

Topics • Essenti

- ◆Essential syntax to use DDL – data definition language
- Data types supported by SQL standard
- How to define tables and modify its structure
- How to define integrity constraints in SQL

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Data Definition Language

- SQL DDL allows database objects such as schemas, domains, tables, views, and indexes to be created and deleted
- Main SQL DDL statements are:
 - CREATE SCHEMA DROP SCHEMA
 - CREATE/ALTER DOMAIN DROP DOMAIN
 - CREATE/ALTER TABLE DROP TABLE
 - DROP TABLE
- CREATE VIEWMany DBMSs also provide:
 - CREATE INDEX
- DROP INDEX
- CREATE DATABASE

DROP DATABASE

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Data Definition Language (DDL)

- ◆ Tables and other database objects exist in an environment
- ◆ Each environment contains >=1 catalogs, and each catalog consists of set of schemas
- Schema is named collection of related database objects with the same owner
- Objects in a schema can be tables, views, security, domains, assertions, collations, translations, and character sets

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DROP TABLE

- ◆ DROP TABLE TableName
- [RESTRICT | CASCADE [CONSTRAINTS]]
- ◆ e.g. DROP TABLE PropertyForRent;
- Removes named table and all rows within it
- With RESTRICT, if any other objects depend for their existence on continued existence of this table, SQL does not allow request
- With CASCADE, SQL drops all dependent objects (and objects dependent on these objects)
- Note Oracle's diff. : CASCADE CONSTRAINTS

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CREATE TABLE

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CATEGORY	STORES THESE DATA
Character string	Strings of characters
Binary large object	Binary data
Exact numeric	Integers and decimal numbers
Approximate numeric	Floating-point numbers
Boolean	Truth values: true, false, or unknow
Datetime	Date and time values
Interval	Date and time intervals

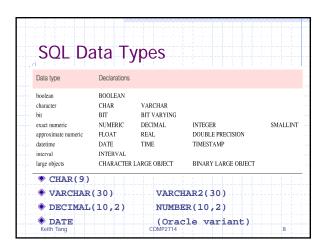


Table 3.3. Examples of Literals				
LITERAL	EXAMPLES			
Character string	'42', 'ennui', 'don''t', N'Jack'			
Numeric	42, 12.34, 2., .001, -123, +6.33333, 2.5E2, 5E-3			
Boolean	true, false, unknown			
Datetime	DATE '2005-06-22', TIME '09:45:00', TIMESIAMP '2006-10-19 10:23:54'			
Interval	INTERVAL '15-3' YEAR TO MONTH, INTERVAL '22:06:5.5' HOUR			

CREATE TABLE

- Creates a table with one or more columns of the specified data type
- With NOT NULL, system rejects any attempt to insert a null in the column
- Can specify a DEFAULT value for the column
- Primary keys should always be specified as NOT NULL
- FOREIGN KEY clause specifies FK along with the referential actions

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CREATE TABLE CREATE TABLE PropertyForRent (propNo VARCHAR2(5) NOT NULL NUMBER(4,0) DEFAULT 4 NOT NULL ,rooms NUMBER(6,2) DEFAULT 600 NOT NULL ,rent CHECk(rent BETWEEN 0 AND 9999.99) ,ownerNo VARCHAR2(5) NOT NULL ,staffNo VARCHAR2(5) NOT NULL ,branchNo CHAR(4) NOT NULL ,PRIMARY KEY (propNo) ,FOREIGN KEY (staffNo) REFERENCES Staff (staffNo) ON DELETE SET NULL ON UPDATE CASCADE ,CONSTRAINT chkrms CHECK(rooms BETWEEN 1 AND 15) COMP2714

Integrity Constraints Consider 5 types of integrity constraints: Required data: NOT NULL position VARCHAR2(10) NOT NULL Domain constraints Entity integrity – Primary Key Referential integrity – Foreign Key Enterprise constraints CHECK constraints Triggers CONSTRAINT keyword – only if naming the constraint

Entity Integrity

- Primary key of a table must contain a unique, non-null value for each row.
- ISO standard supports PRIMARY KEY clause in CREATE and ALTER TABLE statements:
 - PRIMARY KEY(staffNo)
 - PRIMARY KEY(clientNo, propertyNo)
- Can only have one PRIMARY KEY clause per table; can still ensure uniqueness for alternate keys using UNIQUE:
 - UNIQUE(telNo)

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Referential Integrity

- FK is column or set of columns that relates each row in child table containing FK to row of parent table with matching PK or unique key
- Referential integrity means that, if FK contains a value, that value must reference an existing row in parent table
- Definition of FKs with FOREIGN KEY clause in CREATE and ALTER TABLE:
 - CONSTRAINT fk_branchNo
 FOREIGN KEY(branchNo) REFERENCES Branch
 - FOREIGN KEY(orderNo, prodNo) REFERENCES OrderDetail (orderNo, productNo)

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Referential Integrity

- Any INSERT/UPDATE that attempts to create FK value in child table without matching PK or unique key value in parent will be rejected
- Action taken that attempts to update/delete a PK or unique key value in parent table with matching rows in child is dependent on referential action specified using ON UPDATE and ON DELETE subclauses:

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- CASCADE
- NO ACTION
- SET DEFAULT SET NULL
- Note: Oracle's limited support in this

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Referential Integrity

- NO ACTION: Reject delete from parent Default
- CASCADE: Delete row from parent and delete matching rows in child, and so on in cascading manner
- SET NULL: Delete row from parent and set FK column(s) in child to NULL; only valid if FK columns are defined as NULL allowed
- SET DEFAULT: Delete row from parent and set each component of FK in child to specified default; only valid if DEFAULT value is specified for each FK column involved

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CHECK Constraints

- ♠ [CONSTRAINT constraint_name]
 CHECK (condition);
- Minimum or maximum values
 CONSTRAINT chk_rent
- CHECK(rent <= 9999.99)
- Specific list of values CONSTRAINT chk_branchNo CHECK(branchNo IN ('BR09','BR22','BR17'))
- Range of values CONSTRAINT chk_rent CHECK(rent BETWEEN 0 AND 9999.99)

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ALTER TABLE Add a new column to a table Drop a column from a table Add a new table constraint Drop a table constraint Set a default for a column Drop a default for a column

ALTER TABLE ◆ ALTER TABLE MyTable ADD column_b VARCHAR(20) NULL; ◆ ALTER TABLE MyTable DROP COLUMN column_b; ♦ ALTER TABLE MyTable ADD column b VARCHAR(20) NULL CONSTRAINT exb_unique UNIQUE; ◆ ALTER TABLE MyTable WITH NOCHECK ADD CONSTRAINT exa check CHECK (column_a > 1); Keith Tang COMP2714 21

ALTER T	ABLE
ADD co	LE MyTable PRIMARY KEY identify column */ plumn_b NUMBER(5) NOT NULL LAINT column b pk PRIMARY KEY,
colu	column referencing another mn in the same table clumn_c NUMBER(5) NULL CONSTRAINT column_c_fk REFERENCES MyTable(column_b);
◆ Use multi readabili	ple ALTER TABLE statements for ty
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DROP	TABLE	
	BLE TableName RICT CASCADE [CONSTRAINTS]]	
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