last time we are discussing about html it stands for hyper text markup language it is primarily the language which is the first language first markup language which made it possible to retrieve documents stored in the world wide web before that they dint have a clear method and idea of navigating through so many thousands of documents spread all over the web

and greatest contributions which is made by the first inventor of world wide web and the associated documentation whose name is burners lee who is working at cern in Switzerland cern lab which is a actually a nuclear physics lab in Switzerland his contribution was to think about this kind of a hypertext that means linking a text to other text and then associate with it a markup language was [02:27] proposed by him and it was refined and consortium called the world wide web consortium called w three consortium nowadays solidized html

and in fact today lot of the work which is done on the world wide web all the new standards and new applications which come on the web are all cleared by the world wide web configuration that is the the group of people technical people primarily who form a group to swift through all ideas which come to them and then ultimately standardized what is to be used by all users of web

this kind of a standardization is extremely important particularly when a world wide set of people are going to be using some facility which is not really owned by them the machines are all owned by device organizations and they are all connected together interconnected

so they have to cooperate in a cooperation cooperative system or a cooperative world they extremely important for all the cooperating entities to follow a common protocol common standard and otherwise it is just not possible to communicate it is like saying that communication requires that we all speak a common language other wise we did interpreters every where see so the whole idea of standards is essentially what has spond the wide spread use or the world wide web

so html is a standard which has been upload by the world wide web consortium of technical experts and it is actually run on a professional basis and time to time they do get new proposals they swift through proposals and accepts among them and then the standardization group gets together to standardized it

so html is now that way kind of a standard which is used by all the users of the world wide web in other words if you really want to put one of your own documents on the web
or to make your own website which is to be accessed by other people you have to follow this standard otherwise nobody can access you

so in other words you are force per say to use a html as a standard language to specify your entire document which you store in your web page

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so web page design essentially consists of lot of of course esthetic issu issues and what information are to get in their and so on but over and above that it also needs to have certain structure and a structure or a syntax is what is decided by the html and that allows your document also to be linked to others and you can also link to other documents not only other documents but other images and so on as you pointed out there are anchor tags to get other other websites and you can use a so src command to be able to get to images which are stored elsewhere it may be not necessarily in your web page it could be in somebody elses web but you can link to that particular image and get that displayed when you use it for some purpose ok

and in fact most people have web pages which which conveys a lot of information about themselves and also includes very often particularly academics they are publications and many other information about themselves ok and of course companies find extremely important to have web presence as i pointed out last time

so html primarily presents as a facilitate facilitates presentation of the contents of the web page it does not say anything about the nature of the content is it an invoice is it a bio data is it a purchase order is it a book description you don’t really know from the way in which the html is designed it only says what headings are to be put what is to be a bookmark what what link what other pages to visit gets linked and other kinds of
information and it doesn’t say anything about the what what it contains i mean what what is the meaning of the contents also has no means of specifying the type of data otherwise is it a number is it a character string is it a structure data structure is specifiable

(Refer slide time:08:10) we just need a markup language which is richer and it is more descriptive struc of structure of the document and what it represents apart from the syntax of representing the pages you also have to 08:16[] some meanings or semantics which others can understand so this is a kind of a quest which people got into in other words they try to come with a new language and so the result of that is a mark language called extensible markup language which has become now standardized the world wide web consortium and the in fact it is based on a very generalized markup language and i will say something little bit about it but i am this purpose in this course is not get into great detail about markup markup languages in general but there is a generalized markup language whose subset is the extensible markup language [noise] called xml
xml the actually you could you could have call it eml but eml looks somewhat odd so to this use xml using the second letter of the word extensible document has content of course and it has a structure and it needs to be presented in the for for ease of reading

word processors and html emphasize presentation of content and have no means of specifying what the data actually represents the structure and the content what what it actually contains ok what information does it contain

so presentation is emphasize of html like paragraphing bold facing italics connecting to other documents and so on

so xml is a relatively new language its not i wont call it an year old its already become may be four five years old now which is capable of specifying what a document really represents it has it’s a proper subset in the international standard known as standard generalized markup language or sgml and sgml was actually proposed by a group of information scientist including librarians and others whose specialized in this area and its a open standard and it is not proprietary in in fact this standard was very very general and so general that implementation became a little bit of a an issue and so based on sgml there are actually derivatives or subsets which effectively use a same spirit of the sgml but they they do the job with the simpler language which you can learn quickly and also can be implemented and other words you require some method of translating that and that was the implementation issue and implementation is as important as just proposing something ok these again and again occurs in computer science

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you know in the early days algol are organic language was considered of extremely good standard language promoted by Europeans and in fact it is a very good language from he point of view of learning from the point of view of actually the syntax of the language at at the time it was invented or or actually proposed it does considered a very great advanced over the existing language that time for scientific work namely co the Fortran and for business data processing namely Cobol but of course Fortran was a primary language for scientific computing and algol was suppose to kind of replace that when it so happen that algol was very nice in terms of the proposed structure of the language and so on syntax semantic rules and what not

but when it came to implementation it became very inefficient comparably it became inefficient and Fortran compliers are lot more efficient

so even though algol is a good language every body every body type of agreed to that but then when it came to use people used Fortran because it is efficient and of course in those days computer power is it a premium and computer time was not easily available and efficiency was as important or in fact more important than the beauty of the structure of the language ok algol spent a lot of time in the beautiful structure of a language

so in some some people says that algol has a some status as Sanskrit which is chanted by a few high priest but nobody really uses it primarily because it is difficult in some sense ok and for day to day use people use something simpler ok and that’s what is happen to algol

same thing about sgml sgml is gain super set of all possible markup languages and of course sub set one of the sub sets proper sub sets you might say is xml

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xml defines the structure of a document unlike html it has tags which are user defined in html the tags are all static like you know h one is user headings and i for italics and so on and of course there is no marker at all what the document really contains whereas xml has user defined tags and using those user defined tags you can kind of guess what that document represents if in a for a human reader ok and of course for a computer interpret you have to define the tags again somewhere and that what is the method which is used

in other words xml gives you the freedom to define your own tags but then it also puts imposes on you a requirement that the tags be explained in some language where called a you called DTD ok but i will come i will come to that

(Refer slide time:15:24) and formatting and presentation are not part of the html unlike html on the other hand you know this is delegated to other language formatting part is delegated another language called extensible style language because essentially formatting is one of style you know bold face and italics and so on

so there is a xml extensible style style language which accompanies that and say something about the the how to kind of format that document but the markup language say something about the content

linking documents to create hypertext is also not integrated in xml xml to so to extent it is not as simple to use for multi purpose and much more powerful linking is enabled by separating it in a companion language called extensible link language in other words it divides the concerns which are addressed by html into many parts one is say look at the style the other is to look at the links and the important part namely a content is what xml effectively emphasizes
like for instance a purchase order is printed using xml i am not this course i cannot talk about the entire syntax of xml and describe xml in great detail actually books have been written on xml and there are courses which talk to you and with which deal with xml at great line

but from the point of you of an information systems analyst designer the reason i am talking about xml is that when you go to web based design particularly for e commerce and so on you must have some understanding of the way in which the content is presented and meaning of the content is presented in that is the reason i have give you a flavor of what xml is without getting into great depth depth about xml ok

and so in xml a purchase order you know in this case the tag is which is defined is the purchase order purchase order that itself is the is the tag and the so from the actual you know tag one can guess that the document which follows is purchase order so you can have order number date of the order purchasers name and purchasers address as you can see just like an h html there is a beginning tag like in this case order number is the beginning tag and order order number is got an end with a slash in front of the order number

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so the whatever is contained between these two tags is actually content the order number ok and the date of the order again it it gives the date so from the tag you can associatively guess what the content is and so these are all user defined tags and name and slash name so you can know what abc traders are having their address ok

similarly item suppose in this purchase order there is a an item to import you have an item item name item definition contains item name which is c programming item code in
this case item code is isbn number of that book and quantity in stock the purchase order has has to mention the quantity so fifty is to be ordered and suppliers name is given as the suppliers name and you can also give suppliers address and so on ok in other words the entire purchase order document can be put in the xml format

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observe that tags used have a syntax similar to html tags are however meaningful to human reader
and XML definition clearly brings out the structure of an invoice. What it the invoice consists what all the what are the purchase order contains and that is brought out ok.

However, to interpret such a document and process it by a computer, a companion document called a document type definition is needed. That is DTD.
document type definition has its own syntax and we give DTD for this xml document

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that is purchase order there are the these these are all they look gibberished view but just like any language it is got some type of you know it has a struc it essentially says the elements of purchase order order number date and so on and date con contains year
month and day its actually a structure and year is a is a day numeric data month is a numeric data day is a numeric data so there are many parts of it which describe as a numeric data or alphanumeric data and so on DTD specifies all that ok and name is a character data and so on

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so there are actually in this case see there are these these things are all defined in the language and as there books have been written you have to learn like any learning any language here learn all the syntax to be able to write your own your own DTD ok and your own xml document ok
so the say i continued every every thing which occurs in that particular xml document
every tag has been defined in terms of what item for instance [noise] consist of three parts
item name item code quantity and item name and item code are character data and and
supplier name also this is got in the character data things like that type ok [noise]

(Refer slide time: 21:42) each statement in DTD declares the elements of xml program
entry plus states the purchase order element is the top level element with one or more
entry following it
two statements introduced at the start of the xml definition which specifies the version of xml and file name of DTD specification that DTD specification itself must have a file name so that’s all all is specified

so assuming DTD is a file purchase order dtd then the purchase order dot dtd has an entire description whichever put down its an xml version so and so doc type purchase purchase order system purchase order there is stored stored in a file named purchase order dot dtd tags used in xml definition are those specified in that dtd

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so in other words xml is not a standalone xml is there along with it you got DTD style language and linked language all that together is actually a packet which is lot more general than a single language called a single html and which is obviously much more complex but much more powerful from the point of view of use ok it is got it has semantics it can be processed and so on whereas html is only formatting

so [22:58] various various elements [] dates specifies the tag date higher level tag which consists of three tags and year declares year of string characters
xml’s main use in creating documents in world wide web which can be retrieved by browsers on client computers and then interpreted user defined type gives several advantages you see there is a you can send or push information to the user who can interpret it using the dtd time varying data can be specified by the user for for an instance
the a push technology in other words if you are a stock broker and you want to get periodically data on the stock market situation then every hour or every half an hour dep depending upon what you specify there will be little [24:03] will wake up and send out that information from that from that website in to yours and then you can interpret it with with the standard xml interpreter which is sitting in your machine ok

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and so many things which are time varying like stock prices we want we are interested in getting periodically cricket scores something like that there are also can nowadays its there in somewhere in the web and it can push to you that information once in once in whatever inter value you specify

(Refer slide time: 25:09) so for online banking a stan standard xml for banking of course the tags are all very specific because things like the withdraw or deposit or [24:59]
cheques or you know the transfer certain amount and so on they are all part of the
standard xml format financial initiative and is used to exchange information such as bank
statements

and similarly software and data updates are all essentially pushed through through an xml
document

(Refer slide time:26:43) xml is adaptable to many natural languages such as kannada uni
and Unicode standard is used in other words it is not language specific xml is not specific
only to english you can use other language tags as for the machine is concerned the those
tags will be interpreted as a Unicode or set of bits and it doesn’t know any difference
between while it is kannada or tamil or english or whatever it only understands the bit
string language ok and that is what the whole thing is about that is whole advantage is
that it is somewhat language independent so you can have an xml document in Chinese or
in Hindi or whatever ok

and that is the beauty of this methodology provide of course every body uses the same
kind of a coding method and xml standard is a Unicode as i pointed out earlier Unicode is
a sixteen bit code which has capable of representing any language in the world today ok

and also other subsets are of sgml similar to xml have been used in other areas scientific
publications markup language that are used where that is something called chemistry
markup language because chemistry and and mathematics and physics and so on has their
own gorgon has their own interesting requirements like mathematics will require
represents sets vectors matrices and differential equations and stuff like that and
chemistry will have to have to represent organic molecules of all all shapes and sizes and
chemical formula and so on for that chemistry markup language is there
so in other words markup language idea is very powerful idea and that is useful useful in many areas of human activity and you can actually specialize it and of course things like chemistry markup mathematical markup and so on have been standardized by appropriate user groups so there is a chemistry group which has sat together set what is an appropriate mark up language to exchange documents or papers in chemistry

similarly in mathematics because if you look at a standard word processor mathematicians don’t like very much because mathematicians in mathematics you have sub scripts super scripts sometimes double supers scripts double and sub scripts and all types of parenthesis and symbols there there exist i belongs to and so on so they require something which is appropriate for their short hands which they use mathematicians use and that is what is essentially done in the mathematical markup language by the appropriate group

these are all becoming important because regardless of whether you are chemist or a mathematician or a physis or mechanimist today everybody is interconnected on the web and there is a large group of cooperating scientist or cooperating individuals and so one would like to communicate easily between groups and that requires standardization that’s what they have done ok

so i have given you a flavor of the world wide web and the way in which documents are stored in the world wide web and the documents are processed are they need for markup languages and there is essentially very quick birds eye are two lectures on the whole thing it doesn’t really do justice to subject but other hand it is enough for us to kind of understand the implications of the electronic commerce and how these are all useful in electronic commerce because we are more interested later on in this course electronic commerce because sysm system analysis and design today is not restricted to a single computer because restricting to a single computer is extremely constraining today no computer is isolated every computer is connected to every other computer

so organizations also work with LAN’s in their own organizations so many of the modifications they are taking place in the design of information systems have to keep in mind these new fact namely the interconnection in communication between computers and we also have to be concerned about the fact that you once you have interconnected machines of not only a single organization but multiple cooperative organization we had to have proper standards of communication and proper protocols and so on

and is also the emerging emerging technology called many of the software services are offered by companies on the world wide web available to you like they are providing things like accounting packages available as a web service so you can get down to that web to their accounting package and pay by use so is a lot of transformations which really taking place in the area of of systems for organizations the way in which computers are being used by the organizations is under going a shift and we will see probably in the next five years a new emergence the new paradigm or new method of actually using computers and appropriately new methods of designing systems for this changed world
so i think you should be aware of these things because in your working life which will be next time probably to hopefully thirty years or so there’s going to be a lot of technological changes and you got to be continuously update update it and keep yourself up to date and that requires you to kind of a at least an appreciation at this stage of where these networks and so on going and that even though the basic ideas of the system analysis and design we have been talking about are still important you got to be kind of looked at from a slightly different perspective of being able to provides a web service like for instance we got web service available to check your decision tables for logical correctness and so on then you will actually logon to that web service and use that instead of doing your own work your own checking and so on so will be an assistance which is which comes from the from the web and it will be economically in the long run here if you have to pay for it see that the points which you have to keep back your mind while working in the industry in terms of new new trends which occur all the time ok and our field as we know its very dynamic and its never its not static and it continuously unlearn hat you have learnt and relearn new facts as we go along

so i am going to now talk about another important topic which is there whether it is going to be a network or whether it is going to be a single computer or whatever it is this is the importance of control audit and security of information systems in fact the security of information systems becomes lot more difficult and important when you go to a network of computers in network of computers when computer connected to every other computer security issue is become a very very serious issue mainly because of fact that people easily snoop on the and there are you know people are the people who are who can hack on the machines and get data which doesn’t really belong to them and it may can trade the data there is been lots of frauds which are being being committed all the time using using the internet to kind of raid banks account numbers and stuff like that

similarly credit card companies are forever alert about somebody breaching their security and getting in to their web site and steal credit card numbers password and stuff like that

so i think its extremely important to worry about not only security but auditing in other word auditing something breach occurs see actually if a breach occurs somebody has done a fraud we are able to track down the fraud step so you must have an audit trail which is called other words do you able to pin point who did it at what time he did it how often he is done it so once you can pen it to a particular person you can take you know you can actually app depending up on the kind of thing he has done he may even be sent to jail ok if he has done a fraud of financial type he can go to jail and new information technology act even says even that if you hack in to somebody elses web site and alter that web site and is do some damage mischievously not necessarily to steal even then you are liable to six months in prisonment

so there is a serious offence ok so audit trials are very important and control is the what what you are really require in case controlling the make sure that you put in enough of a safe guard in the design of your system in such a way that such frauds that are minimized in other words even some frauds occur or some mistakes occur not necessarily fraud an
error in data entry or error somewhere along the line occurs that error has been detected early in the life cycle of the of the system

so that the error does not remain there and propagate further so control is an important part what control should should i put to avoid problems we need methods audit and testing of information system whether information system you deliver is you make as per the specifications are not and security as i pointed out so the the what will learn about these are these

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since the primarily we we ask the questions why controls are necessary in information systems and how to con what methods are used to control information systems and how to control that is why its required and what are the methods available and how to implement those methods
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and apart from similar questions we will ask about auditing say like the for instance we talked about control similarly we talk about audit why they require auditing how are systems audited the methods used to test information systems and how do how the security information systems ensured

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similarly why how the what are the methods available and how do how to implement them are all common method it is control or audit or security all three topics we have to ask the same questions

(Refer slide time:38:41) and as i been pointing out its very important to ensure the reliability of reports produced by an information systems

if unreliability report is seen by users the entire creditability of the system is lost ok this is as i pointed out very often exam results if a mark sheet is a wrong wrong sheet goes to a person apart from causing unnecessary hardship for the for the students it also reflects badly on to the way in which the system is designed to give you give a wrong information

so people completely loose there trust on the information systems or the computer they always start blaming the computer and not the person who design the system on the computer computers wont make any mistakes normally there is no hardware mistakes which are made by machines in other words no additional mistakes are normally made whereas mistakes are in programming in data entry are made by people so you got a guard against peoples weaknesses and that’s what the whole thing is about

ensuring reliability is not difficult for small systems or small systems you can essentially go through a walk through and two people can look at it but it becomes million lines of code it becomes important to have systematic controls
and so for the large systems designing a large is quite different role designing the small many computer organizations companies are entirely dependent on computer based information systems they are got rid of their manual systems they are based on computers because everything is connected everybody’s desk has got a laptop or a pc desktop computer and there is a whole network

so because of that the dependence becomes very high when dependence becomes very high and also there is a lot of sensitive information like financial data the trace of [39:49] companies the their drawings and so on and
any companies got data which is sensitive to them there sales figures may be and what there plans are in the future strategic ideas lots of things which are which are specific for the company and all these things are effectively stored in a machine

(Refer slide time: 40:34) so essentially it is essential to protect the system against frauds and ensure that sound accounting practice are followed the accountability as well the
accounting if it is the if it is a actually do with financers you are of sound accounting policies

necessary to trace the origin and fix responsibilities as i said if the fraud occurs [noise] audited primarily for this

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and a system contains many individual sub systems because it’s a million line code one monolithic system cannot really be handled easily it will be divided into sub systems or modules different people will design different modules at least we all to be link together that is the whole motivation there object oriented modeling which we looked at where objects are all designed separately and then objects are link together as over components to get the whole system working
so even though sub system you work when we link them together to make a full system it may have some fault like a zigsa puzzle you know you have a lot lot of thing which you had put together the whole thing should looks look correct and if you don’t have that the that ability to put them together properly then there will be errors in the final system

so apart from individual sub system the indi the entire system is being designed as we tested and when the integration occurs [41:40] in errors make [] so before releasing the system the entire operational system should be tested for correctness and completeness ok

so this is very important but on the other hand it is very difficult so people claim that you know if if you every system individually works you have a higher higher confidence that the inter connected system will work but you have to really look at the interfaces ok is the system giving the right information required by the by the other sub system is it interpreting it correctly your question which you have got to be answered very carefully in other words if it is best isolate of them so that error made by some other system does not affect what happens in this system so each system should be self contained but then even then if some message or something comes here they 42:41 with that message is it correct that is what is important to kind of look at
(Refer slide time:42:51) systems contain sensitive data about the organization also about the persons working in the organization that’s not the private data about people ok and in hospital systems for instance has been lot of data about patients medical data and in any company there we have a data about the salaries of individuals and in any bank there will be a lot of data about the account holders how much they have hold and what is their withdrawal and deposit pattern and so on these are all very sensitive and will got to be very very careful about protecting them from thieves sometimes it is [43:31] employees thieves are of course fraud stirs take it away and try to sell it ok that’s seems to happening in our many of our so called call centers and so on where they are we are all security conscious then the call center employee can really you know steal some data and sell it to somebody else and this is being happening in the last few months there have be in paper news items and so on which have brought out these and those 44:05 call centers and so called bpo that is business process outsourcing organization depends very much on ensuring privacy and ensuring also security or whatever they are actually assign to ok so it is extremely important to worry about the the fact there are employees who kind of has a [44:32] there are outsiders who tried to get into your system and steal and lastly they are [44:41] employees somebody who are happy is abo about to leave you and so on and he intentionally corrupts some staff as a revenge for whatever he thinks has be the wrong communicating 44:55 and so on that is and these are all you know human human qualities i mean also done human beings are our own weaknesses weak moment he may even sell it otherwise he may be a very honest person ok

so the point really is the system designer has a responsibility to make sure that the because of the human weakness if something is done this detected and first of all you prevent it prevention is lot more better than auditing and finding out who do and fix responsibilities and so on where the first step you have to prevent it and if you unable to prevent it then only you have to worry about if you don’t prevent how do i fix responsibility who who has done the fraud ok
so if you don't want to point out that the most important thing is to make sure if the proper controls that you prevent it to begin with and so that is essential what the controls are all about as

so access should be carefully controlled and provided only to persons on need to know basis you should not allow unnecessarily people to get into data bases and so on with for which they have no business to get into and also sensitive databases where they are stored in disk so on they got up encrypted unless they are encrypted or garbled otherwise you know when somebody retrieves it by either desire by mistake you can get get across data which is no business to get into and only people who were authorized will be given the decryption key to be able to decrypt it and use it for whatever the user want to make it for only for people who are doing very often the encryption and decryption is done with finger prints and finger print readers are now widely available and you just put a finger print only if you put a finger print the the database gets decrypted

so tomorrow you cannot say i dint do it because you’re your thumb print is there and the time at which you logged on is there and all that is there in the machine ok and so you have been watched rep continuously by system these kind of things are the wa what is required [47:27] design to prevent because if people know that they are being watched and whatever they do they will be detected sometime or the other then they will be much more carefully they will not hopefully it will prevent them from doing the fraud ok

so the the fear of going to jail is what keeps a lot of people honest ok so it’s the same way in this case the fear of being caught is also as important as when they want to design a system so you put certain amount of apart from responsibilities of course people suppose to have you also had a put along with some little bit of controls so that that is also some might say audit trial trail you ok

![MOTIVATION FOR SECURITY](image-url)
(Refer slide time:48:25) computers are networked corruption erasure may take place due to viruses

viruses are ever present problem in a network of computers so you have to make sure that viruses don’t don’t get in

there is also something called denial of service attacks in other words what they try to do is if you are doing e commerce or using using web site the send other computer generates thousands of enquiries so that legitimate users cannot get in to your site

so in other words the fraud stair has really denied legitimate service to your to other customers by effectively keeping your space engaged analogy would be like you know somebody if they want to make your telephone inoperative what the person can do is to call you and not hang up that becomes more or less the you kind of or held up because you put down and then you can give continuous he can be having a machine to continuously call you and keep you’re your computer engaged so that somebody else wants to legitimately call you he cannot call you because your computer telephone is always engaged because of somebody’s fraud being a fraud like repeatedly calling your number ok and with no message the call comes from the computer you pick it up and there is no message just a whistle and then you put it down and immediately another call comes it can be a nuisance same way somewhat like a denial of services something similar to that in other words it it it were they are [50:15] with a lot of enquiries by a legitimate people ok systems should be designed with appropriate security measures and is one more thing which is very important nowadays there is disaster recovery disaster recovery is something which is essential like for instance last year in India there is a lot of disasters there is a earth quake in Kashmir there is a an earth quake in Gujarat there is a flooding of Mumbai the the in fact lot of computers in the sub urbs computer centers are all flooded and computers became in operated and of course every body talks about the nine eleven as when the world trade center was was destroyed whole lot of computers in that in that building belong to many computers banks insurance companies and so on all got destroyed

and so they have a problem of these disasters you know you cant force that the idea flood ok the floods in Bombay was supposedly the biggest floods were over hundred years

similarly floods also occurred in Bangalore and main places flooding occurred last year ok
so these are all I am talk about when I say last year it is year two thousand five there is a lot of disruption during the monsoons and so the modulation depend entirely on a computer when such a disaster occurs they must have business continuity plan in other words there service should not be disrupted ok and the databases should be protected ok

so there are two situations one is you must have continuous continuity of service is called business process continuity and also some archiving so that you can recover your databases and so on

so it's essential to ensure quick recovery and disasters and ensure continuity of service so there are many levels depend up on the criticality of your operation you would get into different levels of disaster recovery you know if you have a airlines reservation system and the reservation system is down for two hours people have lost lot of customers and so one would like to have a system thereby even if there is a failure of s major server then some other server takes over and continuous the service for you so this kind of thing which you make sure and disaster recovery

so primarily then we see that the requirement for control requirement for audit and requirement for security and also part of security disaster recovery is a is a [noise] you might say something like 53:21 security security one aspect is of course protecting the other aspect protecting is intruders and so on the other is protecting us natural calamities both are important

so control are methods to ensure that a system processes data as per design and that all data is included and are correct so very often some data are left out like when you are
entering data of lot of students who exam processing results come if you leave out a few students the results wont be declared and we got really worry about what happen ok particularly is badly effected and you have to make sure that all the data is included and that all data is correct

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**CONTROL AUDIT AND SECURITY OF INFORMATION SYSTEM**

- **CONTROL** - Method to ensure that a system processes data as per design and that all data is included and are correct

- **AUDIT AND TESTING** - Ensure that the system is built as per specifications and that processed results are correct. Protect systems from frauds.

Audit and testing ensures that the system is built as per specifications and that processed results are correct and protect systems from fraud.

Security is concerned with protection of data resources programs and equipment from illegal use theft vandalism accidents disasters etc.
so we effectively have security audit and testing control these are three aspects which are very important as i said information systems handle massive amounts of data accidents such as not including some data can cause serious damage

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incorrect data entry leads to sometimes high monetary loss suppose somebody enters in a bank data entry is thou is thousand one lakh is a huge loss now question is who is going to bear that loss credibility is also loosed suppose you withdraw thousand rupees and suddenly if i am with a lakh of rupees with somebody is it shows a lakh of rupees withdrawn of course you don’t have a lakh in your bank then immediately say the computer is made a mistake even though the program is not not correct or the system is not correct

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controls to make sure the data entering the computers are correct that’s what you have to make sure check clerical handling of data before it is input to a computer any any mistakes in clerical handling after all this is union problem ok
(Refer slide time:56:21) provide means of detecting and tracing errors which occur due to bad data or bad program it can be the errors can occur because of bad data input or bad programs in fact the common saying is garbage in garbage out a program may be correct but if suppose you feed wrong data you get answers will be wrong ensure legal requirements are made very often the legal requirements which particularly the banking and so on where there is an requirement for regular audit and in some organization there is a public audit so the system should be designed so that its amenable to such audits and all the legal requirements are met of course to got against frauds

many techniques here available for control first of all there is something called organizational methods the in the organization you must have well defined responsibility for input preparation it’s a growth for input preparation and they are well trained for doing that and you have to make sure that when when this preparation is done at the and of the preparation they correctness the prepare data is is checked any error is automatically detected delivery that data output use how is the output use operation and maintenance of computer operation and maintenance of not only the com the hardware but the application software which is running on the machine that’s where mainly concerned with the application software
if there are any changes in the program it may be due to some requirement changes but any changes should be documented because it could be a fraud somebody change the little one must change in the program to debit rather than credit ok and that can play havoc ok so plus instead of minus ok and so any any kind of a change has be documented and let us call trail who made the change when was it made performance of the task and recording must be different persons to prevent frauds banks follow it regularly

in other words you know in fact they have double account entry and so on and for instance the when the cheque is cheque en cashed by somebody has checks the balances at the end of the day particularly for cash cash transactions ok and cash beginning at the end or or responsibilities of two different peoples see it is counted and given then counted and taken back by different person ok and by not the not by a same person

in the there are the control measures which are are techniques which are used one is called input preparation control where you have sequence numbering so if you list anything in a sequence numbering we will tell you what you are missed ok
there are batch controls for the whole batch and data entry and verification whenever data is entered somebody also enters it and the two are compared and verified and there are totals of a records and self checking there is self checking codes we talked about in a in earlier case in other words the the checking of numbers so that it essentially input is correct so i come back to this again next time and look at the input preparation controls in great detail ok because we are running out of time in this today ok so will see you next time

(Refer slide time:59:26)