# C# .NET LINQ Examples

* How to select data from a database to a DataTable
  + See SelectAll() in DataViewer.cs
  + See case “Graph Data” in FilterViewDB() in DataViewer.cs
* How to select rows in a DataTable
  + <http://code.msdn.microsoft.com/101-LINQ-Samples-3fb9811b>
  + See GetList() in TableFilter.cs
* How to filter a DataTable
  + See FilterViewCSV() in TableFilter.cs
* How to edit rows in a DataTable
  + See foreach in OutliersDB() in DataViewer.cs
* How to update a database with a DataTable
  + See UpdateDBCleanse() in DataViewer.cs
* How to get column data types from a database
  + See GetSchemaTable() and property IndependentColumnType in DataViewer.cs

# T-SQL Examples

* SQL Server needs to know what database to use for sql queries:

* + 
* Create Faults Table

* + 
* Test the Faults table for unique constraints

* + 
* Are there any StringTags with more than one StringNumber?
  + Yes (1 genuine case and 6 erroneous cases; NOT common)



* Are there any StringTags with more than 40 Cells? Yes
  + Show a list of the different numbers of Cells and how many strings have that number:



* + Example: There are 181 strings that have exactly 40 cells.
* Are there any batteries with more than one reading on the same day? Yes, many

* + 
* Show a list of StringTags and how many cells they have:

* + 
* Show a list of ReadingDates and how many Strings have that date:

* + 
* Show a list of ReadingDates and how many readings have that date:

* + 
* Show a Table of readings that have voltage less than 0.5 and are adjacent to another battery on the same string with the same reading date that also has voltage less than 0.5.

* + 
* **BDS40 Fault 1**: Increase the probability of F1 by 38% when CellVoltage <= 0.5 and adjacent to another battery on the same string with the same reading date that also has voltage less than 0.5

* + 
* **BDS40 Fault 2:** Increase the probability of F2 by 75% when CellVoltage > 17.4:

* + 
* **BDS40 Fault 3:** Increase the probability of F3 by 75% when CellResistance = 65535

* + 
* Show a table of strings, how many cells they have, and the size of their groups. The size of groups are defined as 10% of the number of cells on the string.

* + 
* Show a table of readings that have voltage less than 0.5 and are within 4 batteries to another battery on the same string with the same reading date that also has voltage less than 0.5:

* + 
* Show a table of distinct ReadingIds that have voltage less than 0.5 and are within X batteries to another battery on the same string with the same reading date that also has voltage less than 0.5, where X is 10% of the number of batteries on that string. Also show the number of batteries found within X of this reading that follow the same criteria:

* + 
* Show a table of distinct ReadingIds that have resistance = 65535 and are near **EXACTLY** X-1 other batteries on the same string with the same reading date that also have resistance = 65535, where X is 10% of the number of batteries on that string:

* + 
* **BDS40 Fault 4:** flag readings that have 8 adjacent batteries of the same string and date that are “maxed out” at the same resistance value. A maxed resistance value has been determined to be something over 30000 up to 65535.

* + 
* **BDS40 Type 5**: Same as a type 4, but with X is 20% instead of 10% (double or two adjacent groups, where a group is 10% of the number of cells on a string)

* + 
* Use T-SQL rank() to solidify the ordering of the Faults table so that all Readings for a single battery are neighbors. **Note:** This will allow for selection of two successive readings without knowing the difference in ReadingDates.

* + 
* Show the days of difference between each reading and the previous reading of the same battery

* + 
* List the readings that have a difference in TSLR from the previous reading

* + 
* **BDS40 Type 6:** Flag all readings that have a different TSLR (Time Since Last Reading) than the previous reading on the same battery

* + 
* Show a table that lists a battery reading with the next four adjacent batteries with the same date, on the same string, and where the voltage alternates from low to high, but decreases in variance each time. Also show their voltage.

* + 
* The above appears to be too sensitive. Make sure the distance between the alternation is more than 20% and the difference between the ramping is more than 5%

* + 
  + The \* .97 means that the voltage must be at least 3% lower to register.
  + 3% may be too sensitive, but 5% may not be sensitive enough.
* **BDS40 Fault 7:**

* + 
* **BDS40 Fault 10:** A row is entered incorrectly if StringTag is not a number.

* + 