JUNE BR

3/06/2013 MON

Rs = 120/-

Data : Collection of facts and figures

→ 1. STORING DATA IN BOOKS AND FILES:

Disadvantages:

1) Costly in maintanance
2) Required lots of man power
3) Not secure
4) Retriving data will be time consuming.

When Computers are comes to world, there is no any Software to store the file and that time all these Files are stored in Flat files (or) Text Files. For which we can reduce the manpower. So automatically production cost is decreased and profit will be increased.

→ 2. FLAT FILES OR TEXT FILES IN COMPUTER:

Drawbacks:

1) Retriving of data is complicated because we need to write different application programs for retriving.
2) Security problems comes into picture while managing the data
3) Data Redundancy and in-consistancy due to multiple copies of the data
4) Data Integrity (maintaing proper data) can be adopted because we can't impose any business rules on the data present under a text file.
5) No indexing mechanism for accessing the data from text files.

DATABASE: It is a specialized software for managing the data than storing the data.

4-Jun-13 TUE

DATA STORE OR DATA SOURCE:

It is a location where we can store the data, where data is a collection of fact and figures.

we have different types of data stores available like,

-> Books and files
-> Flat files on a computer
-> Database.

DATABASE: A database is a special software that is purely designed for managing the data.

In between 60's & 70's the concept of databases was born mainly to resolve the problems or drawback we are facing with the older system like books, flat files etc.

Databases have given a permanent solution for the various problems we have been facing earlier like,

DATA RETRIVAL: It is a process of retriving information from a datastore. which is very complex while retreiving data from flat file which was addressed with a special Language.

SEQUEL: [Structured English Query Language]

That can retrive a language form a database as simple as possible.

SECURITY: Data is never secure under books and flat file where as database are provided an excellent "ROLE BASE SECURITY MECHANISM" for accessing the data to secure the data which includes a process of authonication on authorization.

DATA REDUNDANCY AND DATA IN-CONSISTANCY:

These problems comes into picture when we maintain multiple copies of the data where the changes are made in one copy will not be reflect to other copy in case of books and flat file but in case of database we can maintain No. of copies of the same data and still the changes made a one copy reflects to the other.

DATA INTEGRITY: This is about maintaining proper data and to maintain proper data every organization imposes a set of rules on the data and we call these rules as business Rule. Database provides an option of imposing the business rules with the help of Constraints and triggers.

INDEXING: Indexes are used for accessing the data much more faster where a flat file doesn't provide any proper indexing mechanism but data bases users an excellent indexing mechanism to accen the data from any where in the sameway.

Databases are of two types
-> OLTP (on Line Transaction processing)
->OLAP (ConLine Analytical processing)

The OLTP is for managing the current on day to day information where as OLAP is to maintain the past or history of the data. Which is mainly used for data Analysis and can also be called as WAREHOUSES.

DBMS: [DATA BASE MANAGEMENT SYSTEM]

It is a subject which tell how to organize the data in a more efficient way. Basing on the subject there are various data base model which came into Existance time to time like,

HDBMS [Hierarchial Database management system] one-Many.
NDBMS [Network Database management system] Many-Many.
RDBMS [Relational Database management system]
ORDMS [object Relational Database management system]
OORDBMS [object oriented Relational Database Management system]

5-June-13 WED

HDBMS [Hierarchial DataBase Management system]

This is the first DBMS model that came into existance in the 60's which will organize the data in the form of a tree structure or organizational structure.

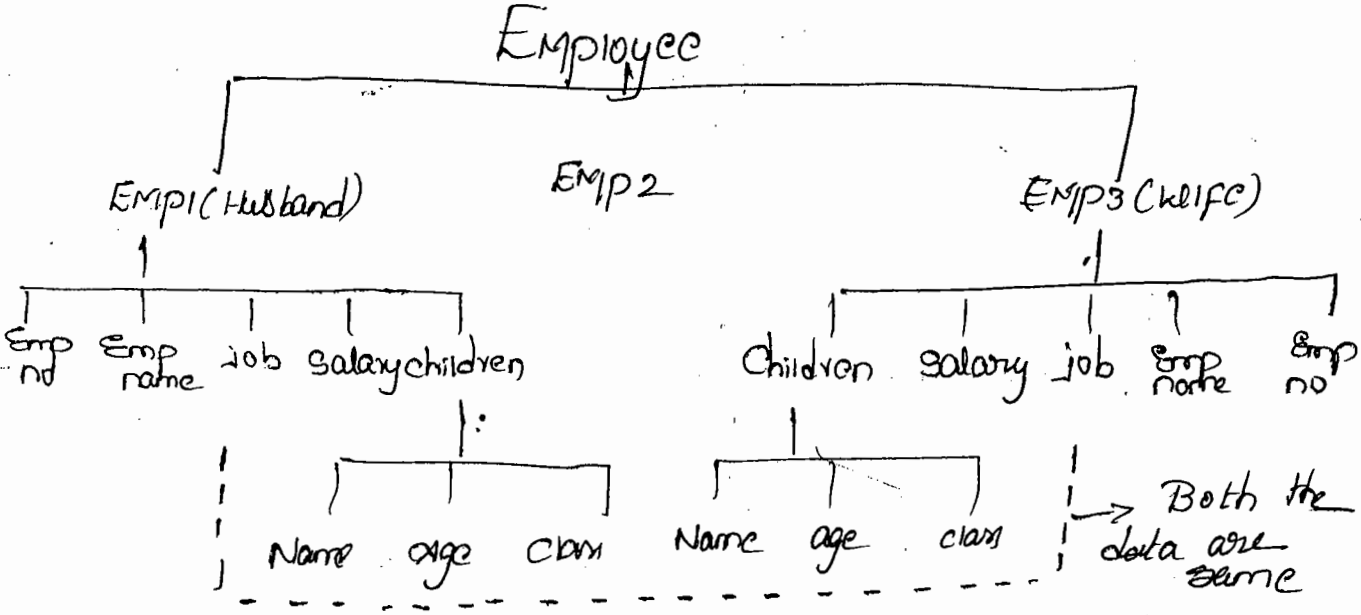
To represent the data in DBMS we first identity an entity. i.e Whose data has to be managed.

Ex:- customer, Employee, student etc.

Anything which has attributes to get can called as entity. Once we identify the entities we can identify the of that entity and put the data in a hierarchical order as following

Employee:-

-> Empno
-> Empname
-> Job
-> Salary
-> children.



HDBMS is designed on the relationship model one to many.

Drawbacks of HDBMS:-

→ Because it is designed in one to many relationship a child can have only a single parent so, redundancy comes into Picture because of data duplication.

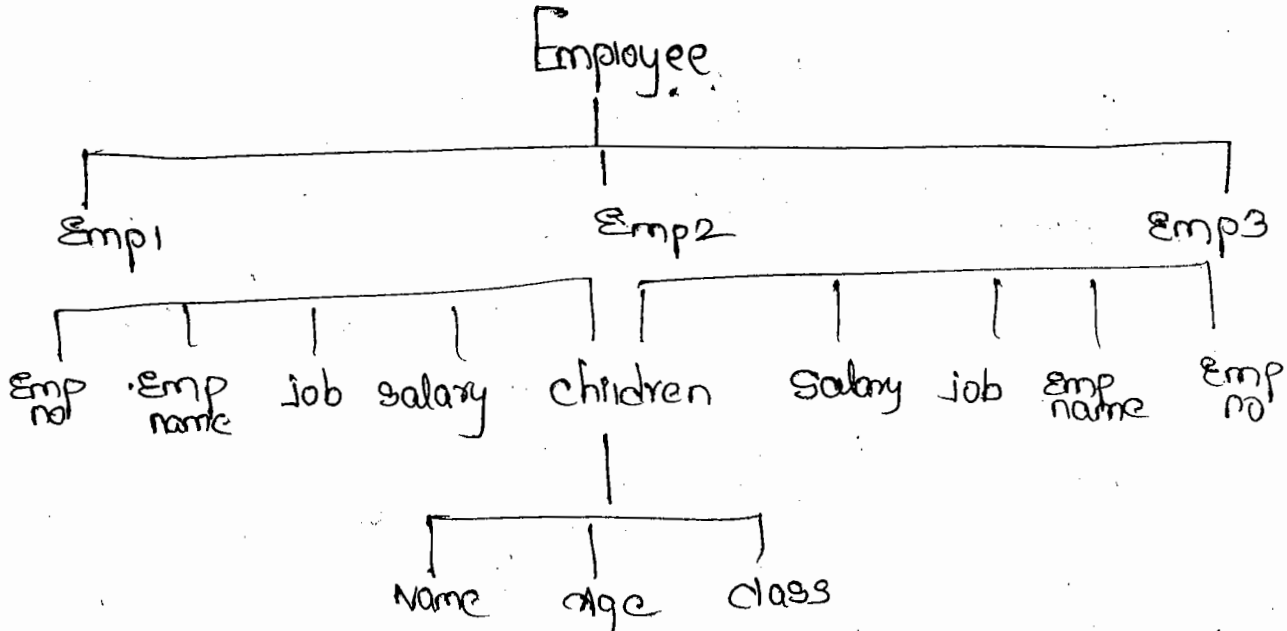
→ When we want to access the data in this model we need to travel from the root node step by step to the desired level, which will be time consuming.

The first database that came into existance in a hierarchical model is IMS [Information, Management system] from IBM

Currently the windows registry under windows os runs in the hierarchical model only.

NDBMS: [Network Database Management system]

The Network model is a modification to the existing hierarchical model bringing many to many in to the picture so that a child can have multiple parent which can eliminate the redendancy.



→ Accessing the data in this model is very faster because it uses pointers for identification of the data

→ In 1969 the first NDBMS was launched with the Name as IDBMS [Integrated Database Management System]

→ There are no major drawbacks in this model but still the immediate take over by Relational model in 70's didnot make the Network model successful.

RDBMS: [Relational Database Management System]

In HDBMS and NDBMS data is organised in the form of a tree structure which looks complex to manage and understand also. So to overcome this problem in 70's Dr. E.F. Codd from IBM came with a new concept on storing the data in a table structure i.e Rows and columns of data.

⇒ E.F. Codd with all this ideas for the new model called as Relational model has published an article with the title as

"A Relational Model of Data for Large shared Data Bank"

→ Basing on this above article many companies came forward like IBM, Relational Software INC [currently oracle] etc. has started the designed for the new database model i.e RDBMS.

→ RDBMS is mainy based on two mathematical principles Relational Algebra and calculus.

→ In the year 70's IBM has given the prototype for RDBMS known as "system R"

→ In the year 1974 IBM has launched a language for Communication with RDBMS known as SEQUEL.

→ The first Relational database was launched in the industry in the year 1978 with the name multi relational data store followed by Berkley Ingress QUEL and IBM 3812

→ In the year 1979 Relational software INC has launched the most popular database in the market right now i.e oracle.

6-06-2013 THRUSDAY

CODD RULES:

Dr. E.F codd in his RDBMS specifications has proposed a set of roles that has to be satisified by database to be called as Relational and we call those role as Codd Rules.

There are 12 codd Rules which are proposed by codd and any database will be called as Relational needs to satisfy atleast six of the available Rules.

1. THE INFORMATON RULE: According to this data under a Relational database must be stored in the poorm of a table that is Data in the form of rows and columns.

2. THE GUARANTEED ACCESS RULE:

According to this every row of the table must have a unique identification for accessing the row. so, that we can easily pick the desired row from the table. To do this there should be a column in the table which doesn't contain (or) allow duplicates and NULL values and we call that column as a identity column.

To maintain a column as identity we can take the support of primary key constraint.

3. SYSTEMATIC TREATMENT OF NULL VALUES RULE:

NULL
The value is unknown

According to this a database should allow storing of NULL values under a column of a table provided the value is unknown and this NULL value should be capable of being stored under any datatyped column like a string or int or float or boolean.

4. THE VIEW UPDATING RULE:

A view is a logical table which is used for maintaining multiple copies of the data without Redundancy. The best thing in a view is any modification we perform on the table Reflects into the view.

According to the view updating rule the views which are displaying the data should also be updatable and those changes must be Reflected back into the table.

SEQUEL (Structured English Query Language)

Its a language that has been designed for communication with any RDBMS and it is common for all RDBMS products.

SEQUEL now known as SQL is controlled by ANSI (American National standard Institution) which gives the specifications for SQL that has to be followed and

implemented by all the database vendors (whoever (owner) the owndatabes) like MICROSOFT, ORACLE, IBM

SQL is a declarative programming Language where as programming languages like C, C++, Java, C# comes under the category of imperative programming Languages.

SQL:

SQL is further divided into Five subpoints Like

DDL (Data Definition Language)
DML (Data manipulation Language)
DQL (Data query Language)
DCL (Data control Language)
TCL (Transaction control Language)

DDL deals with the structure of the data. It provides Four commands on it like,
- Create, Alter, drop and Truncate

DML deals with the data directly and it contains three commands on it like,
- Insert, update and delete

DQL also deals with the data only but for retorving the data we use it which contains only a single command
- SELECT

DCL deals with the security of the data (or) manage by setting the permissions for users to access (or) restrict the data access. This contains three commands in it like,
- Grant, Revoke and Deny

TCL deals with Transaction management which contains the three command in it Like,
- COMMIT, Rollback and Savepoint.

(Here the two statements should execute at the same time or none of the statement should execute) Eg:- Transfering a amount from one account to other account.

(SQL Server) database but SQL is a Language

7/06/2013 FRIDAY

SQL SERVER: It is also an RDBMS that has been designed and developed by adopting the codd rules

The development of SQLServer database has been done as following

* In 1987 Sybase released SQL Server for unix operating system.
* In 1988 Microsoft, Sybase and Aston Tate joined hands to launch SQL Server For OS/2.

Note:- OS/2 is an operating system that is designed by Microsoft and IBM.

* In 1989 Microsoft, Sybase and Aston Tate released SQL Server 1.0 For OS/2.
* In 1990 SQL Server 1.1 is released with support for windows 3.0 clients.
* In the same year Aston Tate drops out of SQL Server development
* In 1991 Microsoft and IBM ended joint development of OS/2.
* In 1993 Microsoft launched windows NT 3.1
* In the same year Microsoft and Sybase released versions of SQL Server For windows NT.
* In 1994, Microsoft and Sybase codevelopment of SQL-Server officially ended and microsoft continued to develop the windows version of SQL server and Sybase continued to develop the Unix version of SQL server

UNIX Version

* In 1995 Microsoft released version 6.0 of SQLServer
* In 1996 Microsoft released version 6.5 of SQLServer
* In 1998 Microsoft released version 7.0 of SQLServer

In 2000 Microsoft released SQL Server 2000
In 2005 Microsoft released SQL server 2005 on November 2005
In 2008 Microsoft released SQL Server 2008 on August 2008
In 2010 Microsoft released SQL Server 2008 R2 - on April 2010.
In 2012 Microsoft released SQL Server 2012 on on March 2012

Version	year	ReleaseName	Codename
1.0(OS/2)	1989	SQLServer1.0	-
1.1(OS/2)	1991	SQLServer 1.1	-
4.21(WinNT)	1993	SQLServer4.2.1	SQLNT
6.0	1995	SQLServer 6.0	SQL95
6.5	1996	SQLServer 6.5	Hydra
7.0	1998	SQLServer 7.0	Sphinx
8.0	2000	SQLServer 2000	Shiloh
9.0	2005	SQLServer 2005	Yukon
10.0	2008	SQLServer 2008	Katmai
10.5	2010	SQLServer 2008R2	Kilimanjaro
11.0	2012	SQL Server 2012	Denali

Note:-
To work with SQL Server we have two database type

1. database Engine (or) server.
2. database client

→ The database Engine is a server where by using this server we can work on different system.
→ database Client is the one where the client use in the system (user)
Eg:- ATM.

To Work on SQL server we use
SQL Server Management Studio.
It is a tool used for the SQL server.

If we connect to server. It shows a window with

Server type

Server name

Server Authentication

Login

Password.

In the Sever type we have 4 types

→ Database Engine
→ Integrated server
→ Analysis server } OLAP
→ Reporting server.

But we prefer Database Engine, because it cannot be seen in the operating system. We work on it.

Server name should have the user name

Sever type- we have two type
→ Windows Authenication
→ SQL server Authenication.

Windows Authenication works on the user admin and it is secured one. and here it has the own database Engine, database client.

SQL Server Authenication works on the current user Password when it is installed we have to, give that Password

But on the operating system if we give default it takes Windows Authentication,
But if we mixed mode Form we will have both Windows & SQL server authentication.

Admin Part in the operating System.

SAT
8/06/2019

Working With SQLSERVER:

While working with SQL server first we need to choose a version of SQLserver we want to work with. After choosing the version we want to work with it we need to choose the edition under this version. Where Microsoft makes SQLserver available in multiple editions with different featured sets and targetting different users.

Currently we are provided with the following editions under SQL server

1. Data center:- It is a fully featured Edition designed for data centers that need high levels of application support. These Edition has been retired in SQL server 2012.
2. Enterprise Edition:- This Edition includes the core database Engine and Add on services, with a range of tools for creating and managing a SQL server cluster. It can manage databases as large as 524 petabytes and address 2 tetra bytes of memory and also support 8 physical processor before 2012 and from 2012 it is 160 physical processor.
3. Standard:- This Edition include the core database Engine along with the standalone services. It differs from Enterprise Edition in that it supports fewer active instances and does not include some high availability functions such as hot-add memory (allowing memory to be added while the server is running) and parallel indexing.
4. Web:- This Edition is an option available for web hosting.
5. Business Intelligence:- This Edition is introduced in SQLserver 2012 focusing on Self Services and corporate business intelligence.

Work Group – This Edition includes the core database functionality but does not include any additional services. This Edition has been retired in SQL Server 2012.

Express – This Edition is a scaled down, free Edition of SQL Server which includes only the core database Engine. Two additional Editions provides a superset of features not in the original Express Edition. The first is SQL Server Express with Tools which includes SQL Server Management Studio Basic. The second is SQL Server Express with advanced services which adds full-text search capabalities and reporting services.

Express
- Sql server Express — database engine
- Sql server Express with Tools — database Engine, management studio
- Sql server Express with services — database Engine, management studio and Reporting services

When we install Sql server on our machine it will be installed as two seperate components are parts that is Every database software has those two parts.

→ Database Engine (or) Server
→ Database client.

Database Engine is the place where we store the data and it is integerated with the OS which can be found as an operating system services.

Note:- After installing Sql server to test the server running under the OS control go to start menu and type "Services.msc" under the search text box. Which displays a list of operating system services which are running in the back ground process In that list we can find the database Engine running.

(SqlServer(MSC SQL server) provides to Running Automatic

Database Client - SQL Server provides a database client tool which acts as a interface to communicate with the database server that is "SQL server Management Studio". Whenever we open the management Studio we need to first connect with the data Engine con Server to perform any database operations.

To Launch management Studio. Go to

→ Start menu select All programs

↓

Microsoft SQL Server

↓

double click on SQL Server management Studio.

once the management studio opens it displays a window known as connect to Server using which we need to connect with the database Engine. under dat window we need to supply the following details

1. Server type – Choose Database Engine in it
2. Server Name - specify the name of the machine on which the database Engine or Server is running. If it is on the local machine specify the name of local machine only or simply Enter Local. (or Dot (.)
3. Authentication - It is a processor of verfying the credentials of a user to login into the server. SQL server supports two different Authentication model for login into the server.
   1. Windows Authentication
   2. SQL Server Authentication

While installing an SQL Server we must select an Authentication mode for database Engine. either Windows Authentication mode (default) or Mixed mode

If we select Windows Authentication when the user connects to the server it validates the account name & password using the windows principal token in the operating system. So SQL server does not ask for any password and doesnot perform any identity validation.

When the user connects through the SQL server using SQL server Authentication Logins are created in SQL server that are not based on window user account. Both the user name and password are created by using SQL server and stored in SQL server. So users connecting with this Authentication mode must provide their credentials every that they connect.

* Note:- Windows Authentication is a default mode and it is much more secured than SQL server Authentication. because it uses "Kerberos Security Protocol" for enforcing Password security. (it is a real time environment used for securing)

If using SQL server Authentication (enabled), we need to supply the login name and password under connect to server and click on the connect button. Where as if we choose windows Authentication directly click on the connect button (disabled) which connects to the server and we can start performing operations on the server.

Working With Sql Server:

Sql Server is a collection of databases where a database is again a collection of various objects like Tables, Views procedures, Functions, Triggers, Indexes ..etc

Databases under into Sql server are divided into 2 categories.

1. System databases
2. User databases.

1. System databases: These databases are used by sql for the functionality of sql server and without these databases the server will not function. users of sql server are not given a direct support for updating the information under system databases. The system databases include these four databases

   1. Master
   2. Model
   3. MSdB
   4. TempdB

1. Master: These database records all the system level information under associated with the server.

2. Model: It is used as a template for all new databases created on sql server database

   i.e Whenever we create a new database a copy of the model database is taken and given with a new name.

3. MSDB :- It is used for recording or storing information about alerts, Jobs etc. that are performed by SQL Server agent (eg:- Cbaekupfiles)

4. TempDB :- It is used as a workspace for holding the temporary tables that are created under various databases. once we restart the server the temp db database is destroyed and again recreated. So, we will not find any temporary tables that are created previously.

User databases :- These are databases created and managed by the users for storing their objects like tables views extra.

To create a database open the management studio and in the left hand side, we find the option called window object Explorer, open it and right click on the node Databases and select new database which opens a window asking for database name. Enter a name under it.

Ex:- Sql11 and click OK.

Which creates a databases and adds it under the databases node

Creating a database using create statement

we can also create a database by using Create Command which should be used as following.

Syntax :- Create Database <dbname>

<> : Anyvalue
[] : optional

→ To create a table in the above process, in the management studio, we will find a button New query under the toolbar, click on it which opens a window, under it write the following statement

Create Database Sqlll

→ To execute the statement, again in the toolbar we find a button, Execute click on it which will parse and execute the statement

Whenever a database created on sqlserver, it will have two operating System files

1. A datafile
2. A Logfile

DATAFILE: This is the file which contains data and objects such as a tables, indexes, stored procedure etc. and this data files can either be a primary or secondary datafile

Primary datafile contains the start-up information for the database and pointers to other files associated with the database. (ndf)

Every database can have only one primary datafile and Saved with an Extension .mdf (master datafile)

Secondary datafile are optional and user defined, we use

Secondary datafile, when the data is spread across multiple disks by putting each file on a different disk drive. we can have any number of secondary datafiles and they are with a Extension .ndf (next datafile).

LOGFILES: These files contain all the information that is required to recover all transactions in the database, because it holds transactional log information. There must be atleast one Log file for each database which is saved with an Extension .Ldf (Log datafile).

To view the mdf and Ldf files of our database

Sql11 (C or d drive)

→ Go to <drive>:\program Files\Microsoft sql Server\MSSQL11.MSSQLSERVER\MSSQL\Data

Sql11.mdf
Sql11_log.ldf

Wed
12/06/2013

Datatypes in SQL server:

A datatype is an attribute that specifies what type of data a column can hold in it. like integer data or character data or monetary data or date and time data or binary strings, and so on.

SQL server supplies a set of system datatypes that defined all the types of data that can be stored within SQL server. Data types in SQL server are organized into following categories.

1. Exact numerics
2. Approximate numeric
3. Date and time
4. Character strings
5. Unicode character strings
6. binary strings
7. other data types

INTEGER TYPES: Exact Number datatypes that stores integer data.

Datatype	Range	Storage
Bigint	-2^{63} to $2^{63}-1$	8 bytes
int	-2^{31} to $2^{31}-1$	4 bytes
Smallint	-2^{15} to $2^{15}-1$	2 bytes
tinyint	0 to 255	1 byte

MONETARY OR CURRENCY TYPES: Datatypes dat. represents monetary or currency values

Datatype	Range	Storage
Money	-922,337,203,685,477.5808 to 922,337,203,685,477.5807	8bytes
Small Money	-214,748.3648 to 214,748.3647	4bytes

Bit (BOOLEAN TYPE): An integer type that can take a value of 1, 0 or NULL.

Note:- The string values TRUE AND FALSE converted to Bit values. TRUE is converted to 1 and false is converted to 0. Converting to bit promotes any nonzero value to 1.

DECIMAL TYPES:

Syntax:-

decimal [(P[,S])] and numeric [(P[,S])]

Numeric data types that have fixed precision and scale.

P(precision): The maximum total number of decimal digits that can be stored, both to the left and to the right of decimal point. The precision must be a value from 1 through the maximum precision of 38. The default precision is 18.

S(scale): The maximum number of decimal digits that can be stored to right of the decimal point. Scale must be a value from 0 through p. scale can be specified only if precision is specified. The default scale is 0. Maximum storage sizes vary based on the precision, as following

Precision	Storage bytes
1-9	5
10-19	9
20-28	13
29-38	17

Float [(n)] and Real: Approximate number datatypes for use with floating point numeric data. floating point is approximate. Therefore not values in the datatype can be represented Exactly. Where n is the no. of Bits that are used to store the mantissa of the float number in scientific notation, and, therefore dictates the precision and storage size. If n is specified it must be a value b/w 1 and 53. The default value of n is 53.

n value	Precision	Storage size
1-24	7 digits	4 bytes
25-53	15 digits	8 bytes

Date and TIME Types: SQL Server supports following date and time types.

1. Date: Defines a date
2. Time [(fractional seconds_precision)]: Defines a time of a day. The time is without time zone awareness and is based on a 24 hour clock.
3. DateTime: Defines a date that is combined with a time of day with fractional seconds. that is based on 24-hour clock.
4. SmallDateTime: Defines a date that is combined with a time of day. The time is based on a 24-hour day, with seconds always zero (:00) and without fractional seconds.

5. Date time 2 [(Fractional seconds precision)]: Defines a date that is combined with a time of day that is based on 24 hour clock. Date Time 2 can be considered as an Extension of the above DateTime type that has a larger data range.

6. DateTime offset: [(Fractional seconds precision)]: Defines a date that is combined with a time of a day that has time zone awareness and is baled on 24-hour clock.

Datatype	Range	Storage
Date	January 1, 1 A.D. to December 31, 9999 A.D.	3 bytes
Time	00:00:00:0000000 to 23:59:59:9999999	5bytes
DateTime	Date Range: January 1, 1753, to December 31, 9999 Time Range: 00:00:00 to 23:59:59:997	8bytes.
Small DateTime	Date Range: January 1, 1900, to June 6, 2079 Time Range: 00:00:00 to 23:59:59	4bytes
Date-time 2	Date Range: January 1, 0001 A.D ~~through~~ to December 31, 9999 AD	6 bytes if Precision < 3. 7 bytes if Precisions is 3 & 4.

	Time Range : 00:00:00 to 23:59:59.9999999	8 bytes for other precision
DateTimeoffset	Date Range : January 1, 0001 A.D. to December 31, 9999 AD Time Range : 00:00:00 to 23:59:59.9999999	10 bytes

CHARACTER TYPES: Are string datatypes of either fixed length or variable length.

1. char[(n)] : Fixed length, non-unicode string data, n defines the string length and must be a value from 1 to 8,000. The storage size is n bytes.

2. Varchar[(n|max)] : Variable length, non-unicode string data, n defines the string length and can be a value from 1 to 8,000. Max indicates that the maximum storage size is $2^{31}-1$ bytes (2 GB). The storage size is actual length of the data entered + 2 bytes.

3. text : Same as varchar(max).

4. nchar[(n)] : Fixed length unicode string data. n defines the string length and must be a value from 1 to 4000. The storage size is two times of n bytes.

5. nvarchar[(n|max)] : Variable length unicode string data. n defines the string length and can be a value from 1 to 4000. Max indicates that the maximum storage size is

$2^{31}-1$ bytes (2GB). The storage size in bytes is two times the actual length of data entered + 2 bytes.

6. ntext: Same as nvarchar(max).

BINARY TYPES: Binary datatypes of either fixed length or variable length for storing binary values like images, Audio and videos.

1. binary [(n)]: fixed length binary data with a length of n bytes. Where n is a value from 1 to 8000. The storage size is n bytes.

2. varbinary [(n/max)]: Variable length binary data. n can be a value from 1 to 8,000. max indicates that the maximum storage size is $2^{31}-1$ bytes (2GB). The storage size is the actual length of the data entered + 2 bytes

3. image: Same as varbinary(max).

NOTE:- text, ntext and image datatypes will be removed in the future version of Microsoft SQL server. Avoid using these datatypes in new development work, and plan to modify applications that currently use them. use nvarchar(max), varchar(max), and varbinary(max) instead.

n - represents - National (nvarchar)

Thursday
13/06/2013

OTHER DATA TYPES:

1. ROWVERSION: Is a datatype that exposes automatically generated unique binary numbers within a database. Row version is generally used as a mechanism for version stamping table rows. The storage size is 8 bytes. The row version datatype is an incrementing number and does not preserve a date or a time.

* NOTE:- upto 2005, of SQL SERVER we have a datatype Timestamp which is used for version stamping table rows. That datatype is deprecated in the current version and introduced with row version. So, it is not advised to use timestamp anymore.

2. UNIQUE IDENTIFIER: Is a 16 byte GUIT (Global unique Identifier) a column of this datatype can be initialized with a value by using the newId function.

3. XML :- Is a datatype that stores xml data we can store instances of wellformed xml in a column of xml type. The storage representation of xml datatype instances cannot Exceed 2GB in size.

4. SQL_Variant :- A column of this type can store values of different datatypes. For example a column defined as sql variant can store int, binary and character values also. It can have a maximum length 8016 bytes. This includes both a base type information and the base type value. The maximum length of the actual base type value is 8000bytes.

5. Cursor: A datatype for variables or stored procedure o/p parameters that contain a reference to a cursor. The cursor datatypes cannot be used for a column in a CREATE TABLE Statement.

6. Table: Is a special datatype that can be used to store a result set for processing at a later time in a function or stored procedure.

Creating a table:-

Syntax:- Create Table <tnames> (<colname><dtype>[,...n])

→ Table Name must be unique under the database
→ The name of the table should be ranging b/w 1 to 128 characters
→ Never start table names with numerics (or) special characters and also do not use spaces in table names. If there are multiple words combine them with an (_).
→ The maximum No. of columns a table can have in the current version of SQL Server is 1024.

Ex:- To create a table for customers in bank.

```
Create table Customer (custid int, Cname varchar(50),
Balance Decimal (9,2), DOD SmallDatetime, city
varchar(50))
```

To create the table under a database first open Management studio provide the Authentication details and login. Now click on the New Query button on the top which opens a query window on the top of it we find a combo box listing all the databases

Choose your database (Sqli) and then click on the execute button which creates the table in the selected database.

After creating the table if we want to know the structure of the table any time use the statement

Syntax:- SP_ Help <tname>

Eg:- SP_ Help Customer

INSERTING RECORDS INTO THE TABLE:

Syntax:- Insert into <tname> [(<collist>)] values (<valist>)

RETRIVING DATA FROM A TABLE:

Syntax:- Select * [collist] from <tname> [<clauses>]

Insert into customer values (1001, 'scott', 5000, '06/18/2013', 'Hyderabad')

String and Date values has to be enclosed under single quotes

While entering date we need to give the date in either mm/dd/yyyy or yyyy/mm/dd formats.

Ex:

Select * From customer.

Inserting values into Selected columns

Insert into customer (custid, cname, Balance) values (1002, 'smith', 5000).

Note:- If a value is not inserted into a column it will take the default value as NULL. Because the default default value for a column is NULL.

We can write the above statement like this also,

Insert into customer (1003, 'Blake', 7000, NULL, NULL)

Note:- While using NULL in the insert statement do not put it under single quote.

Inserting values into the table when we are aware of the columns, but not aware of column sequence.

Insert into customer (city, cname, custid, AOD, Balance) values ('Delhi', 'James', 1004, '2013/06/13', 10000)

Using ~~Get Date~~ GetDate() for inserting values into Date column.

Insert into customer values (1005, 'williams', 15000, GetDate(), 'Chennai')

→ GetDate() is a predefined function which returns the server date and time.

Retriving all Records of the data:-

Select * From customer

Retriving Selected Columns:

Select custid, cname, Balance From customer.

Retriving columns of a table in a desired order:-

Select custid, cname, city, AOD, Balance from customer

Retriving columns of a name with alias name:-

Select custid, cname as [customer Name], city, AOD as [Account opening Date], Balance From customer.

Note:- Alias should be represented in [ ] where we provide space.

Retrieving Selected records from table:-

Select * From customer Where Balance > 5000

Note:- Where clause is used for restricting unwanted records from the table.

Select * From customer Where city IS NULL

While comparing a column value with NULL we should not use Equal (=) and not Equal (≠) operators in that place we should use IS NULL and IS NOT NULL Because NULL is a infinite or indefinite or unknown value. So, no two null values can be compared with each other.

14-June-2013

Updating (update command):-

Update command is used for modifying in a existing data that is present under a table.

Syntax:- Update <tname> Set <column> = <value> [,...n]
[<Where condition>].

Ex: Update customer Set Balance = 6000 Where custid = 1001

Note:- While updating or deleting a record a Where Condition is mandatory for unique identification of the record.

Multiple columns can be update

Ex:- Update customer Set Balance = 4000, city = 'Hyderabad' where custid = 1002.

Ex:- update customer set AOD = GetDate() Where AOD IS NULL

AOD
NULL
NULL

DELETE COMMAND:- It is used for deleting record(s) From a table

Syntax:- Delete From <tname> [Where <condition>]

Ex:- Delete From Customer Where Cust_id = 1005

Droping a table:- It is a process of destroying the Existence of the object in the database.

Syntax:- Drop table <tname>

Ex:- Drop table Customer

DATA INTEGRITY: In computing, data integrity refers to maintaining and assuring the accuracy and consistency of the data over its entire Life-cycle and is an important feature of database (or) RDBMS system. Data integrity means that the data contained in the database is accurate and reliable.

To provide integrity of data RDBMS provides us a set of integrity constraints which ensures that data Entered into the database is accurate valid and consistent.

Integrity constraints are basically divided into three types of those are

→ 1. Entity Integrity, not allowing multiple rows to have same identity within a table.

Eg:- Primary key & unique.

→ 2. Domain Integrity: Restricts adata to predefined data types.
Eg:- Dates., Eg:- check

→ 3. Reperntial Integrity, Required the existence of a related row in another table.
Eg:- foreign key.

* CONSTRAINTS :- SQL Server Supports Five constraints for maintaining data integrity those are
1. NOT NULL
2. UNIQUE
3. PRIMARY KEY
4. CHECK
5. FOREGINKEY

* Note:- constraints are imposed on columns of a table.

1. NOT NULL :- If these constraint is imposed on a column, that column will not allow null values into it.

Syntax:- Create Table <tname (<colname> <dtype> ~~Not Null~~
<colname> <dtype> NOTNULL[, ...])

Eg:- Create Table customer (
custid int Not NULL, cname varchar(50), Balance Decimal(9,2),
AOD smalldatetime Not NULL, city varchar(50))

* Note:- NOT NULL constraints can be imposed on any number of columns.

Ex:- Insert into customer values(100, 'Raju', 5000, NULL, 'Hyderabad')

In the above case we are trying to insert a column value AOD on which the Not null constraint is imposed. So, the insert statements execution fails.

Note: When we insert a null value into a column on which the Not null constraint is imposed, the execution of the insert statement is terminated by displaying a user friendly error message telling the reason for termination and also specifies the database, the table and the column where the problem got occured. (Error).

UNIQUE CONSTRAINT: If this constraint is imposed on a column, that column will not allow duplicate values into it.

Syntax:- Create Table <tname>(
<colname> <dtype> [constraint <const name>]
<const type> [,---n])

Note:- Here constraint type in the sense, it can be unique (or) primary key (or) check (or) Foregin key also.

Ex:- Create table customer (Custid int unique, cname varchar(50), Balance Decimal(9,2), AOD small Datetime NOT NULL, City varchar(50))

Note:-
If we insert a duplicate value into a column that contains uniaue constraint on it, the statements get terminated by dilplaying an error menage. But that error message will not contain the column name where the violation got occured. It only displays the constraint name

unique, primary key, check and foregin key constraints

are independent objects under the database which are created and linked with the column of the table. So, they have their own identity or name i.e, the reason why if these four constraints are violated they will never ben the column where the violation occured. They will only display their name.

Actually a constraint name must be defined by us while creating the table. If not defined by us database server will give a name to that constraint and those names will not be user friendly for identification. So, it is always suggested to provide our own name to the constraint for easy identification by adopting a naming convention as following.

<Columnname>_<constraint type>

Ex:- creating a table by giving own name to a constraint

```
Create table customer (
Custid int constraint custid_unique unique,
Cname varchar(50), Balance decimal (9,2), AOD
 Smalldatetime NOT NULL, city varchar(50));
```

Monday.
17/06/2013

IMPOSING CONSTRAINTS ON TABLE:

We can impose constraints on a table in two different ways:

1. Column level imposing a constraint
2. Table level imposing a constraint

In the first case, we provide the constraint information beside the column only where as in the second case we first define all the columns and then we define constraints on the columns.

*NOTE:- We cannot impose not null constraint in Table level. It is possible only for rest of the four constraints.

Column level imposing a constraint

```
Create table customer (custid int constraint custid_
unique unique, cname varchar(50), Balance decimal(9,2),
Aod smalldatetime NOT NULL, city varchar(50));
```

Table level imposing a constraints

```
create table customer (
custid int, cname varchar(50), Balance decimal (9, 2),
Aod smalldatetime NOT NULL, city varchar(50),
constraint custid_unique unique (custid));
```

Composite Constraint:-

There is no difference in behaviour whether the constraint is imposed in table level (or) column level but if a constraint is imposed in table level we have an advantage of imposing composite table level constraints. That is one constraint on multiple columns.

Branch Details

city	Branch code	Location BranchName
Hyderabad	B_1	Ameerpet
Hyderabad	B_2	Punjagutta
Hyderabad	B_3	Jubilee Hills
Mumbai	B_1	Dadar
Mumbai	B_2	Powai
Mumbai	B_3	Thane
Chennai	B_1	Gopalapuram
chennai	B_2	Ayanavaram
Chennai	B_3	Mahiramapuram
Delhi	B_1	Lajpat nagar
Delhi	B_2	Dilshad colony
Delhi	B_3	connaught place

In the above table city and Branchcode columns must be imposed with a composite constraint.

eg:- Create table BranchDetails (
city varchar(50), Branchcode Varchar(10), Branch Location varchar(50),
Constraint city_Bc_UQ unique (city, Branchcode)).

NOTE:-

The drawback with a not NULL constraint is it will allow duplicate values where as incase of unique constraints it will allow null values.

PRIMARY KEY CONSTRAINT: It is a combination of unique and Not NULL which doesn't allow NULL as well as duplicate values into a column (or) columns. using primary key we can enforce entity integrity. We can impose only one primary key constraint on a table which can be either on a single or multiple columns also. i.e compaite Primary key is allowed.

Ex:- Column level imposing primary-key constraint

```
Create Table customer (
cutid int Constraint custid_PK primary key,
Cname varchar(50), Balance Decimal (9,2), DOB Smalldatetime NOT NULL, City varchar(50));
```

Table level imposing primary key constraint

```
Create Table BranchDetails (
City varchar(50), Branchcode varchar(10), Branch location varchar(50),
constraint City_BC_PK primary key (City, Branchcode)
)
```

CHECK CONSTRAINT: It is a constraint which enforces domain Integrity by limiting the possible values that can be entered into a columns (or) column.

Eg:- column level imposing constraints

Create table Customer(
Custid INT constraint Custid_Pk primarykey, cname varchar(50), Balance Decimal(9,2) Constraint Balance_ck check(Balance >= 1000), AOD SmallDateTime NOT NULL, City varchar(50));

Table level imposing constraints

create table Customer(Custid int, cname varchar(50), Balance Decimal (9, 2), AOD smallDatetime NOT NULL, City varchar(50), Constraint Custid_PK primary key (Custid), Constraint Balance_ck check (Balance >= 1000));

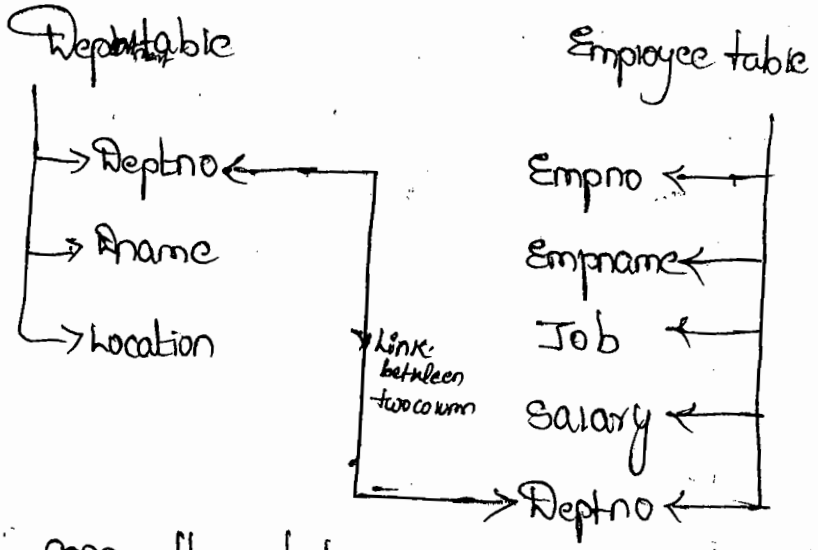
Tue
18/06/2013

FOREIGN KEY CONSTRAINT: This constraint is used for Providing referential integrity for the data that is present in a column (or) columns That is it requires the existence of a related row in another table. To impose a foreign key constraint we require the following things

NOTE: Foreign key constraint is used for relating (or) binding two tables with each other and then verify the existence of one tables data in the other.

We require two tables for binding with each other and those two tables must have a common column for linking the tables.

Eg:-



In the above case, the dept no column of Dept table is being referred under the Employee table. So in this context Department table is referred as a master or a parent table and the Employee table is referred as Detailed table (or) child table.

NOTE:- The common column that is present in both the two tables need not have the same name but their datatypes must be same.

The common column that is present under the parent or master table is known as a reference key column. And reference key column should not contain duplicate values in it. So, we need to impose either unique (or) primary key constraint on that column.

If we impose primary key constraint on the reference key column that column will also be the identity column of the table

The common column which is present in the child or detailed table is known as Foreign key column. and we need to impose a foreign key constraint on the column which refers to reference key column of Master table.

Department table → (Master (or) parent table)

Reference Key column.

Deptno	Dname	Loc
10	Sales	Mumbai
20	Production	Chennai
30	Finance	Delhi
40	Research	Hyderabad

Employee → (Detail (or) child table)

Empno	Ename	Job	Salary	Deptno → Foreign Key column.
1000				10
1001				10
1002				10
1003				10
1004				20
1005				20
1006				20
1007				20
1008				30
1009				30
1010				30
1011				30
1012				40

To create department table

Create Table Department (Deptno int constraint Deptno_PK primary key, Dname varchar(50), Loc varchar(50));

Insert value

```
Insert into Department values (10, 'Sales', 'Mumbai');
Insert into Department values (20, 'Production', 'Chennai');
Insert into Department values (30, 'Finance', 'Delhi');
Insert into Department values (40, 'Research', 'Hyd--');
```

To create child table:

Imposing Foreign key constraint in column level:

```
create table Employee( empno int, ename varchar(50), job
varchar(50), salary Decimal(7, 2), Deptno Int constraint
Deptno_FK References Department (Deptno))
```

Impaing foreign key constraint in Table level:

```
Create table Employee (Empno int, ename varchar(50), job
varchar(50), salary Decimal(7, 2), Deptno int,
constraint Deptno_FK Foreign key (Deptno) references
Department (Deptno))
```

NOTE:- While imposing a foreign key constraint in table level we need to explicitly use the Foreign key clause to specify the foreign key column where as it is not required while imposing in column level because the constraint is defined beside the foreign key column only.

When we impose the foreign key constraint and establish relations between the table, the following three rules will come into picture.

RULE1 :- Cannot insert a value into the foreign key column Provided that value is not existing under the reference key column of master table.

RULE2 :- Cannot delete a record from the master table Provided that records reference key value has child records in the child table without addressing what to do with the child records.

RULE3 :- cannot update the reference key value of a master table provided that value has corresponding child records in the detail table without addressing what to do with the child records.

Wed 19/06/13

If we want to delete (or) update a record in the master table when they have corresponding child records in the child table we are provided with a set of rules to perform delete and update operations known as Delete rules and update rules.

DELETE RULES:

On Delete NO Action
On Delete cascade
On Delete Set NULL
On Delete Set Default

Update Rules:

on update No Action
on update cascade
on update Set NULL
on update Set Default

ON DELETE NO ACTION (or) ON UPDATE NO ACTION:

This is the default rule that is applied on the child tables that restrict deleting a record in the master table (or) updating a reference key of a master table when corresponding child records are present under the child table.

ON DELETE CASCADE (&) ON UPDATE CASCADE

If this rule is applied while creating the child table we can delete a record in a master table or update the reference key value of the master table, Even if there are child records in the child table. But along with it the child table records will be deleted if it is delete & Foreign key value will be update if it is update.

ON DELETE SET NULL AND ON UPDATE SET NULL:

In this case also deleting or updating reference key values of master table is possible when corresponding child records or Existing in the child table but in case of delete or update in master table the corresponding child records foreign key value changes to NULL. NOTE:- If we want to impose these rules the foreign key column should not contain a NOT NULL constraint on it.

ON DELETE SET DEFAULT AND ON UPDATE SET DEFAULT:

This is same as SET NULL but in this case child tables foreign key value gets updated with default value of that column. Where as if a default value is not Provided in the column NULL is the default, default value.

IMPOSING A DELETE RULE OR UPDATE RULE WHILE CREATING THE CHILD TABLE:

Delete rules and update rules were not imposed on master table, they are imposed on the child table that to on the foreign key column. as following.

Syntax :- <column> <datatype> constraint <constName> References <MTName> (<RK.Col>)
on Delete {NoAction / cascade / set NULL / Set Default}
on update {NoAction / cascade / Set NULL / set Default}

Ex:- Create table Employee (Empno Int, Ename varchar(50), Job varchar(50), Salary Decimal (7,2), Deptno INT constraint Deptno-fk References Department (Deptno) on Delete cascade on update cascade)

Providing Default Value for a column:

→ The default, default value for any column is NULL, provided the column is not imposed with a NOT NULL constraint.

→ At the time of creating the table we have a chance of giving our own default value on the column. so that when we insert a record into the table without specifying a value to that column automatically the default value comes into picture and inserted into the column. Where as if we provide a value that value only will be inserted.

Ex:- Create Table Employee (Empno int, ename varchar(50), Job varchar(50), ~~default null~~ salary Decimal (7,2) Default 5000, Deptno int constraint Deptno-fk Reference Department (Deptno) on Delete Cascade on Update cascade)

Ex:- Deptno int Default 40 constraint Deptno-fk References Department (Deptno) on delete set default on update set default)

20-June-13 Thursday

SELF REFERENTIAL INTEGRITY:

This is same as the Referential integrity we have learnt earlier. In earlier cases we are binding one column of a table with another column of another table where as in self referential integrity we bind a column of a table with another column of same table i.e both Foreign key and Primary key will be present in one table only.

Primary key column — EMPLOYEE — Foreign key column

Empno	Ename	Job	Mgn
1000	Naveen	President	NULL
1001	Scott	manager	1000
1002	Smith	salesman	1001
1003	Blake	Clerk	1001
1004	Raju	manager	1000
1005	Ajay	Analyst	1004
1006	James	clerk	1010 → Invalid

In the above table we are binding the column mgn(Foreign key) with another column of the same table i.e Empno(Reference key) to verify the value entered into mgn column to be existing under Empno column

→ Creating Employee table using all constraints in column level

```
Create Table Employee
(
Empno Int constraint Empno-pk primarykey, Ename
varchar(50) NOTNULL, Job varchar(50), mgn Int constraint
mgn-Fk References Employee (Empno), salary Decimal(7,2)
Default 3000 constraint sal-ck check (salary Between
5000 and 15000), Deptno Int constraint Deptno-FK Reference
Department (Deptno)
)
// Inserting Records to the above table---
```

IDENTITY PROPERTY:-

We can apply this on a table for creating a identity column for the table.

Syntax :- Identity (seed, increment)

↓ These two are optional.

Seed is the value i.e used for the very first row that is loaded into table.

Increment is the incremental value i.e added to the identity values of the previous row that was loaded.

Note:- You must specify both seed and increment or neither, It neither is specify, the default is (1,1)

→ Creating table by using Identity function

```
Create Table suplier
(
Sid int Identity (101, 1),
Sname varchar(50),
```

Goods varchar(50),
Location varchar(50),
);

→ Inserting values :-

Insert Into Suplier (Sname, Goods, Location) values ('AMIT', 'Cool Drink', 'Hyderabad')

Note:- We can't insert a value into the identity column Explicitly, but we can insert by setting a Identity_Insert Property as ON default is OFF which will not allow Explict inserting.

→ Identity Property doesn't promise any uniqueness to the column values. If we want uniqueness we should explicitly impose either unique or primary key constraint on that column.

→ Identity Function can generate only Integer values can't generate alpha Numeric values.

→ When an Identity column is existing For a table with Frequent deletion gaps will occur between Identities values. So, when Frequent deletion on being done on a table do not use the identity property. However it is still possible to fill the existing gap by setting the Identity_Insert property as ON

Syntax :- Set Identity_Insert <Tname> ON

When we set the property as ON it will allow to insert values explicitly into the Identity column.

Ex:- Set Identity_Insert Supplier ON
Insert Into supplier (Sid, Sname, Goods, Location)
Values (50, 'AAA', 'Cool Drinks', 'Hyderabad')

If we want to restrict inserting values into Identity explicitly set the property as OFF again as following.

Ex:- Set Identity_Insert Supplier OFF.

ALTER TABLE COMMAND:

By using the alter Table command we can perform the following actions on a table.

1. we can Increase/Decrease the width of a column.
2. we can change the datatype of a column.
3. we can change the NOT NULL to NULL or NULL to NOT NULL
4. we can add a new column
5. we can drop a existing column
6. we can add a new constraint
7. we can drop a existing constraint on a table.
8. Disable/re-enable check constraint of a table.

Example:-
```
Create Table Student
(
Sno Int,
Sname varchar(50)
)
```

→ Syntax to perform First three operations

Syntax:-

```
ALTER table <Tname> ALter column <coiname> <dtype>
    [<width>] [NULL / NOT NULL]
```

// To change the width of a column Sname on student table

Ex:-
```
Alter Table Student Alter column
    Sname varchar(100)
```

NOTE:- When we increase the width of a column we don't have any problem but while decreasing the width, if the table contains data in it we cannot decrease the width less than the max existing characters in the column.

// Changing the data type of a column.

Ex:- Alter Table Student Alter Column
Sname nvarchar(100)

// changing the column Null to Not Null

Ex:- Alter Table student Alter Column
Sno Int Not Null

// Changing Not Null to Null

Ex:- Alter Table Student Alter Column
Sno Int Null

Friday
21/06/2013

Adding a New column under a table:

Syntax:- Alter Table <Tname> Add <colname> <dtype> [Not Null] [Constraint <const name>] <cons type>

Eg:- Alter Table Student Add class int

Alter Table Student Add Grade Int Not Null

Alter Table student Add Fees Decimal (7,2) constraint Fees_ck check (Fees > 3000).

→ We can drop an existing column

Alter Table <Tname> Drop column <columnlist>

Ex: Alter Table Student Drop Column Grade.

→ We can add a new constraint. (optional)

Alter Table <Tname> Add [constraint <consName>] <consType>

(<conslist>...

→ Alter Table Student Add constraint Fees_Default Default 5000 for Fees.

Note:- Default is not a direct constraint but if we wanted to Provide or) give a depault value for any existing column of the table we can add it as a constraint on the column.

→ Alter Table student Add Constraint sname_UQ unique (sname)

Adding Primary Key on a Existing Column:- If we

If we wanted to add a primary key constraint on any existing column of the table first the column must be a Not Null column then only Primary key constraint can be added.

Ex:- Alter Table student Alter column sno int Not NULL

Alter Table student Add constraint sno_PK primary key (sno);

We can drop an existing constraint on a table

Alter Table <Tname> Drop constraint <cons Name>

Alter Table student Drop constraint sname_UQ

Alter Table Student Drop constraint sno_PK

- Disable / re-enable Check constraint of a table:

Syntax:- Alter Table <Tname> Nocheck / check constraint <ConsName>

Ex:- Insert into student (sno, Fees) values (101, 2500)

—Will raise an error.

Insert into stud

Alter Table Student Nocheck constraint Fees_CK

-- Disabling a constraint

Insert into student (sno, Fees) values (101, 2500)

—Will be inserted.

Re-enable:

Alter Table Student check constraint . Fees_CK

--- Enabling a constraint.

Insert into student (sno, Fees) values (102, 2500)

-- Will raise an Error again

DROPPING A TABLE: COMMAND:

Syntax:- Drop table <Tname>

Ex:- Drop table student

Note: when a table is dropped all the dependent constraint on the table also gets dropped.

We cannot drop a master table directly.

TRUNCATE TABLE COMMAND:

Syntax:- Truncate Table <Tname>

If we Truncate a table all the rows of the table without logging them

Truncating a table is similar to delete statement with no where clause. However Truncate table is faster and uses fewer system and Transaction log resources.

We can Recover the data deleted using where but no possible in case of truncate

Where clauses can be applied in case of delete but not in case of truncate.

If a table is truncated identity column of the table is reset to seed value. Where as delete will not do that.

If we truncate the table it removes all rows from the table, but the table structure columns, constraints remain unchanged.

We cannot truncate the data in the master table.

DQL

SELECT COMMAND:-

This Command is used for retesiving a data from a table (or) tables.

Syntax:- Select * |<collist> From <Tname> [<clauses>]

Clauses:

- Where
- GroupBy
- HAVING
- Order By

{WWW.bangarraju.Net Link – Demo Tables}

22/06/2013

Dept : Deptno, Dname, Loc

Emp: Empno, Ename, Job, mgr, Hiredate, Sal, Comm, Deptno.

BUILT IN FUNCTIONS:

Sql server provides number of built in function like mathematical Function, String Function, data type Functions, Datetime Function, convertion function etc. For helping us in presenting as well as retriving the data

MATHEMATICAL FUNCTION:

1) ABS(n): "n" is a numeric expression. It returns a positive integer value of the given expression "n".

Eg:- Select Abs(100), Abs(-100)

O/p 1 100 100

2) CEILING(n): Returns the smallest integer greater than or Equal to the special numeric expression.

Eg:- Select ceiling(15.3), Ceiling(-15.6);

3) FLOOR(n): Returns the largest integer lessthan or Equal to the Specified numeric expression.

Eg:- select Floor(15.3), Floor(-15.3)

4) LOG(n,[,base]): Returns the natural logarithm value of the specified expression.

Note:- By depault Log function returns the natural logarithm. The natural Logarithm is to the base "e". you can also change the base of the Logarithm to another value using the optional base parameter

Eg:- Select Log(10), Log(10,2), Log(10,10)

5) $Log_{10}(n)$: Returns the base-10 logarithm of the specified Expression.

Eg:- Select $Log_{10}(10)$; O/p: 1

6) PI(): Returns the constant value of PI

Eg:- Select PI();

7) power(n,m): Returns the value of the specified value of to the specified power m

Eg:- Select power(2,4)

8) RAND([Seed]): Returns a pseudo-random float value From 0 to 1 exclusive. Seed is an integer expression. If not specified, the SQL Server Database Engine assign a Seed value at Random. For a specified seed value the result returned is always the same.

Eg:- 1) Select Rand() - - Random value changes each time.
2) Select Rand(100) - - Same value generates always.
3) select Rand(), Select(100) -- Same value will generates For both everytime we execute.

9) ROUND(n, Length [, Function]);- Returns a numeric value rounded to the specified length on precision.

Length is the precision to which the expression is to be rounded when length is a positive number of Expression is rounded to number of decimal positions specified by length. when length is a -negative number expression is rounded on the left side of the decimal point as Specified by length. If it is positive.

Eg:- Select Round(156.789, 2), Round(156.784, 1), Round(156.789, 0); Round(156.789, -1), Round(156.789, -2);

Note:- function is the type of operation to perform when function is not specified or has a value of zero(0) [default] expression is rounded. when a value other than 0 is specified expression is functional.

Eg:- Select Round (156.789, 2, 1)

Round (156.789, 1, 1)

Round (156.789, 0, 1)

Round (156.789, -1, 1)

Round (156.789, -2, 1)

// Generates a Random no between 1 to 100.

eg:- Select Round (Rand() * 1000, 0)

10) SIGN (n): Returns the sign of the specified expression which will be (+1) <positive> (0) <0> or (-1) <negative>

Eg:- Select sign (10), sign (0), sign (-10),

o/p - 1 0 -1

11) SQRT (n): Returns the square root of the specified value.

eg:- Select SQRT (4);

12) SQUARE (n): Returns the square of the specified value

Note:- Apart from the above we are also provided with Trignometric function like ACOS, ASIN, ATAN, ATAN2, COS, COT, SIN, TAN for which we need to pass n as a Parameter where as n represents the angle.

STRING FUNCTION:

1) ASCII (s): 's' store string Expression - Returns the ASCII code value of the left most character in the expression.

eg:- Select Ascii ('A'), Ascii ('Hello')

o/p = 65 72

2) CHAR(n): Converts given ASCII code to a character

Eg:- Select char(90) o/p - Z

3) NCHAR(n): Returns the unicode character for the specified integer

Eg:- select Nchar(256); o/p : Ā

--n can be greater than 255 also.

4) LEN(s): Returns the number of characters in the specified string option excluding trialing spaces

Eg:- Select Len('Hello'), Len('Hello '), Len('Hello')

Eg:- Select * From Emp where Len(Ename) = 5

5) CHARINDEX (expToFind, expToSearch [, start_Location]):

Searches for an expression in another expression and return its starting index position is Fand.

Eg:- Select charindex ('w', 'Hello world') → 8

charindex ('o', 'Hello world') 15

charindex ('o', 'Hello world', 6) 18

charindex ('a', 'Hello world') 0

→ Write a Query to get the List of Employee whose name contain char 'a' in it.

Select * From Emp where

charindex ('a', Ename) >= 1

6) CONCAT (string_value1, string_value2 [, string_valueN]):

Returns a string i.e the result of concatinating 2 or more string values.

Eg:- Select concate ('Hello', 'How', 'Are', 'you');

7) FORMAT(value, Format [, culture]): Returns a value Formated with the specified format [d, D, N, G, C] and in optional culture in SQL server 2012. use the FORMAL function for Locale-aware formatting of date/time, number and currency values.

Date Formatting:-

Select GetDate(), Format (GetDate(), 'D')
Select GetDate(), Format (GetDate(), 'D', 'hi-IN')
Select GetDate(), Format (GetDate(), 'D', 'hi-IN')

Number Formatting:-

Select Format (123456T., 'N')
Select Format (123456T, 'N', 'hi-IN')

Currency Formatting:-

Select Format (123456T, 'C')
Select Format (123456T, 'e', 'hi-IN')

Monday
24/06/2013

Ex:- Select Empno, Ename, Job
Format (Hiredate, 'd', 'hi-IN') AS DOJ,
Format (Sal, 'c', 'hi-IN') AS Salary From Emp.

LEFT(S,n): Returns the left part of the string with the specified number of characters.

Ex:- Select Left ('Hello', 3)

Hel

→ Write a query to retrive the list of Employees whose name start with the character S

Select * From Emp where Left(Ename, 1) = 'S'

RIGHT(S,n): Returns the right part of the string with the specified number of characters.

Ex:- Select Right ('Hello', 3)

llo.

→ Write a query to get the list of Employees whose name ends with the character y

Select * from Emp where Right (Ename, 1) = 'y'

→ Write a query to get the list of Employees whose name contains character 'a' in 3 place.

Select * From Emp Where Right (Left (Ename, 3), 1) = 'a'

SUBSTRING (S, Start, Length): Returns Part of a character binary Text or image Expression from the given Expression.

Select Substring ('Hello', 2, 3)

→ Write a query to get the list of Employees whose name contains character 'a' in 3 place

Select * From Emp where substring ('Ename', 3, 1) = 'a'.

→ Write a query to get the list of Employees whose name contains character 'a' in it.

Select * From Emp Where CHARINDEX ('a', Ename) 1 = 0
Select * From Emp where CHARINDEX ('a', Ename) >= 1

LOWER(s): Returns an Expression after converting data to Lowercase.

Select Lower ('Hello')

Ans Hello

Select Empno, Lower (Ename) as Ename, Job, Sal From Emp.

UPPER(s): Returns an Expression after converting data into uppercase.

Select Upper ('Hello')

Ans HELLO

Select Empno, Upper (Ename) as Ename, Job, sal From Emp

LTRIM(s): Returns a character Expression after it removes the leading blanks

Select Len (' Hello') 8

Select Len (LTrim (' Hello'))

5.

Select Len (' Hello'), Len (LTrim (' Hello'))

5 5

RTRIM(s): Returns a character string after truncating all trailing blanks.

Select Len('Hello...'), Len Rtrim('Hello ...'))

Ans 5 5

REPLACE(s, string_search, string_replacement):- Replaces all occurances of the search string value with replacement string value.

Select Replace('Hello world', 'l', 'x') Ans:- Hexxo woxld

Select 'John Smith'
'Johnsmith'

Select * From Emp where Ename = 'John Smith'
Select * from Emp where Ename = 'Johnsmith'

Eg:- Select * from Emp where Replace('Ename, ' ', '') = 'Johnsmith'

Ans Johnsmith.

REPLICATE(s, n):- Repeats a string value for specified number of times.

Select Replicate('Hello', 3)

Ans HelloHelloHello

REVERSE(s): Returns a reverse order of a string value.

Select Reverse('Hello')

olleH

SOUNDEX - Returns a 4 character (SOUNDEX) code to Evaluate the similarity of two strings.

Ex:- Select Soundex('color'), Soundex('colour')
Select Soundex('Smith'), Soundex('Smyth')
Select Soundex('Greed'), Soundex('Greene')

Am:- C460
S530
G650

C460
C530
C650

Ename = Smith, Smyth

Eg:- Select * from Emp where Ename = 'Smith'
Select * from Emp where Ename = 'Smyth'

Select * from Emp where soundex(Ename) = Soundex('Smith')

Select * from Emp where (or) soundex(Ename) = soundex('Smyth')

NOTE:- SOUNDEX converts an alphanumeric string to a four character code that is based on how the string sounds when spoken the first character of the code is the first character of the given expression converted to uppercase. The second to fourth characters of the code are numbers that represent the letters in the expression.

(ex:0)

DIFFERENCE(S1, S2): Returns an integer value that indicates the difference between the soundex value of two character expression.

NOTE:- Soundex code from different strings can be compared to see how similar the strings sound when spoken. The difference function performs a soundex on two strings and returns an integer that represents how similar the soundex codes are for those things.

Eg:- Select Difference ('color', 'colour')

Am 4 — quite similar.

Select Difference ('India', 'America')

Am 1 — quite opposite.

The Result here can be from 1 to 4 where,
4 indicates the 2 strings are similar (strong similarity)
1 indicates the 2 strings are (weak similarity)

SPACE(n): Returns a string of Repeated spaces.

Select 'Hello' + space(5) + 'World'

'Hello.....World'

STUFF(S, start, length, replace_string): It inserts a string into another string by deleting the specified length of characters in the first string at the start position ~~upto the specified length~~ and then inserts the second string into the first-string

Ex:- Select Replace('Hello World', 'l', 'x')

Hexxo Woxld

Select Stuff('Helloworld', 3, 2, 'x')

Hexo world

Select stuff('Hello.....World', 6, 5, '')

Hello world.

DATA TYPE FUNCTIONS:

DATALENGTH(Expression): Returns the number of bytes used to represent any Expression.

Ex:- ~~Select~~ ~~*~~ ~~From~~

Select DataLength(empno), DataLength(Ename) From Emp

	empno	Ename (varchar)
Ex:-	4	5
		5

fixed length. variable length.

Ex:- Select DATALENGTH (100), Data Length ('Hello')

4 5.

IDENT_CURRENT ('table_name'): Returns the last identity value generated for a specific table

Ex:- Select IDENT_CURRENT ('Supplier')

Op - 111

IDENT_SEED ('table_name'): Returns the original seed value that was specified when an identity column in a table is created.

Ex:- Select IDENT_SEED ('Supplier')

Ans:- 101

IDENT_Incr ('table_name'): Returns the increment value specified during the creation of an identity column in a table.

Ex:- Select Ident_Incr ('Supplier')

Ans:- 1

Tue
25/06/2013

DATE AND TIME FUNCTIONS:

GETDATE(): Returns a datetime value that contains the date and time of a computer on which the instance of SQL server is running.

GETUTCDATE():- Returns a datetime value that contains the date and time of the computer on which the instance of SQL server is running. The date and time is returned as UTC time (Coordinated Universal Time). This is same as GMT.

SYSDATETIME: Returns a date time 2(7) value that contains the date and time of the computer on which the instance of SQL Server is running.

SYSDATETIMEOFFSET: Returns a date time offset(7) value that contains the date and time of the computer on which the instance of Sql server is running. The time Zone offset is included.

SYSUTCDATETIME: Returns a datetime2(7) value that contains the date and time of the computer on which the instance of SQL server is running.

Eg:- Select GetDate(), GetUTCDate(), SYSDATETIME(), SYSDATETIME OFFSET(), SYSUTCDATETIME().

DATENAME(datepart, date): Returns a character string that represents the specified datepart of a specified date.

Datepart is the value we want from the given date. which can be any of the following.

datepart	Abbreviations
year	yy, yyyy
quarter	qq, q
month	mm, m
dayofyear	dy, y
day	dd, d
week	wk, w
weekday	dw, w
hour	hh
minute	mi
second	ss, s
millisecond	ms
microsecond	mcs
nanosecond	ns
Tzoffset	tz

Eg:- Select DateTime (mm, GetDate()) June

Select DateTime (tz, SYSDATETIMEOFFSET()) -07:00

Select DateTime (yy, GetDate()) 2013.

→ Write a Query to get the list of Employees joined in the month of April.

Select * From Emp where DateName (mm, Hiredate) = 'April'

DATEPART (datepart, date): Returns an integer that represents the specified datepart of the specified date.

Eg:- Select * from Emp where Datepart (mm, Hiredate) = '04'

Note:- DateName and Datepart functions are very similar the only difference is the first one gives the result as varchar and second one gives the Result as int.

DAY (date): Returns an integer representing the day of the month of the specified year date.

Eg:- Select Day(GetDate())

MONTH(date): Returns an integer that represents the month part of a specified date.

Eg:- Select Month (GetDate()).

Eg:- Select * from Emp where Month(Hiredate) = 04.

Year(date): Returns an integer that represents the year part of the specified date.

Eg:- Select year (GetDate()) = 2013

Select year ('10/24/1978') } 1978.

Select year ('1978/10/24')

Note:- When we Enter the date manually it must be either in mm/dd/yyyy format (or) yyyy/mm/dd

EOMONTH(~~start~~ date, [, month_to_add]): Returns the last day of the month in the specified date.

Eg:- Select EOMONTH(GetDate()) — 2013-06-30
Select EOMONTH(GetDate(), 15) — 2014-09-31
Select EOMONTH(Ge Date(), -18) — 2011-12-30

DATEDIFF(datepart, startdate, enddate): Returns the count of the specified datepart boundaries across the specified startdate and enddate.

Select DateDiff(yy, '12/25/1900', GetDate()) — 113
Select DateDiff(mm, '12/25/1900', GetDate()) — 1350

→ Write a query to find the number of years each employee is working in the organisation.

above to [Select * from Emp where DateDiff(yy, HireDate, GetDate())]

→ Select Empno, Ename, Job, Sal, DateDiff(yy, HireDate, GetDate()) as Seniority, Deptno from Emp

→ Write a query to get the list of Employees worked for 32 years.

Select * From Emp where DateDiff(yy, HireDate, GetDate()) = 32

DATEADD(datepart, number, date): Returns a new datetime value by adding an interval to the specified datepart of the specified date.

Eg:- Seled DATEADD(dd, 168, GetDate()) — 2013-12-10 13:01:39:727

Eg:- Select DATEADD(mm, 78, GetDate())

2019-12-25 13:03:32.340

DATEFROMPARTS (year, month, day): Returns a date value for the specified year, month and day.

DATETIMEFROMPARTS (year, month, day, hour, minute, seconds, miliseconds): Returns a datetime value for the specified date and time.

TIMEFROMPARTS (hour, minute, seconds, Fractions, precision): Returns a time value for the specified time and with the specified Precision.

Eg:- Select DATEFROMPARTS (1978,07,17)
Select DATETIMEFROMPARTS (1978, 07, 17, 12, 50, 30, 00)
Select TIMEFROMPARTS (11, 53, 36, 00, 3)
Select TIMEFROMPARTS (11, 53, 36, 00, 7)

Eg:-

ISDATE (Expression): Returns 1 if the Expression is a valid date; otherwise Returns 0.

Eg:- Select ISDATE ('06/25/2013'), ISDATE ('25/06/2013'), ISDATE ('2013/06/25')

→ O/p 1 0 1

SETDATEFORMAT {format}: Sets the order of the month, day, and year date parts for interpreting date in a session.

- Format can be mdy (default), dmy, ymd, ydm, myd, and dym.

Eg:- Select SETDATEFORMAT dmy
Select ISDate ('06/25/2013'), ISDATE ('25/06/2013'), ISDATE ('2013/06/25') → O/p 0 1 0

Wed 26/06/2013

CONVERSION FUNCTIONS:

This functions are used for converting a value from one datatype to other.

CAST (expression AS data_type [(length)]): Converts an expression of one data type to another.

Eg:- Select cast(GetDate() as varchar(12)) o/p.

Length is optional. The default value of length is 30 {Jun 26 2013}

eg:- Select cast(123.456 as int) o/p 123

CONVERT(data_type [(length)], expression [, style]):

Convert is same as cast o/p

Eg:- Select convert (varchar(12), GetDate()) Jun 26 2013

Select convert (~~varchar~~ int, 123.456) 123.

Length is an optional integer that specifies the length of target data type. The default value is 30.

Style is an integer expression that specifies how the convert fenction has to translate the expression.

If style is NULL NULL is returned.

When expression is a date or a time data type, style can be one of these values:

100 to 114, 120, 121, 126, 127, 130, 131 (With century)

(or)

1 to 8, 10, 11, 12, 14 (without century).

Note:- style 0 or 100, 9 or 109, 13 or 113, 20 or 120, and 21 or 121 always return the century (yyyy)

Ex:- Select convert (varchar(12), GetDate(), 101) 26/06/2013
Select convert (varchar(12), GetDate(), 102)
Select convert (varchar(12), GetDate(), 103)
Select convert (varchar(12), GetDate(), 3) 26/06/13

When expression is money (or) Small money style can be one of these values: 0, 1, 2, 126 (Equivalent to style 2 use it when converting to nchar (or) nvarchar)

Eg:- Select convert (varchar, sal, 0) From Emp
Select convert (varchar, sal, 1) From Emp
Select convert (varchar sal, 2) From Emp

O/P
5,000
5000

LOGICAL FUNCTIONS:

1. CHOOSE (INDEX, val-1, val-2 [, val-n]): Returns the item at the specified index from a list of values.

Eg:- Select choose (3, 10, 20, 30, 40, 50)

O/P - 30.

2. IIF (Boolean_expression, true_value, false_value);- Returns one of two values, depending on whether the Boolean expression evaluates to true or false.

Eg:- Select IIF(10<20, 'Hello', 'Hai')
Select IIF (10>20, 'Hello', 'Hai')

O/P
Hai
Hello

Thursday
27/06/2013

SYSTEM FUNCTIONS:

HOST_ID(): Returns the workstation identification number. The workstation identification number is the process ID (PID) of the application on the client computer that is connecting to SQL server. Eg:- Select Host_ID()

3944

HOST_NAME(): Returns the workstation name.

Eg:- select Host_Name()

Server

ISNUMERIC (expression): Determines whether an expression is a valid numeric type.

NEWID(): creates a unique value of type uniqueidentifier.

↳ Ex:- Select ISNumeric(10.56), ISNumeric('Hello'), ISNumeric('1000')

o/p - 1 0 1

Note:- We use the NewID function for inserting a values into a column with a unique identifier datatype.

ISNULL (check_expression, replacement_value): Replaces NULL with the specified replacement value.

Eg:- Select ISNULL (100, 200), ISNULL (NULL, 200)

o/p 100 200

Write a query to get the total sal of all the Employee.

Eg:- Select Empno, Ename, Job, Sal, comm, Sal + ISNULL(comm, 0) as Total sal From Emp.

Note:- Any arithmetic operation performed on a null value will return a null ~~value~~ again.

COALESCE (expression [,...n]) : Returns the first non null Expression among its arguments. This is same as ISNULL but can be given with multiple expressions.

Eg:- Select coalesce (NULL, NULL, 10, 20, NULL, 30)

10.

Select Empno, Ename, Job, Sal, Comm, Sal + Coalesce (Comm, 0) as Total sal From Emp.

NULLIF (Expression, Expression): Returns a null value if the two specified expressions are equal or else returns first expression.

Eg:- Select NULLIF(10, 20), NULL(10, 10)

O/p 10 NULL

CASE: Evaluates a list of conditions and returns one of multiple possible result expressions. The case expression has two formats

1. The simple case expression which compares an expression with set of values to determine the result.

Syntax:-
```
CASE input expression
WHEN value THEN result_expression [...n]
[ELSE else_result_expression]
END.
```

Q:- Write a query to give a comment column on the employee table as

President	Bigboss
Manager	Boss
Analayst	Scientist
Others	Employee

Sol:-
```
Select Empno, Ename, Job
Case Job
When 'president' then 'Bigboss'
When 'Manager' then 'Boss'
When 'Analyst' then 'Scientist'
Else 'Employee'
End As Comment
From Emp
```

Q:- Write a query to give a comment column on the employee table (Sal)

```
x [ Select Empno, ename, Sal,
    Case Sal
    When Sal > 3000 THEN 'Above Target'
    When Sal = 3000 THEN 'On Target'
    Else 'Below Target'
    End AS Comment ] x
```

```
Select Empno, ename, Sal,
Case sign(Sal - 3000)
When 1 Then 'Above Target'
When 0 THEN 'on target'
Else 'Below Target'
End AS comment
From Emp.
```

Q. The Searched CASE Expression which evaluates a set of boolean expression to determine the result.

Syntax:-
```
CASE
WHEN <condition> THEN result_expression [...n]
 [ELSE else_result_expression]
END.
```

Ex:-
```
Select Empno, Ename, Sal,
CASE
WHEN Sal > 3000 THEN 'Above Target'
WHEN Sal = 3000 THEN 'ON TARGET'
Else 'Below Target'
End AS comment
From emp.
```

META DATA FUNCTIONS:

APP_NAME(): Returns the application name for the current session.

Eg:- Select APP_NAME()

O/p - Microsoft SQL Server - Query (Visual Studio.)

COL_LENGTH('table', 'column'): Returns the defined length of a column in bytes

Eg:- Select COL_LENGTH('Emp', 'Ename') 100
Select COL_LENGTH('Emp', 'Empno') 4

DB_ID([database_name]): Returns the database identification (ID) Number

Eg:- Select DB_ID(), DB_ID('Sql'), DB_ID('Master')

O/p- 7 7 1

DB_NAME([database_id]): Returns the database name for the given database id.

Ex:- Select DB_NAME(1), DB_NAME(2)

O/p- Master tempdb.

OBJECT_ID('object_name'): Returns the database object identification number of a object.

Eg:- Select OBJECT_ID('Emp'), OBJECT_ID('DEPT')

O/p - 469576711 437576597

OBJECT_NAME([object_id]): Return the object name for the given object id.

Eg:- Select OBJECT_NAME(469576711)

O/p - Emp

COL_NAME (table_id, column_id) :- Returns the name of the specified column from the corresponding table identification Number and column index number.

Eg:- Select col_name (OBJECT_ID ('Emp'), 1)

o/p- Empno.

RANKING FUNCTIONS:

Topclause:- using the "Top clause" we can get the top records of a table.

Eg:- Select Top 5 * FROM Emp

Select Top 5 * From emp orderBy Empno Desc

(Sal) Select Top 5 * From Emp orderBy sal Desc

RANK() OVER ([partition_by_clause] < order_by_clause >):

Returns the rank of each row in the table.

Eg:- Select Empno, Ename, Sal, Rank() over (order by sal) From Emp default - asc

Select Empno, Ename, sal, Rank() over (order by sal Desc) From Emp.

→ Write a query to get the top 7 salaried employees of the table with their ranks.

Sol:- Select Top 7 Empno, Ename, Sal, Rank() over (order by sal Desc) from emp.

Partioned by clause can be applied for dividing or grouping the data basing on any column.

Eg:- Select Empno, Ename, Sal, Deptno, Rank() over (Partition by Deptno order by sal Desc) from Emp

o/p- Deptwise)

Select Empno, Ename, sal, Job, Rank() over (partition by Job order by sal Desc) from Emp. (Jobwise) O/P

DENSE_RANK() OVER ([partition_by_clause] < order_by_clause>): Returns the rank of rows in the table, without any gaps in the ranking

Eg: Select Empno, Ename, sal, Dense_Rank() over (order by sal Desc) from Emp

Select Empno, Ename, Sal, Deptno, Dense_Rank() over (order by Partition by deptno order by sal Desc) from Emp

Select Empno, Ename, sal, Job, Dense_Rank() Over (partition by Job order by sal Desc) from Emp. (it will take the duplication)

ROW_NUMBER() OVER ([partition_by_clause] <order by Clause>): Returns the Sequential number of a row in the table being retrieved, starting at 1 for the first row of Each partition

Eg:- Select Empno, Ename, sal, ROW_NUMBER() OVER (order by sal desc) from Emp.

Select Empno, Ename, Sal, Deptno, ROW_NUMBER() over (partition By deptno order By sal Desc) from emp

NTILE (integer Expression) OVER ([partition_by_clause] <order_by_Clause>): Distributes the rows into a specified number of groups. The groups are numbered, starting at one. For each row, NTILE returns the number of the group to which the row belong.

Eg:- Select Empno, Ename, Job, Sal, Deptno, NTILE(3) order (order By Sal Desc) From Emp.

28/06/2013 Friday

AGGREGATE FUNCTIONS:- Aggregate function perform a calculation on a set of values and returns a single value. Except COUNT, aggregate functions ignore null values.

DISTINCT Keyword:- If we use this keyword on a column within a query it will retrieve the values of the column without duplicates.

Eg:- Select Distinct Job From Emp
Select Distinct Deptno From Emp.

COUNT([[DISTINCT] expression] | *):- Returns the no. of items in a group.

Select count(*) From emp

Note:- When we use * in count it returns no. of rows in the table. In place of *, if we use a column name it will return the no. of NOT NULL values in that column.

o/p
15
Select count (Ename) From Emp 4
Select count (comm) From Emp 3
Select count (Distinct Deptno) From Emp 5
Select count (Distinct Job) From Emp

If Distinct is used on the column will ignore duplicates

COUNT_BIG([[Distinct] expression] | *):- Returns the number of items in a group.

Note:- COUNT_BIG works like the COUNT function only. The only difference between the two functions is the return value. COUNT_BIG returns a ~~beig~~ bigint datatype value where as COUNT returns an int datatype value.

Sum ([DISTINCT] expression) :- Returns the sum of all the values (or) only the distinct values in the expression. SUM can be used with numeric columns only. Null values are ignored.

Eg:- Select Sum(sal) From Emp
Select Sum(comm) From Emp

Select Sum(Deptno) From Emp
Select Sum(Distinct Deptno) From Emp.

AVG ([DISTINCT] expression) :- Returns the Average of the values in a group. Null values are ignored.

Eg:- Select sum(sal), Avg(sal) From Emp
Select sum(comm), Avg(comm) From Emp.

MIN ([DISTINCT] expression): Returns the minimum value in the expression.

Eg:- Select MIN(Sal) From Emp
Select MIN(Hiredate) From Emp.

MAX ([DISTINCT] expression): Returns the Maximum value in the expression

Eg:- Select MAX(Sal) From Emp
Select MAX(Hiredate) From Emp

STDEV ([DISTINCT] expression) :- Returns the statistical standard deviation of all values in the specified column Expression.

VAR ([DISTINCT] Expression) :- Return the statistical variance of all value in the Specified Expression.

OPERATORS: An operator is a symbol specifying an action that is performed on one or more Expressions. The Following lists the operator categories that Sql Server supports.

1. ARITHEMATIC OPERATORS: Arithematic operators perform mathematical operations on two Expressions of same or different datatypes of numeric data

+, -, *, /, %

→ Write a Query to get the total investment made For salaries Every month.

```
Select Sum(sal)+sum(comm) As total salaries From Emp

Select Empno, Ename, sal, comm, sal+ISNULL(comm,0) as
 Total Salary From Emp

Select Empno, Ename, sal, comm, (sal+ISNULL(comm,0)) * 12
as AnnualSalary From Emp
```

ASSIGNMENT OPERATOR: The Equal sign (=) is the only assignment operator.

COMPARISION OPERATOR: Comparision operators test whether two Expression are the same, we can use Comparision operators on all Expressions except expressions of type text, ntext or image.

=	Equals
>	Greaterthan
<	Less than
>=	Greater than or Equal to

<=	Less than or Equal to	
<>	Not Equal to	
!=	Not Equal to (NOT ISO Standard)	(This we will use in SQL only)
!<	Not less than (NOT ISO Standard)	
!>	Not greater than (NOT ISO Standard)	

→ Write a Query to get the list of Employees earning a salary greater than 3000.

Sol:- Select * From Emp where Sal > 3000

Select * From Emp Where Sal !< 3000 (Here 3000 will be

↳ In this case the value 3000 can also be taken into Consideration.)

!<	Equals +	>=
!>	Equals	<=

Compound Operators:- Compound operators execute some operation and set an original value to the result of the operation.

+=	Add Equals
-=	Subtract Equals
*=	Multiply Equals
/=	Divide Equals
%=	Modulo Equals

Eg:- update emp set Sal += 100 where Empno = 1004.

Logical Operators:- Logical operators test for the truth of some condition. Logical operators like comparision operators returns a Boolean datatype with a value of TRUE, FALSE or UNKNOWN

And: Returns true if both boolean Expressions are true.

OR: Returns true if either of the boolean Expression is TRUE

NOT: Reverses the value of any bother boolean operator.

BETWEEN: Returns true if the operand is within a range

In: Returns true if the operand is Equal to one of the a list of Expressions.

Like: Returns true if the operand matches a pattern.

Exists: Returns true if a sub-query contains any row

SOME: Returns true if some of a set of Expressions are true.

Any: Returns true if any one of a set of expressions are true

All: Returns true if all of a set of comparisions are true.

→ Write a query to get the list of employees whose Job is manager with a salary of 4000.

Sol:- Select * From Emp where Job = 'Manager' and Sal = 4000

→ Write a query to get the list of Employees who are earning a salary more than 3000 with salesman as a Job

Sol:- Select * From Emp where Sal > 3000 and Job = 'Salesman'

→ Write a query the list of Employees whose Job is clerk, manager or Analyst

Sol:- Select * From Emp Where Job = 'Clerk' or Job = 'Manager' or Job = 'Analyst'.

or

Select * from Emp Where Job IN ('clerk', 'manager', 'Analyst')

Select * from Emp Where Job NotIN ('salesman', 'president')

(or)

Select * From Emp where Job <> 'salesman' And Job <> 'president'

→ Write a Query to get the list of Employees whose Salaries From 3000 to 5000.

Select * From ~~Where~~ Emp Where ~~Sal~~ Between 3000 and 5000

(or)

Select * From Emp Where Sal >= 3000 and Sal <= 5000.

(or)

Note:- Between operator takes Max and min ~~Oper~~ values also into consideration

Select * From Emp Where Not sal < 3000 and not sal > 5000

→ Write a Query to get the list of Employees earning a Salary that is less than 3000.

Select * From Emp Where Sal < 3000

(or)

Select * From Emp Where NOT Sal >= 3000

→ Write a Query to get the list of Employees whose name starts with the character 'S'.

Sol:- (Select * From Emp Where Left (Ename, 1) = 'S')

(or) Here space will not get

Select * From Emp where Ename like 'S%')

Select * From Emp where Left (Ltrim (Ename), 1) = 'S'

(or)

select * From Emp Where ~~L~~trim (Ename) Like 'S%'

→ Write a query to get a list of Employees whose name is Smith or Smyth.

Sol:- Select * From Emp where soundex(Ename) = Soundex('Smith')

(or)

Saturday 29/06/13 Select * From Emp where Ename Like 'Sm-th'

Like operator determines whether a specific character string matches a specified pattern. A pattern can include regular characters and wildcard characters. During Pattern matching regular characters must exactly match the characters specified in the character string. However Wildcard characters can be matched with arbitrary Fragments of the character string. Using wild-card characters make the Like operator more Flexible than using the Equal(=) and not Equal(!=) string comparision operators.

% : Any String of zero or More characters

_ : Any single character.

[] : Any single character specified range ([a-F]) or Set ([abcdef]).

[^] : Any single character not within the specified range ([^a-F]) or set ([^abcdef]).

→ Write a query to get the list of Employees whose name starts with any character between A-G

Sol:- Select * From Emp where Ename Like '[A-G]%'

(or)

Select * From Emp where Ename Like '[ABCDEFG]%'

→ Write a query to get the list of Employee whose name doesn't start with characters between a-g.

Sol:- Select * From Emp Where Ename Not Like '[a-g]%'

(or)

Select * From Emp Where Ename Like '[^a-g]%'

(or)

Select * From Emp where Ename Like '[^abcdefg]%'

(or)

Select * From Emp Where Ename Like '[h-z]%'

SET OPERATORS: SQL SERVER provides the following set operators which combines results from two or more queries into a single result set. Those are:

- Union
- UnionAll
- Intersect
- Except

To combine the results of two queries we need to follow the below basic rules.

1. The number and the order of the columns must be same in ~~the~~ all queries.
2. The datatypes must be compatible.

→ Write a Query to find out the jobs associated with deptno 20 & 30.

Sol:- Select Job From

U

UNION: Combines the results of two or more queries into a single result set, that includes all the rows that belong to all queries in the union eliminating duplicates.

UNION ALL: Same as union but duplicates will not be Eliminated.

Sol:- Select Job From Emp where Deptno = 20
UNION
Select Job From Emp where Deptno = 30

(OR)

Select Job From Emp where Deptno = 20
union all
Select Job From Emp where Deptno = 30.

INTERSECT: Returns any Distinct values that are returned by both the queries on the left and right sides of intersect operand.

→ Write a query to get the common Jobs in deptno 20 & 30.

Sol:- Select Job From Emp where Deptno = 20
Intersect
Select Job From Emp where Deptno = 30.

Except: Returns any distinct values from the left query that are not found on the right query.

→ Write a query to get the jobs that are specific to Deptno 20 when compared with Deptno 30.

Sol:- Select Job From Emp Where Deptno = 20
Except
Select Job From Emp Where Deptno = 30

String Concatenation operators: +, +=

→ (Write a query to comment a line Hello your salary is (in place of Empno & Ename))

Eg:- Select Empno, 'Hello' + Ename + 'your salary is' +
Convert (varchar(12), Sal) as comment From Emp

Select Empno, 'Hello' + Ename + 'your salary is' +
Format (Sal, 'c', 'hi-IN') as comment from Emp.

Giving allias Names to columns: We can give allias Name to any column in the select list in two different ways.

Eg:- Select Empno, Ename, Sal as Salary From Emp
Select Empno, Ename, Salary = Sal From Emp
// ('2012')

CLAUSES: We can add these ~~two~~ to a Query for adding ~~Performing~~ additional options like filters, grouping, arranging etc.

- Where
- GroupBy
- HAVING
- ORDER By

Where:- Specifies a search condition for the rows returned by the query so that it will restrict all the unwanted data.

Group By: used for grouping a set of rows into a set of summary rows basing on the values of one (or) more columns

→ Write a query to find out the number of employees working in the organization.

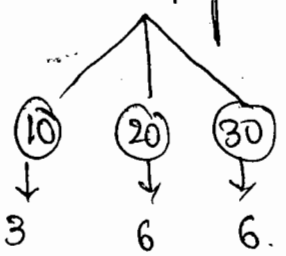
Select count(*) From Emp

→ Write a query to find out the total number of employees belonging to each department.

Select deptno, Count(*) From Emp Groupby Deptno.

(Execution takes place by Groupby Clause)

Emp | (or) Select deptno Empcount = count(*) From Emp Groupby deptno.



dept	Empc
10	3
20	6
30	6

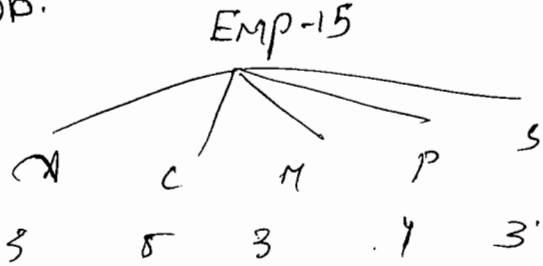
If we use Groupby clause in a query first the data in the table will be divided into different groups basing on the column specified in the Groupby clause and then executes the Group function on each Group to get the results.

→ Write a query to get no. of Employees per each job.

Sol:- Select Job, Count(*) From Emp Groupby Job

(or)

Select Job, Empcount = Count(*) From Emp Groupby Job.



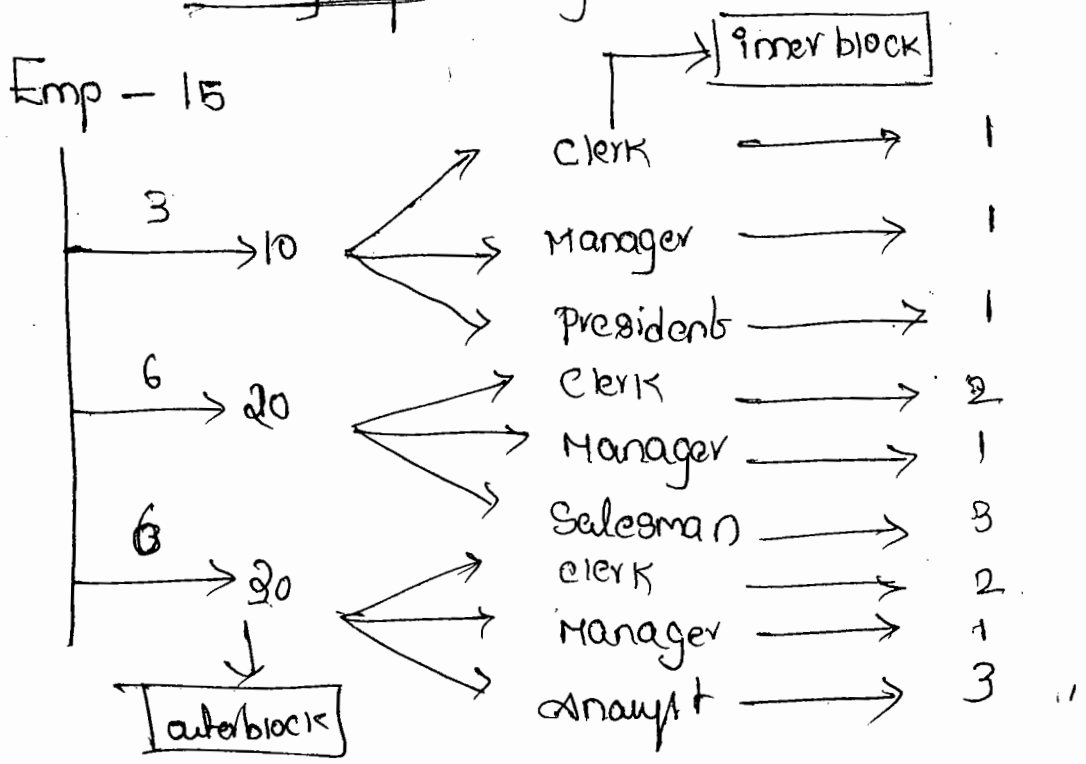
While using Group By clause in a Query, we need to follow (or) consider the following.

1. When a group function is applied on a group it returns only a singe value but each group can return a seperate value.
2. Use group-by clause only on a column which contains duplicate values, never apply it on unique columns.

→ Write a query to get the number of employees working in each job per each department.

Sol:- Select deptno, Job, Empcount = count(*) From Emp Group By Deptno, Job order by Deptno.

When we use multiple columns in a group by clause first, data in the table is divided basing on the first column of the groupBy clause and then each group is sub-divided basing on the second column of the groupBy clause and then the group function is applied on each inner group to get the result.



01/07/2013 | Monday

Rollup and Cube Operators:

Rollup: Generates a simple group by aggregate rows plus sub-totals and also a grand total row.

Eg:-

```
Select count (*) From Emp
Select Deptno; count (*) From Emp Group By deptno
Select Deptno, Job count(*) From Emp Group By deptno, Job
order By deptno, Job.
```

(or)

```
Select Deptno, Job count(*) From Emp Group By Rollup (Deptno, Job)
```

O/p:-

Deptno	Job	Count
10	Clerk	1
10	Manager	1
10	President	1
10	Null	3
20	Clerk	2
20	Manager	1
20	Salesman	3
20	Null	6
30	Clerk	2
30	Manager	1
30	Analyst	3
30	Null	6
Null	Null	15

Cube operator:- Generates a simple group by aggregrate rows, rollup aggregrate and cross-tabulation rows.

Eg:- Select count (*) From Emp

Select Deptno, count (*) From Emp Group by Deptno

Select Job, count (*) From Emp Group by Job

Select Deptno, Job, count (*) From Emp Group By Deptno, Job order By Deptno, Job.

(or)

Eg:- Select Deptno, Job count (*) From Emp Group By cube (Deptno, Job)

Deptno	Analayst	Clerk	Man	P	S	T
10	0	1	1	1	0	3
20	0	2	1	0	3	6
30	3	2	1	0	0	6
	3	5	3	1	3	15

O/p - Analyst 3

Clerk 5

Manager 3

President 1

Salesman 3

→ Write a Query to get the highest salary in the organization

Sol:- Select Max (Sal) From Emp

→ Write a Query to get the highest salary of Each department

Sol:- Select Deptno, Max(Sal) From Emp Group By Deptno.

→ Write a query to find out the highest sal of Each Dept, along with the name of the Employee.

Sol:- Select Deptno, Max(Sal), Ename from Emp Group By Deptno. // Invalid

Note:- The above Query will not be executed because while using groupBy clause in a statement the Select list can contain only three things in it.

1. Columns that are associated with Group By clause
2. Aggregate (or) Group functions
3. Constants

In our above query, Ename (column) doesn't fall under any of the three. So, it cannot be used in the select list

Eg:- Select Deptno, Max(Sal), Ename From Emp Group By deptno // Invalid

Select Deptno, Max(Sal), Get-Date() From Emp Group By deptno // valid

Select Deptno, Job, Max(Sal), 'Hello' From Emp Group By deptno, Job // valid

→ Write a Query to get the total investment being made on salaries For all the Employees for Each Job and for Each Job in Each department.

Sol:- Select Deptno, Job, sum(Sal) From Emp Group By Rollup (Deptno, Job).

→ Write a Query to get all the three above as well as Jobwise investment also.

Sol:- Select Deptno, Job, sum(Sal) From Emp Group By cube (Deptno, Job).

→ Write a Query to find out the total number of clerks in the organization.

Sol:- Select Count(*) From Emp where Job = 'clerk'

→ Write a query to find out the number of clerks in Each department.

Sol:- Select Deptno, Count(*) From Emp Where Job = 'clerk' Group By Deptno.

→ Write a query to get the number of Employees in Each department only if count is greater than 5.

Sol:- Select Deptno, Count(*) From Emp Where Count(*) > 5 Group By deptno // Invalid

Select Deptno, count(*) From Emp Group By deptno Having Count(*) > 5.

HAVING CLAUSE: This clause is also used for restricting the data. Just like Where clause.

The difference between Where clause and Having clause is.

* Where clause is used for restricting the rows before Grouping and Having clause is used for restricting the rows after grouping.
* If the restriction is associated with a aggregate Function we cannot use Where clause there. We need to use Having clause only.
* Where clause can be used for restricting individual rows Where as Having clause is used along with Group By clause to Filter or restrict groups.
* Having clause cannot be applied without a group by clause.

→ Write a Query to find out the number of Employees in Each job only if the count is less than 5.

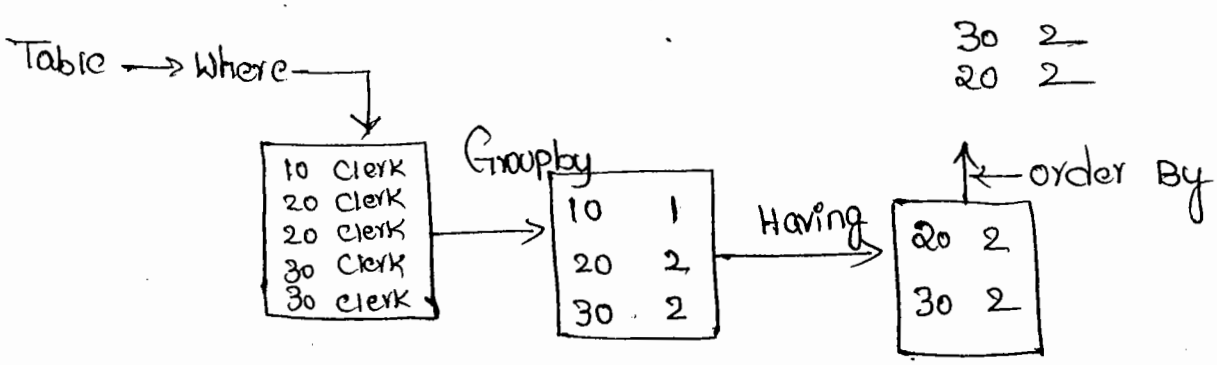
Sol:- Select Job, count(*) From Emp ~~Where count(*)<5~~
Group By ~~Job~~ Job Having count(*) < 5

→ Write a Query to find out the number of clerks in Each department only if the count is greater than 1

Sol:- Select deptno, ~~Job~~ count(*) From Emp Where Job = 'clerk'
Group By deptno Having ~~deptno~~ count(*) > 1.

(or)

Select deptno, count(*) Fromemp
Where Job = 'clerk'
Group By deptno
Having count(*) > 1



Order by clause:- It is used for sorting the data either in ascending (or) descending order of a query basing on a specified list of column(s).

Syntax:- order By <collist> [Asc | Desc]

(default is ascending only)

Eg:- Select Empno, ename, sal, comm, Deptno. From Emp order by sal

Select Empno, Ename, sal, comm, Deptno. From Emp order by sal Desc

Select Empno, Ename, sal, comm, Deptno From Emp where Deptno = 20 order By sal, Comm.

Note:- When we have multiple columns in order by clause, the data first gets arranged basing on the first column and if any duplicate values in the first column then it will take the support of second column for arrangement or else second column will not be used.

Eg:- Select Empno, Ename, Sal, Comm, Deptno From Emp Where Deptno = 20 order By sal, comm desc.

(here one column in asc & other in desc)

2/07/2013 Tuesday

OFFSET AND FETCH options under order By clause.

When applying the order by clause using the offset option we can eliminate the number of rows from the starting record

Eg:- Select Empno, Ename, sal from Emp order by sal offset 5 Rows

- Skips First 5 records in the result

FETCH:

By using the fetch we can specify the number of rows to return after the OFFSet clause is processed.

Eg:- Select Empno, Ename, sal From Emp order by sal offset 5 Rows Fetch Next 5 Rows only.

- Gets the rows from 6-10 in the result skipping first 5 rows.

Eg:- Select Empno, Ename, sal From Emp order by sal offset 0 Rows Fetch Next 5 Rows only.

- Gets the First 5 rows of the result.

SUB-QUERIES:

A Query inside another Query is known as a Sub-Query.

Syntax:- Select <collist> From <Tname> Where <conditional operator> (<Select stmt>)

In a sub-query, First the inner query executes and gives the result to the outer query For execution.

→ Write a query to get the details of the Employees who is earning the highest salary.

Sol:- Select * From emp Where sal = (select Max(sal) From Emp)

→ Write a query to get the second highest salaried Employee details in the organization.

Sol:- Select * From Emp Where sal =
Where sal =
(Select Max(sal) From Emp Where Sal <
(Select Max(sal) From Emp))

→ Write a query to get the third highest salary Employee details in the organization.

Sol:- Select * From Emp.
Where sal =
(Select Max(sal) From Emp where sal <(select max(sal) From Emp Where sal <(Select Max(sal) From Emp)))

We can Nest the queries upto 32 only

Note:- In the above context to get the nth highest Salary Employee details we are writting n+1 queries. but the Max number of queries permitted in the Nesting is only 32.

→ Write a query to get the details of Employees working in Sales department.

Sol:- Select ~~dept~~ * From Emp Where Deptno = (Select Deptno From Dept where Dname = 'Sales')

→ Write a query to get the list of Employees working in Chennai.

Sol:- Select * From Emp Where Deptno = (Select Deptno From Dept where Loc = 'chennai')

→ Write a query to get the list of Employees who is earning more than highest salary of deptno 30.

Sol:- Select * From Emp Where sal >
(Select Max(Sal) From Emp where Deptno = 30).

(or)

Select * From Emp where sal > All
(Select ~~Max~~ Sal From Emp where Deptno = 30).

→ Write a query to get the details of the employee whose is earning less than the lowest salary of deptno 20.

Sol:- Select * From Emp where sal < All
(Select sal From Emp Where Deptno = 20)

(or)

Select * From Emp Where sal <
(Select Min(Sal) From Emp where Deptno = 20)

→ Write a Query to get the list of Employees whose is earning less than the highest salary of Deptno 10.

Sol:-

```
Select * From Emp Where
Where Sal < Any
(Select Sal From Emp Where Deptno = 10)
```

(or)

```
Select * From Emp
Where Sal <
(Select Max(Sal) From Emp where Deptno = 10)
```

(or)

```
Sele- * From Emp
Where Sal < Some
(Select Sal From Emp Where Deptno = 10)
```

* All, Any & Some operators are used with sub-Queries when the inner query is returning multiple values.

* All operator implies the condition should satisfy all the values in the list.

* Any (or) Some (both are same) operator should satisfy any value in the ~~condition~~ list.

Any, Some and All operators can be used only in conjunction (or) association with a sub-Query.

→ Write a query to get the list of Employees who is earning the highest salary in each department

Sol:- Select * From Emp
Where sal IN
(Select Max(sal) From Emp Group By Deptno)

IN operator also can be used with sub-queries when the inner query is returning more than 1 value. Just like we used ANY (or) SOME and ALL operators. But, IN operator is used for Equality condition Whereas, ANY (or SOME AND ALL operators are used in case the condition is lessthan, lessthan or equal or greaterthan, greaterthanorEqual.

The above Query is First getting the highest salary of each department and then using those values in the outer query. So, the problem in this execution is IF the ~~values~~ salaries matches with other salaries in the department even if they are not highest of the department will be retrived.

10	5000
10	4000
20	4000
30	4000

O/P

10	5000
10	4000
20	4000
30	4000

Eg: Select * From Emp where
Deptno+' '+sal IN
(Select Deptno + ' ' + Max(sal) From Emp Group By Deptno)

To overcome these types of problems in oracle we are given with a concept of multicolumn. so that the Comparsion is performed with department & salary also

Select * From emp Where
(Deptno, sal) IN
(Select Deptno, Max(sal) From Emp
Group By deptno)

// Executes only in (oracle)

This type of multicolumn comparisions are not supported in SQL server. So we need to adopt our own logic in getting the results.

Eg:- Select * From Emp Where
Deptno + sal IN (Select Deptno + Max(Sal) From Emp
Group By deptno).

→ Write a query to get the details of the Employee who is the most senior in the organization.

Eg:- Select * From EMP Where
Hiredate = (Select Min(Hiredate) From Emp)

→ Write a query to get the details of the most senior Employee in each department.

Sol:- Select * From Emp Where
Hiredate IN (Select Min(Hiredate) From Emp GROUP
By deptno)

3-Jul-13 Wed

Co-Related Sub Queries:

Many queries can be evaluated by executing the sub query once and substituting the resulting values in to the Where Clause of the outer query. If queries that include a correlated Subquery (Repeating Subquery), the subquery depends on the outer query for its values. This means that the subquery is executed repeatedly. that might be selected by the outer query.

→ Write a query to get the details of the employee who is earning the highest salary in the organisation.

Sol:- Select * From Emp E Where 0 =
(Select count (sal) From Emp m
Where m.sal > E.sal)

In the above case 1st the outer query execute and then the inner query execute by comparing with the value outer query i.e it will count the no.of.outer query salaries are greater than inner qry salaries.

E

Empno	sal
1001	5000
1002	4000
1003	3800
1004	4000
1005	3500
1006	3000

M

Empno	sal
1001	5000 → 0
1002	4000 → 1
1003	3800 → 3
1004	4000 → 1
1005	3500 → 4
1006	3000 → 5

After performing a comparision is keep the record that matching with where condition which is nothing but the highest salary Employee details. So in this process if we use '1' in place of 0 it will give the 2nd highest salaried Employee detail.

→ The Problem what we face in the above execution is if there are duplicate records ranking sequence will not be proper, i.e on the above case if we want to get the 3rd highest salary we can not use 2 because '2' is missing.

⇒ To overcome the problem rewrite the code as following.

```
Select * from Emp E Where 0 =
(
Select count (Distinct sal) From Emp M
Where m.sal > E.sal
)
```

E

Empno	sal
1001	5000
1002	6000
1003	3800
1004	4000
1005	3500
1006	3000

M

Empno	sal
1001	5000 → 0
1002	4000 → 1
1003	3800 → 2
1004	4000 → 1
1005	3500 → 3
1006	3000 → 4

⇒ Write a query to get the details of the department in which employees were working.

```
Select * From Dept Where Deptno In
(
  Select Distinct Deptno From Emp
)
```

---By using correlated Sub query

```
Select * From Dept D Where Exists
(
  Select Deptno From Emp E
  Where E.Deptno = D.Deptno
)
```

Exists (<Stmts>)

Rows > 0 True

Rows = 0 False

Not Exists (<Stmts>)

Row > 0 False

Row = 0 True

→ Write a Query to get the list of dept in which Employees are not working.

Sol:- Select * From Dept Where Deptno
Not IN
(Select Distinct Deptno From Emp)

Select * From Dept D Where Not exist
(
Select Deptno From Emp E Where
E.Deptno = D.Deptno
)

→ Write a Query to get the list of Employee who have sub-ordinate under them.

Sol:- Select * From Emp Where Empno In
(
Select Distinct Mgn From Emp)

Select * From Emp E Where Exists
(
Select * From Emp m where
m.mgn = E.Empno.
)

Note:- Co-related Subquery will be consuming more time to execute because every row of the inner query is getting compared with every row of the outer query. So, use a "correlated subquery" only if there is no chance are using a "Subquery"

JOINS

These are used for retriving the data from one or more tables at a time.

⇒ Joins can be used in any of the following ways.

⇒ Equi – Joins
⇒ non equi – joins
⇒ Self join
⇒ Cartesion join
⇒ outer join

Equi – joins :- If two or more tables are combined using in Equality Condition we call it as a Equi join.

Q: Write a Query to get the Matching records from emp and DEPT tables.

```
Select E. EMPno, E. Ename, E. Job, E. Mgr, E. Hiredate
       E. Sal, E. Comm, E. Deptno, D. Deptno, D. Dname,
       D. LOC From "EMP E, Dept D. Where
       E. Deptno = D. Deptno
```

In the above case it will retrive the records from the both the two tables only. If that the DEPTno matches with the two tables, So it will not retrive the information of Dept no "40" from Dept table Because

a Match is not available in Emp table

Note: The above Query will retrive the data from ~~the~~ both the two tables but the Syntax of joining the table is not a ANSI Standard. To write joins in ANSI Standard we are given with three option.

=> ~~Natural~~
=> Inner join
=> Cross join
=> outer join

Inner join :- using "Inner join" we can implement Equi-join, non Equi-join as well as Self join also.

Equi-join in ANSI Standard:-

Select E.EmpNo, E.Ename, E.Job, E.mgn, E.Hiredate, E.Sal, E.Comm, E.Deptno, D.Deptno, D.Dname, D.Loc From EMP.E Inner join / (only) join Dept D on E.Deptno = D.Deptno

Note: In ANSI Standards to write a join Statement we explicitly use the join keywords between ~~we explicitly~~ the tables which gives descriptiveness and also to join the tables with the conditions we use the "on" keyword but not "where".

4/07/2013 Thursday

Loading data from multiple tables using Equi-Join Condition:-

By using an Equi-Join, we can combine the data of any number of tables provided all these tables contains a common column

DeptDetails

Did	Deptno	comments
1	10	
2	20	
3	30	
4	40	

→ Write a query to join the three tables Emp, Dept & DeptDetails.

Sol:- Non-Ansi Join:

```
Select E.Empno, E.Ename, E.Job, E.mgr, E.Hiredate, E.Sal,
E.Comm, E.Deptno, D.Dname, D.Loc, DD.id, DD.Comments
From Emp E, Dept D, DeptDetails DD.
Where E.Deptno = D.Deptno and
D.Deptno = DD.Deptno.
```

Ansi - Standard Join:

```
Select E.Empno, E.Ename, E.Job, E.mgr, E.Hiredate, E.Sal,
E.Comm, E.Deptno, D.Dname, D.Loc, DD.id, DD.comments
From Emp E
Inner Join Dept D on E.Deptno = D.Deptno
Inner Join DeptDetails DD on D.Deptno = DD.Deptno.
```

Non-Equi Joins: If we join tables with any condition other than Equality condition we call it as a non-Equi Join.

Salgrade

Grade	Losal	Hisal
1	1300.00	1800.00
2	1801.00	2700.00
3	2701.00	3500.00
4	3501.00	5000.00
5	5001.00	8000.00

Write a query to get the data from Emp and Salgrade tables by displaying the grade of the employee basing on the salary.

Sol:- Non-Ansi Join:

```
Select E.Empno, E.Ename, E.Job, E.Sal, S.Grade, S.Losal,
S.Hisal, From Emp E, Salgrade S Where E.Sal Between
S.Losal and S.Hisal.
```

Ansi standard Join:

```
select E.Empno, E.Ename, E.Job, E.Sal, S.Grade, S.Losal,
S.Hisal From Emp E inner Join Salgrade S on E.Sal
Between S.Losal and S.Hisal.
```

→ Write a Query to get the data from Emp, Dept and Salgrade tables.

Sol:- (Select E.Empno, E.Ename, E.Job, E.Sal, D.Deptno, D.Dname, D.Loc, S.Grade, S.Losal, S.Hisal From Emp E inner Join Dept D on E.Deptno = D.Deptno.

Inner Join)x

Non-Ansi Join

Sol:- Select E.Empno, E.Ename, E.Job, E.Sal, D.Deptno, D.Dname, D.Loc, S.Grade, S.Losal, S.Hisal From Emp E, Dept D, Salgrade S Where E.Deptno = D.Deptno And E.Sal Between S.Losal and S.Hisal.

Ansi standard Join:

Select E.Empno, E.Ename, E.Job, E.Sal, D.Deptno, D.Dname, D.Loc, S.Grade, S.Losal, S.Hisal From Emp E Inner Join Dept D on E.Deptno = D.Deptno
Inner Join Salgrade on E.Sal Between S.Losal and S.Hisal.

SELF Join:- Joining a table to itself for getting the results is a Self Join

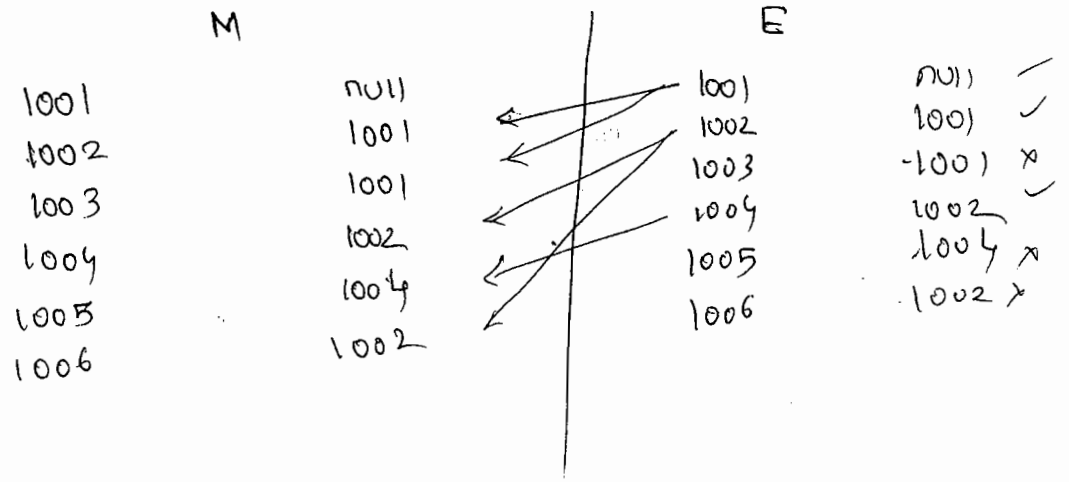
→ Write a query to get the details of the Employee who have Sub-ordinates under them by using a Join.

Sol:- Non Ansi Join:

Select Distinct E.Empno, E.Ename, E.Job, E.Sal, E.Deptno, From Emp E, Emp M where E.Empno = M.Mgr

Ansi standard Join

Select Distinct E.Empno, E.Ename, E.Job, E.Sal, E.Deptno, From Emp E Inner Join Emp M on E.Empno = M.Mgr.



CARTESIAN (or) CROSS JOIN:

If two or more tables are combined with each other without any condition we call it as a cartesian (or) a cross Join. Here Each row of the first table goes and Joins with each row of the second table. So if the first table as m rows and the second table as n rows. The output will be (m x n) rows (Cartesian product).

1. Non-Ansi Join:

```
Select * From Emp E, Dept D
```

2. Ansi standard Join:

```
Select * From Emp E cross Join Dept D.
```

1. Non-Ansi Join

```
Select * From Emp E, Dept D, Dept-Details DD
```

2. Ansi standard Join

```
select * From Emp Cross Dept D Cross Join Dept Details DD.
```

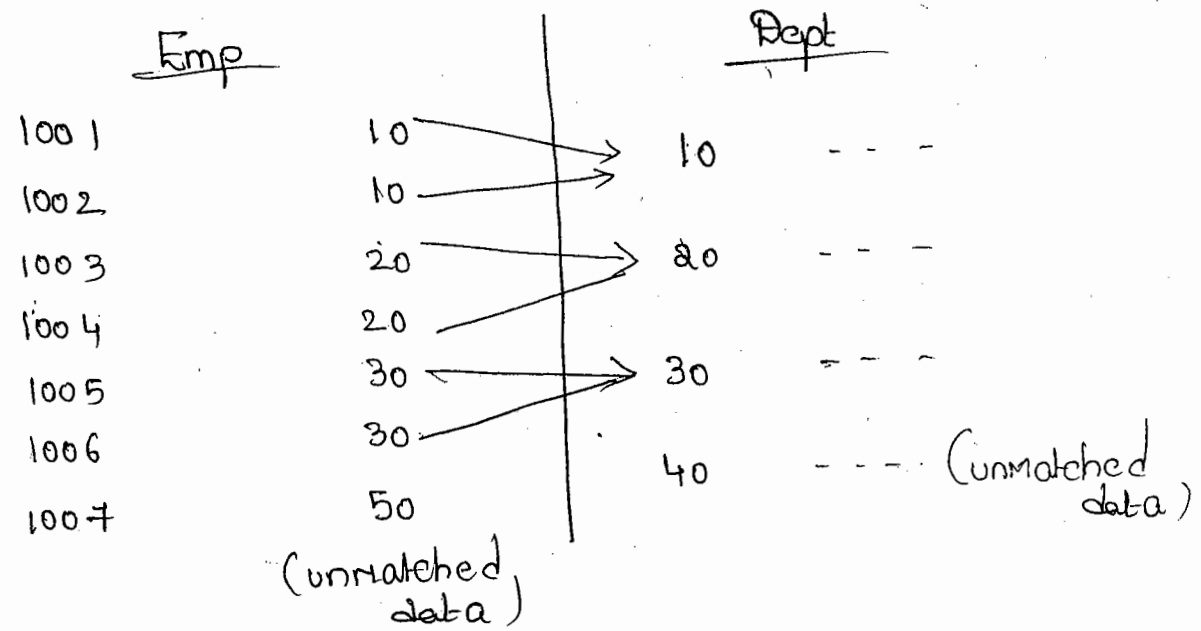
o/p (240)

OUTER JOIN:

It is an extension for the Equi-Join that is in an Equi-Join condition we will be getting the matching information from the tables used in the queries. Where as if a record(s) of a table doesn't have the matching data in the other table that record(s) will not be retervied.

In case of an outer Join just like our Equi-Join will reterive the matching data from all the tables as well as the unmatched data also. Where the unmatched data can be present in the L.H.S table (or) R.H.S table

(or) both tables also.



Outer Joins are of three types:

1. Left outer Join: Retrieves the matching data from both the tables as well as unmatched data from Left hand side table.
2. Right outer Join: Retrieves the matching data from both the tables as well as unmatched data from Right hand side table
3. full outer Join: Retrieves the unmatched data from both the tables plus unmatched data from L.H.S tables plus unmatched data from R.H.S tables also.

Left outer Join:

Eg:- Select E.Empno, E.Ename, E.Job, E.Mgr, E.Hiredate, E.Sal, E.Comm, E.Deptno, D.Dname, D.Loc, From Emp E Left outer Join Dept D on E.Deptno = D.Deptno.

Right outer Join:

Eg:- Select E.Empno, E.Ename, E.Job, E.mgr, E.Hiredate, E.sal, E.comm, E.Deptno, D.Deptno, D.Dname, D.LOC From Emp E Right outer Dept D on E.Deptno = D.Deptno.

Full outer Join:

Select E.Empno, E.Ename, E.Job, E.mgr, E.Hiredate, E.Sal, E.comm, E.Deptno, D.Deptno, D.Dname, D.Loc From Emp E Full outer Dept D on E.Deptno = D.Deptno.

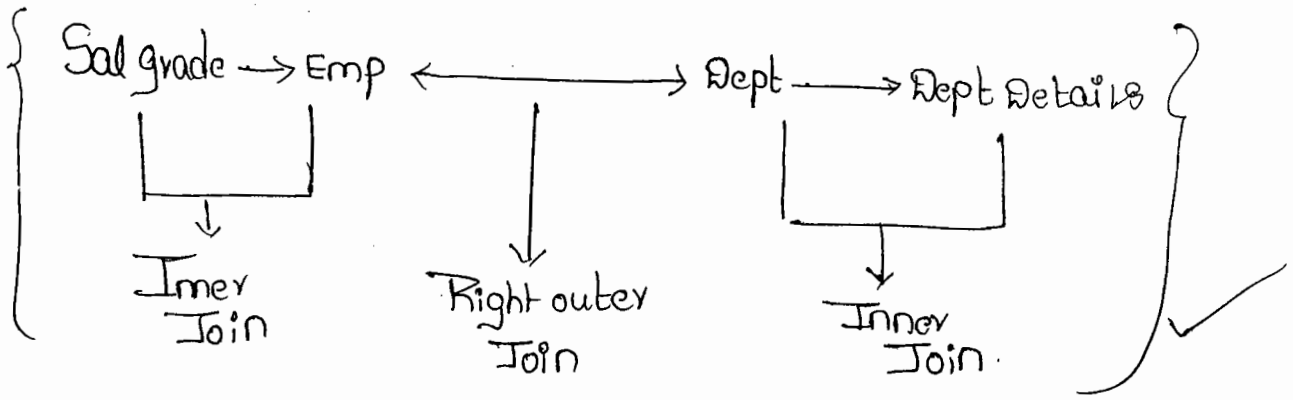
5/07/2013 Friday

→ Write a query to get a matching and unmatching data from the tables Emp, Dept, DeptDetails and (Salgrade.)

Sol:- Select E.Empno, E.Ename, E.Job, E.Sal, ~~E.Deptno~~, D.Deptno, D.Dname, D.LOC, DD.id, DD.comments, ~~S.Grade~~, ~~S.Losal~~, ~~S.Hisal~~ From Emp E Right outer Join Dept D on E.Deptno = D.Deptno. Inner Join DeptDetails DD on D.Deptno = DD.Deptno.

Note:- In the above query, we are not retriving the information from salgrade table. If we want to get the data from that table also with matched and unmatched data the query must be as following.

Eg:- Select E.Empno, E.Ename, E.Job, E.Sal, S.Grade, D.Deptno, D.Dname, D.LOC, DD.id, DD.comments From Salgrade S Inner Join Emp E on E.Sal ~~Salgrade~~ Between S.Losal and S.Hisal Right outer Join Dept D on E.Deptno = D.Deptno Inner Join DeptDetails DD on D.Deptno = DD.Deptno



{Emp → Dept → Dept-Details → salgrade } ✗

SYNONYMS:- It is an object which can be created as an "alias" for any object like table, view, procedure, function etc.

Syntax:- Create Synonym <Name> for <object Name>

Eg:- Create Synonym E For Emp

Select * from E

SEQUENCE:- This is a new object introduced in 2012 Sql Server 2012 used for generating a sequence of numeric values according to the specifications with which the sequence is created.

Sequence is capable of generating numeric values in ascending and descending order also by providing a restart (or) cycle option. When it reaches the Max. value.

Like Identity, sequences are not associated with specific tables.

Syntax:-

CREATE SEQUENCE <Name>

[AS [type]]

[Start with <constant>]

[INCREMENT BY <constant>]

[{MINVALUE [<constant>]} | {NO MINVALUE}]

[{MAXVALUE [<constant>]} | {NO MAXVALUE}]

[CYCLE | {NO CYCLE}]

[{CACHE [<constant>]} | {NO CACHE}]

Type refers to the type of value which should be generated by the sequence must be an integer type only. It allows the following types

tinyint - Range 1 Byte
Smallint - Range 2 Bytes
Int - Range 4 Bytes
Bigint - Range 8 Bytes (default)

Decimal and Numeric with a scale of 0.

Note:- Decimal and Numeric when used without a scale will be integer only.

START WITH: It is the first value written by the sequence. Start value must be a value lessthan or Equal to the MAXIMUM VALUE or greaterthan or Equal to the MINIMUM value of the Sequence. The default start value for a new sequence is Minimum value for ascending Sequence and Maximum value for descending Sequence.

INCREMENT BY: It is the value used for increment or decrement for the next value being generated by the sequence for each column.

If the increment is a negative value it is a descending sequence other wise it is ascending. The default increment is 1 and cannot be specified 0.

MINVALUE: Specifies the lower bound for the sequence object. The default min value for a new sequence is the minimum value of the datatype which is zero for the tinyint and Negative number for all other datatypes.

MAXVALUE: It specifies the upper bound for the sequence object. The default Max value for is the max value of the datatype.

CYCLE | (NOCYCLE): This property specifies whether the sequence object should restart or throw an exception when it is minimum or maximum value is exceeded. Default is Nocycle.

Note:- The cycling restart from the minimum value if it is incrementing sequence or maximum value if it is decrementing sequence but not from the start value.

(CACHE | (NOCACHE) :- This is used for increasing performance for applications that uses sequence object by minimizing the number of I/O's that are required to generate sequence Number.

If we specify a cache size, sql server will generate that many number of values at a time and returns them one by one.

Note:- If we specify the cache without cache size, database Engine will select the size, however that value will not be consistent and not under our control.

When a Sequence is created with a cache option any unexpected shutdown may result in the loss of sequence number remaining in the cache.

Eg:- Create Sequence Myseq
as Int
Start with 1001
Increment By 10

~~Select Next value For Myseq~~

Generating a value ~~use~~ From the Sequence.

Syntax: Next value For <SeqName>

Eg:- Select Next value for Myseq

Eg:- Create Sequence Empseq
as int
Start with 2001
Increment by 1
Minvalue 2000
Maxvalue 2010
Cycle
Cache 5

using Sequence in insert Statement.

```
Insert into Emp(Empno, Ename, sal, Deptno)
    Values (Next value for Emp seq, 'xxx', 3000, 40)
```

Altering a Sequence:- once the Sequence is created you have a chance of modifying the sequence by changing any value we have specified but not, the data type of that sequence.

Syntax:-

```
ALTER SEQUENCE <Name>
    [RESTART [WITH <constant>]]
    [INCREMENT BY <constant>]
    [{MINVALUE <constant>} | {NO MIN VALUE}]
    [{MAXVALUE <constant>} | {NO MAX VALUE}]
    [CYCLE | {NO CYCLE}]
    [{CACHE [<constant>]} | {NOCACHE}]
```

In an alter Sequence statement, we are provided with restart with option which is used for regenerating the values after altering the Sequence.

```
Eg:- Alter Sequence Empseq
     Restart with 2001
     Max value 2015.
```

9/07/2013 Tuesday

Creating a new table From Existing table:

If required we can create a new table basing on the columns of a single or multiple tables also as following.

Syntax:- Select <collist> Into <New Table> From <old Table> [Clauses]

Eg:- Select * into New_Emp From Emp

Select E.Empno, E.Ename, E.Job, E.Sal, D.Deptno, D.Dname, D.Loc, DD.Did, DD.Comments into EmpDetails From EmpE
Inner Join Dept D on E.Deptno = D.Deptno
Inner Join DeptDetails DD on D.Deptno = DD.Deptno.

Creating a blank table by copying the structure.

Select * into Blank_Emp . From Emp Where 1 = 2
Select * From Blank_Emp.

Using identity function while creating a new table from existing table.

Syntax:- Identity (data_type [, seed, increment]) as colname

Identity function can be used only in a select with an into table clause to insert an identity column into a new table.

ex:- Select Identity (int, 1, 1) as Id, Empno, Ename, sal, Comm, Sal + ISNULL (comm, 0) as TotalSal Into Sal_Emp from Emp.

VIEW: It also a database object, much like a table but - Logical We can either call it as a logical or virtual table. Because it doesn't have any physical existance.

Syntax:- CREATE VIEW <Name> [(column [,...n])]
[WITH <VIEW_attribute> [,...n]]
AS select_statement [WITH CHECK OPTION]

<VIEW attribute>:

- ENCRYPTION
- SCHEMABINDING

When compared with table we have the following differences between a table and view.

1. Table is physical where as view is Logical.
2. Table is an independent object where as view is a dependent object that is a view depends on a table (or) tables from which it is loading the data.
3. When a new table is created from an existing table the new and old tables are independent of themselves that is the changes of one table will not be reflected into the other table where as if a view is created basing on a table any changes that are performed on the table reflects into the view and any changes Performed on the view reflects into the table also.

Eg:- Create view sales_view as select * From Emp Where Deptno = (select Deptno from Dept Where Dname = 'sales').

Any Select statement that can retreive information from a table (or) tables can be used for creating a view.

Eg:- Creating a view by specifying column names.

Create view salDetails_view (Dno, Job, salsum) As Select Deptno, Job, sum(sal) From Emp Group By Deptno, Job

* We cannot use an "order by" clause in a Select statement of Create view. But if there is a top clause in the Query order By is valid.

Eg:- Create view. Emp_Asc As select * From Emp order By sal //Invalid

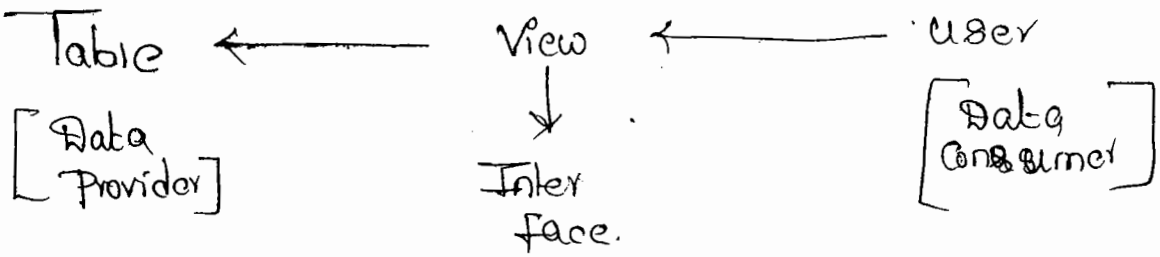
Create view Emp_Asc As Select Top 15 * From Emp order by sal //valid.

Creating a view from multiple tables:

Create view Emp_Dept As Select E.Empno, E.Ename, E.Job, E.Sal, D.Deptno, D.Dname, D.Loc From Emp E Inner Join Dept D on E.Deptno = D.Deptno.

BENEFITS OF A VIEW:

1. When we want to provide access to a subset of data from the table we can then create a view with the required data and give permissions on that view so that we can manage security.
2. When we want to access data from a table (or) tables by writting Complex Queries always in such cases if we create views basing on that queries we can directly query on the views only without writing complex Queries Every time.
3. A View is a logical table, but what it stores internally is a select statement that is used for creating the view. So that, whenever a user performs any operations on the view like Select, insert, update or delete internally the view performs those operations on a table. Simply speaking it acts as a interface between the data provider (table) and the data consumer (user).



10/07/13 Wed

Metadata tables:- These all tables which stores Metadata (data about data) under them. All the Metadata tables are Predefined system tables where we can only query and retrive the data, From those table but can't Manuplate the data

(i) sys objects:- This table contains the information of each and every object i.e created under that database. Like tables [System or users], views, constraints, sequences, synonym etc. We can find out what type of object it is we can make use of the "xtype" column of the table.

Select * From sysobject where xtype = 'U' (user table

xtype values:-

S : System Table
U : User Table
V : View
PK : Primary key
UQ : unique
C : check
F : Foreign key
SO : Sequence
SN : Synonym
SP : Stored procedure
FN : Function

Syscolumn :-

This contains the Information of each and every column i.e associated with each and every table or view

Select * from syscolumn where ID = object_id ('Emp') ;

-- Gets the columns of Emp table.

Syscomments:-

This contains the information of views and check constraints where we find a column text which contains the query used in the creation of a view on the condition i.e applied for a check constraints.

Eg:- Select *Text From Syscomments where Id=object_Id ('Sales_view') -- Gets the text associated with sales_view

→ View classification:-

A) i) Simple views and ii) Complex views

B) i) Updatable views and ii) Non-updatable views

1) SIMPLE VIEW & COMPLEX VIEW:

⇒ A view which is created basing on the columns of a single table is known as a simple table

Eg:- 1) Create View view1 as select Empno, Ename, Job, Sal, Deptno From Emp

2) Create View view2 as select * From Dept.

→ A view i.e created basing on multiple tables columns is a complex view.

Eg:- Create view View3 as Select E.Empno, E.Ename, E.Sal, S.Grade, S.Losal, S.Hisal From Emp E InnerJoin Salgrade S on E.Sal Between S.Losal and S.Hisal.

→ A view which is created basing on a single table will also be considered as a complex view provided. If the query contain any of the following:

1) Distinct, Aggregate Function, Group By clause, Having clause, calculated columns and set operators

Eg 1) Create view view4 as select Deptno, sum(sal) as salsum From Emp Group By Deptno
(sum(sal) → Complex view; Group By → complex view.)

2) Create view view5 as
select job From Emp Where Deptno=20
Intersect
Select job From Emp Where Deptno=30

→ UPDATABLE AND NON-UPDATABLE VIEW:

A view which allows manipulation to the data associated with the view we called it as a updatable view and if it doesn't allow manipulations it's a non-updatable view.

→ By default all the columns of a simple view table are updatable and complex view tables are Non-updatable.

Note:- We can update complex views based on multiple tables but not all the columns we can update only columns associated with one table.

With check option:- If at all a view is created by using a where condition later on if any manipulation are performed on that view against the where condition still those changes are accepted. To test this create a view as following.

Eg:- Create view Finance_view As
Select * From Emp where Deptno=30

In the above case the view is created associating with a viewhere condition "deptno=30" but if we still trying to insert a record that violates our where condition that operation gets performed i.e

Insert Into Finance_view (Empno, Ename, Job, sal, Deptno)
values (1016, 'Abc', 'manager', 4500, 40)

→ If we want to restrict any DML operations on the view against the Where condition we need to add the "with check option" either at the time of creating the view or we can add that option by Altering the view.

Eg:- Alter view Finance_view As select * From Emp
Where Deptno=30 With check option.

Insert Into Finance_view (Empno, Ename, Job, sal, Deptno)
values (1017, 'ABC', 'clerk', 2000, 40)

Now the above statement execution fail as the Where Condition of the view is violating.

With Encryption:- After creating a view we can checkout the statement we have return for creating the view under that the text column of syscomment table. But for any security reason if we don't want to disclosed that information to anyone we can hide it by using "with Encryption" option either while creating the view or Altering the view.

Eg:- Alter view Finance_view
With Encryption
As
Select * From Emp where Deptno=30
With checkoption

→ Now if we verify text column under the syscomments tables it displays Null in the place of create view statement.

Eg:- Select Text From sysComments
Where id = object_id ('Finance_view')

Q) can we drop a table that has dependent views on it?

Ans:- yes we can drop a table even if any dependent views are associated with it, but the views are associated with it, but the views will not be droped. They will be still existing in the database only with the status as inactive object and all those views become active and start functioning Provided the table is recreated.

Thursday
11 | 07 | 2013

WITH SCHEMABINDING:

If a view is created by using the attribute "schemabinding" we "cannot drop" on "alter the table columns" on which the view is dependent.

Eg:- Create view marketing_Emp
With schemaBinding
As Select Empno, Ename, Job, Sal, Deptno
From dbo.Emp Where Deptno = 10

→ After creating the view we cannot drop the Emp table or alter any columns that are specified in the view.

When we want to use the schemabinding option it is must to specify each and every column name in the select statements but cannot use "*"

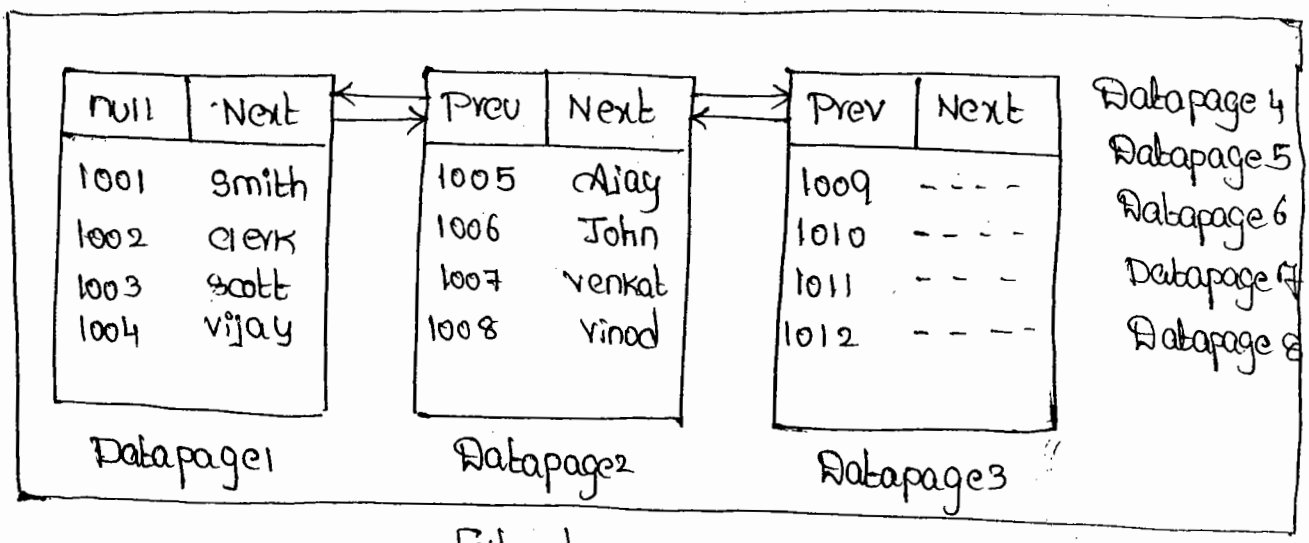
→ While using the schema binding option the table name must be prefix with the owner name is dbo. Which tells the current user is only the owner of the table.

Note:- If required we can use the With Encryption and with schemaBinding option at the same time.

Eg:- Alter View Marketing_Emp
With Encryption, SchemaBinding
As Select Empno, Ename, Job, Sal, Deptno
From dbo. Emp where Deptno = 10

How Data Is Stored under a DataBase?

Sql Server Stores data in it under data pages, where a datapage is a minute location for storing of the information. A datapage will be having a size of 8KB and every 8 data Pages are stored under a logical container known as an "extend"



Extend

⇒ If all the datapage in an extend are filled for storing new data Sql Server creates a new extend with 8 datapages at a time.

Q How will the database engine retrives the information from a table:

Whenever the database engine want to retrive the information from the table it will adopt two different mechanism for Searching the data.

→ Full page scan
→ Index scan

→ In the first case sql server will search for the required information in each and every page to collect the information. So, if the table has more rows it will be taking lot of time for scanning all the data. so it is a time consuming process.

→ In the second case sql server without searching into each and every datapage for retriving the information it will make use of an index for retriving the information, Where an index is a pointer to the information what we are retrive which can reduce the disk I/o operation saving the time, But if we want to use index scan for searching the data first the index has to be created.

Syntax:- Create [unique] [clustered / Non-clustered]
Index <Index Name> on <TableName>
(<collist>)

Note:- Whenever an index is created on a column or columns of a table internally an index table gets created maintaining the information of a column on which the index is created as well as address (pointer to the row corresponding to a column)

Index Table

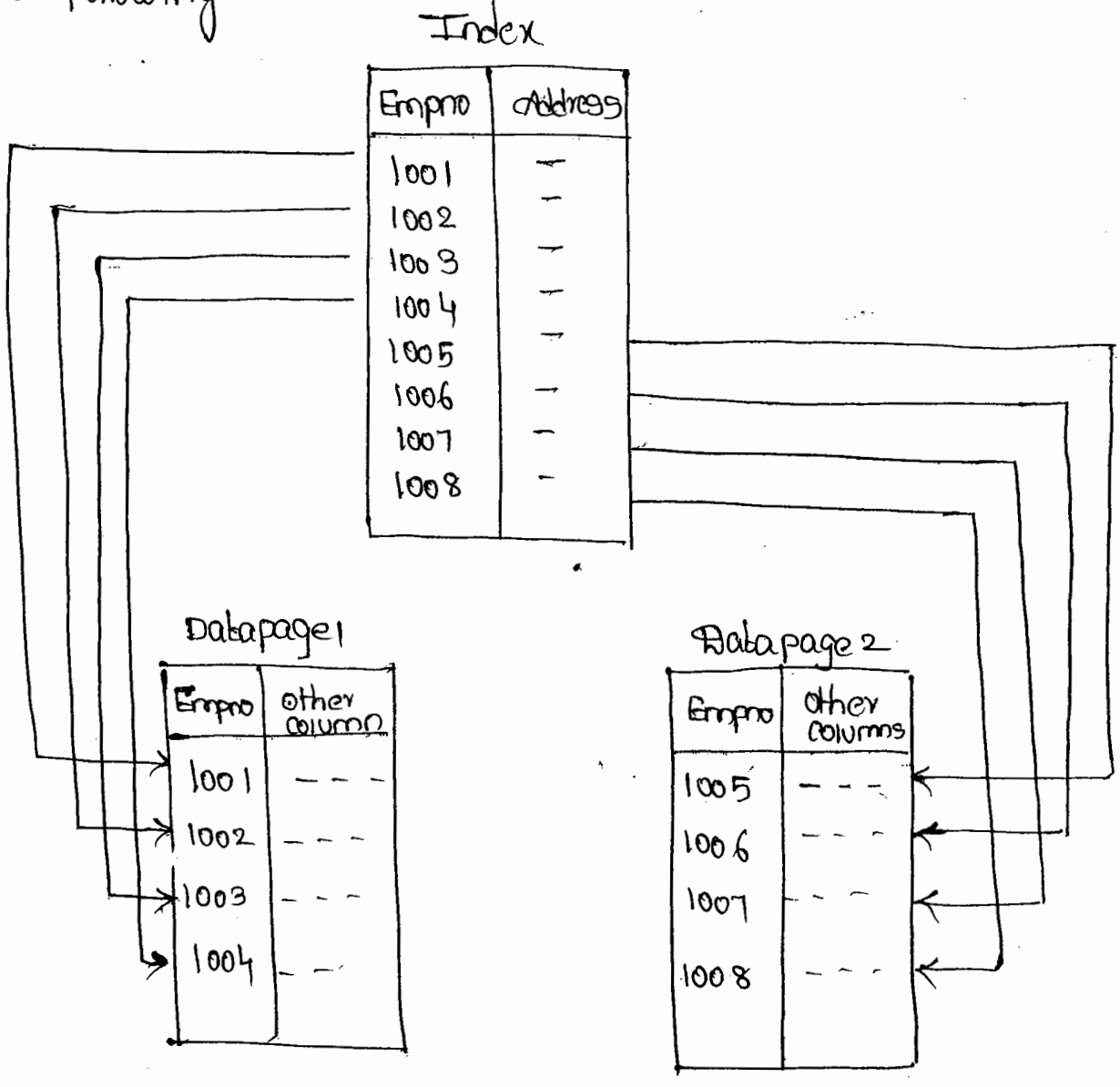
<collist>	Address

CLUSTERED INDEX:- In this case the arrangement of the data in the index table will be same as arrangement of the data of actual table.

Eg:- The index we find in the start of a book.

Note:- Indexes will arrange the information under them by adopting a structure called B-tree structure.

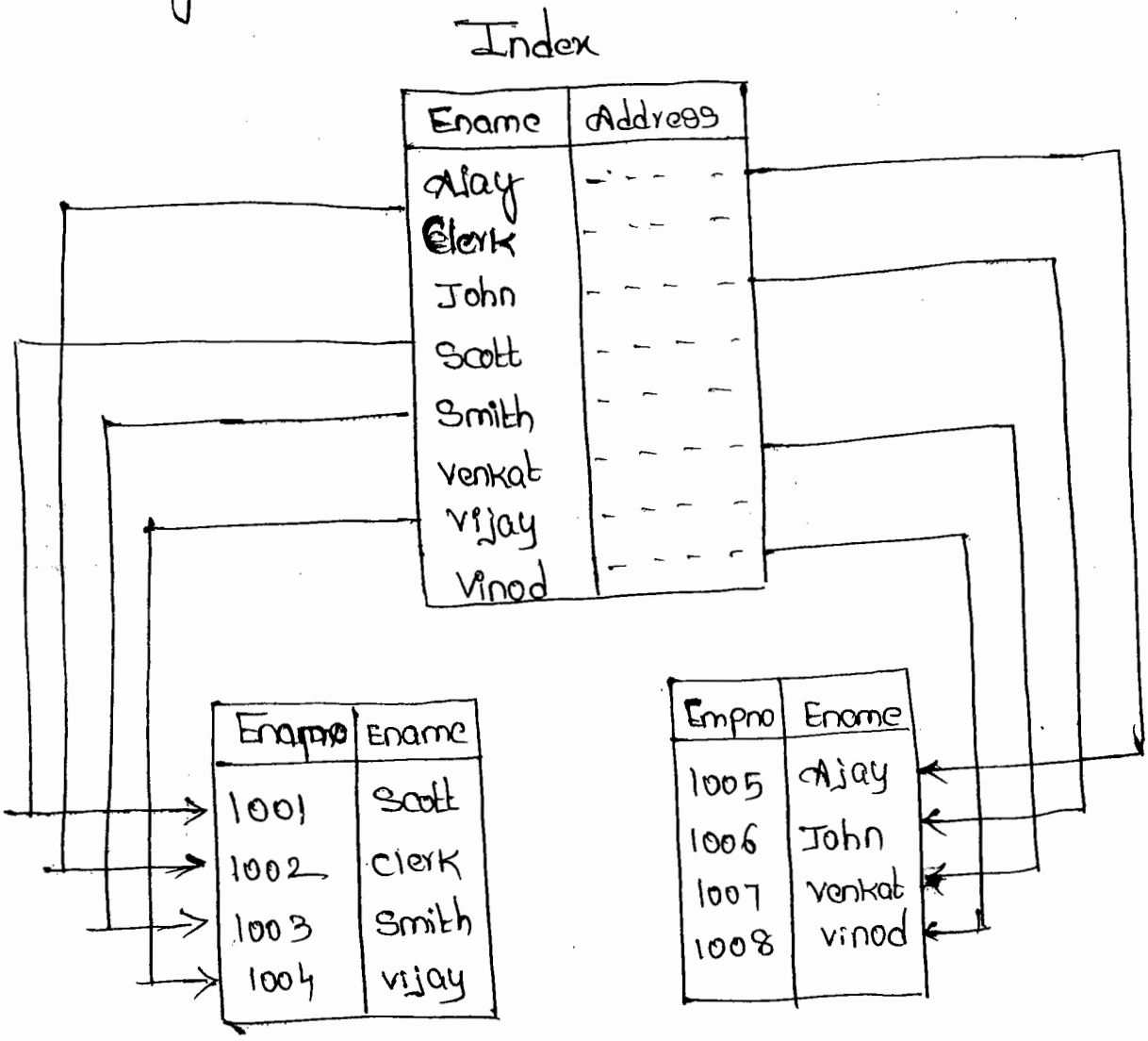
→ Suppose if a clustered index is created on the employee no. column of Emp table internally we will find the information as following.



NON CLUSTERED INDEX: In this case the arrangement of data in the index page or table will be different from the arrangement of in actual table.

Eg:- The index we find in the end of the book.

Suppose a nonclustered index is created on Ename column of Emp table the arrangement of the data will be as following.



Unique Index:- If the index is created by using "unique" option that column on which the index is created will not allow duplicate values i.e it works as a "unique constraints". Unique constraint can be either unique clustered or unique non-clustered also.

Note:- While creating an index if clustered or non-clustered is not specified. Default is non-clustered.

Q:- How many Indexes a table can have?

We can create a maximum of 250 indexes in which only one can be clustered and remaining all are nonclustered

Are indexes created Implicitly or should be create them Explicitly.

When ever we impose a primary key constraint on a tables column internally a "unique clustered" index gets created. Where as if a unique constraint is impose on any column internally a "unique nonclustered" index gets created.

→ Creating indexes on Emp table:-

As the Empno column is imposed with a pk it will contain a unique clustered index implicitly Apart from that we can create any number of nonclustered indexes on the table as following.

Eg: create Nonclustered index Ename_Ind on Emp(Ename)
create index sal_ind on Emp(sal)

Eg:- Create table Student (sid int, sname varchar(50))
Create unique clustered index Sid_Ind on Student (sid)

Note:- In the above case the index will not provide the functionality of primary key for Sid column but still we will get the functionality of unique constraint.

12-Oct-2013 Friday

When SQL Server uses Indexes:-

Sql server uses indexes of a table provided the select or update or delete statement contained "where" condition in them and moreover the where condition column must be a indexed column.

If the select statement contain an "order by" clause also indexes will use.

Note:- when sql server is searching for information under the database first it verifies the best execution plan for retriving the data and uses that plan which can be either a full page scan or an index scan also.

Eg:- Select * From Emp X
Select * From Emp Where Empno = 1003 ✓
Select * From Emp where Ename = 'scott' ✓
Select * From Emp Where Sal > 3000 ✓
Select * From Emp Where ~~Soundex~~ job = 'manager' ✗
Select * From Emp Where Soundex (EName) = Soundex ('Smyth') ✗
Select * From Emp order By Sal Desc

When Should we create Indexes on a Table:

We need to create index on a table columns provided those columns are frequently used in "Where condition" or "order By clause".

→ IF is not adviced creating an index on each and every column because more number of indexes can degrade the performance of database also because every modification we make on the data should be reflected into all the index tables.

Transaction Control Language :- [TCL]

A Transaction is a unit of work or set of statement (Insert, update & delete) which should be executed as one unit.

The rule of transaction tells that either all the statements in the transaction should be execution successfully or non of those statement to be executed.

To manage transaction we have provided with transaction control language, that provides a commands like "commit Transaction," Rollback Transaction", "save Transaction.

Commit Transaction:- Marks the end of a successful transaction which will make all data modifications performed since the start of the transaction permanent under the table and frees the resources held by the transaction.

Rollback Transaction:- It will bring back an implict or explicit transaction to the begining of the transaction or erase all data modification made from resources held by the transaction

Sql server provides or supports 3 different modes of transaction

1) Auto commit transaction mode [default]
2) Implicit Transaction mode
3) Explicit Transaction mode.

Auto Commit Transaction:-

In this mode Programmers are not responsible for begining a transaction or ending a transaction when ever we perform or execute any DML statement - sql server only will Begin a transaction and ends the transaction with a commit or Rollback. So, programmers doesn't have any control on them.

Implicit transaction mode:-

In this mode Sql server will begin a transaction implicitly before execution any DML statement and developers are responsibility to end the transaction with a commit or Rollback. once a transaction ends automatically a new transaction start.

→ To use implicit transaction mode need to explicitly execute the following command.

Set Implicit_Transaction (on/OFF)

If the property value is set as ON it sets the connection into implicit transaction mode and if it is OFF returns the connection to auto commit transaction mode

```
Set Implicit_Transaction ON
update Emp set sal = 5000 where Empno=1002
Commit or Rollback
update Emp set sal = 6000 where Empno=1002
Commit or Rollback
```

Explicit Transaction Mode:-

In this mode programmer is only responsible for beginning the transaction and ending the transaction. To begin a transaction we can use "Begin Transaction" statement and End it either with a "Commit or Rollback"

Eg:-
```
Begin Transaction
update Emp set sal = 6000 where Empno=1001
Commit or Rollback
```

Begin Transaction

Update Emp set sal = 5000 where Empno = 1002

Commit or Rollback.

13/07/2013 Saturday

SAVE TRANSACTION:- This is used for dividing (or) breaking a transaction into multiple units. So that we will have a chance of rollbacking a transaction upto certain a location.

When a user sets a save point within a transaction the save point defines a location to which a transaction can return if part of the transaction is conditionally cancelled.

If a transaction is rolledback to a savepoint, it must proceed to completion of the transaction with a commit statement (or) rollback statement.

Code:-

```
Begin Transaction
Update Emp Set Sal = 5500 Where Empno = 1001
update Emp set Sal = 5000 where Empno = 1002

Save Transaction S1
update Emp set Sal = 4500 where Empno = 1003
update Emp set Sal = 4000 where Empno = 1004

Save Transaction S2
Update Emp Set Sal = 3500 where Empno = 1005
update Emp set Sal = 3000 where Empno = 1006
```

In the above case we are breaking the transaction into three units. So we have a chance of rollbacking the transaction either completely so that all the six statements gets rollbacked (or) rollback upto the save point S1. So, that the last 4 statements gets rollbacked and then commit the first 2 (or) rollback upto savepoint S2 and commit the first 4.

To end the above transaction we can use any of the following statement.

Rollback -- Will end the transaction.

(or)

Rollback Transaction s_1 -- Will not end the transaction
Commit -- Will end the transaction.

(or)

Rollback Transaction s_2 -- Will not end the transaction
Commit -- Will end the transaction.

We have a chance of rollbacking upto a savepoint but can never commit upto a savepoint.

INDEXED VIEWS: As we are aware that a view is a logical table, that is will not store any data in it. What it stores is only the select statement used for creating the view. So that whenever we query on a view, the view will internally query the data from the table and present us. But if the view contains any calculated columns in it are aggregate columns in it whenever we query on the view all the calculations and aggregations has to be performed every time. So if there are more number of rows under a table the process will be time consuming. To overcome this problem we can make the view as physical by defining a unique clustered index on that view.

Creating a unique clustered index on a view improves query performance of a view because now the view is stored in database in the same way a table is stored That is it becomes Physical

If we want to create a indexed view we have the following restrictions:

→ The view must be a Schemabinded View
→ The view should compusalory Count_Big aggregate function in it.
→ If the aggregate functions are associated with any columns if at all column allows null value in it. we should associate it with ISNULL function.

Ex:- Create View SalDetails
With SchemaBinding As
Select Deptno, Count_Big(*) As Empcount,
Sum (ISNULL(sal,0)) As Salsum
From Dbo.Emp Group By Deptno.

As of now, the view is Logical to make it physical we need to define a index on the view as following.

Ex:- Create unique clustered index SalDetails_Ind
on SalDetails (Deptno).

Note:- In the above case after defining the index view becomes Physical, but any modifications performed on the table reflects into the view.

DROPPING AN INDEX: We can drop an index that is created on a table or view as fonwoing.

Syntax:- Drop Index <Name> on <TName>

Drop Index Ename_ind on Emp
Drop Index SalDetail_ind on SalDetails

Ename → column to drop
SalDetails → on view we can drop

PL/SQL (or) TSQL:

Procedural Language / SQL (or) Transact SQL:

The SQL Language what we are using till now has few drawbacks

1. It doesn't provide any mechanism for step by step Execution of the code.
2. It doesn't provide conditional branching and conditional looping statement to execute the logic.
3. It doesn't provide any error handling mechanism.

To overcome the above problems SQL has been added with procedural capabilities to provide the above features and introduced as PL/SQL (or) TSQL.

PL/SQL is all about programming where a program is a block of code.

PL/SQL programs are of two types.

→ Anonymous Blocks.

→ Sub-Programs.
- Stored procedures
- Stored functions
- Triggers.

ANONYMOUS BLOCKS: It is a block of code which is Executed at a point of time. with a session scope.

SUB-PROGRAMS: It is a named block of code that is stored on a server, and can be executed anytime from anywhere also. A sub-program can be defined in three ways.

→ Stored procedure
→ Stored function
→ Trigger.

Declaring Variables in pl/sql programs:

Syntax:- Declare @<var> [AS] <datatype> [size] [,---n]

Ex:- Declare @x int
Declare @m Money
Declare @s varchar(50), @d DateTime.

Note:- Every variable should be prefixed with @ symbol.

Assigining values to variables:

We can Assign either a static value to a variable (or) load values from tables into variables also.

Assigining static values:-

Syntax Set @<var> = <value>

Set @x = 100;

- Note: We need to ~~set~~ use set keyword to assign a static value to a variable.

Loading values from tables into variables:

Syntax:- Select @<var> = <colname> [,...] From <Tname>
[<clauses>]

Eg:- Select @s = Ename, @d = Hiredate. From EMP
Where Empno = 1001

Printing values of variables:

Syntax:- Print @<var>

Ex:- Print @x

Program:- Declare @x int
① Set @x = 100
Print @x

o/p - 100.

② Declare @Ename varchar(50), @sal Decimal(7,2)
Select @Ename=Ename, @sal = sal From Emp Where
Empno = 1001
Print @Ename
Print @sal

Monday
15/07/2013

CONDITIONAL STATEMENTS:

It is a block of code, that executes basing on a condition
They are of two types

1. Conditional branching
2. conditional looping.

Conditional branching

- IF Else if Else
- switchcase (We write select case) but the behaviour is like switch.

conditional looping

- While loop.

Syntax:- If <condition>

```
Begin
 -stmts
End
Else IF (condition>
Begin
 -stmts
End
-- <multiple else if blocks if required>--
Else
 Begin
—stmts
 End
```

Write a program to print the weekday on which the employee as joined.

Sol:-

```
Declare @ Empno int
Declare @ weekDay int
 Set @ Empno = 1001
Select @ weekDay = Datepart (dw, HireDate) From
Emp where Empno = @Empno
If @weekDay = 1
  Print 'Sunday'
Else If @weekDay = 2
   Print ('monday'
Else If @weekday = 3
   Print ( Tuesday'
Else If @weekDay = 4
   Print' Wednesday
```

```
Else If @weekday = 5
    Print 'Thrusday'
Else If @weekday = 6
    Print 'Friday'
Else @weekday = 7
    Print 'saturday'
```

using Select case.

```
Declare @Empno Int
Declare @weekday Int
Set @Empno = 1001
Select @weekDay = Datepart(dw, HireDate) From
 Emp Where Empno = @Empno
 Select case @weekDay
  When 1 Then 'sunday'
  When 2 Then 'monday'
  When 3 Then 'Tuesday'
  When 4 Then 'wednesday'
  When 5 Then 'Thrusday'
  When 6 Then 'Friday'
  When 7 Then
  Else 'saturday'
```

Conditional looping:

- While loop

Syntax :- While <condition>
Begin
-Stmts
End.

Every loop requires 3 things in common.

1. Initialization which sets the starting point of the loop.
2. condition which sets the ending point of the loop
3. Iteration which takes you to the next level of the cycle, either in forward direction (or) backward direction basing on positive (or) negative Iteration.

Eg:-
```
Declare @x Int
Set @x=0          -- Initialization
While (@x<10)     -- condition
Begin
Set @x+=1         -- Iteration.
Print @x
End
```

o/p -
1
2
3
4
5
6
7
8
9
10

Break statement under a loop:

We can break the execution of a loop by using a break statement

Eg:-
```
Declare @x Int
Set @x=0
While (@x<10)
Begin
IF @x=5 break
Set @x+=1
Print @x
End
```

o/p -
1
2
3
4

Write a program for incrementing the salary of a given Employee based on his job.

President	10%
Manager	8%
Analayst	6%
others	5%

```
Declare @Empno Int
Declare @Job varchar(50)
Set @Empno=1005
Select @Job=Job From Emp Where Empno=@Empno
IF @Job='president'
Update Emp set sal+=sal*0.10 where
Empno=@Empno
Else IF @Job='manager'
Update Emp set sal+=sal*0.08 where
Empno=@Empno
ElseIF @Job='Analayst'
Update Emp set sal+=sal*0.06 where
Empno=@Empno
Else @Job='other'
Update Emp set sal+=sal*0.05 where
Empno=@Empno
```

16/07/13 Tuesday

CURSOR:- It is a memory location for storing the result of a query which is designed for storing result sets that is multiple rows at a time.

We use these cursors under PL/SQL programs for processing multirow select statement i.e, a statement which gets multiple rows of data at a time for processing.

MANAGING A CURSOR: Cursor management involves of five steps.

1. Declaring a cursor: In this process we define a cursor by specifying various attributes related to the behaviour of a cursor.

Syntax:- DECLARE cursor_name CURSOR
[LOCAL | GLOBAL]
[FORWARD_ONLY | SCROLL]
[STATIC | DYNAMIC | FASTFORWARD]
FOR <select statement>

2. OPENING A CURSOR: When we open a cursor it will internally Execute the select statement that is associated with the cursor declaration and Loads data into the cursor.

Syntax:- open cursor_name

After loading data into a cursor it will also provide a Pointer for accessing the data from the cursor.

3. FETCHING DATA FROM THE CURSOR: In this process, we access row by row from the cursor for processing of the data

Syntax:- Fetch First | Last | Prior | Next | Absolute n | Relative n
From cursor_name into <variables>

Using an appropriate Fetch method we can move to the desired location and once we move to an appropriate location to identify the Fetch statement is successful or not we can make use of an implict variable that is @@Fetch_status
@@Fetch_status is an implict attribute which doesn't required to be declared. It returns the status of last cursor Fetch statement which can be any of the following values

0	The fetch statement was successful
-1	The fetch statement failed or the row was beyond the result set
-2	The row fetched is missing.

4. CLOSING A CURSOR: In this process, it releases the current result set of the cursor leaving the datastructure available for re-opening.

Syntax:- close cursor_name.

5. DEALLOCATING A CURSOR: In this process, it removes the cursor reference and deallocates it by destroying the data structure.

Syntax:- deallocate cursor_name

```
Declare @Ename varchar(50), @sal Money        -- Initializing
Declare Empcur Cursor For select Ename, sal From Emp
open Empcur
Fetch Next from Empcur into @Ename, @sal      -- condition
While @@Fetch_status = 0
Begin
Print 'salary of' +@Ename +'is:' + cast (@sal as varchar)
Fetch Next From Empcur into @Ename, @sal      -- Iteration.
End
Close Empcur
Deallocate Empcur
```

Write a program to increment the salaries of all the Employees basing on the following Criteria.

President	10%
Manager	8%
Analayst	6%
Others	5%

```
Declare @Empno int, @Job varchar(50), @sal Money
Declare Empcur cursor For Select Empno, Job From Emp
open Empcur
Fetch Next From Empcur @Empno, @Job, @sal
While IF @Job = 'President'
```

```
Declare @Empno int, @Jobvarchar(50)
Declare Empcur cursor For select Empno, Job From Emp
open Empcur
Fetch Next From Empcur @Empno, @Job
```

```
While @@Fetch_status=0
 Begin
 IF @Job='president'
 update Emp Set sal+=sal*0.08 Where
        Empno=@Empno
 Else IF @Job='Manager'
 Update Emp set sal+=sal*0.08 Where
        Empno=@Empno
 Else IF @Job='Analyst'
 Update Emp set sal+=sal*0.06 Where
        Empno=@Empno
  Else
 update Emp set sal+=sal*0.05 Where
        Empno=@Empno
 Fetch Next From Empcur into @Empno,@Job
 End
 Close Empcur
 Deallocate Empcur
```

LOCAL | GLOBAL CURSORS: IF a cursor is declared as Local the scope of the cursor is only "within the program" under which the cursor is declared. Once the program execution is completed we cannot use that cursor anymore. Even if it is not deallocated.

If a cursor is declared as Global under a program, we can use that cursor in other programs also "within the connection" without declaring again. When we want a cursor as global the program should not contain a deallocate statement in it. The cursor gets deallocated once the connection is closed.

```
Declare @Empno Int
Declare Empcur cursor Global for select Empno From Emp
open Empcur
Fetch Next From Empcur Into @Empno
While @@Fetch_status = 0
Begin
Print @Empno
Fetch Next from Empcur into @Empno
End
Close Empcur
```

→ Write the above program by opening a New Query window (New connection)

After Executing the program for the First time, comment the declare cursor statement and execute again. Still the program Executes because the cursor is declared as "Global"

→ Now write the same code in another Query window change Global as Local and run the program. After completing the Execution comment the Declare cursor statement and ~~Exe~~ run the program again. Where we will get an "error" as the cursor is "Local"

STATIC / DYNAMIC: If a cursor is declared as static after opening the cursor any modifications that are performed to the data in the table will not be reflected into a cursor. So the cursor Contains old values only in it.

```
Declare @sal Money
Declare Empcur cursor static for select sal From Emp
  Where Empno = 1001
```

```
Open Empcur
Update Emp set sal=10000 where Empno=1001
Fetch Next from Empcur into @sal
Print @sal
Close Empcur
Deallocate Empcur
```

Before Executing the above program, verify the salary of Employee 1001 and then execute the program. Even if, the Program is updating the salary in the table the fetch statement will still display the old value of the table only but not the new value.

If we want the changes made on the table to be reflected into the cursor after opening the cursor, declare the cursor as dynamic

FORWARD ONLY / SCROLL CURSORS:

If a cursor is declared as forward only it allows you to navigate only to the next records in a sequential order and moreover it supports only a single fetch method that is fetch Next where as a scroll cursor allows you to navigate bidirectionally that is top-bottom (or) bottom-top also. and it supports six different fetch methods.

Fetch Next / Fetch prior, Fetch First, Fetch last, Fetch Absolute #, Fetch Relative #

Eg:-
```
Declare @Empno int
Declare Empcur cursor Scroll for Select Empno
From Emp
Open Empcur
```

o/p

```
Fetch Next From Empcur into @Empno          1001
Print @Empno
Fetch last From Empcur into @Empno          1015
Print @Empno,                               1014
Fetch prior From Empcur into @Empno
Print @Empno                                1005
Fetch Absolute 5 From Empcur into @Empno
Print @Empno                                1008
Fetch Relative -2 From Empcur into @Empno
Print @Empno                                1001
Fetch First From Empcur into @Empno
Print @Empno
close Empcur
Deallocate Empcur
```

SUB-PROGRAMS:

It is a named block of code that is directly saved on the server and can be executed when and where it is required under databases a subprogram is refered as a "stored Procedures" or a "Stored Function".

STORED PROCEDURES:

It's a block of code designed to perform an action when called.

Syntax:- Create [Alter] procedure <name> [(
@<param> <dtype> [size] - [default] [out/output],
...n)]
[With <procedure attributes>]

```
As
  Begin
    -stmts
  End
```

A procedure is very similar to a function in our C, C++ Languages (or) a method in Java or .Net Languages.

A procedure definition contains two parts in it

1. Procedure header
2. procedure body.

Note: The content above As is known as "procedure header" and the content below As is known as "procedure body"

If required we can pass parameters to a procedure to make the procedures more dynamic

Calling a stored procedure.

Syntax:- Exec <procedure name> [<list of param values>]

Ex1:-
```
Create procedure Test1
    As
     Begin
       Print 'My First stored procedure'
     End
```

Once the procedure is created, ~~or database~~ it is physically saved on the server as a "database object" which can be called from anywhere connecting to the server.

Wed 17/07/2013

STORED PROCEDURES

Calling the above procedure :-

We can call the above procedure from anywhere that is in a new query window (or) From any application that is developed using JAVA (or) .NET Languages also.

→ Calling the procedure in query window

```
Exec Test1
```

o/p - My First Stored procedure

Procedure With Parameters :

Ex :-

```
Create Procedure Test2 (@x int, @y int)
As
Begin
Declare @z int
Set @z = @x + @y
Print 'sum of the 2 no's is :' + cast(@z varchar)
End.
```

Calling procedure with Parameters

```
Exec Test2 100, 50
```

o/p - sum of the 2 no's is : 150

(or)

```
Exec Test2 @x = 100, @y = 50. (or)
Exec Test2 @y = 50, @x = 100.
```

Defining a procedure With default values to Parameters :

```
Create Procedure Test3 (@x int=100, @y int)
 As
  Begin
  Declare @z int
   set @z=@x+@y
   Print 'sum of the 2 nos is :' + cast(@z as varchar)
   End
```

If a default value is given to a parameter of a procedure, while calling the procedure passing values to that parameter is only optional.

→ Calling the above procedure

```
Exec Test3 200, 250
Exec Test3 default, 150
Exec Test3 @x=default, @y=300
Exec Test3 @y=250
```

o/p

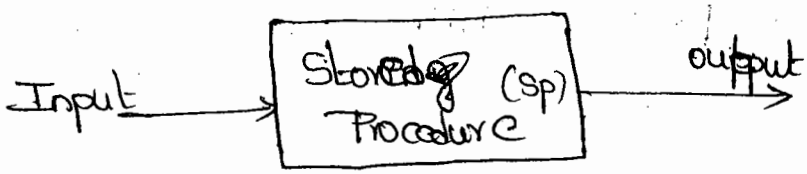
```
450
250
400
350
```

A PROCEDURE WITH OUTPUT PARAMETERS:

Parameters of a procedure can be of two types

1. Input parameters
2. ouput parameters

Input parameters are used for bringing a value into the procedure for execution where as output parameters are used for carrying a value out of the procedure after Execution.



Ex:- Create procedure Test4 (@a int, @b int, @c int out,
@d opt output)

```
As
Begin
 Set @c = @a + @b
 Set @d = @a * @b
End
```

If a parameter is declared as output we only require to assign a value to the parameter inside the procedure. So that, Procedure will send that value out in the end of procedures Execution.

An output parameter can be declared either by using out/output keyword also.

→ Calling the above procedure.

```
Declare @x int, @y int
 Exec Test4 200, 50, @x out, @y output
 Print @x
 Print @y
```

Note:- While calling a procedure with output parameters we need to declare variables first and substitute in the place of the parameter list, so that the result comes and sits in those variable, but here also we need use out/output keywords.

18/01/2013 – Thrusday

SP- Help Text: It is a predefined system procedure using which we can view the content of a stored Procedure Sub-program.

Ex:- Sp_Help Text Test4

Note:- Whenever a procedure is created the content of the procedure is saved under the syscomments table just like views are saved.

Ex:- Select * From Syscomments Where Object Name (Id) = 'Test4'

In this table we have a column text under which the complete create procedure statement gets saved. The SP_Help text system procedure will retrive the data from the syscomments table that is the text columns data and displays it.

PROCEDURE ATTRIBUTES: There are two types of attributes

1. With Encryption
2. With Recompile

1. With Encryption: If this attribute is used on the Procedure the text of this procedure is encrypted and will not be shown to anyone in the text column of the syscomments table. So, noone will be having an option to view the content of it.

To test this do the following.

```
Alter procedure Test4 (@a int, @b int, @c int out,
                       @d int output)
With Encryption
As
Begin
 set @c = @a + @b
 set @d = @a * @b
End
```

After Altering the procedure again go and verify the text from the syscomments table (or) by using sp-Helptext which will not show the code of the procedure.

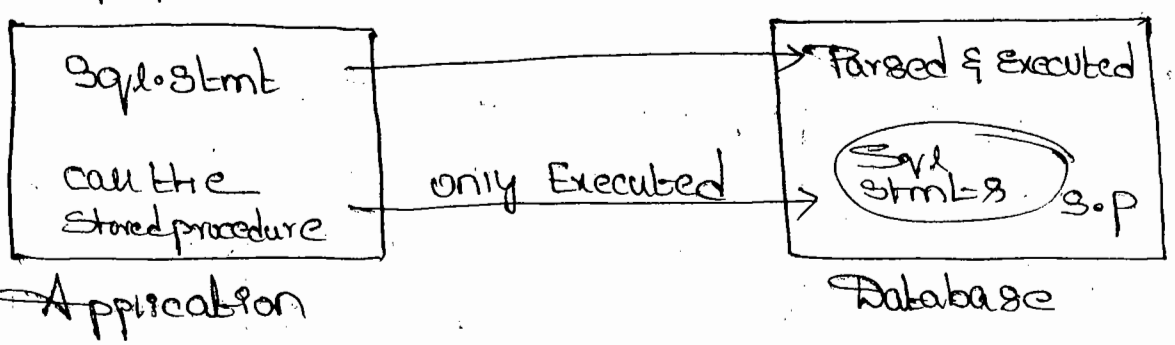
Sp-Helptext Testy

Note:- When an Application is developed for a client at the time of installing this application on client system we will be using the with encryption option on all the views, procedures, functions, triggers etc and install on the clients machine. so that they will not be having the chance viewing the source code or Altering the source code.

→Why do We create Procedures?

Sol:- Whenever we want to execute an sql statement from an application the sql statement what we send from an application will be first parsed (compiled) for execution Where the process of parsing is time Consuming because parsing occurs each and every time we execute the statement.

To overcome the above problem we write sql statements under a stored procedure and Execute, because a stored Procedure is a Precompiled block of code without Parsing the statement gets executed whenever the Procedures are Called which can drastically increase the performance of database Servver.



2. With Recompile Attribute :- Whenever a procedure is compiled for the first time it prepares a best query plan according to the current state of database and executes the query plan when the procedure is called

The compilation of the procedure and preparing a query plan is performed not only at the time of Procedure creation but each and everytime the server is restarted. (Implicitly occurs)

If the procedure is created by using the with Recompile procedure Attribute it is forced to be compiled each time it is executed and whenever it is compiled it re-prepares the query plan.

Forcing a procedure for recompilation and preparing a query plan is required when the database undergoes significant changes to its data or structure.

Another reason to force a procedure to recompile is if at all the table is added with new indexes from which the procedure might be benefited forcing for recompilation is very important. Because we cannot wait until the server is restarted for preparing a new query plan.

Note:- Even if the with Recompile option is available it is not suggested to be used if at all there are no significant changes in the structure of the database.

Note:-
A query plan prepared for the execution of a Procedure is stored in the "Cache Memory", so, it is not physical that is the reason why everytime we restart the server it will Recompile and prepares the query plan.

Write a procedure For inserting a record into the Employee table when the name, Job, salary and Deptno are given by generating a unique Employeeno and returning it back.

```
Create procedure Emp_Insert(@Ename varchar(50), @Job
    varchar(50), @sal Money, @Deptno Int, @Empno int output)
AS
  Begin
  Set No count on
  Begin Transaction
   Select @Empno = Max(Empno) + 1 From Emp
   Insert Into Emp (Empno, Ename, Job, sal, Deptno)
    values (@Empno, @Ename, @Job, @sal, @Deptno)
   Commit Transaction
   End
```

Calling the above procedure
(or)
Executing

```
Declare @Empno Int
 Exec Emp_Insert (xyz', 'Manager', 4500, 40, @Empno out
 Print @Empno.
```

19/07/2013 · Friday

Rewrite the above code.

```
Select @Empno = ISNULL(Max(Empno), 1000) + 1
From Emp.
```

Write a procedure which takes Employee number as a Parameter and returns profident fund at 12% and professional tax at 3% which should be detected from the salary.

```
Create Procedure deductions (@Empno int, @PF Money out,
    @Pt Money out)
As
 Begin
  Select
  Declare @salary Money.
  Select @Sal = Select From Emp Where Empno = @Empno
   Set @PF = @sal * 0.12
   Set @Pt = @Sal * 0.03
  End
```

Exec

```
Declare @vPF Money, @vpt Money
Exec Deductions 1001, @vPF out, @vpt out
Print @vPF
Print @vpt
```

Write a procedure which takes the Empno and prints the next salary of employee.

```
Create procedure Emp_nextsal (@ Empno int) @sal
 Money)
As
 Begin
  Declare @Sal Money, @Nsal Money, @PF money, @pt money
  Select @Sal = Sal From Emp Where Empno = @Empno
   Set
```

```
Exec Deductions @Empno, @PF out, @pt out
    Set @Nsal = @sal - (@PF + @pt)
    Print 'Net salary of the Employee is:' + cast (@Nsal as
    varchar).
    End
```

Executing

```
Exec Emp-Netsal 1001 .
```

A procedure for dividing two numbers

```
Create procedure Divide (@x int, @y int)
AS
 Begin
 Declare @z int
  Set @z = 0
  Set @z = @x / @y
 Print 'The Result is:' + cast (@z as varchar)
  End.
```

Execution

```
    Exec Divide 100, 5
    Exec Divide 100, 0
```

In the above case, when we execute the procedure we will get the Error at the second Execution Because the divisor value is zero where a number cannot be divided by zero as per the rule of mathematics.

In SQL Server whenever an error occurs at a line of code it will first print the error message and then continues with the execution. So, in the above case, when the error occured in the procedure the result will be as following.

Msg 8134, Level 16, State 1, Procedure Divide, Line 6
Divide by zero Error encountered.

The Result is : 0

The problem in the above execution is Even if the Error occured in the program, it is still showing the Results so there are chances of users being confused

Note:- Whenever any error ocared while executing a Program developed by using any programming Language, the program terminates abnormally on the line where the error got occured, but under SQL server it will still continue the Programs execution.

In the above case, both the behaviours are wrong because when errors occur in a programming Language it will skip the execution of all the statements after the error Even if, those statements are not related with the error. Where as In SQL Server because the execution will not stop when the error occured statements related with the error also will be executed but it should not happen.

For Example in our above procedure, when the error got occured it is still displaying the "Result is : 0" which should not be displayed.

HANDLING ERRORS: We handle errors of a program Both in a programming language as well as Databases also. Where as handling an error in a programming Language needs stopping the abnormal termination and allowing the statements which are not related with the error to execute, where as handling an error in SQLSERVER means stopping the execution of statements which are related with the Error.

HANDLING ERRORS IN SQLSERVER: From SQLServer 2005 we are provided with a structure Error handling mechanism with the help of try and Catch blocks which should be used as following.

Begin Try
- Stmts which will cause the error.
- Stmts which are related with the error that should not execute when error occured.

End Try

Begin catch
- Stmts which should be executed whenever the error occurs.

End Catch.

To overcome the problem we faced in the Divide Procedure Rewrite the procedure as following.

Sol:-

```
Alter procedure Divide(@x int, @y int)
As
 Begin
  Declare @z int
   Set @z=0
   Set @z=
  Begin Try
    Set @z = @x/@y
Print 'The Result:' + cast(@z as varchar)
 End Try
  Begin catch
    Print 'Divisor should not be zero'
 End catch
  End
```

Skip the execution

Re-execute the program again as Following.

```
Exec Divide 100, 50
Exec Divide 100, 0
```

When we execute with correct values any error will not occur in the program. So after executing all the statements in the try block control directly jumps to the statement present after catch block without executing catch block.

If any error occurs in the execution process in such case from the line where the error got occured in Try control directly jumps to catch block. So rest of the statement in Try will not execute. Where as, Catch block will execute.

Note:- In our above program, when the error got occured we are displaying an Error message "Divisor ~~cannot~~ should be zero", In place of that Error message we can also display the original error message associated with that data. By calling a function "Error_Message". To test this alter the above procedure by rewritting the code inside the catch block as following.

```
Print Error_Message()
```

20/07/2013 - Saturday

PREDEFINED ERRORS: Whenever a Error occurs under a Program Like dividing a number by zero violation of Primary key, Violation of check constraint etc. The System displays an Error message telling us the problem encountered in the code.

Every Error that occurs in the program is associated with four attributes.

1. Error Number
2. Error Message
3. Severity Level
4. State

```
Msg 8134 (Error Number), Level 16 (Severity Level),
State 1 (State), Divide by zero error encountered
(Error Message)
```

1. ERROR NUMBER:
Error Number is a unique identification given for each and Every Error that occurs in the program

This value will be below 50,000 for pre-defined Errors and must be above 50,000 for the Error is user defined.

2. ERROR MESSAGE:

It is a brief information describing about the error occured which should be Max From 2047 charanters.

3. SEVERITY LEVEL:

This tells about the importanke of the Error which can be ranging between 0 to 25. In which,

0 to 9 are not severe which can be considered as Information (or) status Messages

11 to 16 Indicates these Errors can be corrected by the user.

17 to 19 Indicates these are Software Errors cannot be corrected by the user. must be reported to System Administrator.

20 to 24 Indicates Fatal Errors and if these Errors occur they can damage the system (or) database. So here the connection immediately terminates with the database.

4. STATE:

It is an arbitrary value which is not that important can be ranging between 0 to 127. We use this whenever the same Error has to occur in multiple places.

Note:- We can find the information of all predefined errors under the table "Sys Messages"

```
Select * From SysMessage Where
  MsgLangID = 1033
```

* 1033 represents English Language.

→ Write a procedure for inserting a record into dept table when we pass the deptno, dname and Location as Parameters but inside the procedure along with inserting the record into dept table a matching record should also be inserted into deptdetails table. By generating a unique Did and also comment.

Note:- Make sure in the procedure that both the two statements will be successfully executed (or) none of the statements execute.

```
Create procedure Dept_Insert(@Deptno int, @Dname varchar(50),
  @Loc varchar(50))
AS
  Begin → Set Nocount ON
  Declare @Did Int
  Declare @Comments varchar(1000)
  Select @Did = ISNULL(MAX(Did), 0)+1 From
  DeptDetails
  Set @comments = 'This department is Located in'
    + @Loc + 'and mainly involved in' + @Dname

  Begin Try
  Begin Transaction
    Insert Into Dept values (@Deptno, @Dname, @Loc)
    Insert Into Dept-Details values (@Did, @Deptno, @comments)
  Commit Transaction.
```

```
End Try
Begin catch
Rollback Transaction
Print Error_Message()
End catch
End.
```

Calling procedure

```
Exec Dept 50, 'operation', 'pune'
```

22/07/13 Monday

Raising Errors Explicitly in a program:

Generally Errors will raise in a program on predefined reasons like dividing a number by zero, violation of Primary key, violation of check, violation of referential integrity etc.

Where as if required we can also raise an error in our programs in two different ways.

1. Using Raiserror Statement
2. Using throw statement (new Feature of Sql Server 2012)

Syntax:

```
Raiserror (errorid |errormsg, severity, state) [with Log]

throw errorid, errormsg, state
```

Difference between Raiserror function and Throw Statement.

Ans: If we use any of these two statements in a program for raising an error without try and catch blocks, raiserror statement after raising the error will still continue

the execution of the program where as throw statement will terminate the program abnormally on that Line. But if they are used under try block both will behave in the same way that is will jump directly to catch block from where the error got raised.

Raiserror Statement will give an option of specifying Severity of the error message where as we dont have these option in case of throw statement where all error messages will have a default severity of 16

In case of Raiserror there is chance of recording the error messages into the sever log file by using the With log option where as we cannot do in case of throw.

In case of throw you need to specify both errorid and errormessage to raise the error where as in case of raiserror we can specify either id (or) msg. If id is not specified default Errorid is 50,000 but if we want to specify only Errorid first we need to add the error message in the sys messages table by specifying a unique id to the message.

Write a procedure for dividing two numbers and raise an error in the program if the divisor is 1. by using raiserror statement.

```
Create procedure DivideByone1 (@ x int, @y int)
 AS
  Begin
   Declare @z int
   Set @z = 0
   Begin Try
   IF @dy=1
   Raiserror('Divisor can't be one', 16, 1)
   Set @z = @x/@y
   Print 'The result is:'+cast( @z as varchar)
   End Try
   Begin catch
    Print Error_number()
    Print Error_message()
    Print Error_Severity()
    Print Error_State()
   End catch
  End
```

(Executing)

```
Execute DivByone1 100, 1
```

The above procedure can also be defined with the help of a throw statement with in place of raiserror as following.

```
Create procedure DivByone2 (@x int, @y int)
 AS
  Begin
```

```
Declare @z int
Set @z = 0
Begin Try
if @y = 1
throw 60001, 'Divisor can't be one', 1
Set @z = @x/@y
Print 'The result is :' + Cast(@z as varchar)
End Try
Begin Catch
Print Error_number()
Print Error_message()
Print Error_Severity()
Print Error_state()
End catch
End.
```

(Execution)

```
Exec DivByone2 100, 1
```

Additional options With Raiserror statement.

1. With Log : By using this option in the raiserror statement we can record the error message in the sqlserver log file so that if the errors are fatal database Administrator can take care of fixing those Errors.

Note:- If the severity of the Error is greater than 20 specifying the with log option is Mandatory.

To test this Alter the procedure DivByone1 By changing the raiserror statement as following

Raiserror ('Divisor can't be one', 16, 1) with log

Now execute the procedure and whenever the given error raises ~~you~~ We can watch the error messages recorded under sql server LogFile.

To view the Logfile open

Object Explorer → Go to Management node → sql server Logs node → open the current Logfile by double clicking on it.

Using substitutional parameters in the errormessage of RaisError.

Just like C Language we can substitute values into the error message to make the errormessages as dynamic as following.

Raiserror ('The number %d can't be divided by %d', 16, 1, @x, @y) With Log.

Raising errors by storing the error message in Sysmessages table

We can Raise an error without giving the error message in Raiserror statement but in place of Error message we need to specify the errorid. and to specify the errorid First we need to record that errorid with Errormessage in Sysmessages

table by using "sp_addmessage" system stored procedure

sp_addmessage <errorid>, <severity>, <errormsg>

To test this first add a record a sysmessages table as following.

sp_addmessage 51000, 16, 'Divide by one Error encountered'

Now Alter the Procedure DivByone1 by changing the raiserror statement as Following.

Raiserror (51000, 16, 1) With log

→ Deleting our Errormessages From sysmessages

~~sp_help~~

sp_DropMessage <errorid>

sp_Dropmessage 51000

→ Write a procedure For transfering the funds from one account to the another account and make sure of the transaction management in the procedure as well as raising an error if at all the amount being transfered Plus 1000 (Minimum Balance) is greater than the Balance of the customer.

Ans:- Create Procedure customer_Funds (@srcId int, @destid int, @Amount Decimal(9,2))

As

Begin

Declare @count1 int @count2 int

```
Declare @Balance Decimal(7,2)
Select @Balance = Balance From customer where
Custid = @srcId And status = 1
Begin Try
IF ((@tAmount + 1000) > @Balance
Begin
--throw 50001, 'In sufficient Funds', 1
Rais error('In sufficient Funds', 16, 1)
End
Begin Transaction
update customer set Balance -= @tAmount Where
Custid = @srcId and status=1
Set @count1 = @@Rowcount
Update customer set Balance += @tAmount where
Custid = @DestId and status=1
Set @count2 = @@Rowcount
IF @count1 = @count2
Commit Transaction
Else
Rollback Transaction
End Try
Begin catch
Print Error_message()
End catch
End
```

Structure of table

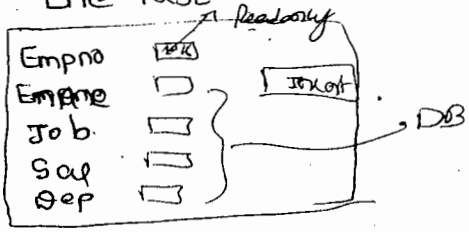
Bit

Primary key

Custid	cname	Balance	Status
101	Zane	15000.00	1

23/07/2013 - Tuesday

@@Rowcount: It is an implicit variable which returns the number of rows affected by the last executed DML statement.



FUNCTIONS:

It is also a sub-program like a stored procedure which is defined for performing an action such as a complex calculation and returns of result of the action as a value.

Differences between function and a procedure

* A function must return a value where as procedure never returns a value
* A procedure can have parameters of both input and output. Where as a function can have only input parameters.
* In a procedure we can perform select, insert, update and Delete operations. Where as function can be used only to perform select. cannot be used to perform insert, update and delete operations that can change the state of the database.

* Procedures provides the option for to perform transaction management, Error handling etc Where as these operations are not permitted in a Function.

* We call a procedure using Execute command so we cannot embedd (or) use them in a select Statement Where as Functions are called by using select command only.

* From a procedure we can call another procedure (or) a Function also where as from a Function we can call another function but not a procedure.

Functions are of three types in sql server

1. Scalar Function
2. Inline Table valued Function
3. Multi-statement Table valued function.

SCALAR FUNCTIONS: These functions returns a single value as a output

Syntax:- Create/Alter function <Name>(
@<param> <dtype>[size][=default], ---- n)
Returns <scalar type>
[with <Function Attributes>]
As
Begin
<Function body>
Return <scalar expression>
End

Q: Write a Function that takes an employee number and returns the neat salary of that employee.

Ans:
```
Create Function Emp_GetNetSal (@Empno int)
Returns Money
As
Begin
Declare @Sal Money, @comm Money
Declare @PF money, @pt Money, @NSal Money
Select @Sal = Sal, @comm = comm From Emp Where
Empno = @Empno
Set @PF = @Sal * 0.12
Set @pt = @Sal * 0.03
Set @NSal = @Sal - (@PF + @pt) + IsNull (@comm, 0)
Return @NSal
End
```

Calling a Scalar Function:

Syntax:- Select <owner>.<Function> (<list of values>)

Ex:- Select Dbo.Emp_GetNetSal(1005)

```
Select Empno, Sal, Comm, Dbo.Emp_GetNetSal (Empno)
As NetSal From Emp.
```

TABLE VALUED FUNCTIONS: In this case we can return a table as an output from the Function. These are again of two types.

1. Inline table value
2. Multi-statement table value

INLINE TABLE VALUED FUNCTIONS:

In this case the body of the function will have only a single Select statement prefixed with "Return" other than that it cannot contain any content

Syntax:- Create | Alter Function <Name> (
@<param> <dtype> [size] = [default], ----n)
Returns Table
[With <Function attributes>]
As
Return (<select stmt>)

Q.

Write a Functions that gets the data of the Employees working in a department when we specify the department name where the data should come from Emp, Dept and salgrade tables

```
Create Function Get_EmpDetails (@Dname Varchar
(50)) Returns Table
As
Return ( Select E.Empno, E.Ename, E.Job, E.sal,
        S.Grade, D.Deptno, D.Dname, D.Loc From
        Emp E Inner Join Dept D on E.Deptno = D.Deptno
        Inner Join salgrade S on E.Sal Between S.Losal
        And S.Hisal where D.Dname = (@Dname)
```

Calling a Table valued Functions

Select <collist> From <owner>.<Function>(list of values)

Select * From dbo.Get_EmpDetails ('sales')

(or)

```
Select Empno, Ename, Sal, Grade, Deptno, Dname
From Dbo.Get_EmpDetails ('Marketing')
```

MULTI-STATEMENT TABLE VALUED FUNCTION: This is same as the above which can return a table as an output but here the body can contain more than one statement and also the structure of the table being ~~Return~~ Returned ~~written~~ can be defined by us.

Syntax:-

```
Create | Alter Function <Name>(
@<Param> <dtype> [Size] [= default], ... n)
Returns @<table var> Table (<column def's>)
[With <Function attributes>]
AS
 Begin
 <Function body>
 Return
 End
```

Note:- In case of multi-statement table valued function we need to define our own structure to the table being return.

24/07/13 - Wed

Write a function which returns a table with the salary details of all the employees like empno, sal, Comm, PF, pt and Netsal.

Sol:-
```
Create Function Emp_GetsalDetails()
    Returns @MyTable Table( Empno int, salMoney,
    comm Money, PF money, pt money, Netsal Money)
```

```
AS
Begin
Declare @Empno int
Declare @sal Money, @comm money
Declare @PF money, @pt money, @Nsal Money.
Declare Ecur cursor For select Empno, sal, Comm
From Emp
open Emp cur
Fetch Next From Ecur into @Empno, @sal, @comm
While @@Fetch_status=0
Begin
  Set @PF = @sal * 0.12
  Set @pt = @sal * 0.03
  Set @Nsal = @sal - (@PF + @pt) + IS NULL (@comm, 0)
  Insert into @MyTable values (@Empno, @sal, @comm
  @PF, @pt, @Nsal)
  Fetch Next From Ecur into @Empno, @sal, @comm
  End
  Close Ecur
  Deallocate Ecur
  Return
End.
```

FUNCTION ATTRIBUTES:

While creating a Function we can define Attributes to the function like.

1. With encryption
2. With SchemaBinding.

TRIGGERS

A Trigger is a special type of stored procedure that Automatically executes when an event occurs in the database server without being explicitly called.

Triggers are of two types

1. DML Triggers
2. DDL Triggers (Introduced in sql server 2005)

DML Triggers:

DML Trigger Execute when the user tries to modify data through data manipulation Language Event. Those are Insert, update and delete statements on a table or view.

These triggers fire when any valid event is Fired regardless of whether or not any table rows are affected in the table.

Note:- Insert, update and delete statement are also known as Triggering sql statements because those three are responsible for the trigger to Fire.

DML Triggers can be used to enforce business roles and data integrity.

DML Triggers are similar to constraints in the way they can enforce integrity.

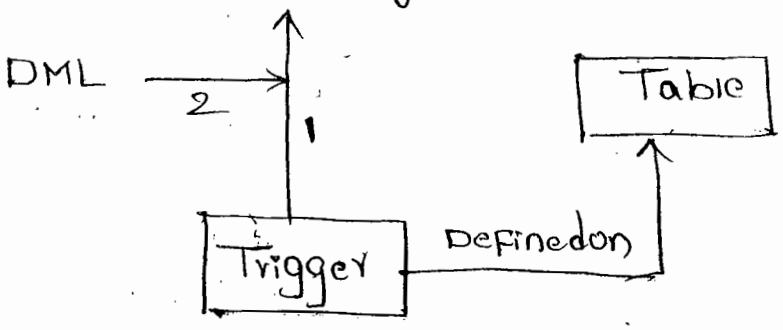
With the help of a DML Trigger we can enforce integrity which cannot be done with Constraints that is comparing values with values of another table etc..

Syntax:- Create | Alter Trigger <Name>
on <TableName> | <ViewName>
[With <Trigger attributes>]
For | After | Instead of
[Insert, update, Delete]
AS
Begin
- Trigger Body
End

As per the specifications of Sql we have three different types of triggers

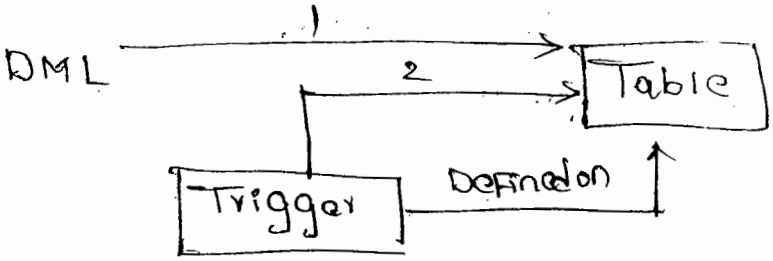
1. Before trigger
2. After trigger
3. Instead of trigger

1. Before trigger: This trigger fires before the Execution of Triggering Sql statement



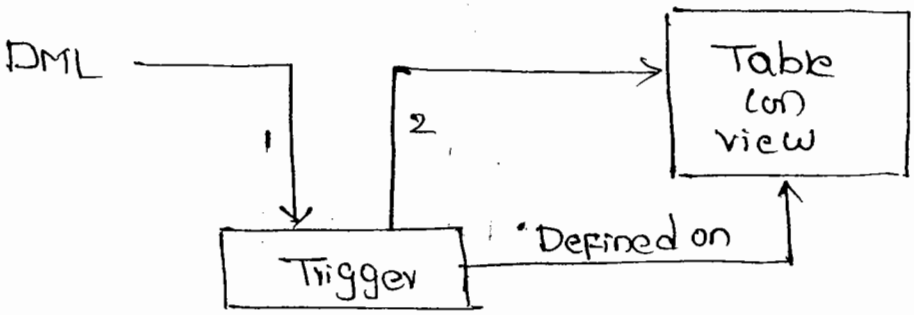
[verification is performed based on movies tickets in cinema hall)

2. After trigger: These trigger fires after the execution of Triggering Sql statement.



[verification is performed in the train ticket (TTR)]

Instead of Trigger: In this case the triggering Sql statement is only responsible in calling the trigger but will not reach the table directly. Now on behalf of the triggering sql statement trigger performs operation on the table (or) view.



In Sql server database we have only After and Instead of triggers but not before triggers.

In other databases like oracle we have all the three triggers but instead of triggers can be defined on "Views" only. Where as in sql server instead of trigger can be defined on "tables" also which will give the same behaviour like a before trigger.

While defining a trigger in Sql server on tablename or view name in the syntax refers to the table or view on which we are defining the trigger.

For/After Specifies that the trigger fires only after trigger sql statements is executed.

Note :- After triggers cannot be defined on views.

Instead of is to specify the trigger is executed on behalf of the triggering sql statement.

Insert, update, Delete is to specify which statement will activate the trigger and we need to use atleast one option or combination of option also can be used.

Define a trigger on emp table which will restrict DML operations on the table apart from business hours where business hours are between 9 to 5.

Ans:-
```
Create Trigger Emp_Trg1
on Emp After Insert, update, Delete
AS
 Begin
 Declare @Hours int
 Set @Hours = Datepart (HH, GetDate())
 IF @Hours Not Between 9 to 16
  Begin
  Rollback Transaction
  Raiserror ('Transaction can't be performed
            now', 16, 1)
  End
 End
```

Try to perform any DML operations on the table Apart from the business hours immediately the operation is rolled back by displaying an error message.

Note:- Whenever we perform a DML operation on any table which is defined with any trigger an implicit transaction gets started before the execution of DML statements which can be roned back inside the trigger if required if not rolled back in the

end of Triggers execution Transaction is committed.

25/07/2013 Thrusday

Write a Trigger on the Dept table so that it will convert the deptarment name and Locations values into uppercase in whatever case they are entered while inserting.

Sol:- Create Trigger Dept_Trg1
on Dept After Insert
AS
Begin
Declare @Deptno int, @Dname varchar(50), @Loc varchar(50)
Select @Deptno = Deptno, @Dname=Dname, @Loc=Loc
From Inserted
Update Dept set Dname = upper(@Dname), Loc=
upper(@Loc) where Deptno=@Deptno
End

After creating the trigger test the trigger by inserting Record as following

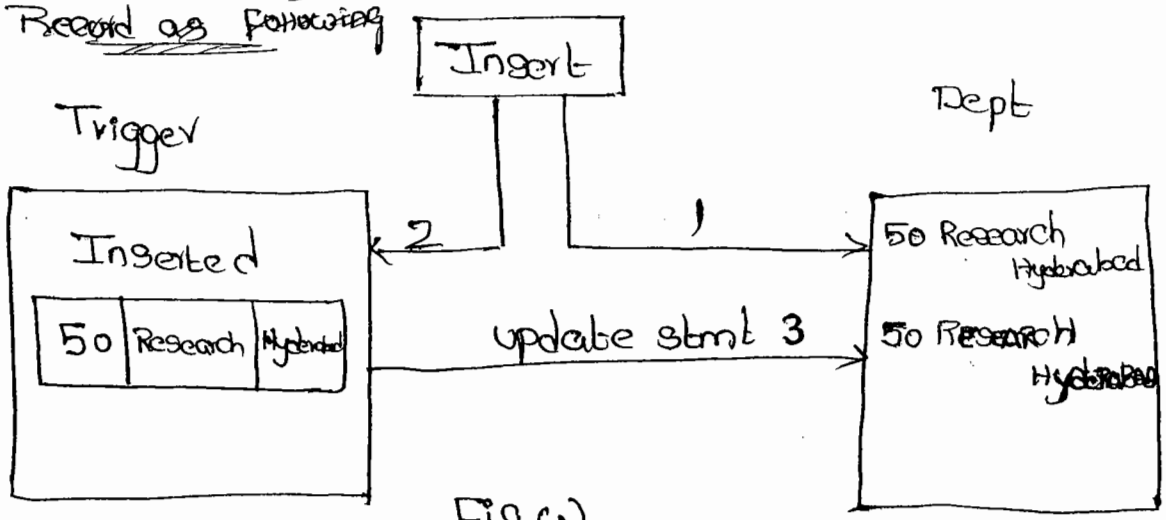


Fig (1)

After creating the trigger test the trigger by inserting Record as following

→ Insert Into Dept values (50, 'Research', 'Hyderabad')
Select * From Dept

Whenever a trigger fires because of an insert statements, the values that are being inserted in the table will be captured in the trigger under a table known as inserted using which we can find out what values are being provided by the user for inserting into the table.

In the above case our trigger is a after trigger so first the insert statement executes and values will be inserted into table then the trigger executes. so that first the values are captured into the inserted table and then from the trigger we are updating the inserted values of the table. (Show the Fig 1 above.

Q:
→ Write a trigger on the Dept table which generates a unique deptno and insert into the table when the users insert a record without specifying the deptno.

Ans:- Create Trigger Dept_Trg2
on Dept Instead of Insert
as
Begin
Declare @Deptno int, @Dname varchar(50) @Loc varchar(50)
Select @Deptno = Deptno, @Dname = Dname, @Loc = Loc From
Inserted.
If @Deptno IS NULL
Begin
Select @Deptno = IS NULL (Max (Deptno), 0) + 10 From Dept
End.

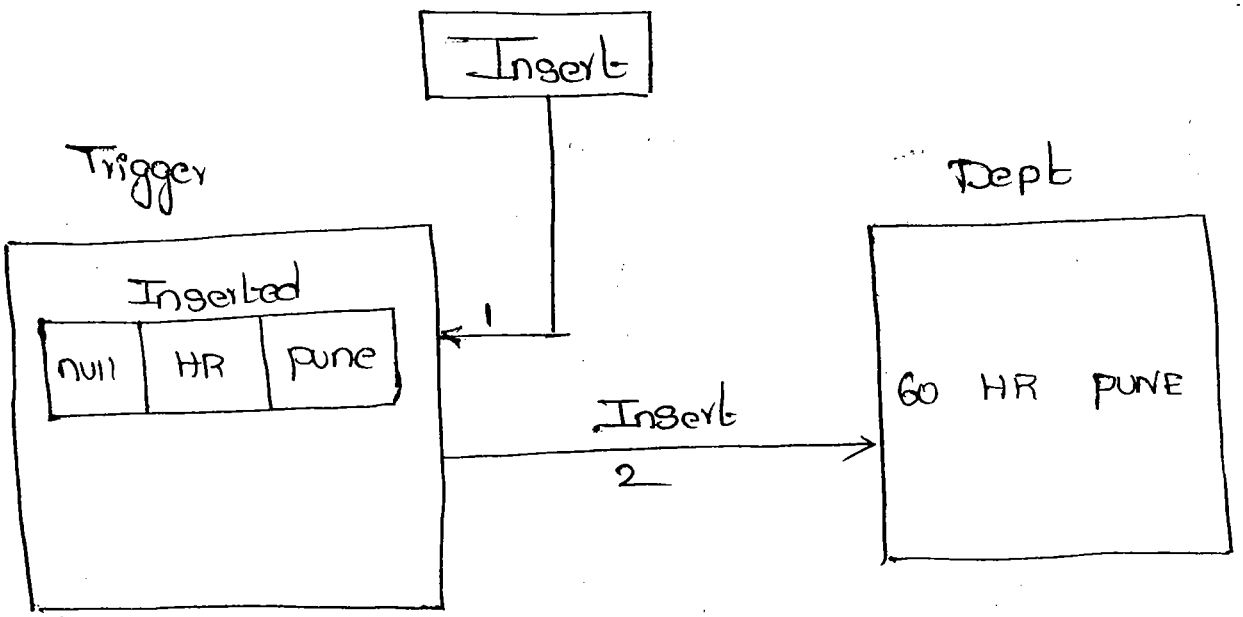
Insert into Dept values(@Deptno, @Dname, @Loc)
End.

Execute the at
Test the above Trigger by Inserting the following records.

Insert into Dept (Dname, Loc) values ('HR', 'pune')
- In this case a new Deptno is generated.

Insert into Dept values (65, 'AAA', 'BBB')
- In this case new Deptno is not generated b'coz the user has given it.

In the above case, we have defined a instead of trigger so here first the insert statement will call the trigger and submits the value being inserted then the trigger is generating a deptno if not existing and finally insert the values into the table.



Note:- In the above case after the insert statement is inserting is executed from the trigger immediately our previous trigger Dept_trg1 will also fire and converts the data into uppercase.

Write a trigger on the Emp table which fires when we perform a Delete operation on the table and restrict those operations if the job of the employee is President.

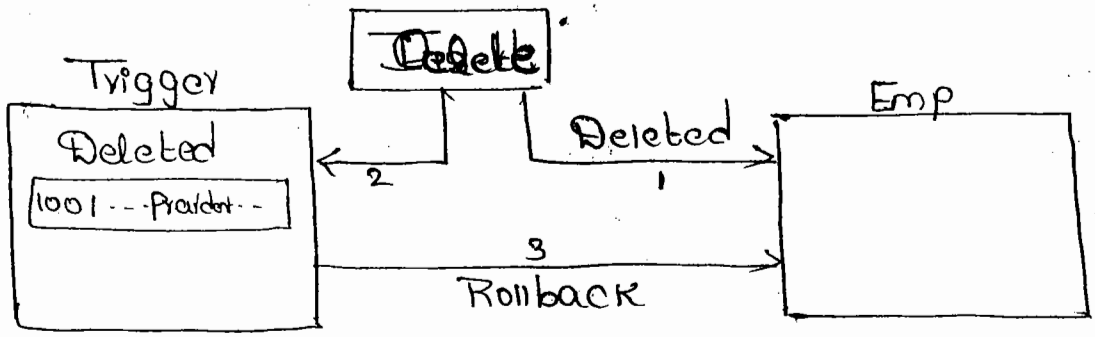
Sol:-
```
Create Trigger Emp_Delete_Trg
on Emp After Delete
As
Begin
Declare @Job varchar(50)
 select @Job=Job From Deleted
If @Job='president'
Begin
Rollback Transaction.
Raiserror ('can't delete president's Info.', 16,1)
End
End
```

By depault our Employee table as a self referential Integrity constraint so even the trigger is defined on a table constraint comes into picture restricting the delete operation because it has child records so to test the trigger drop the constraint.

Alter Table Emp Drop Constraint Mgr_Ref

Now test the trigger by executing the following statement

Delete From Emp Where Empno=1001



Whenever we perform a Delete operation on a table the record being deleted from the table is now captured under the trigger within a Magic table deleted.

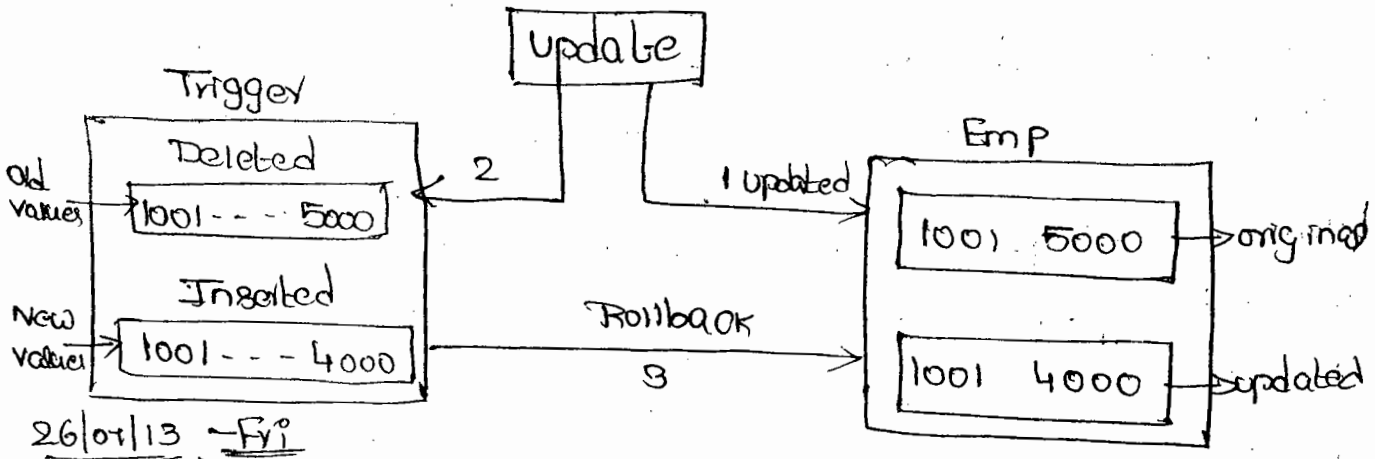
→ Write a trigger on the Emp table that fires when the salary is updated and restricts the operation if at all the new salary is less than the old salary.

Sol:-
```
Create Trigger Emp_Update_Trg
On Emp After update
AS
 Begin
 Declare @Osal Money, @Nsal Money
 Select @Osal = sal From Deleted
 Select @ Nsal = Sal From Inserted
 IF @Nsal < Osal
Begin
Rollback Transaction
Raiserror ('new salary must be greater than old salary',
 End                                    16,1)
End
```

Test the above trigger by executing the following update statement

Update Emp set Sal=4000 where Empno=1001

Whenever we update a record the trigger treats the update operation as a Delete and Insert. So inside the trigger we will be having both the two magic tables deleted and inserted where Deleted table contains the old values of table and the inserted tables contains the new values of updation.



26/01/13 - Fri

Magic tables:

These are specially created inside of a trigger when we perform insert, update and Delete operations. We have two Magic tables inserted and Deleted under a trigger.

Inserted

This table is created when we perform an insert operation that provides access to the values being inserted into the table.

Deleted:- This table is created when we are performing a delete operation providing access to the record being deleted.

When we perform an update operation we will be having both inserted and deleted table also where inserted will provide access to the new values being inserted and deleted/updated table provides access to the old values of the table.

→ Define a trigger on the dept table so that whenever a record is inserted into the table it will verify whether the corresponding Deptno information is present in DeptDetails table or not and if not present will insert a new record into the table by generating a unique departmentid and given deptno with null in the comments.

```
Create Trigger Dept_Nested
on Dept After Insert
AS
Begin
Declare @Deptno int, @Did int
Select @Deptno = Deptno From Inserted
If Not Exists ( Select * From DeptDetails Where
                                Deptno = @deptno)

Begin
 Select @Did = ISNULL (MAX(Did), 0) + 1 From DeptDetails
 Insert Into DeptDetails Values(@Did, @Deptno, null)
End
End
```

Test the above trigger by inserting a record in the table as following

```
Insert Into Dept (Dname, Loc) Values ('Research', 'Hyderbad')

Select * From Dept
Select * From DeptDetails
```

→ Write a trigger on the emp table so that whenever a record is being inserted into the table first it verifies the given deptno is existing in the dept table or not if not existing will first insert the deptno into the dept table with name and Loc as Null and then inserts the actual record into Emp table.

Ans:- Create Trigger Emp_Nested
on Emp Instead of Insert
As
Begin
Declare @deptno int
Select @ Deptno = Deptno From Inserted
If Not Exists (Select * From Dept where
Deptno = @Deptno)
Begin
Insert into Dept values (@Deptno, Null, Null)
End
Insert into Emp(Empno, Ename, Job, Sal, Deptno)
Select Empno, Ename, Job, Sal, Deptno From
Inserted.
End

To test the above trigger write an insert statement as Following.

Insert into Emp (Empno, Ename, Job, Sal, Deptno)
Values (1011, 'Abc', 'Clerk', 2000, 60)

In the above case when the record is inserted into the table internally the trigger fires first and captures all the values in it.

Because the trigger is a instead of trigger, then it verifies the given deptno is existing in the dept table or not and if not existing will insert a new record into dept table.

once the record is inserted into dept table then the trigger we defined earlier on the dept table will also Fire and comesponding record is inserted into Dept-details table. These process of a trigger invoking another trigger For execution is known as Nested triggers.

Insert → Emp
  → Emp-Nested [Trigger]
    → Dept
      → Dept-~~Details~~ Nested [Trigger]
        → Dept-Details

Note:- In SQLServer, the support For nested triggers is given upto 32 levels.

Instead of Triggers: Instead of Triggers are designed for defining on views actually that is as per the specifications of SQL they can be used only on views. To make the non-updatable Complex views as updatable

By default all complex views are that are defined on multiple tables were not-updatable.

If we want to make those complex views as updatable we can do it by defining a instead of trigger on that table. So that we can perform DML operations

on Complex Views also.

To test this process first create a complexview as following.

```
Create View Emp_Dept
 As
 Select E.Empno, E.Ename, E.Job, E.Sal, D.Deptno,
    D.Dname, D.Loc
 From Emp E Inner Join Dept D
 on E.Deptno = D.Deptno
```

Now try to insert a record into this view as following

```
Insert into Emp_Dept values(1100, 'Williams', 'Manager',
        4000, 100, 'HR', 'Pune')
```

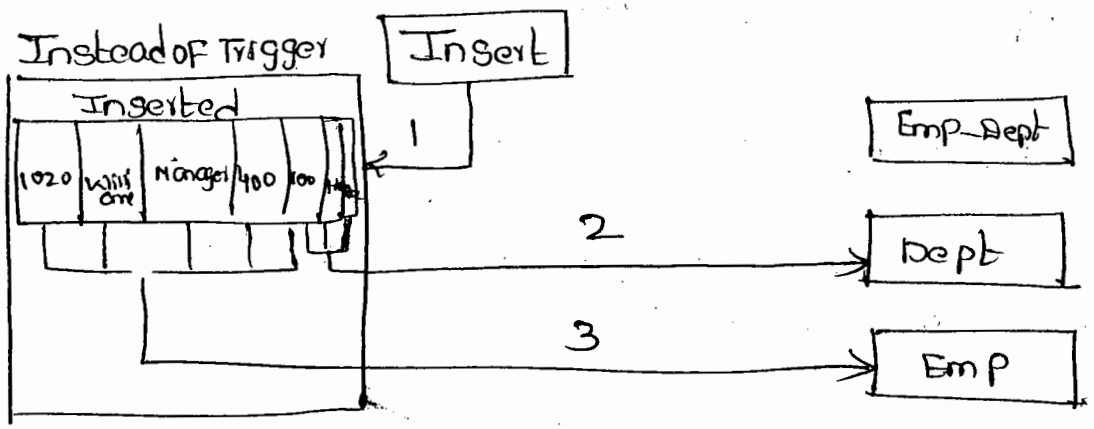
When we execute the above statement the operation fails reporting an error the view Emp_Dept is not updatable.

Now to make it updatable we need to define an instead of trigger on the view.

```
Create Trigger View_Trg
On Emp_Dept Instead of Insert
As
 Begin
 Insert into Dept (Deptno, Dname, Loc)
 Select Deptno, Dname, Loc From Inserted

Insert Into Emp (Empno, Ename, Job, Salary, Deptno)
     Select Empno, Ename, Job, Salary, Deptno
      From Inserted
End
```

Now Execute our previous insert statement and Insert a record into the view which internally calls the trigger and inserts the values into the two tables.



29/07/2013 - Monday

Defining the instead of trigger for performing delete operation on Complex view

Sol:- Create Trigger view_Delete
on Emp_Dept Instead of Delete
AS
Begin
Declare @Empno int, @Deptno int, @count int
Select @Empno = Empno, @Deptno = Deptno from Deleted.

Select @count = count (*) From Emp where
Deptno = @Deptno

Delete From Emp Where Empno = @Empno
if @count = 1
Begin
Delete From Dept where Deptno = @Deptno
End
End.

Note:- In the above case, if their is only one Employee working for the department we want to delete After deleting the record from emp table it will delete from dept table also where as if there are more than one Employee working in the department, it will not delete from dept table

To test the above trigger, ~~depts~~ Write the following statement and execute.

→ Delete from Emp_Dept Where Empno = 1020.

Disabling the Nested Trigger

As we discussed Earlier a trigger can fire another Trigger for execution and we can Nest them upto 32 levels.

It is possible to disable these Nested triggers if not required by changing the server setting of Nested triggers as OFF (0). Default is ON (1).

```
sp_configure 'Nested Triggers', 0
Reconfigure
```

Note:- When we change the server settings the setting gets affected only after restarting the server but without restarting the server we can change the server setting by using the statement "reconfigure"

Trigger → Trigger → Trigger
After → After → After
Instead of → After → Trigger

DDL TRIGGERS AND LOGON TRIGGERS:

DDL Triggers Fire in response to a variety of data definition Language Events like create, Alter, drop, Grant, deney & Revoke

We use DDL triggers when we want to do any of the following Certain

1. Prevent changes to ~~alter~~ our database.
2. For something to occur in the database in response to a change in your database.
3. Record changes are Events in the database.

A DDL trigger is a special type of Stored procedure that executes in response to a Server scoped or database Scoped Events

DDL triggers fire only after the DDL Statement executes so we cant use "Instead of triggers" here and more over DDL triggers will not fire in response to events that effect local ~~tbl~~ temporary tables.

DDL Triggers doesn't create the special Magic table inserted and deleted.

DDL Trigger scope:-

DDL Trigger can fire in response to an Sql Event processed in the current database ~~or~~ on the current server. The scope of the trigger depends on the Event specified to define the trigger

Syntax:- Create (or Alter) Trigger <Name>
on All Server | Database
[With <trigger attributes>]
For | After <event_type>
As
Begin
- Trigger Body
End

<Event type> refers to the event that will fire the trigger which can be anything like Create_table, Drop-table, Alter-table ... etc which must be following a convention of event_type that is which event and which type.

Events { Create_Table, Drop_view, Alter_procedure } types.

Write a trigger which restricts dropping of a table from the database at any time.

```
Create Trigger Restrict_Drop Table
on Database After Drop_Table
As
 Begin
 Rollback
 Raiserror ('can't drop table under this database.', 16, 1)
 End
```

After creating the table, try to drop a table which gets restricted.

Note:- Drop DDL triggers and Logon triggers immediately after testing.

Dropping a DML Trigger

```
Drop Trigger <Trigger Name>
```

Dropping a DDL Trigger

```
Drop Trigger <Trg Name> on All Server | Database
```

Dropping a Logon Trigger

```
Drop Trigger <Trg Name> on All Server
```

Dropping the above trigger.

```
Drop Trigger Restrict_DropTable on Database
```

→ Write a trigger which restricts creating and Altering of a table apart from business hours.

```
Create Trigger Restrict_DB create or Alter Table
on Database After create_Table, Alter_Table
As
Begin
Declare @Hours Int
set @Hours = Datepart (hh, Getdate())
If @Hours Not Between 9 and 16
Begin
Rollback
Raiserror ('can't create or alter table now.', 16, 1)
End
End
```

Dropping the above trigger.

```
Drop Trigger Restrict_DB create on All Server
```

Define a trigger on a server so that it will restrict Create, Alter and drop operation on a database.

```
-Create Trigger Restrict_DB
 On All Server After
 Create_Database, Alter_Database, Drop_Database
 As
  Begin
   Rollback
   Raiserror ('you can't perform any operations on a
   database, most be a sys admin user to do them.', 16, 1)
   End.
```

30/07/2013 – Tuesday

LOGION Triggers:-

These are same as DDL Triggers, but Fires only when we login into the server.

Syntax :-
```
Create or Alter Trigger <Name>
 on All Server
 [With <trigger attributes>]
  For |After Logon
  As
   Begin
    -Trigger body
   End
```

Logon triggers executes in response to a Logon Event This Event is raised when a User session is established with the Server.

LoGon Trigger Fires after the authenication face of logining in Finshes but before the user Session is actually established.

Note:- Logon Triggers can be defined only Server level but not database level.

Ex:- Create Trigger Connect_Success
On All Server After Logon
AS
Begin
Print 'Login operation was successful'
End.

→ Write a trigger that Fires when a user login into a Server to allow only three connections i.e, Fourth Connection should not be established.

Sol:- Create Trigger connection_Limit
On All Server After Logon
AS
Begin
IF original_Login() = 'sa' And (Select Count(*)
From sys.DM_Exec_Sessions where is_user_
Process=1 And original_Login_Name = 'sa') >3
Rollback
End.

[original_Login() → Predefined Function
original_Login_Name → column Name]

Temporary tables

These are tables that are created on the database specifically for using at a point of time only that is they are not Permanently stored on the database.

Generally while defining procedures, Functions, if we want to store a set of records to be used in that sub-program we use this temporary tables.

If required a temporary table can be created directly under the database just like other tables.

Temporary tables are of two types

1. Local temporary table.
2. Global temporary table.

We create a temporary table same as we create a Normal table but to specify it is a temporary table we prefix the table name with a single "#" if it is local temporary and "##" if it is global temporary.

Ex:- create Table # LocalTest (Id int, Name varchar(50))

create Table ## GlobalTest (Id int, Name varchar(50))

Note:- In whatever database we create a temporary table it gets stored under a tempdb database only. you can check it from the object Explorer below tempdb database.

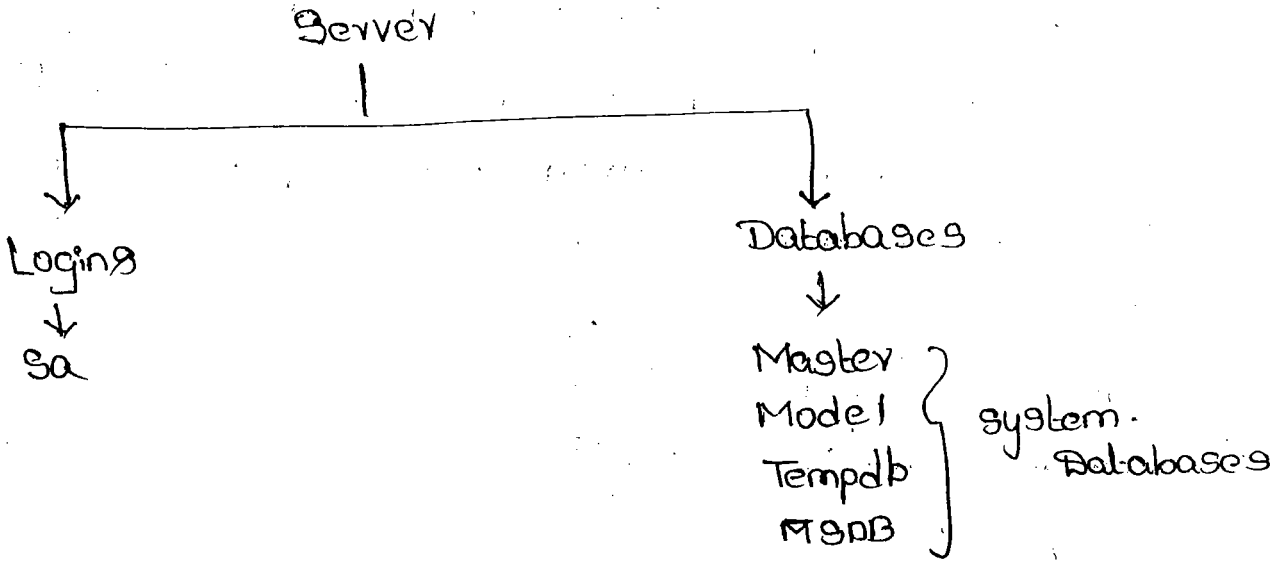
A Local temporary table can be accessed only within the session were the table was created where as a

Global temporary table can be accessed from other sessions also.

The temporary tables whatever we are created under a connection will be dropped or deleted once the connection where the table is created is closed.

Logins under database Server:-

By depault when we install sql server on a machine it comes with logins and databases as following.



Sa(sys.admin) is the depault login account under Sql server and considered as the owner of all the Server so Logining an as "sa" we can perform each and every operation on the server without any restrictions.

If required just like we can create New databases, we can also create new logins under the server by using "Create Login" Statement.

Syntax:- Create Login <LoginName> With
Password = '<pwd>'
[Must_change,

Check_Expiration = on|OFF,
Default_Database = [<DB Name>]

Note:- To create a New login we must be a system Administrator.

Create Login Raju with password='321'

Create Login Raju with password='321'
Must_change, check_Expiration = ON

In this case first time the user logs in the Password gets expired so must be change immediately

Now, we can login with the new login account that can access only master, msdb and tempdb databases but not model database (or) any other user database also.

For the New login it is not possible to give access to modeldb, bub we can give access to user databases if required.

We can give access to user databases with the help of a built in stored procedure

SP_GrantDBAccess

only the owner of the database can give access on a database to other users.

sa (sql11)
SP_Grant-DB Access 'Raju'

Authentication and Authorization:-

In the above case, after giving access to the database to the new login, the new login can access the database that is he is authenticated for accessing the database but after accessing the database he cannot perform any operation on the database because he is not authorized to perform any action.

Authentication is a process of verifying the credentials of a user to login into the system. Where as authorization is a process of verifying whether the user as permissions to perform any operations on the database.

DATA CONTROL LANGUAGE:

This is basically used for authorizing a user to Perform any actions on a database which comes with the three commands

1. Grant
2. Revoke and
3. Deny

1. **Grant**: This command is used for giving a previlege (or) permission for a user to perform an action on the database. previlages are of two types
   1. System previlage
   2. object previlage

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System previlege: It is a permission which is given on the complete database to perform any operation on the database.

Syntax:- Grant <permission> to <user / Role>

Ex:- Grant create Table to Raju
Grant Alter Table to Raju.

Note:- If a new user creates a table on other users database he doesn't requeries any permission for manipulating his table. because he is the ower of that table.

Object previlege: If a Permission is given on a specific object it is an object previlege.

Syntax:- Grant <permission> [columns)] on <object>
to <user / Role> [with Grant option]

Ex:- Grant Select on Emp to Raju
(or)
Grant select (Empno, Ename, Job, sal) on Emp to Raju
Grant Insert, Delete on Emp to Raju
Grant update (Empno, Ename, Job, sal) on Emp to Raju

Inside sa user

Giving Execute permission on sp:
Grant Execute on DivByone1 to Raju

Giving select Permission on Function
Grant select on Emp_GetSalDetails to Raju.

With Grant option: If a Permission is given to a user/ Role by using with Grant option that user can give that Permission to another user.

ROLE: A role is a group of permissions that is a set of Previleges combined together as a group and can be assigned at a time to the user.

Syntax:- Create Role <Role name>

Ex:- Create Role MyRole

After creating a role grants permissions to the role we have created just like we granted to a user.

Ex: Grant Select, Insert, Update, Delete on Dept to MyRole.

Inside sa user:
- Grant select, update on Deptdetails to MyRole.
- Grant select, Delete on Salgrade to MyRole.
- Grant select, Insert on customer to MyRole.

once after adding Permissions to the role we can add Members under the role so that the user will get all the Permissions that are added under the role.

Adding the member under a role

SP_AddRoleMember <rolename>, <loginname>

SP_AddRoleMember 'MyRole', Raju.

Removing / Deleting a Member from a role

SP_DropRolemember <rolename>, <loginName>

Sp_DropRoleMember 'MyRole', Raju.

REVOKE COMMAND: This is for taking back the Permission that are given to a user (or) a Role.

Syntax:- Revoking a system privelege

Syntax:- Revoke <permission> From <user | role>

Ex:- Revoke Create Table From Raju

Revoke ~~creat~~ Alter Table From Raju

Revoking a object privilege

Syntax:- Revoke <permission> [(column(s))] on object From <user | role> [cascade]

Ex:- Revoke Delete on Emp From Raju

Revoke insert, update on Emp From Raju.

onrole ← Revoke select, Delete on salgrade From MyRole

Cascade: We use cascade on Revoke when a Grant Permission is given by using with Grant option so that cascade will Revoke permission from all the users to whom the permission as been given by the grantee [Here raju is a granter] and [Sa is a grantee]

Deny: This is used for deniing a permission from a user so that it prevents the user from inheriting the Permission from a role also.

Syntax:- Denying a system Previlege
Deny <permission> To <user | role>

Deny create Table to Raju

Deny Alter Table to Raju

Denying a object previlege:

Deny <permission> [[column(s)]] on object
To <user | role> [cascade]

ex:- Deny select on Dept To Raju

In the above case, we have given a select permission on Dept table to Raju through a role so that if we want to take back that permission Revoke cannot be used because the permission is not given directly in such cases we use deny which denies the permission from that user. But still, that permission can be used by other users of the Role.

1|08|13 - Thursday

carrying or copying a database from one machine to the other.

If we want to carry the database from one machine to the other we have various options.

1. Backup and Restore: A Backup is a file with .bak extension. To take a backup of a database in the object explorer, right click on the database select tasks → Backup, will open a window click on the ok button which will create a backup copy of a database in the following location.

<drive>:\Program Files\Microsoft SQL Server\MSSQL11.MSSQLSERVER\MSSQL\Backup.

We can carry the above backup file onto the destination system where sql server was present and restore it there. To do this open the object Explorer right click on databases select restore database. which opens a window

in that window, select the option device and click on the button beside it which opens a window for selecting the backup device click add button which opens a dialogue box using it select the backup file from its physical file and click ok→ok → ok which restores the database under the server.

Q. Copying mdf and ldf files associated with the database:

As we are aware that every database is associated with a .mdf and .ldf files to carry the database from one place to another we can also copy these two files.

By default we will find those files in the following location.

<drive>:\programfiles\Microsoft SQL Server\MSSQL11.MSSQLSERVER\MSSQL\Data

Note: We cannot copy these two files when the databases is connected under the server - so to copy them first we need to detach the database from the server. To de-tach the database from the server :-

open object explorer right click on the desired database → select task → detach which opens a window just click on the ok button. Now we can copy the mdf and ldf files

Now copy the mdf files and ldf files onto the target system where SQL server was available and copy those files on to the target machine into any folder (but best location is data Folder)

Now those files can be attached under the server. which will add the database under server. To do this right click on databases node in object Explorer and select attach which opens a window -> click on Add button that open a dialogue box using it select the .mdf file from its physical location were we copied it, click ok, ok. which will attach the database under server.

3. Generating a script file for to the complete database and its object.

We can generate a script file (.sql) and run the script file on the destination so that the database and the objects gets created there. To do this in object Explorer -> right click on the database -> select task -> select Generate scripts which opens a wizard guiding you in the process of script generation.

In the wizard open select Next button, choose the option of entire database (or) selected objects. and click Next which opens a window in that under a filename specify the location where we wanted to save the script file and click Next. which displays a review of selections click Next which displays the progress and success of the script click finish. and close the window. Now we can find the script file in the specified location. To run the script file on a machine copy the file on to that machine and double click on it which directly opens a Management studio, execute.

(use sql)

SQL SERVER REPORTING SERVICES:

It is a tool from sqlserver used for designing of reports. To design a report by using this it must be first installed on the machine.

Note:- In many editions of sql server reporting services comes as a part of it.

Using Reporting services we can design reports with a wide variety of datasources like Sql server (or) oracle, xml, Excel etc...

It provides a full range of ready to use tools and services to help you create, deploy and manage reports for organisational needs.

Reporting services is a ~~service~~ server based reporting platform that provides comprehensive reporting functionality for a variety of datasources. Reporting services tool work within the Microsoft visual studio environment and are fully integrated with Sql table tools and components.

With reporting services we can create interactive tabular Graphical (or) Free form reports where the reports can include rich data visualization including charts and maps.

Creating a simple report using reporting services

Go to → startmenu → All programs → Microsoft visual Studio 2010 and click on it open which opens you VisualStudio 2010 shell".

In the window open in the lefthand side we find an option new project Click on it which opens

the new project window, select business Intelligence and under it select reporting services. Now in the right select report server project. Now in the bottom specify a name to the project Ex:- Sqll reports pr. and below it specify the location to save. and click ok. which opens a wizard for creating a report. Click Next button Specify a Name to the datasource as leave the same. Choose the type as Microsoft Sqlserver. click on the edit button and specify the connection details. and click ok. which displays the connection string in the text box click on the next button which will prompt for userid and Password confirmation click ok that opens a window (Design the query). In it under the query string textbox enter select * from Emp. and click Next. Now choose the Report type as tabular. click Next. Now add all the columns into the details list box. and click Next button. choose a table style in the list and click Next and click Finish. by specifying the Report name as Emp which gets saved as Emp.rdl (report definition Language).

Now open the solution Explorer in the right hand side of the studio and under the reports folder we find "Emp.rdl" right click on it and select run which opens a Report viewer. Enter the username and password and click view report which displays the data.

2/08/2013 - Friday

Creating a Report by loading the data from multiple tables:

Open the project sqlll reports we have created earlier and in the right hand of the abgee project we find the Solution Explorer open it for adding a new report in the project

SHARED DATASOURCES:

Every report requires the connection details to specify from where the data has to be loaded i.e, userid, Password, Database name, servername etc So while configuring a report we need to provide all these details as we done it in our first report.

Suppose if we want to design multiple reports accessing data from same database without providing the connection details under the Each report we can take the help of shared datasources that is once we configure these shared datasource we can start consuming it under multiple reports directly.

To create a shared datasource, in the Solution Explorer rightclick on shared datasources under the project and select add new datasource which opens a window in it Enter a name to the datasource Ex:- MYDS. Choose the server type as Microsoft SQL server, click on the Edit button which opens a window. In that specify the connection details click -> OK -> OK which adds the datasource under the Shared datasources mode.

Note:- The shared datasource we created right now can now be used under all the reports we want to design basing on a database we have configured with.

Creating a new report:

Now rightclick on the reports node in Solution Explorer select add new report → click on the next button now under shared datasource we will find our MYDS that as been created above. select it and click Next. Now under the query string text box right the following query.

```
SELECT E.Empno, E.Ename, E.Job, E.Mgr, E.Hiredate, E.Sal,
E.Comm, D.Deptno, D.DName, D.Loc, DD.Did, DD.Comments,
S.Grade. FROM Salgrade S
INNER JOIN Emp E
ON E.Sal BETWEEN S.Losal AND S.Hisal
INNER JOIN Dept D
ON E.Deptno = D.Deptno
INNER JOIN Deptdetails DD
ON D.Deptno = DD.Deptno.
```

Click on the Next Button choose tabular and click on the Next button

If we want to display the report page by page basing on any column we can do it by adding the Column into the page display Field list box.

In our current report let us display the report basing on the Deptno So that Employees of Each department will be shown in Seperate page.

To do this select deptno and click on the page button so that it's get added into list box beside. Now add the remaining column into Details box. Click on the Next button choose a style for the table and click Next now enter the name of the report as multi-table report and Click finish which adds the .rdl File under reports. Now right-click on it and select run. which displays the information page by page basing on the department number.

Note:- Currently when we run the report it will ask for the username and password. Every time we run the reports to avoid this open the solution Explorer and double click on the shared datasource we created earlier in it select the option credentials and select the radio button, use this username and password. and enter the username & Password and click ok. Now if we run the report again it will not ask for username and password.

Note:- for adding any titles to a Report we are given with an option of adding a header to the report, to do it go to reports and select add pageheader which will add a header section on top of the report now open the tool box and drag and drop required fields on to the section and do the neccessary alignments.

Same as above we can also add a page footer section to the bottom of the report.

Drilldown reports using GroupBy clause: Add a new report in the project → click Next → choose the shared datasource and click next → Now right the query under the query Builder String text box as Following

Select Deptno, Job, Max(Sal) as MaxSal From Group By Deptno, Job.

Next click on the next button → choose tabular and click on next button now add the Deptno and Job columns into Group list box and maxsal into Details list box. Click Next select Stepped radio button and Enable drilldown checkboxes. click the next button choose a table style, Click Next, Specify the name of the report as drilldown report and click Finish. Now right Click on the report Select run.

Matrix Reports: These reports are used for summarizing the information to design this report add a new reports in the project Click Next choose the datasource and click Next and write the following Query in the query string text box as following

Select Deptno, Job, sum(sal) AS salsum From Emp Group By cube (Deptno, Job)

→click Next → choose the report style as matrix →

→click Next now select deptno and add it under rows list box Select Job and add it under columns list box Select salsum and add it under details list box click next choose a style for the matrix click next → name the report as matrix report and click Finish. Right click on

the report and select Run.

3/08/13 - Sat

Parametrized Reports:

These are used for making your reports move dynamic that is with the help of the parameters we can send values to the reports for execution so that those values can be sent to the report in run-time and basing on that report queries gets executed.

To design a parametrized report Add a new report under the project click Next. Choose the data source and click next and write the following query in the query string textbox.

```
Select
  E.Empno, E.Ename, E.Job, E.Sal, S.Grade, E.Comm,
  D.Deptno, D.Dname, D.Loc From Emp E
  Inner Join Salgrade S
  On E.Sal Between S.Losal and S.Hisal
  Inner Join Dept D
    On E.Deptno = D.Deptno
      Where D.Deptno = @deptno
```

Click Next Choose tabular and click Next. Now add the Columns into details list box click Next. Choose your table style, click Next Enter the report name as Report Parameters and Click finish. Now run the report. which will first ask for the parameter Enter the value to the parameter and click View reports.

Note:- The Parameter of the report we added that is Deptno can be found under a window report data in left hand side of the studio under parameters node. Right click on the parameter and select parameter Properties in which we find name, Prompting text etc. Under prompting text enter the text we want to prompt For entering of the value. click OK.

Desiging Reports Manually:

Till now we are desiging the reports by using a report wizard but if required we can manually also design the reports where as to design the reports manually. First we need to configure a dataset. where a dataset is collection of fields associated with single (or) multiple tables. Dataset can also be created as shared just like shared datasources (or) we can also create Embedded datasets also. where a embedded dataset is specific to that report only.

open the solution Explorer right click on the reports and Select add new item which opens a window select report in it naming it as manual report.rdl and click OK where we will get a blank report. Now open the Report data in the left hand side and there we find a node Datasets right click on it select add dataset which opens a window name the dataset as customer as choose the radio button. use the dataset Embedded in my report Next click on the new button beside the datasource and choose our shared datasource that is Myps Next in the Query textbox below right the

Query as following.

```
Select  Custid, Cname, Balance, Status
FROM    customer
Where   (Status = @Status)
```

Next click on the ok button which adds the customers as dataset under datasets Node.

Above datasets we find parameters Expand it to view our Status parameter. Right click on it and select Parameter properties. and the window opened enter the Prompt as "Enter Status value either true or False" click ok. Now open the toolbox take a text box and place it on the top of the report and enter any Company name into it and do any necessary alignments to it.

Place another text box for displaying the address and do the neccessary alignments. Now in the toolbox select line Item and draw a line below company Name and address. From the toolbox place a table which shows with two rows, First row reserve for head and second row reserve for data Now put your mouse in the First cell of the second row which displays an icon click on it that displays the columns of your dataset. select Customer id, Select customer name, select balance.

By default it comes with three columns only now right click on the top of the third column select insert column right which adds a new column. to that column bind the Status. Now run the report by entering the Status Number.

Northwind and pubs . (Google)

↓

Employee

Displaying Images into Reports

Note:- Let us create the current report configuring with Employee table of Northwind database using a shared dataset

1. First create a shared datasource configuring with Northwind database
2. Now in the solution Explorer rightclick on shared dataset and select new dataset. give a name to the dataset as Employee DS, Next under the datasource choose the datasource configured with Northwind choose the query type as text and write the following query

```
Select EmployeeID, LastName, FirstName, Country, Photo
  From Employee
```

Click the ok button so that the dataset is added under shared dataset node with a name as Employeeps.rsd Now add it new report in the project that is blank report naming it as image reports.rdl. Open report data window right click on datasets select add dataset. Select use a shared dataset and below select Employee DS dataset. and click ok. which will display the columns of your table.

Now place a table on the report and add each column to each cell that is employee id LastName, FirstName, Country and Photo.

When we bind the column of the table to a cell by default it contains a textbox for displaying the data but rightnow under photocolumn we cannot display a image in the textbox. So select and delete the textbox in the second row. and place a pimage box in that cell Selecting from a toolbox.

After the image is added into the cell right-click on it and select image properties. In the window open under select the image source combo box choose database option. Below that under used this field combo box choose the photocolumn. Under use this MIME type combo box select image/Jpeg and click ok. Now run the report where we will be getting the image in the photo column.

Note:- By default if the image is compatable it will directly display the image if the image is not displayed again go to image properties click on the button beside the photocolumn and in that on the top textbox we find a value as following.

= Fields!photo.value

Delete it and write it as following.

= System.Convert.FromBase64String(Mid(System.Convert.ToBase64String(Fields!photo.Value),105))

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