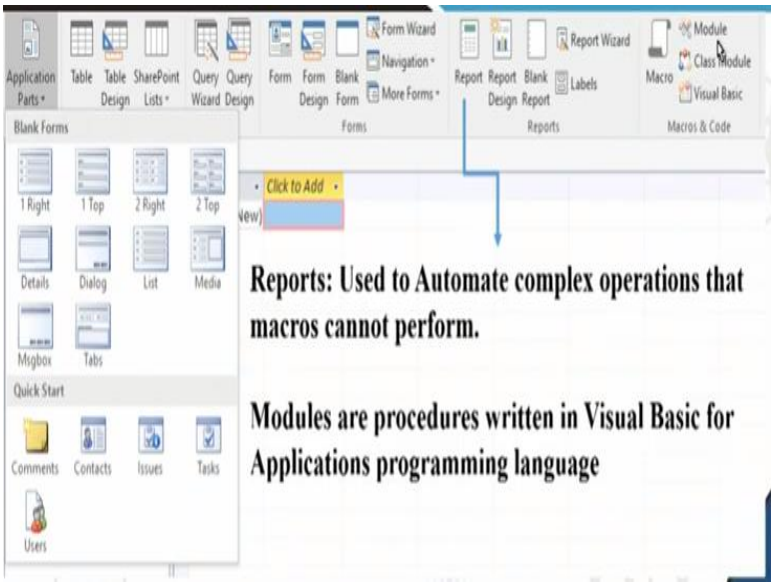
**(Refer Slide Time: 31:29)**




So when you look at the next tab it is reports that is here okay so what is basically reports to this display and prints data from the table or query based on user defined custom format okay .Again it is based on the user so everyone has their own way of printing it so it is based on the user on how the this particular thing as to print it. Only one very different thing is from the forms is that report cannot be edited it okay it will be in the log format and it will be printed as it is.

Reports can contain information's for more than one table or queries you can have any number of queries all queries will be processed based on the availability of information and that will be given you as an output okay.

**(Refer Slide Time: 32:17)**



So there is no limit in today's context of computing there is absolutely no limitations of queries is not limitations of time whereas previously you could have got something as timed out certain errors. But in today's computing capacity absolutely there is no rules or limitation in terms of this the reports also again or automate complex of operations that macros cannot perform you can again have this then modules or procedures written in visual basics for application programming languages.

So you will have different modules for developing that particular thing that is module is somewhere here okay. So you can look at how this can be changed.

**(Refer Slide Time: 33:02)**

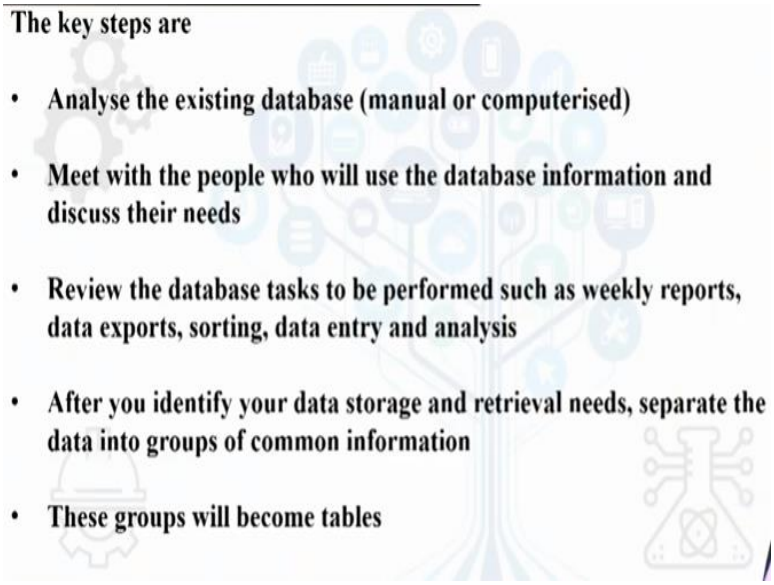

Then you have planning and designing of database so when you are looking planning and designing the first thing you have to before you create any database is that first thing is planning on first why are you building a database and what purpose that it should serve maybe after a few years or few months it make take a different shape. But when you initially planning look at a long term goal and look at how you have to develop a entire database.

The time the time taken to design will be the time spent when you create and maintain the database. So when you actually design the database very nicely you need less time to maintain it or may be alterate but when you are if you do not take a time in designing the database then your maintaining time would be extremely high in terms of when the database is in real use. The focus should be basically on data the people who use the database and the tasks so the first what data

you are storing how the people will look at the data what are the different groups of people who will be using the database and finally what are the tasks that maybe performed on this database.

So you have to look at it very carefully without looking at this do not every create a database okay.

**(Refer Slide Time: 34:25)**



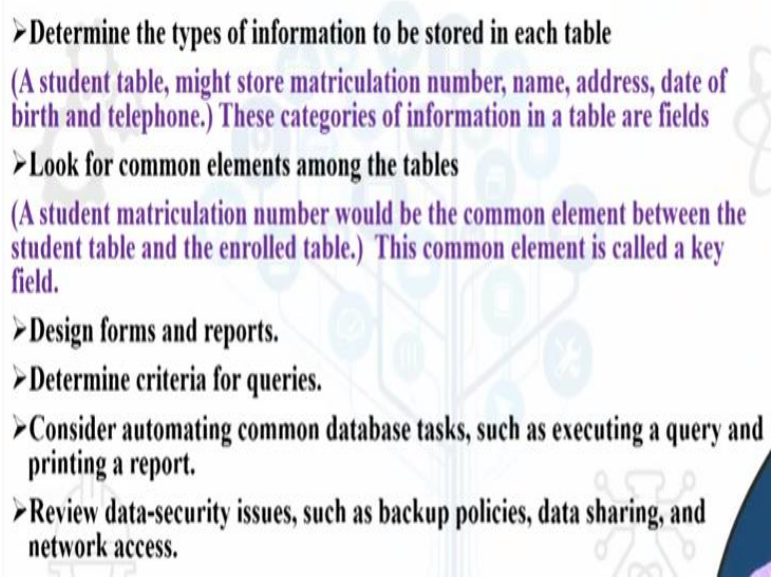

So when you are if you want to create a database there are certain keys steps first thing is analyze the existing database normally when you have to convert it in a digital database you will normally have a manual database right in a form of a register, box etc., So what you have to basically do is first analyze the existing database and understand what are the data that are stored in different databases then take it forward.

So me look at people information for example look at different users different people who will be looking at particular database information and in case they need certain modification that as to be done when you are creating a database look at it. So plan it then review the database task to be performed such as weekly reports data exports sorting data entry analysis. So most of this things has to be there when you are looking at your today's scenario of developing a database and with the daily routine.

After you identify your data storage and retrieval needs so you need different kinds of data storage different ways of retrieval so based on how you need to store your data retrieve how to

you want to retrieve it each and every data has to be separated into groups of common information okay. Then each of these groups will be different tables okay so are different work sheets fine so once you have created these different work sheets you are almost ready to start working on a database management system or developing a database management that is a these are the first steps of looking at how do you create a database okay.

**(Refer Slide Time: 36:08)**




Then when you determining the types of information that has to be stored in each table it may be like student table which may need at matriculation number his or her address date of birth scoring information, telephone or contact number of parents etc., So these categories of information in the table are called as fields. So which means that every work sheet will have huge number of fields when you have a data.

Then for common elements among tables or workbooks so you should look at which are the common elements so these are called as key fields or key worksheet fields okay. When you are looking at this key worksheet once you have understood what are the key worksheets field is actually connecting different worksheets then look at designing forms and reports what kind of reporting you have to do? What are the forms that are necessary how the reports have to be printed is the certain format or certain styling that is necessary.

Then determine the criteria for queries so there are there may be certain queries which may not be inbound to your data. So look at what is upper bound and the lower bound of those queries

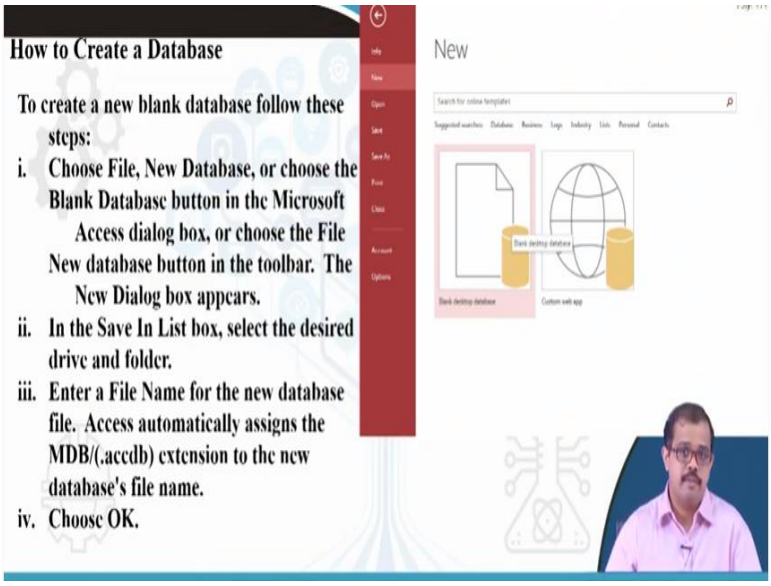
how the query has to be done? is there certain constraints in your data so mention those constraints put those constraints in terms of non queriable constraints. So all of these has to be looked at the consider automatic common database tasks such as executing query and printing a report weekly report monthly report etc., make it more automatic than making it more manual.

Because when this database is huge it is difficult for anyone to locate and print particular data instead if it is automated it is much easier and most importantly look at the data security issues in today's world it is most of it data security issue. So look at most of back up policies so where you are backing up I have the policies relevant to you are the policies is really good in terms of your data storage and maintenance.

So look at how you store the data develop policies of the data so data sharing if it is there every companies as its own policy of data sharing and network access. So look at the policies for example when you would have seen in some of these slides have adopted some of the materials from some of the very big universe it is. So those materials have their over there those materials have their own policies of data sharing.

So that particular data sharing has to be given certain credits which you would have seen that it is adopted from so and so place you could have seen the lower footer. So that is how the policies have to be looked at and finally the most important is network access. How good is you network access and how much data it can actually handle over a period of time.

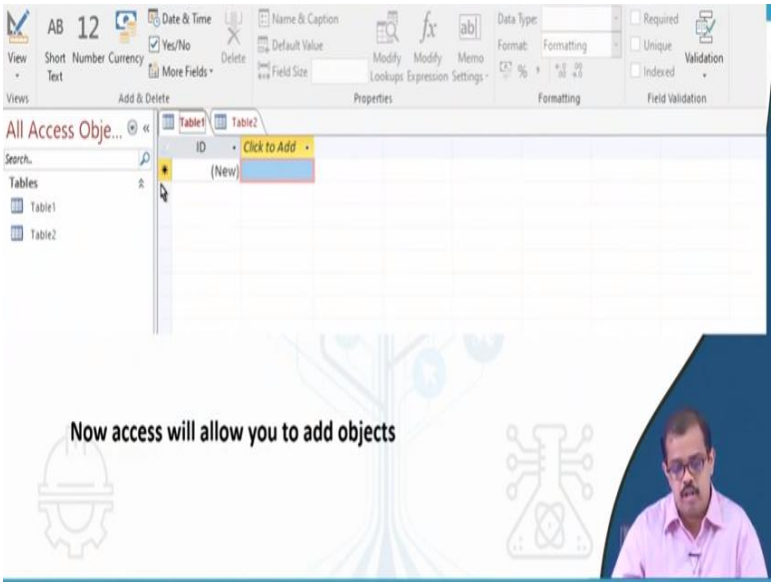
**(Refer Slide Time: 39:06)**




Then how do you basically create a database that is I did say that you have click on this file okay in the older system it may be very different this is access 2019 so you have to just go to your open your double click on your Microsoft access. So once you open it so click on new and you can see a blank desktop or if you have been connected to the internet you can see a huge number of different applications that can be done Microsoft have populated it with huge number of applications preformatted application the databases so you can even use those databases.

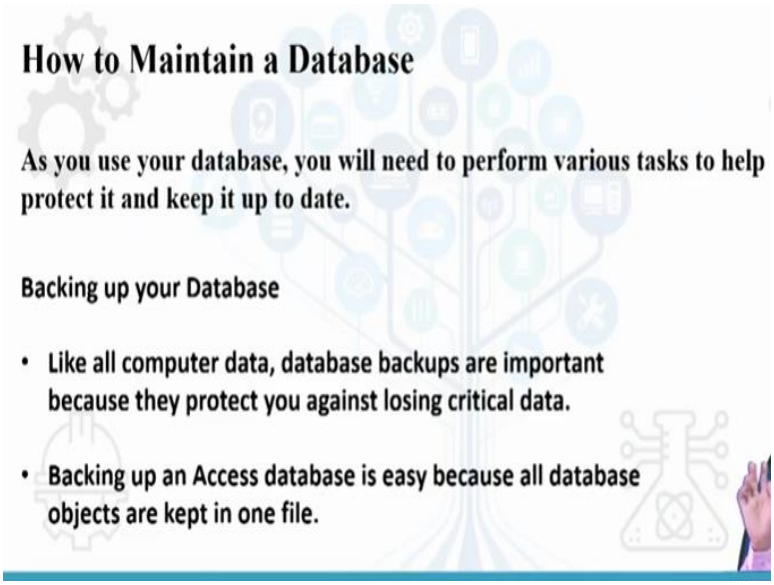
And basically the older databases used to be stored in MTB format now the latest version is dot ACCB okay access database dot ACCDB. So if you given this name as a student dot ACCDB is the extension that will store your database into okay.

**(Refer Slide Time: 40:10)**




So once you have done now you can start looking at this is how you are Microsoft access looks so you can start looking at adding tables adding objects adding information. So you can start populating your Microsoft access or your database okay.

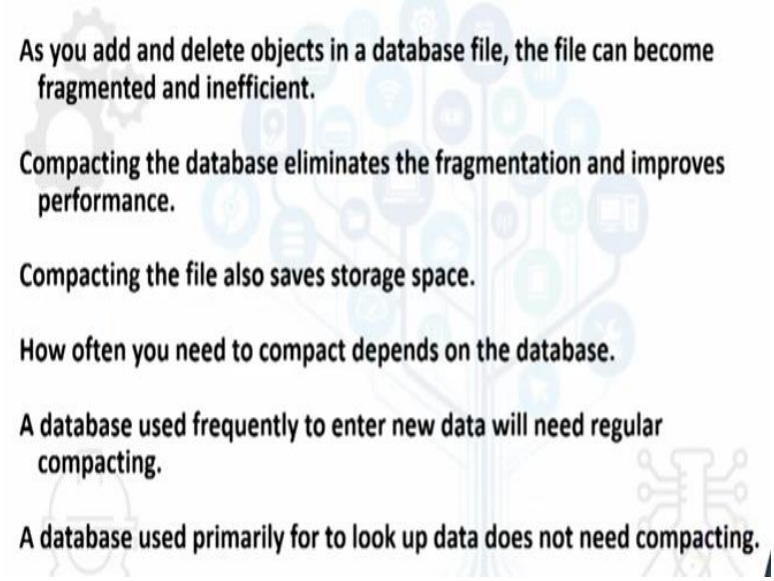
**(Refer Slide Time: 40:27)**




So now once you have created your database you have start you have already populated data into a database there is certain things you have to maintain a database it means to say that the first thing is backing up your database that is where the maintenance comes into effect. Most of the computer data has is prone to any issues or may be due to issues with the computer or the aging systems.

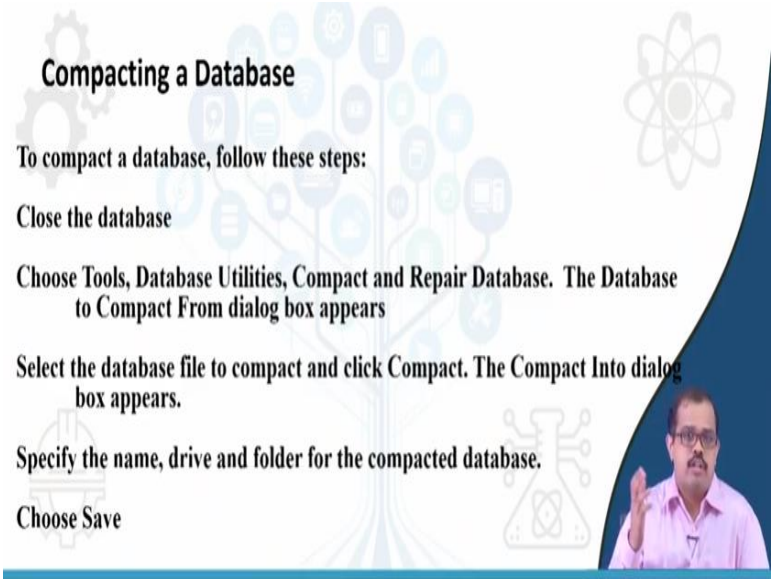
So they may be prone to losing critical data so always back it up I would prefer if it is a huge database which is altering every minute or maybe backing every 6 hours 8 hours data or even a day or backing up it if it is not very critical database of it is not that database which is used frequently then probably backing up weekly or monthly extremely useful. And only thing is that it is easy because it is databases that here the access part this is stored as objects and are kept as one file and not a separate file.

**(Refer Slide Time: 41:35)**




So it is very easy to back up even with your Microsoft word which is easy or one note cloud can easily store it in master way.

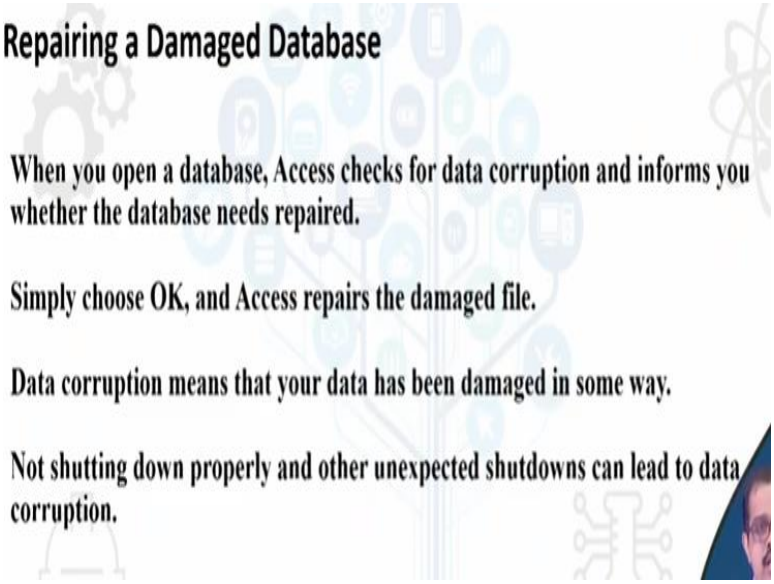
**(Refer Slide Time: 41:43)**



Then compacting a database so this is another term that is normally used when the people are using the database in the daily routine when you have to compact a database first thing is you cannot compact a database when you are actually using it. You have to close the database so how do you do it choose tools database utilities compact and repair database. So that the database to compact from the dialogue box appears which every database you want to do it.

Then select a database file to compact and click compact so specify the name drive and folder for compact database. Compacting is pressing it so if it 10 MB so you want to get it into 1 MB so you are compacting it so then click as safe okay.

**(Refer Slide Time: 42:32)**

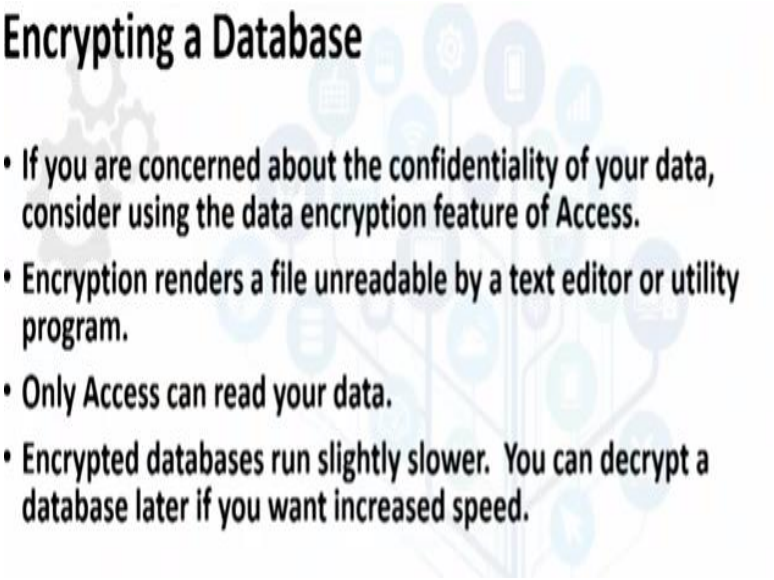



Then may be certain I mean due to certain operation while saving why maybe power out or any of the issues there may be repairing of there may be repairing of that particular database file is necessary. So it can be used from the data repair of a damaged databases so it is just if you go into the repair as I previously said in the previous menu go to repairing and just simply choose it as okay access the repairs the most of the damaged files so if not all.

So most of the damaged files can be repaired so when you look at repairing it maybe your file is damaged it may be because of some of the other way it may be because of saving, storing or maybe your system the way it is there or the hard disk. So it may be anything or it may be not even shutting down properly so unexpected shutdown all of these gives you corruption issues. So

that can be repaired using Microsoft access. So 90% of the cases most of the databases repaired there are certain databases if it cannot be retrieve then it may fail in repairing the databases.

**(Refer Slide Time: 43:40)**



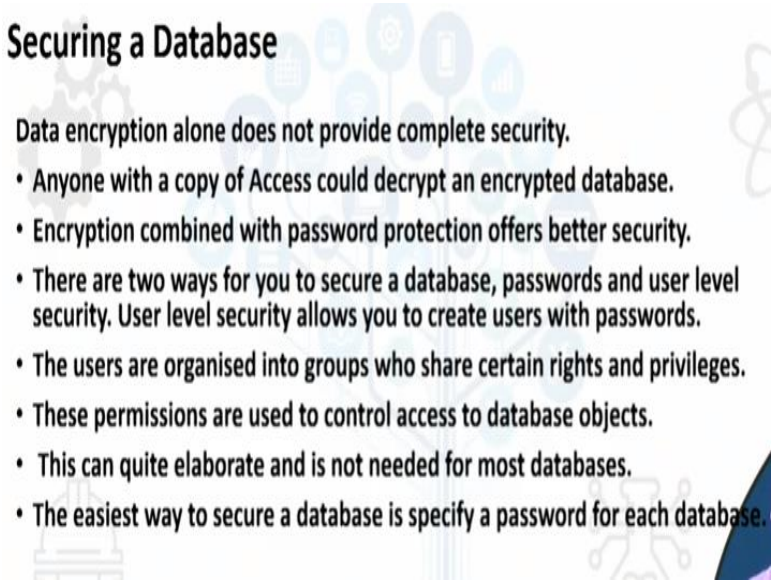

Encrypting a database so now in today's scenario you would have heard of encrypting all your information yes it is extremely important if it is confidential information that has to be stored okay. So you can consider using the encrypting as one of them measures so encrypting renders it unreadable by the text editor or any utility program except the Microsoft access database.

So it has to be the same access applications with certain values that it can open up that particular database to run okay. Only access can review a data encrypted databases are slightly slower okay you can decrypt the database any time you need okay you do not need to worry about it but you can decrypt any time. Buy encrypting and keep an eye on storing the database is always say when you have a lot of confidential information or confidential data that has been stored okay.

**(Refer Slide Time: 44:40)**


So if you want to encrypt and decrypt this are the different ways first thing is as you close the database come to the main menu of access then choose tools security encrypt or decrypt the databases. So once you have encrypted it you can store at in that particular format that the encrypted format and just say okay. If you want to decrypt it the same thing that you want to follow come back to that particular tool then look at decrypt and you can decrypt the entire database.

**(Refer Slide Time: 45:13)**




And final thing is securing the database securing means you have to put in certain information without which that information you cannot access that database it is just like your fingerprint password finger print or your password to access your mobile phones similarly we have to secure

our databases anyone with the copy access to could decrypt and encrypt a database. So that is why encrypted databases if you just have an access version same version of the access if you have an encrypted database just plug in and once you start decrypting it you can decrypt the entire database.

So in order to avoid this you can even secure your databases okay so encryption that is with the password production offers extremely good security. There are various ways of beaching this password but as of now that is the best way. So put up the best password which cannot be breached okay there are 2 ways to secure your database password and user level security user level security is normally allows you to create user with password.

Only those users can access that particular database with other password with certain levels of information. The users are organize into groups who share certain rights and privileges only those privileges with those only privileges they can use it they cannot access to everything. For example if you have looked at your I mean company data sheet or it may be your college they certain software certain things have only given to you.

Whereas administrative thing is not administrative access in your system is not given to you in case the certain applications are not working so you send in a letter to the computer administer or you request your teacher to help you out. So the teacher logs in as administrator unlocks it only then you will be able to look at it so only certain users have certain privileges but the administrator will have the overall control or the database creator will have the overall control of the database okay.

So these permission are used to control the database objects the easiest way to secure a database is specify a password for each databases. So that is the best way to look at it okay.

**(Refer Slide time: 47:37)**


So these are some of the way steps that you have to use it just open a database open security tab then click in in the password text box add a password. So verify the password again and close it so your database would be secured enough only thing is that if you forget your password you will never be able to access the database again even if you want to. So please remember that password whatever you have stored.

**(Refer Slide Time: 48:05)**


So but I would suggest providing some common passwords in order to look at it. So in summary we looked at we started with a class with just refreshing what you mean by a database management system. How do you actually look at a relational database then we looked at what is excel how excel can be a good quantitative analytical statistical sheet that can hold data. Then we

looked at Microsoft access and how do you build a data how do you mean by objects what do you mean by fields okay.

Objects are those which are in the row information's okay fields are in the column information these are more of attribute information whereas these are attributes in rows okay. So then we looked at how you store and maintain a database finally we ended it with how do you encrypt a database how do you encrypt and secure a database which is extremely important in today's scenario. So we have looked at this in the next class we will look at more of the database aspects and look in more details of how we handle a database okay till then have a nice time thank you.