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| **[Introduction](file:///\\\\Naeast.ad.jpmorganchase.com\\home\\amerxbus\\XBUS\\nacdc1vdihome12\\R666050\\jpmDesk\\Desktop\\My%20Stuff\\Proficiency;%20SQL\\ch1\\1.PNG)** | | | |
| SQL’s Purpose | * To manipulate sets of data, typically, from a relational database * ANSI and ISO standards | | |
| **Database** | | | |
| *A container to help organize, store and retrieve data in an effective way* | | | |
| **Relational Database/Model** | | | |
| *A way to describe data and the relationships between data entities* | | | |
| Summary  Database design is important; it controls the questions you can ask later.  SQL is the language you use to ask those questions.  SQL is a powerful declarative language that you can grasp by understanding a few basic concepts | | | |
| [**Understanding Basic SQL Syntax**](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch2\1.PNG) | | | |
| **SQL Statement** | | | |
| *An expression that tells a database what you want it to do.* [[Click Here](file:///H:\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch2\1\1.PNG)] | | | |
| |  |  |  | | --- | --- | --- | | Basic SQL Commands | Purpose | Example | | SELECT | Retrieves one or more rows from one or more tables | [[Click Here](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch2\2\2.PNG)] | | INSERT | Adds one or more rows into a table | [[Click Here](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch2\3\3.PNG)] | | UPDATE | Modifies one or more rows in a table | [[Click Here](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch2\4\4.PNG)] | | DELETE | Removes one or more rows from one table | [[Click Here](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch2\5\5.PNG)] | | | | |
| Summary  Once you understand the basics of SQL you will be able to get the questions you have answered correctly. | | | |
| [**Querying Data with the SELECT Statement**](file:///H:\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch3\1.PNG) | | | |
| [[The SELECT List](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch3\1\1.PNG)] | * Most of the time it contains a list of columns from a table you want to query. * In this cause, a FROM clause is required. * After every column comes a comma. * Except: no comma after the last column. * \*, This wildcard “SELECT list” character pulls all the columns from a table | | |
| [[The FROM Clause](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch3\2\2.PNG)] | * Defines the table you want to query | | |
| Examples: | | | |
| [[Aliasing the Table Name](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch3\3\3.PNG)] | [[NOT DISTINCT](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch3\4\4.PNG)] | | [[DISTINCT](file:///\\NAEAST.AD.JPMORGANCHASE.COM\HOME\AMERXBUS\XBUS\NACDC1VDIHOME12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch3\5\5.PNG)] |
| Summary  Query data with the SELECT command  The SELECT list defines the table  DISTINCT constrains results to unique values | | | |
| **Filtering Results with the WHERE Clause** | | | |
| [[The WHERE Clause](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch4\1\1.PNG)] | | * Constrains the result set * Comes after the FROM clause * Contains Boolean expressions * Only matching rows are in the result set | |
| [[Boolean Operators](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch4\2\2.PNG)]  [[Other Operators](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch4\3\3.PNG)] | | | |
| [[The AND Keyword](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch4\4\4.PNG)] | | * Combines two expressions * If both are True, row is included * If either is FALSE, row is excluded | |
| [[The OR Keyword](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch4\5\5.PNG)] | | * Also combines two expressions * If either are TRUE, row is included * If both are FALSE, row is excluded | |
| [[The BETWEEN Operator](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch4\6\6.PNG)] | | * Acts on column and two values * TRUE if column value is between two values * Inclusive – includes two values (like >= & <=) | |
| [[The LIKE Operator](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch4\7\7.PNG)] | | * A more fuzzy version of = * String with special characters inside * If the match is true, the row is returned | |
| [[The IN Operator](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch4\8\8.PNG)] | | * Like a multi-value = operator * List of potential value * True if any of the values in the list “hit” | |
| [[The IS Operator](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch4\9\9.PNG)] | | * Special operator * Like a equals operator * But just for value that might be NULL | |
| [[The IS NOT Operator](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch4\10\10.PNG)] | | * Also just for NULL * Like a “NOT EQUALS” operator | |
| Summary  The WHERE clause enables us to restrict the result set of our queries  The more complex the question we want to ask, the more complex the WHERE clause becomes | | | |
| [**Shaping Results with ORDER BY and GROUP BY**](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch5\1.PNG) | | | |
| [[ORDER BY](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch5\1\1.PNG)] | | * Allows sorting of result set * After the WHERE cause (if there is one) * Specify one or more columns * ASC (default) or DESC | |
| [[Set Function](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch5\2\2.PNG)] | | * Computers new values from column values * Use in place of columns in SELECT clause * Passes column name to function * Helps us to ask more interesting questions | |
| [[Set Functions + Qualifiers](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch5\3\3.PNG)] | | * Often used together * Add inside of the function * Run against DISTINCT column values | |
| [[GROUP BY](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch5\4\4.PNG)] | | * Allows multiple columns with a set function * Breaks result set into subsets * Runs set function against each subset * Runs set returns 1 row per subset * Subset is dictated by column in GROUP BY * Column must appear in SELECT LIST * Appears after FROM and/or WHERE Clauses | |
| [[HAVING](file:///\\NAEAST.AD.JPMORGANCHASE.COM\HOME\AMERXBUS\XBUS\NACDC1VDIHOME12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch5\5\5.PNG)] | | * Works like WHERE works against SELECT * Restrict the subset | |
| Summary  Answering more complex questions requires more complex queries  ORDER BY to soft result sets  SET functions to roll-up or slice  GROUP BY to create subsets  HAVING to restrict GROUP BY | | | |
| **Matching Different Data Tables with JOINs** | | | |
| The JOIN Clause | | * Merges multiple tables into one result set * FROM clause includes all tables * Separates each table with a comma * WHERE clause typically included * Expression with columns from each table * There are different types of JOINs | |
| [[CROSS JOIN](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch6\1\1.PNG)] | | * Simplest JOIN * All rows from both tables * No WHERE clause * Least useful * Inefficient * Cartesian Product * CROSS keyword implied | |
| [[INNER JOIN](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch6\2\2.PNG)] | | * Most typical JOIN * Emphasizes relational nature of database * Matches column in first table to second * Primary key to foreign key is most common | |
| OUTER JOIN | | * INNER JOIN doesn’t deal with NULL values * OUTER JOIN works even when no match * NULL columns if no match in second table * FULL OUTER JOIN returns all joined rows * NULL when no match in either table | |
| [[LEFT OUTER JOIN](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch6\3\3.PNG)] | | * Another NULL-related JOIN * All rows from the left side will be returned * NULL for non-matching right side table | |
| [[RIGHT OUTER JOIN](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch6\4\4.PNG)] | | * Opposite of LEFT OUTER JOIN * All rows from the right side will be returned * NULL for non-matching left side table | |
| [[FULL OUTER JOIN](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch6\5\5.PNG)] | | * LEFT OUTER JOIN a RIGHT OUTER JOIN | |
| SELF JOIN | | * You can JOIN a table on itself * Odd but sometimes useful * No special syntax * Same table on left and right side of JOIN * Useful when table contains hierarchical data | |
| Summary  JOINS make the relational model come to life by associating tables together | | | |
| [**Adding, Changing, and Removing Data**](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch7\1.PNG) | | | |
| [[All the Commands – AKA CRUD](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch7\1\1.PNG)] | | | |
| [[INSERT](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch7\1\1\1.PNG)] | | * Command is actually INSERT INTO * Table name after command * Only one table allowed * List of columns in parens * VALUES keyword * List of values in parens * Values and columns must be equal | |
| [[BULK INSERT](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch7\2\2.PNG)] | | * INSERT allows only one table and column list * Insert multiple rows with one statement * Either multiple values lists or * SELECT statement following table name | |
| [[UPDATE](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch7\3\3.PNG)] | | * Modifies column(s) in a single table * WHERE clause dictates which rows * SET keyword follows table name | |
| [[DELETE](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch7\4\4.PNG)] | | * DELETES one or more rows in a table * Permanent! * DELETE FROM is actual full command * WHERE clause is critical! | |
| Summary  INSERT, UPDATE, and DELETE are the three SQL commands you want to learn if you are going to be modifying data in your database tables | | | |
| **Creating Database Tables** | | | |
| DATA DEFINITION LANGUAGE (DDL) | | * SQL subset for creating databases and tables * Most tools have a visual method * Good to have an idea of what they are doing | |
| [[CREATE DATABASE](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch8\1\1.PNG)] | | * Oddly not part of the SQL Standard * Is supported by most implementations * USE DATABASE to scope future queries * Can also fully qualify table name to database | |
| [[CREATE TABLE](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch8\2\2.PNG)] | | * Is part of SQL Standard * Followed by table name * Then list of column definitions * At minimum column name and type | |
| [[Standard SQL Data Types](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch8\3\3.PNG)] | | | |
| [[NULL VALUES](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch8\4\4.PNG)] | | * NULL is a special value in SQL * Indicates a lack of a value * Columns can be required or not required * Required is NOT NULL * Not required is NULL | |
| [[PRIMARY KEY](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch8\5\5.PNG)] | | * Must be a unique value per row * Must be NOT NULL * Can be a multiple columns (compound key) | |
| [[CONSTRAINT](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch8\6\6.PNG)] | | * Way to add keys in one grouping * Primary or foreign keys | |
| [[ALTER TABLE](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch8\7\7.PNG)] | | * Used to change an existing table * Add/remove column * Change column data type * Change column constraints * Must comport with current data | |
| [[DROP TABLE](file:///\\Naeast.ad.jpmorganchase.com\home\amerxbus\XBUS\nacdc1vdihome12\R666050\jpmDesk\Desktop\My%20Stuff\Proficiency;%20SQL\ch8\8\8.PNG)] | | * Removes table and all data from database CAREFUL! * Error if table is a foreign key to another table | |
| Summary  Understanding DDL is a good foundation for working with SQL, even if you use it rarely  CREATE TABLE is the command to configure your columns and relations  ALTER TABLE lets you change existing definitions  DROP TABLE removes the table and all its rows from the database | | | |