

DataClient 1.1 Manual

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(Under Development)

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Abstract

DataClient is a MapWindow GIS Plug-in which adds database client functions. These allow MapWindow GIS to manage and use GIS and other data types on supported relational database.

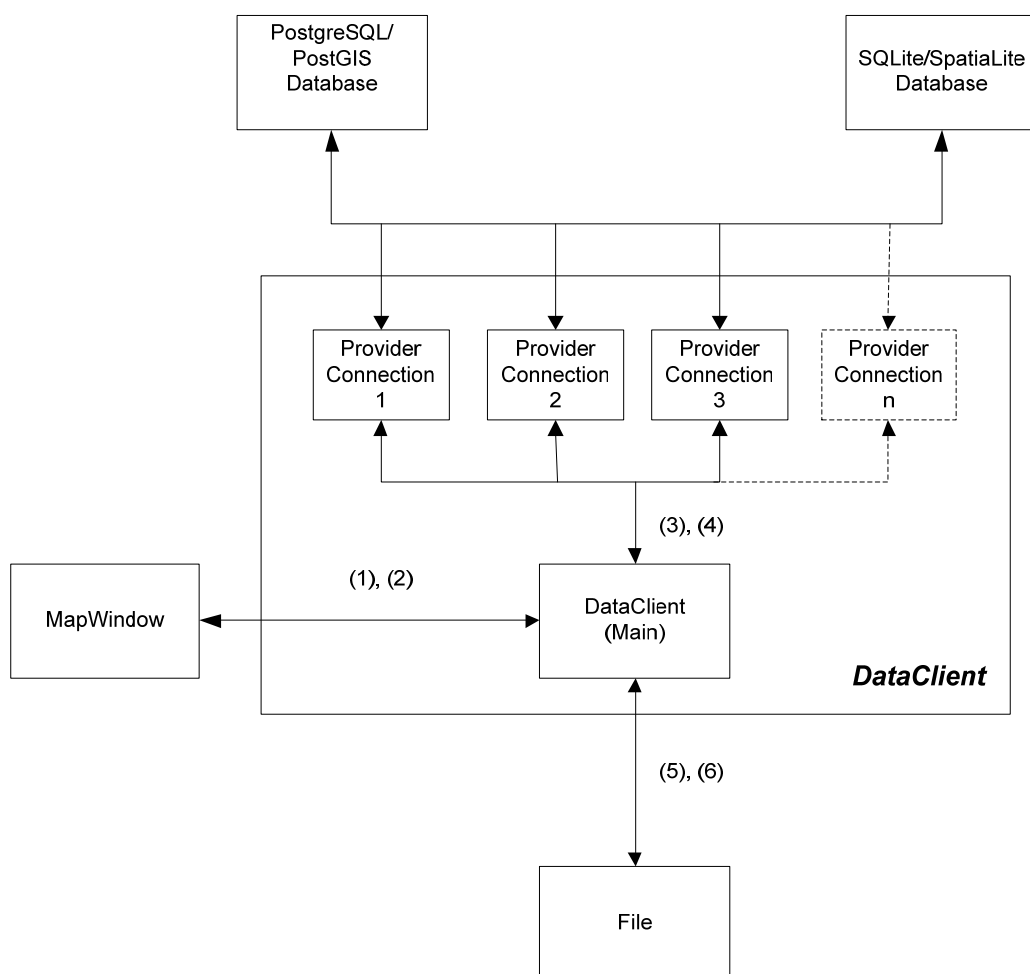
This is the manual for version 1.1

Chapter 1

Introduction

DataClient is developed by Poom Malakul Na Ayudhya. The purpose is to make MapWindow GIS to be able to use relational databases (RDBMS) as a database client. That means DataClient can create data tables and store (3) or retrieve (4) them to and from supported database. It also can use Mapwindow GIS to display data table containing vector data by adding a shapefile layer (1) or loading it back to create a data table (2). DataClient can also open (5) or save (6) data table to file on local computer.

The relational database systems currently supported are PostgreSQL/PostGIS and SQLite/Spatialite .



Chapter 2

Installation

2.1. Knowledge Requirements

SQL and relational database management

To use DataClient efficiently knowing about SQL and database management are required. DataClient comprises of SQL Query Editor that you can edit and save SQL command as a file with extension .sql. DataClient can generate SQL command statements for some purposes by using the menus. But in some case you need to edit command by yourself to do exactly what you want.

Basic GIS

Because DataClient can handle GIS vector data. It is better to know about basic GIS objects such as point, line and polygon. You also should know about coordinate system and projection that GIS objects use.

2.2. Software Requirements

MapWindow GIS Application x86 version 4.7 or later

This is the Window Application that DataClient plugs into. You can download from <http://www.mapwindow.org>. It is free and open source. DataClient uses MapWindow for displaying vector GIS data on the map.

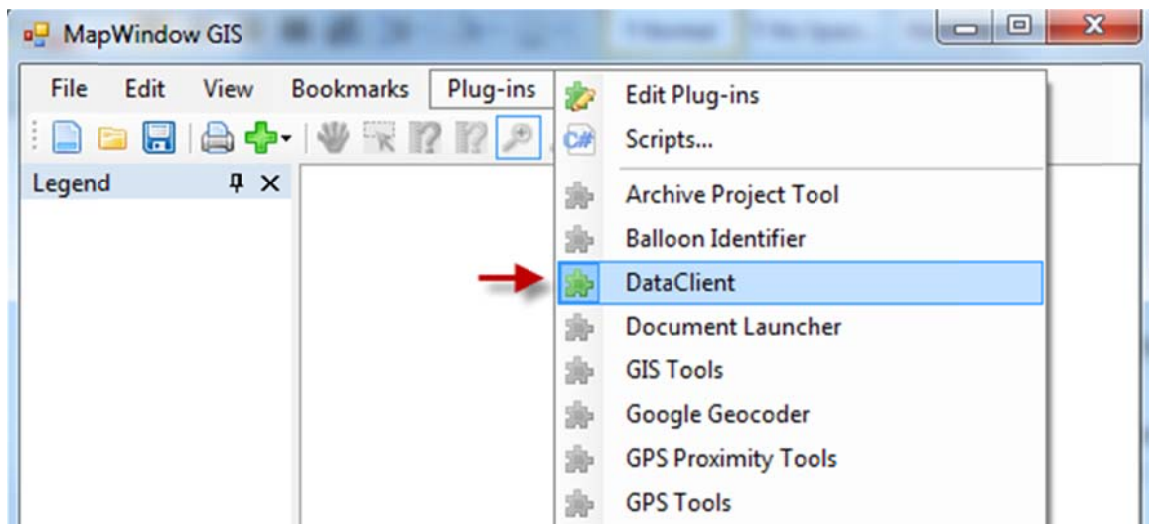
PostgreSQL 8.3 or later and PostGIS 1.3.3 or later

PostgreSQL is the relational database software that DataClient connects to. PostGIS is an extension of PostgreSQL that make it capable of handling GIS Data with relational database efficiently. PostgreSQL/PosGIS can be installed on both Windows and Linux Platform. They are both free and open source. Before using with DataClient, you have to make sure that PostgreSQL/PostGIS Server is available and functions properly.

SQLite/Spatialite is included in this package. You don't need to install it separately.

2.3. DataClient Installation

1. Make sure that you have installed MapWindow already and it can function properly. Then close it.
2. Uninstall previous version of DataClient.
3. Double click DataClient Setup file to start installation. Following the steps of installation.
4. Open MapWindow, click on Plug-ins menu and select DataClient. DataClient menu will appear on main menu bar.
5. If you want to connect DataClient to PostgreSQL/PostGIS server, make sure that you have enough privilege to use the database on the server.

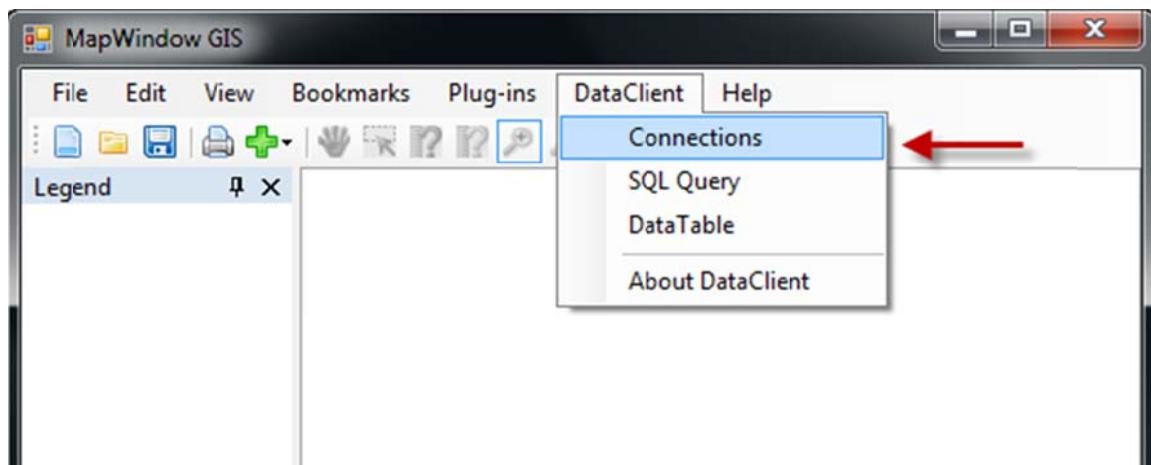


Chapter 3

Using DataClient

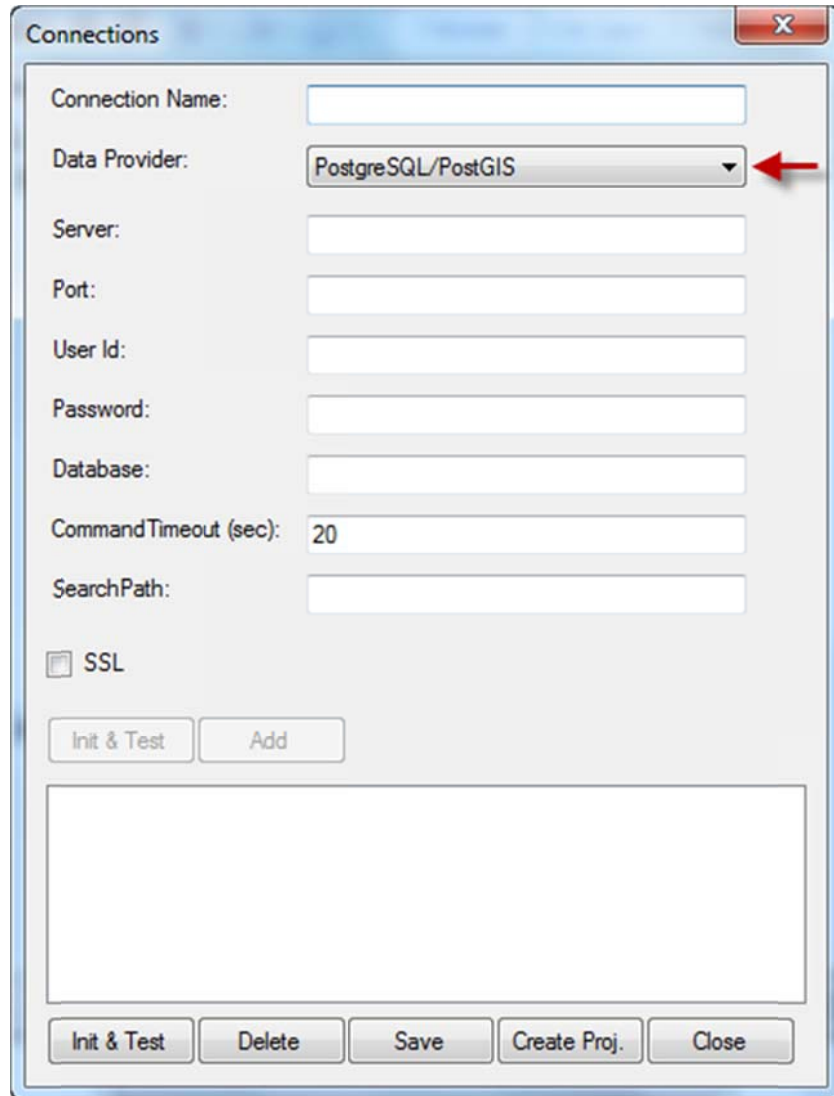
3.1 Connections setting

DataClient uses Connection to connect to Data Provider. To start Connections setting, click on Connections menu.



Type in any Connection Name you want and select Data Provider by clicking on Data Provider ComboBox to select Data Provider Type. Currently, you can choose PostgreSQL/PostGIS or SQLite/Spatialite.

For PostgreSQL/PostGIS Data Provider:

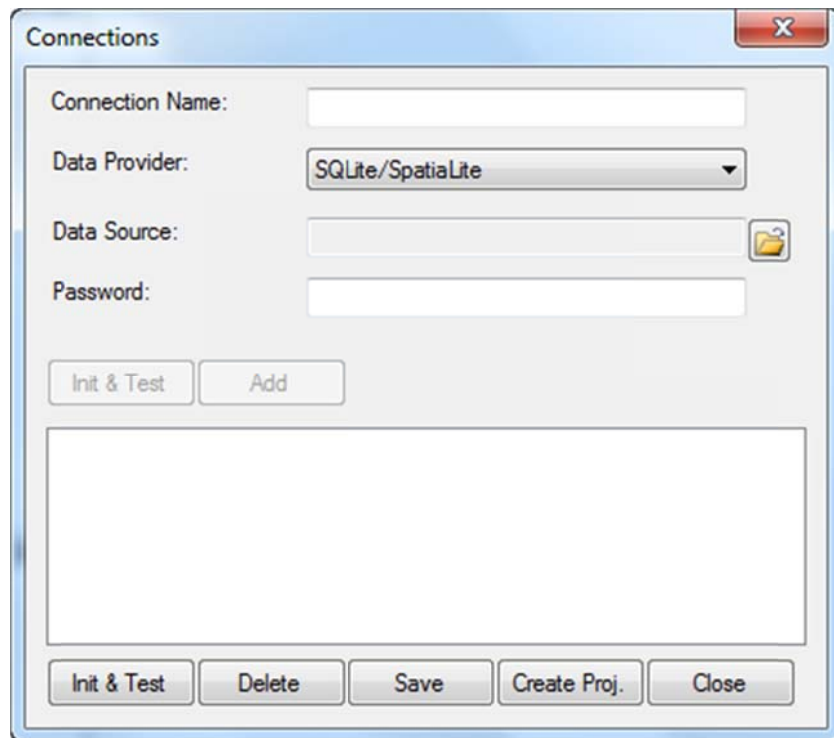


Server:	Name or address of PostgreSQL/PostGIS database server
Port:	Port number
User Id:	PostgreSQL user name
Password:	User's password
Database:	atabase name
Command Timeout (sec):	Command Timeout in second
SearchPath:	Schema names separated by comma

Tip: You have to make sure that you have enough privilege on any schemas you type in. And one of them must have PostGIS installed, ex. public schema.

SSL: Secure connection

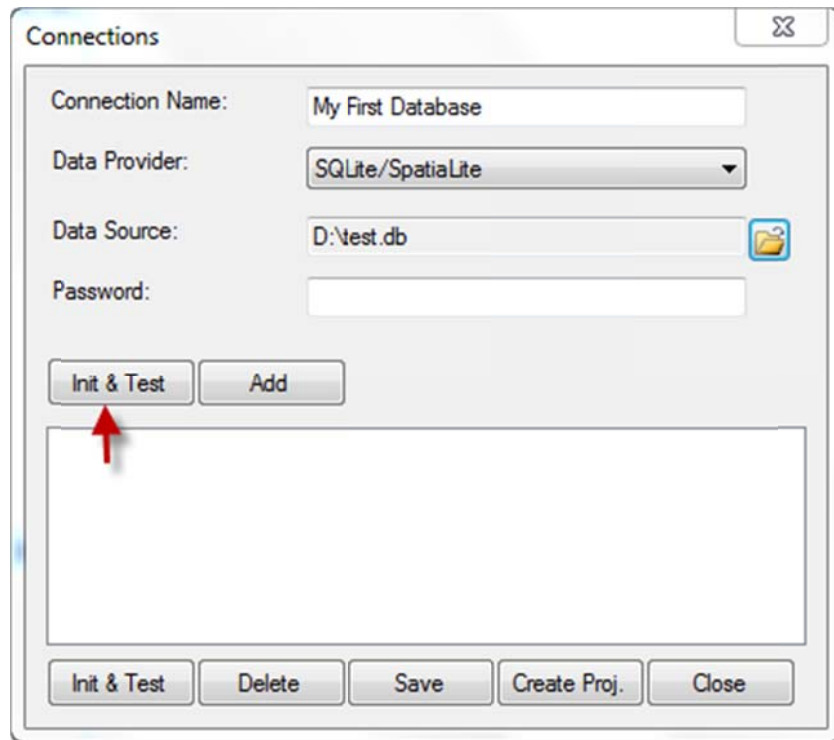
For SQLite/Spatialite Data Provider:



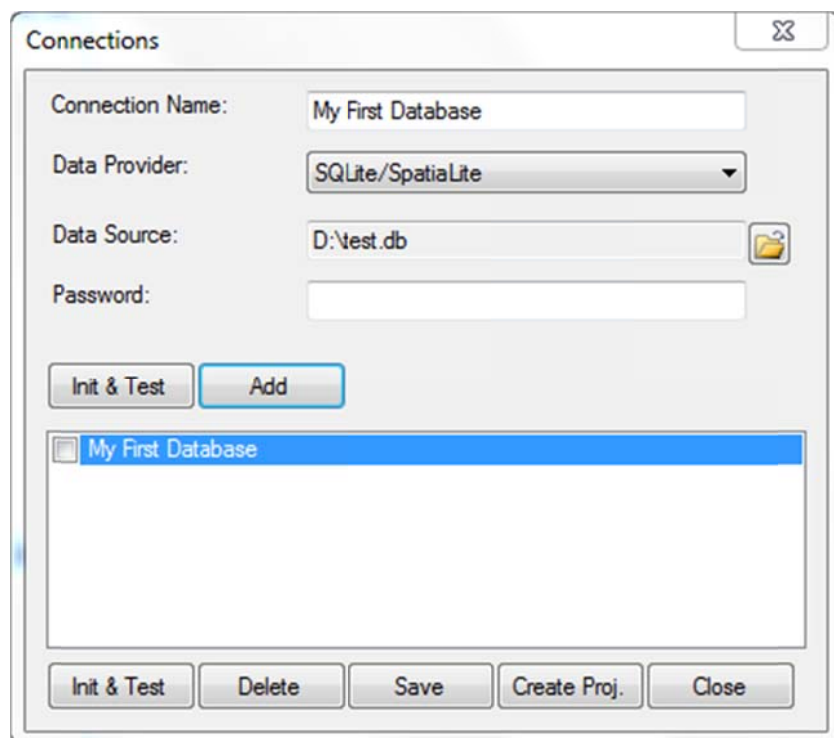
Data Source: Database file name, click on open button on the right side.

Password: Encrypted password (optional) if you want to encrypt your database file.

After entering enough information, press “Init & Test” button to initialize and test connection to database server.

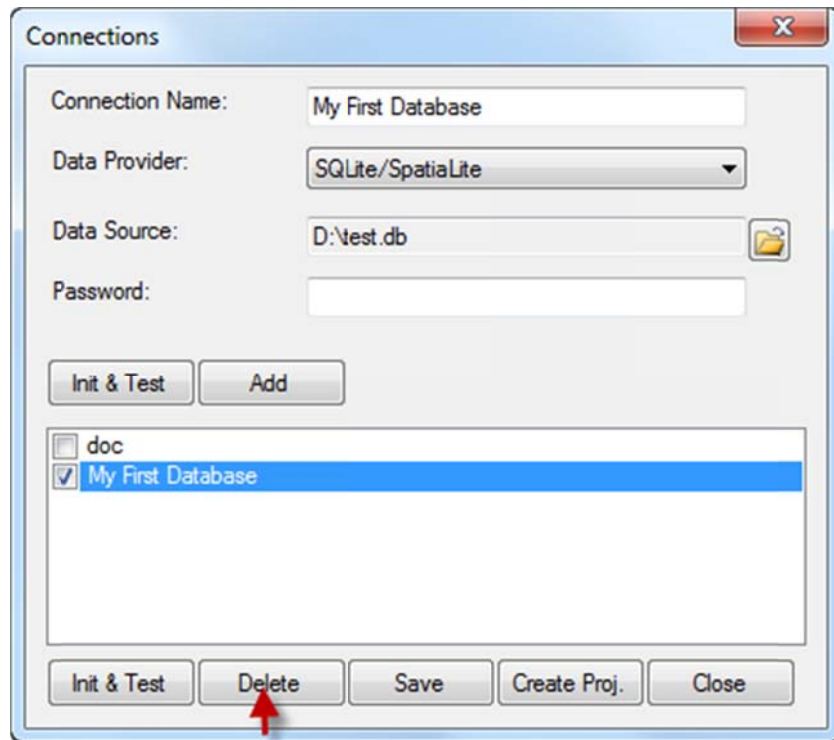


Then you can click Add button to add this connection into Connection List Box below.



If you click on any connection that was already added, the information of the connection will be shown on the input panel above. You can also initialize and test any selected connection by clicking on "Init & Test" button below the Connection List Box.

To delete any connection, check on that connection and press delete button.



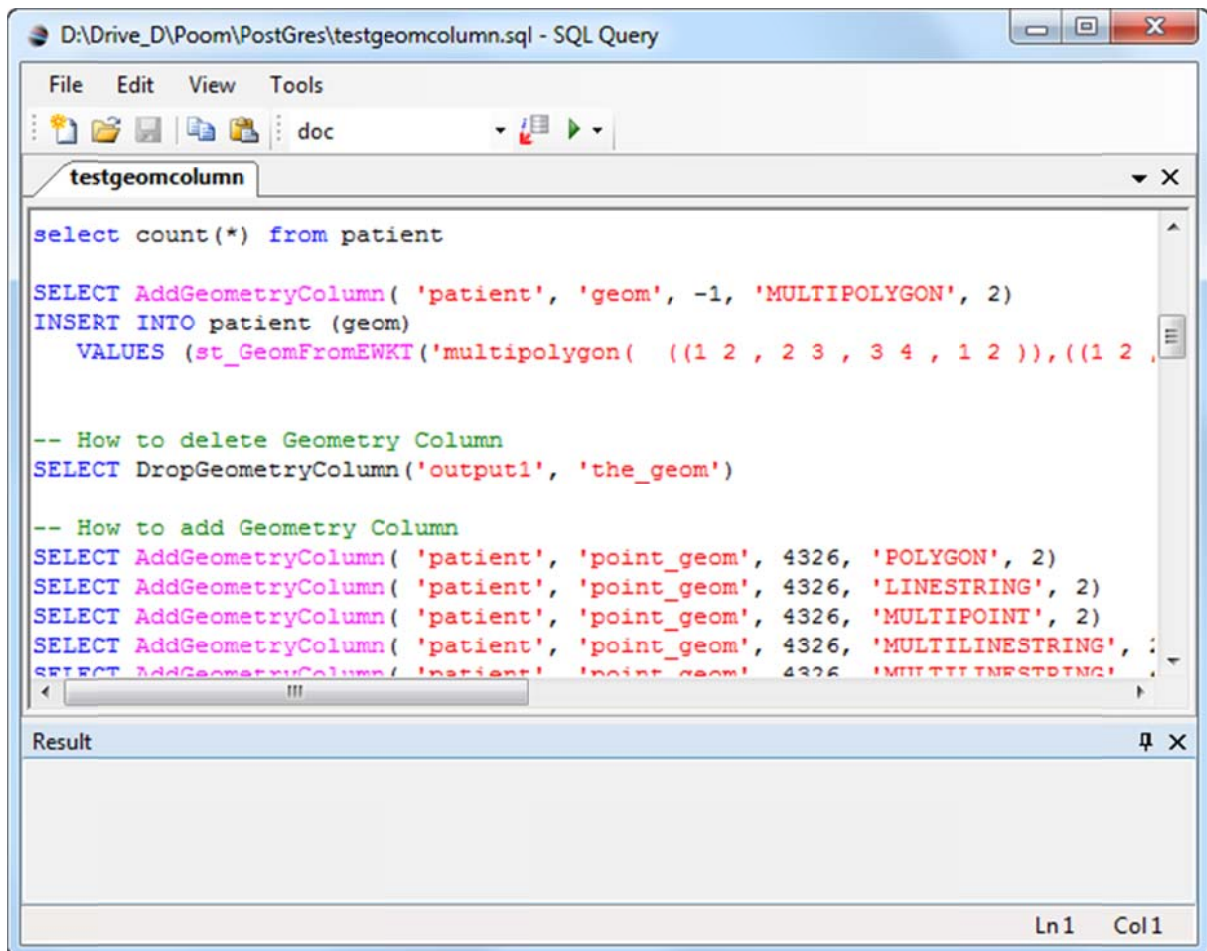
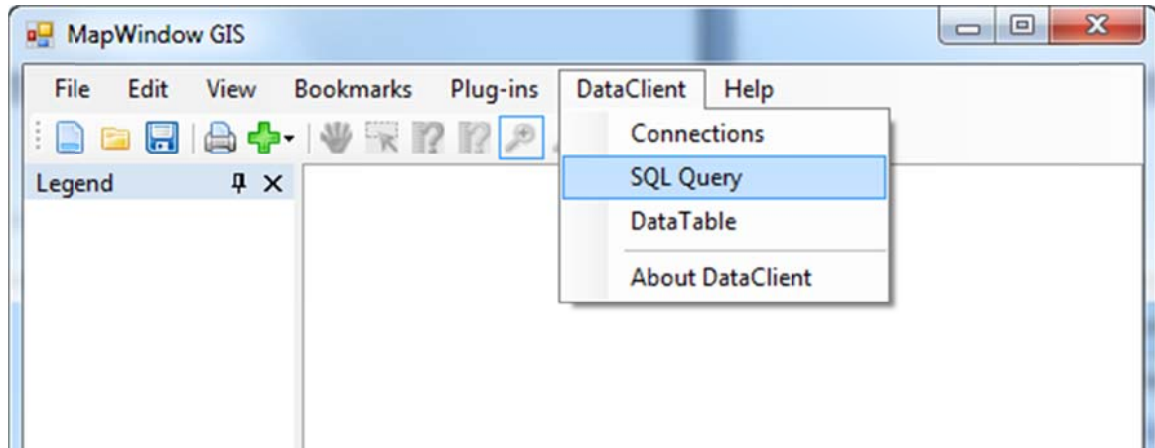
If you want to save Connection configuration, click on save button. The data will be save on your computer in encrypted file so no one can read it.

The projection file is included in the installation package. However if you want to create the new one, click on "Create Proj." button. Both PostGIS and Spatialite support this function.

3.2 SQL Query

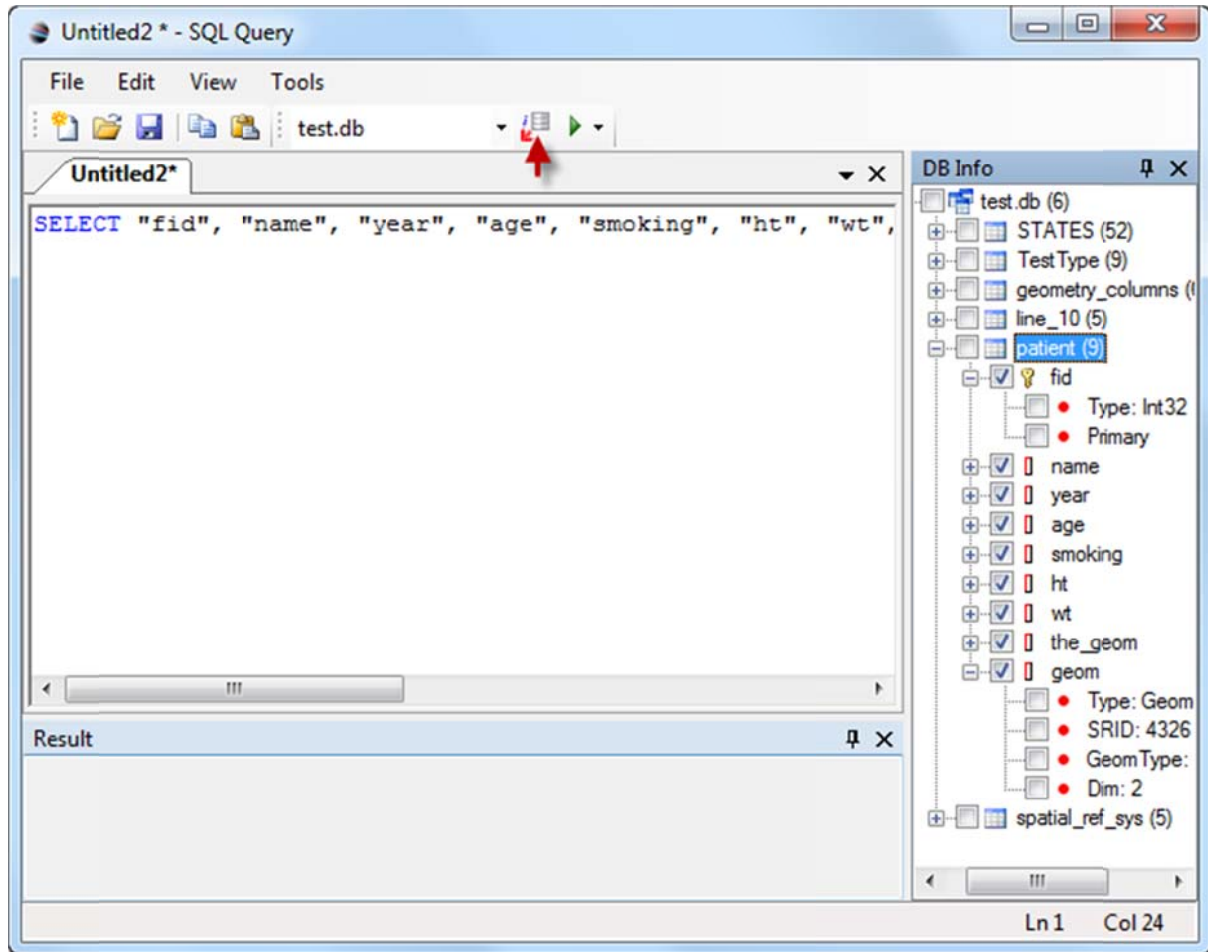
3.2.1. SQL Editor

To start SQL Editor, click on SQL Query menu.

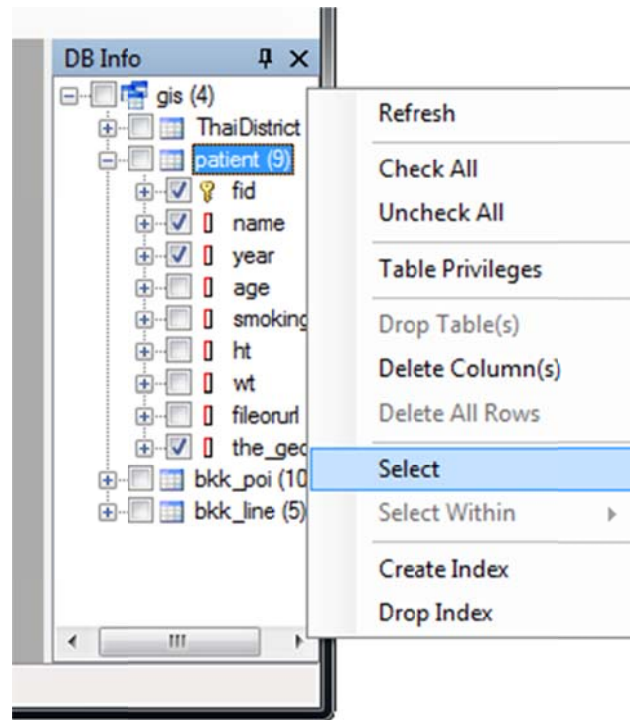


You can use SQL Editor to edit, open and save SQL command.

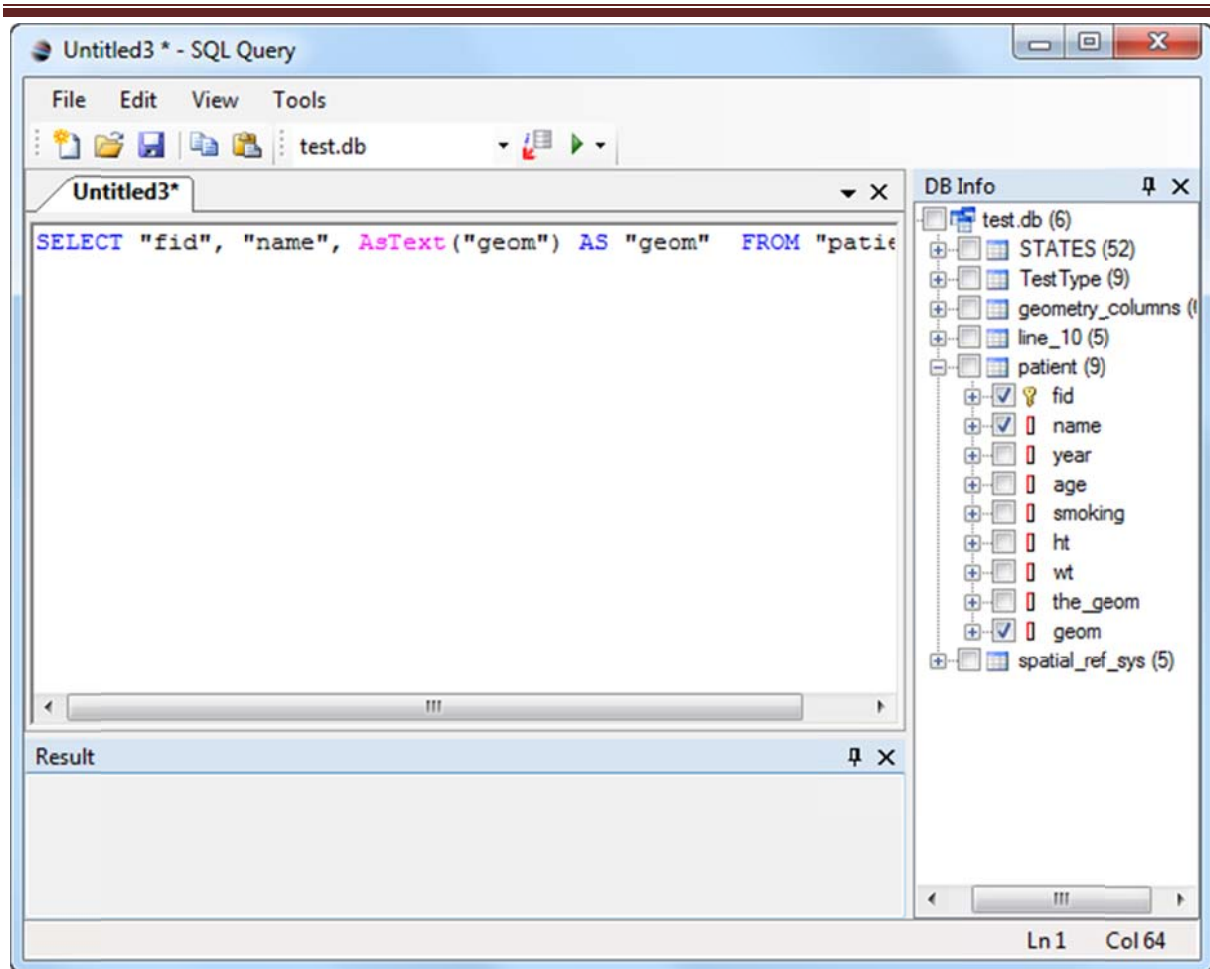
3.2.2. Generate SQL Query Command



You can retrieve database information in the working connection by clicking on DB Info button. If DataClient can connect to the server successfully, the right pane will appear with tree view information. The root node is the Connection name following by the number of table in parenthesis. The child node is the name of table following by the number of column in parenthesis. The grandchild node is the name of column and its details.

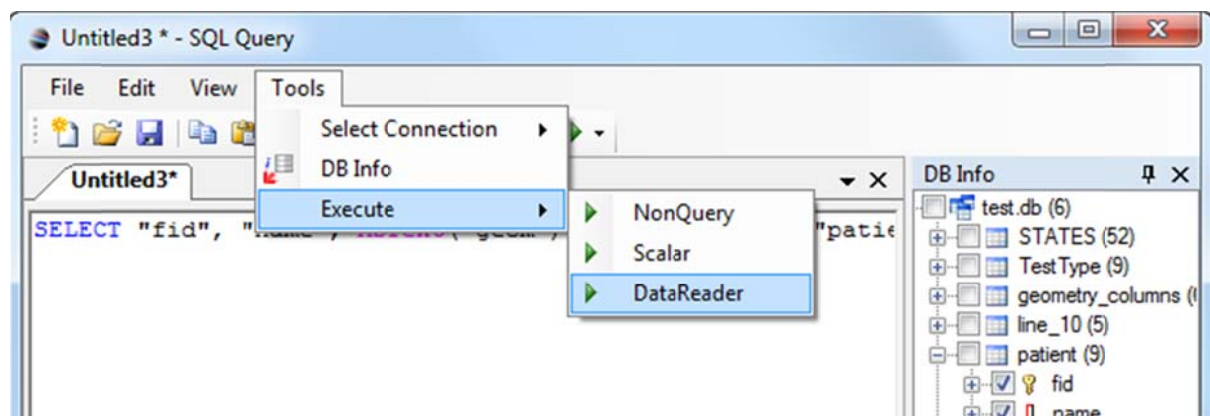


Generating SQL command depends on the node(s) you check. You can check either table node(s) or column node(s) but not both at the same time. After checking, right click on DB Info pane, you can see the command(s) that can be generated.



In this example, we choose column fid, name and geom in patient table. Then right click and click on Select submenu to generate select command.

3.2.3. Execute command to Database

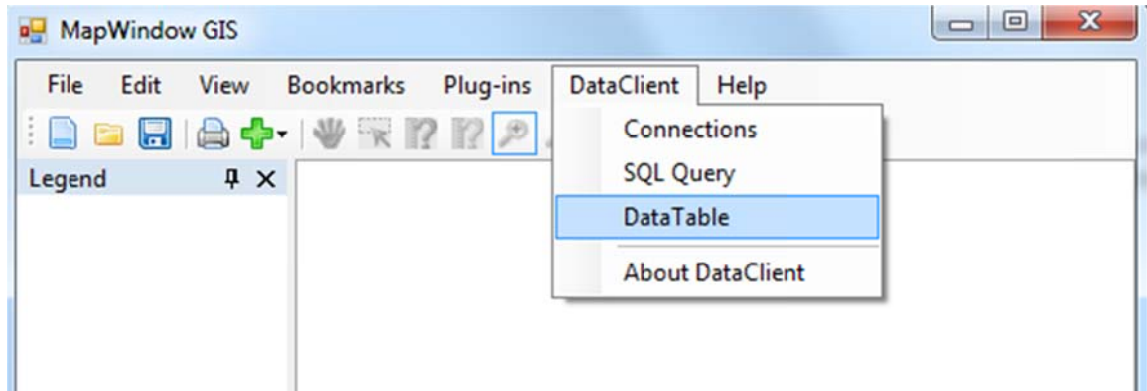


After generating SQL command, you can edit it in the editor and execute it by click on Execute button. There are three types of execution: Execute NonQuery, Execute Scalar and Execute DataReader. If you don't want any result, click on Execute NonQuery. But if you want scalar result, click on Execute scalar. And finally if you want table result, click on Execute DataReader. The result also depends on the SQL command you will execute. You can also change to any Connection you want to make a query.

3.3 DataTable

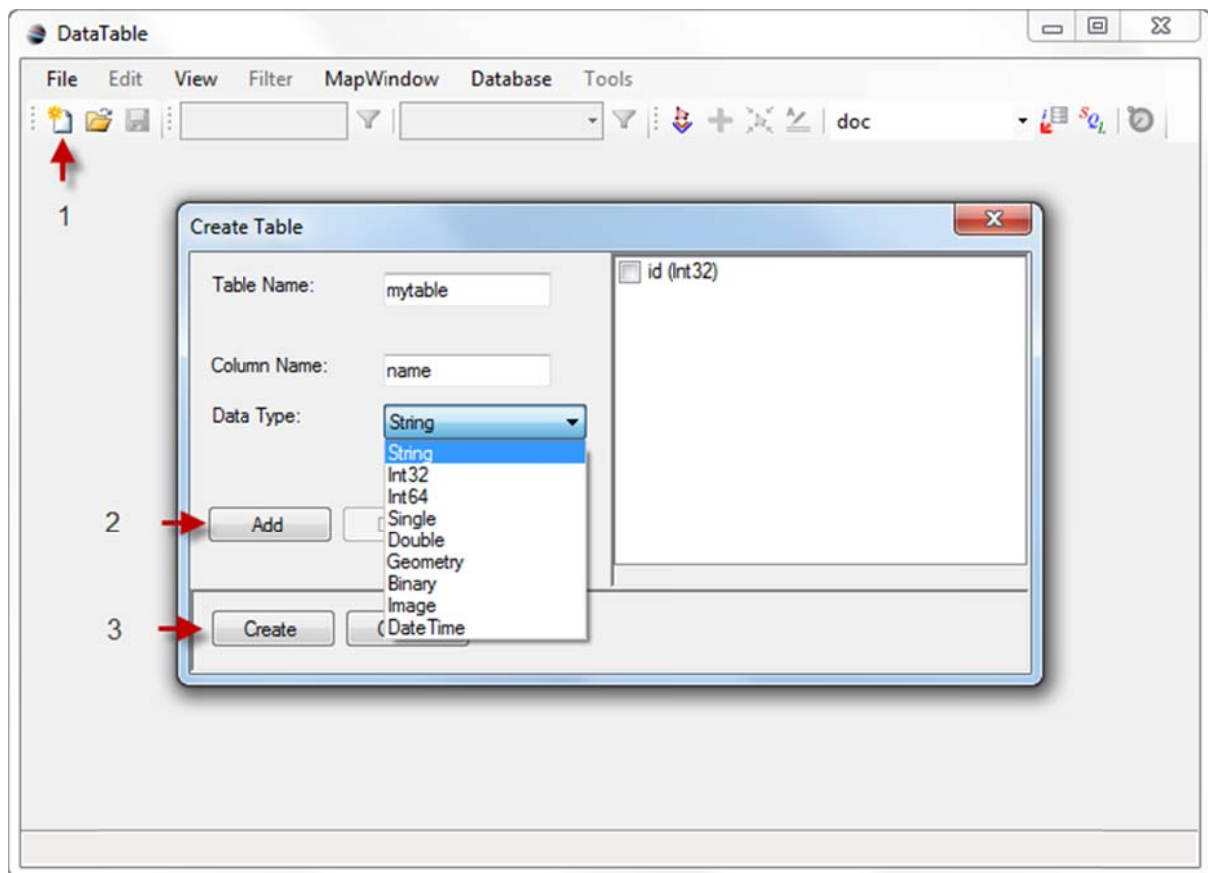
3.3.1. DataTable Management

To start DataTable, click on DataTable menu.



3.3.1.1. Create DataTable

To create new data table, click on File->New or New button (1).



You can now enter table name and create column(s) and its type you want. There are nine data types you can choose:

String: Text

Int32: 32 bit integer

Int64: 64 bit integer

Single: 32 bit floating number

Double: 64 bit floating number

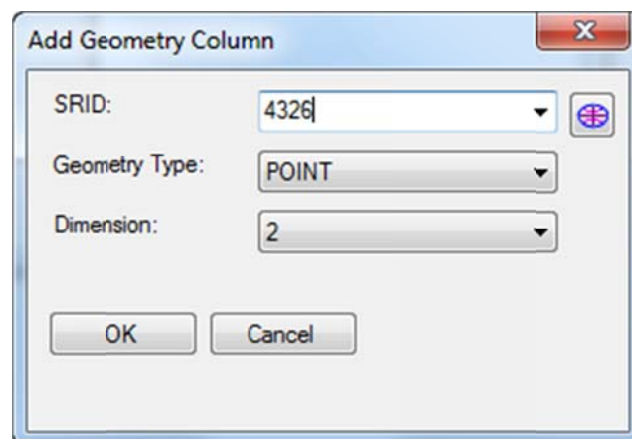
Geometry: GIS Vector Data

Binary: binary file

Image: image file

DateTime: date and time

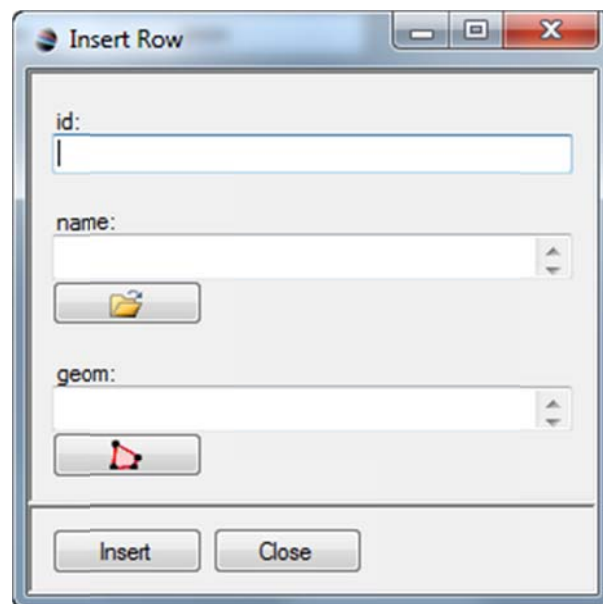
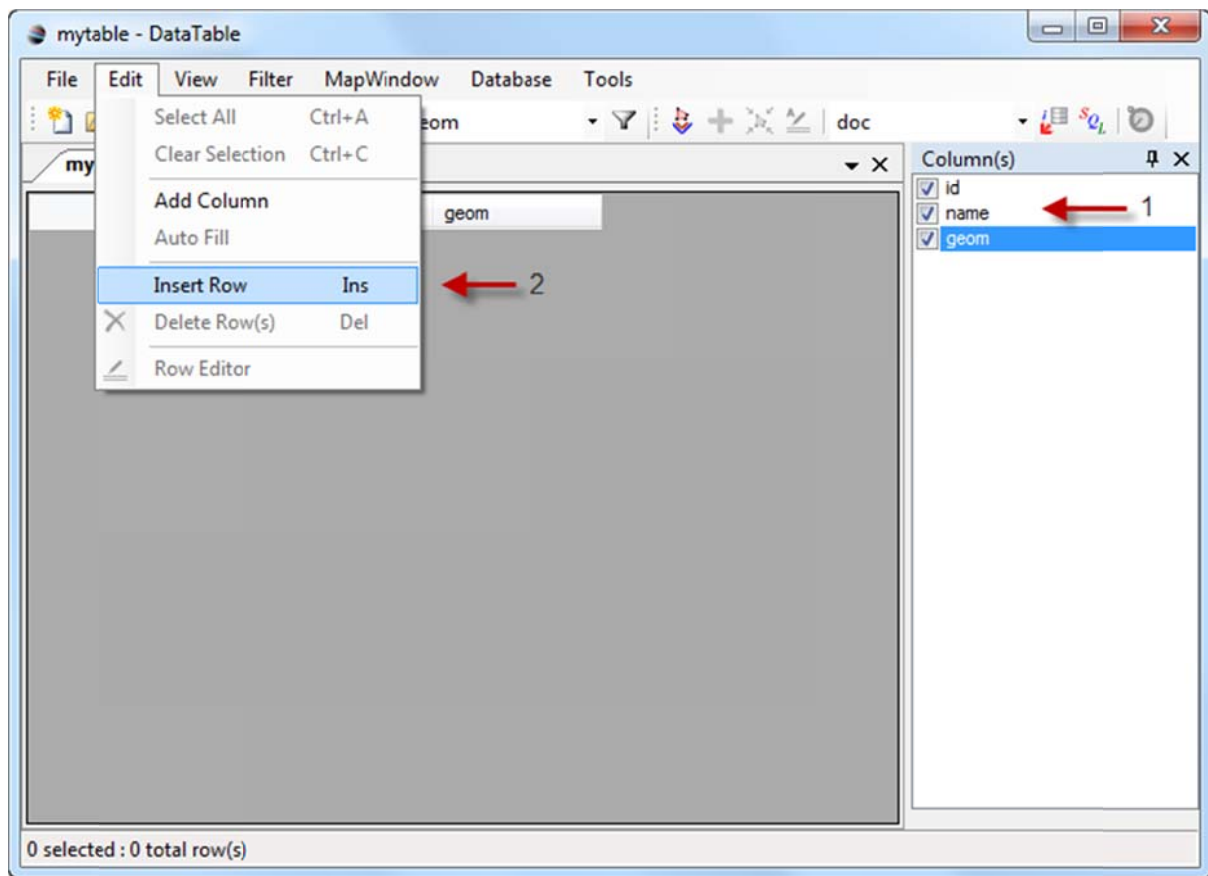
Then click Add button to add new column (2) or click Delete button to remove wrong added column. After finishing adding column(s), click Create button to create new table (3).



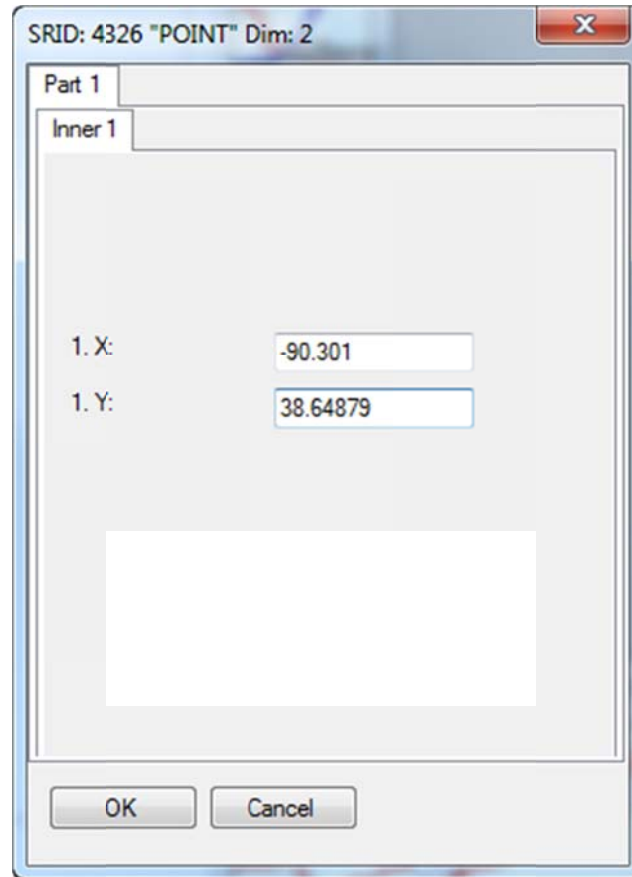
For adding geometry column, you have to enter SRID (Spatial Reference System Identifier), Geometry type and dimension.

3.3.1.2. Insert Row(s)

To insert new row, check on the column(s) you want to enter information (1). The column you don't check will also be inserted as a null value. Then Click on Edit-> Insert Row (2) or press Insert Key.



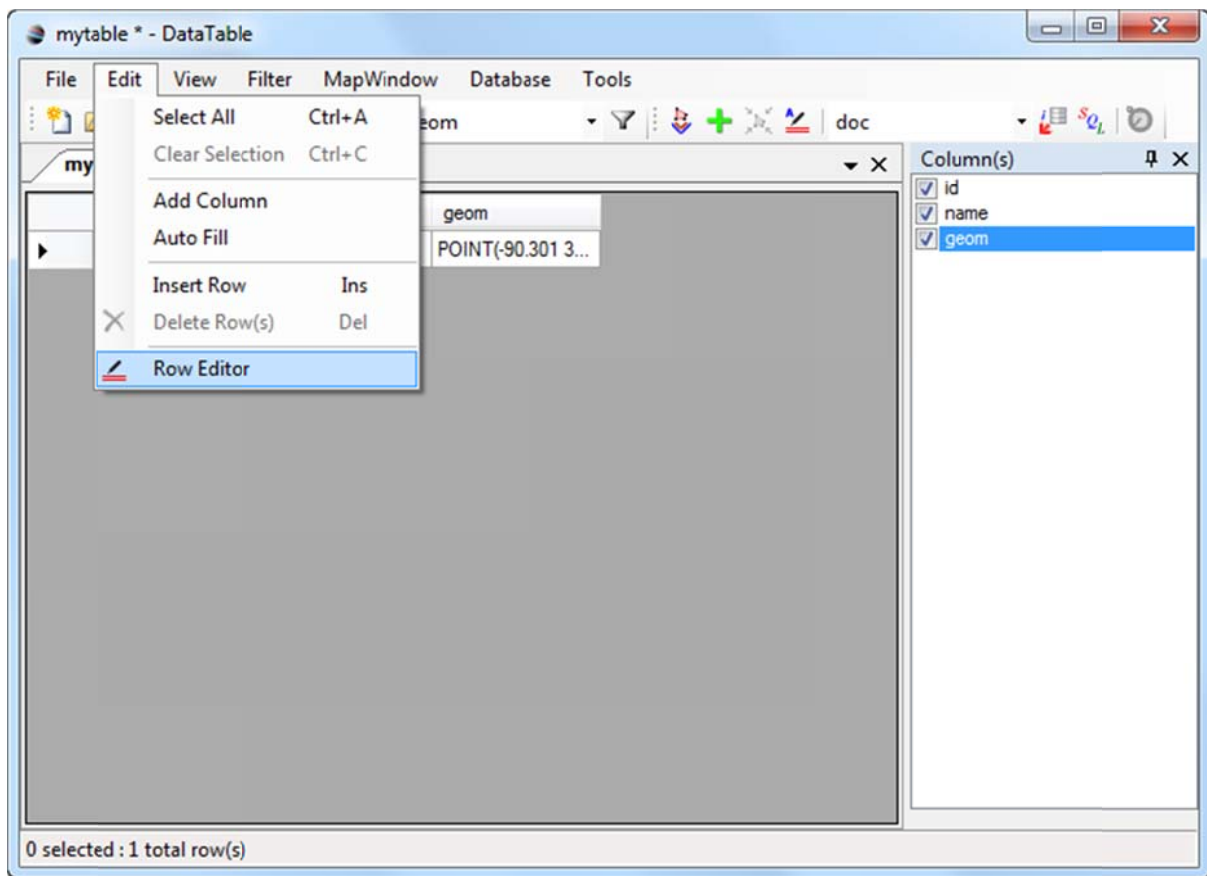
The Insert Row window will appear. Now you can enter the data. Most of the data types can be entered directly to the input box. Some data types can also be loaded from a file by clicking on the button below the input box such as string data type. Binary and Image must be loaded from file only.



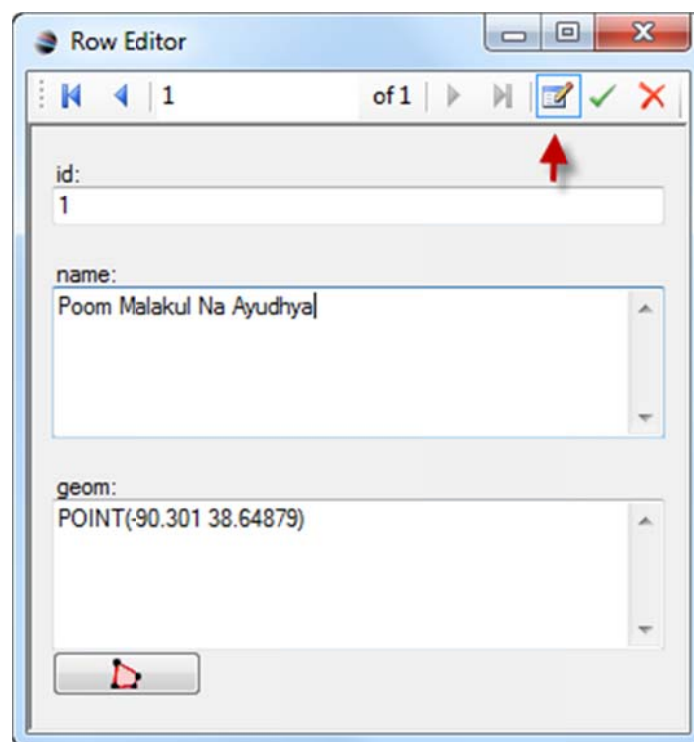
For Geometry data type, the entering data depends on the geometry type, dimension and point numbers. Each coordinating point value must be entered as a floating point number.

3.3.1.3. Edit Row(s)

To edit row(s), Edit-> Row Editor.



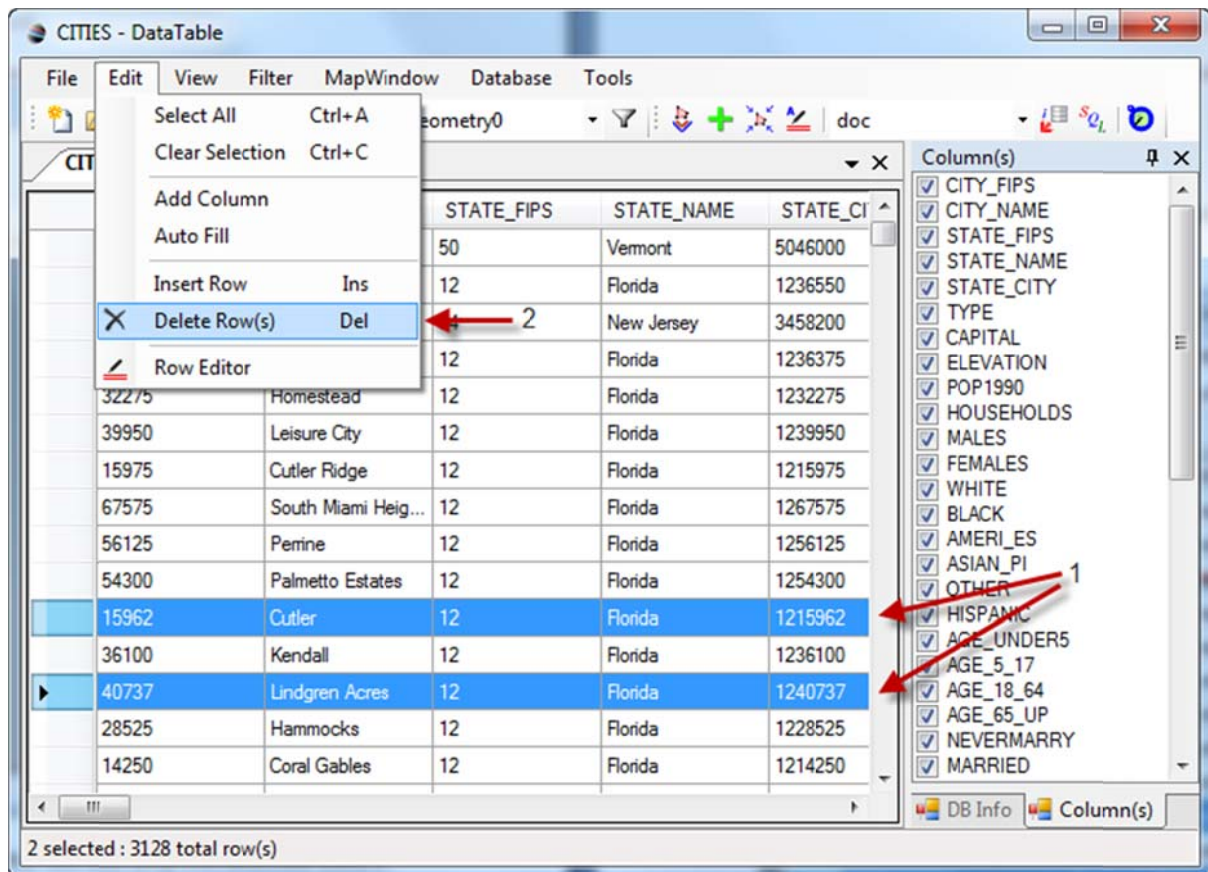
If there are some rows selected in current DataTable, Row Editor will edit only this selected rows. If not, it will edit all rows in the DataTable.



To start editing, click on edit button. After finishing row editing, click Apply button to make changes to the row or click Cancel button to cancel changes.

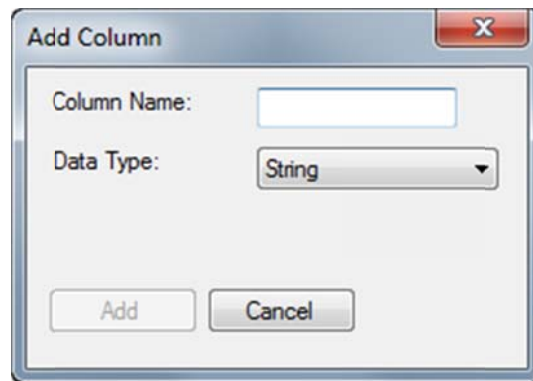
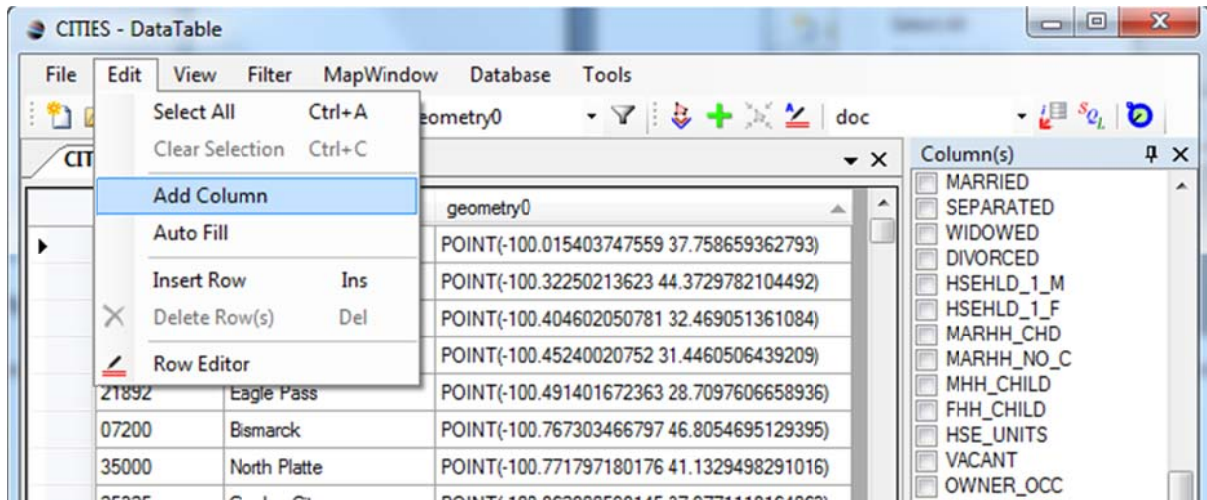
3.3.1.4. Delete Row

To delete row. First select the row(s) to delete (1). Then click Edit-> Delete Row(s) (2) or press Del key.



3.3.1.5. Add New Column

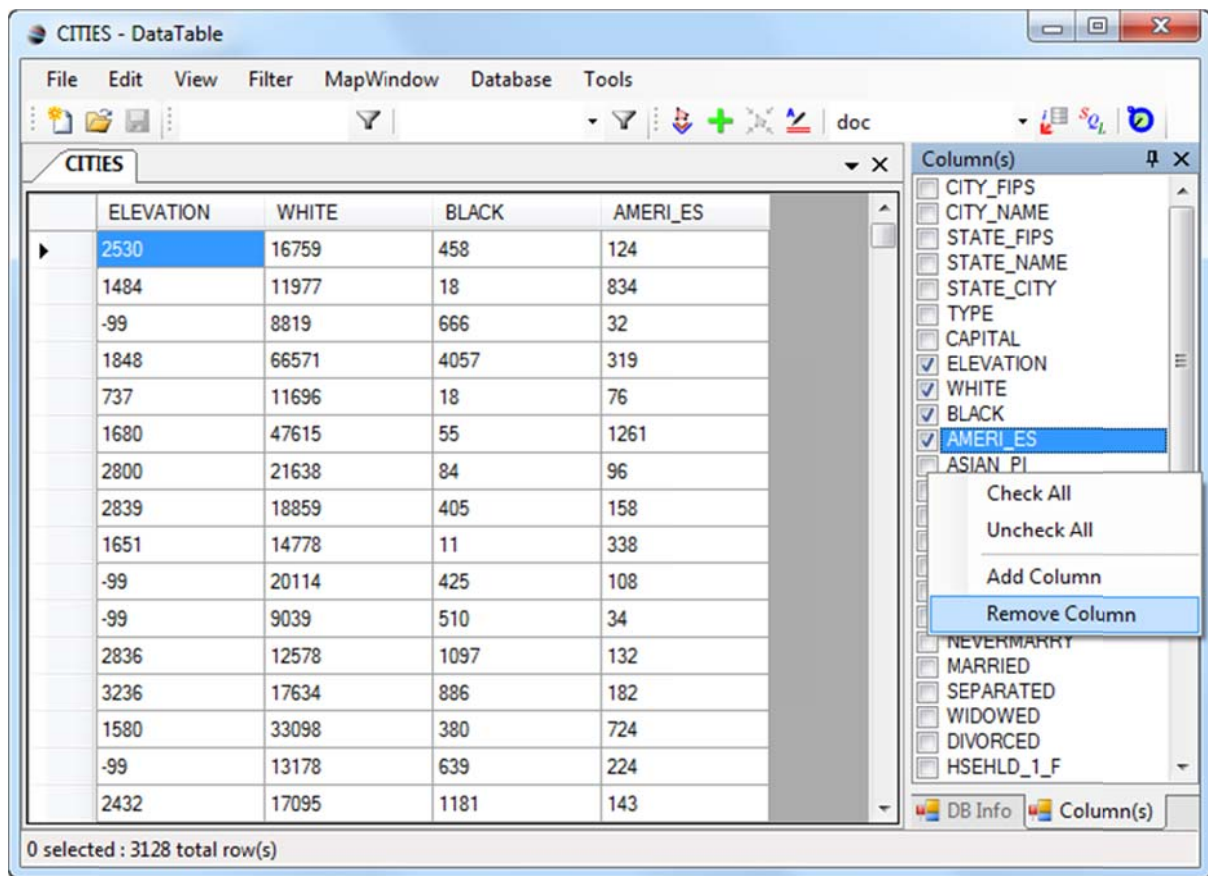
To add new column, click Edit-> Add Column.



Enter column name and choose data type. Then click Add button to add new column to the current DataTable.

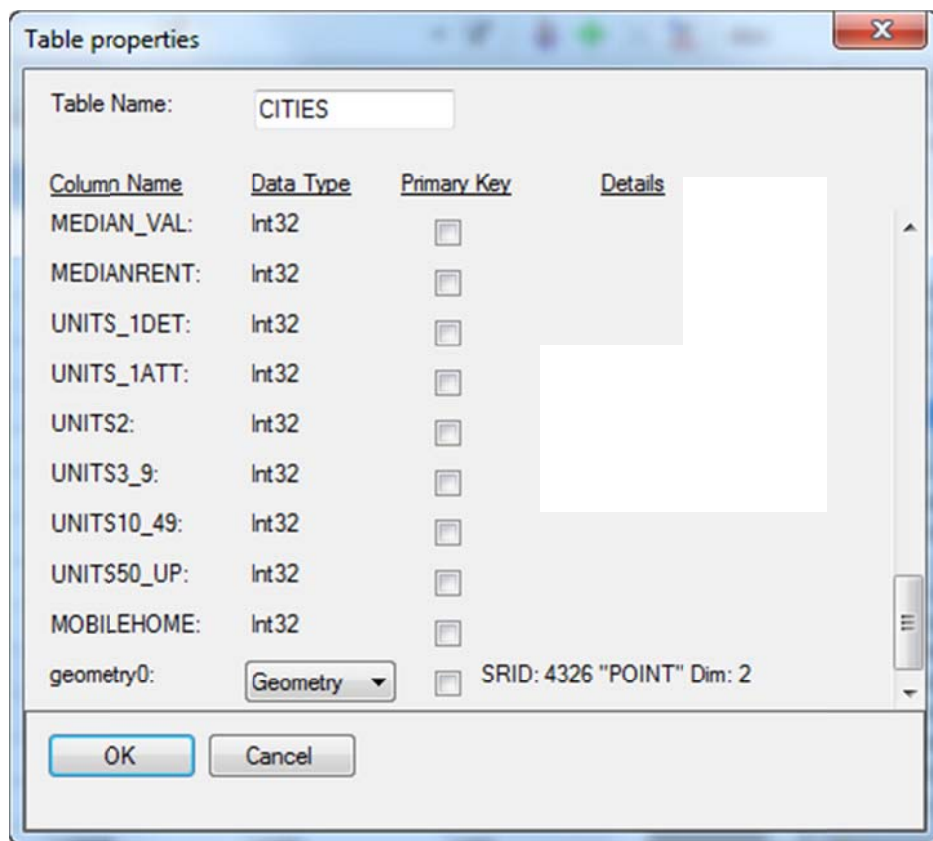
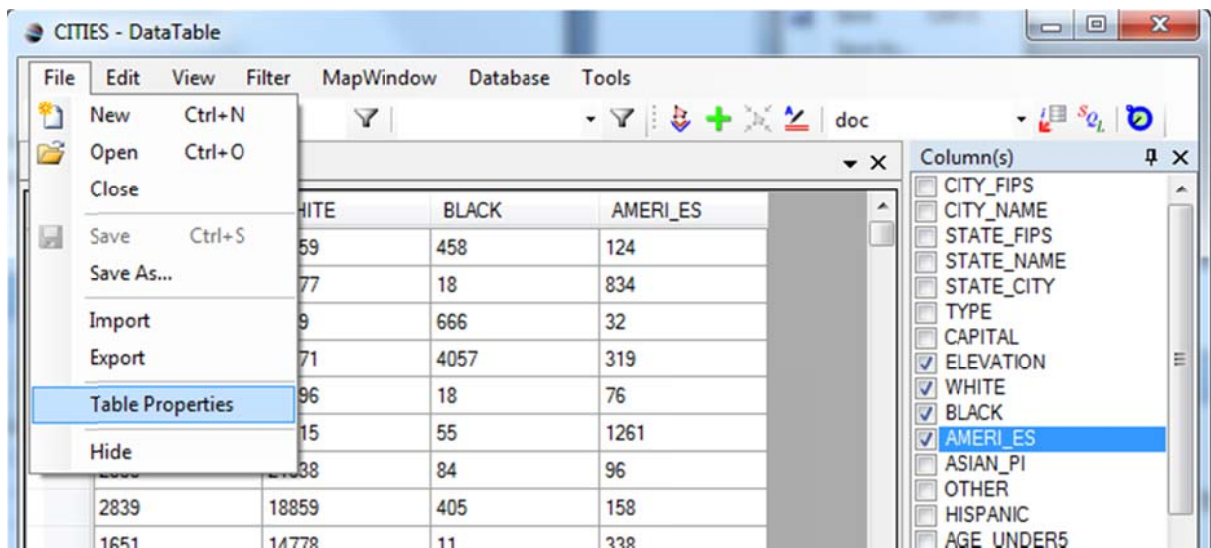
3.3.1.6. Remove Column

To remove column from current DataTable, check on columns to delete from Column(s) pane. Then right click and select Remove Column. To open Column(s) pane, click View-> Output Column.



3.3.1.7. DataTable Properties

To open current DataTable Properties, click File->Table Properties



In this Table properties window, you can:

- change Table Name
- change data type between String and Geometry and between Image and Binary
- select which column(s) are Primary key by checking on Primary Key checkbox

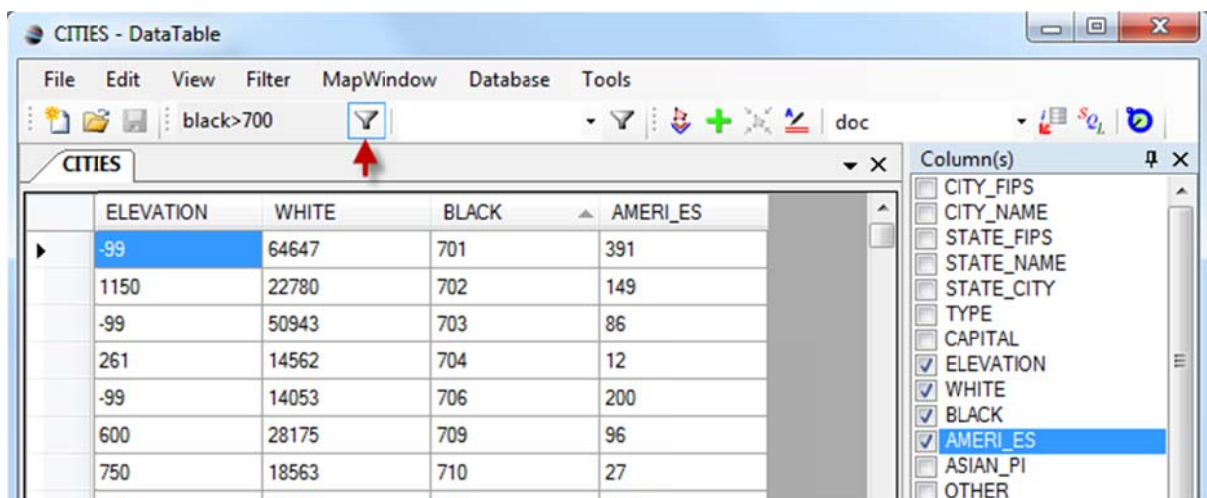
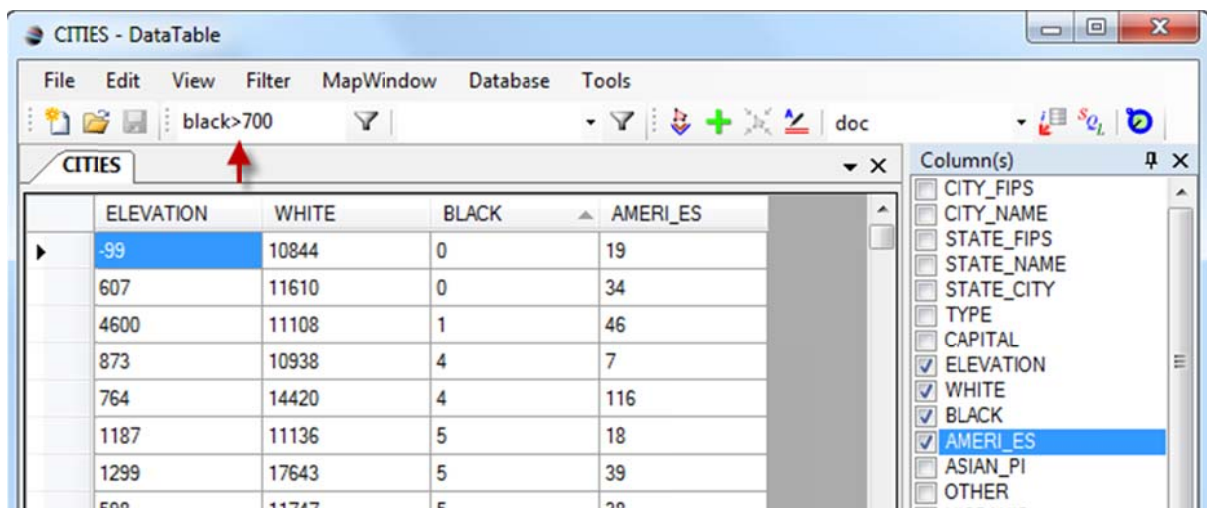
Tip: When you query table from database or load table from shapefile layer or open local table file, some time the data type is not correct. So you can correct it by using Table Properties.

3.3.1.8. Filtering

General Filtering

You can enter condition for filtering rows of current DataTable by click on Filter-> Setting Filter or enter directly on the toolbar. Then click on Filter-> Enable Filter menu or Enable General Filter button to apply filtering. The condition is the expression that follows Expression Syntax of Data Column Expression Property. You can get the details from:

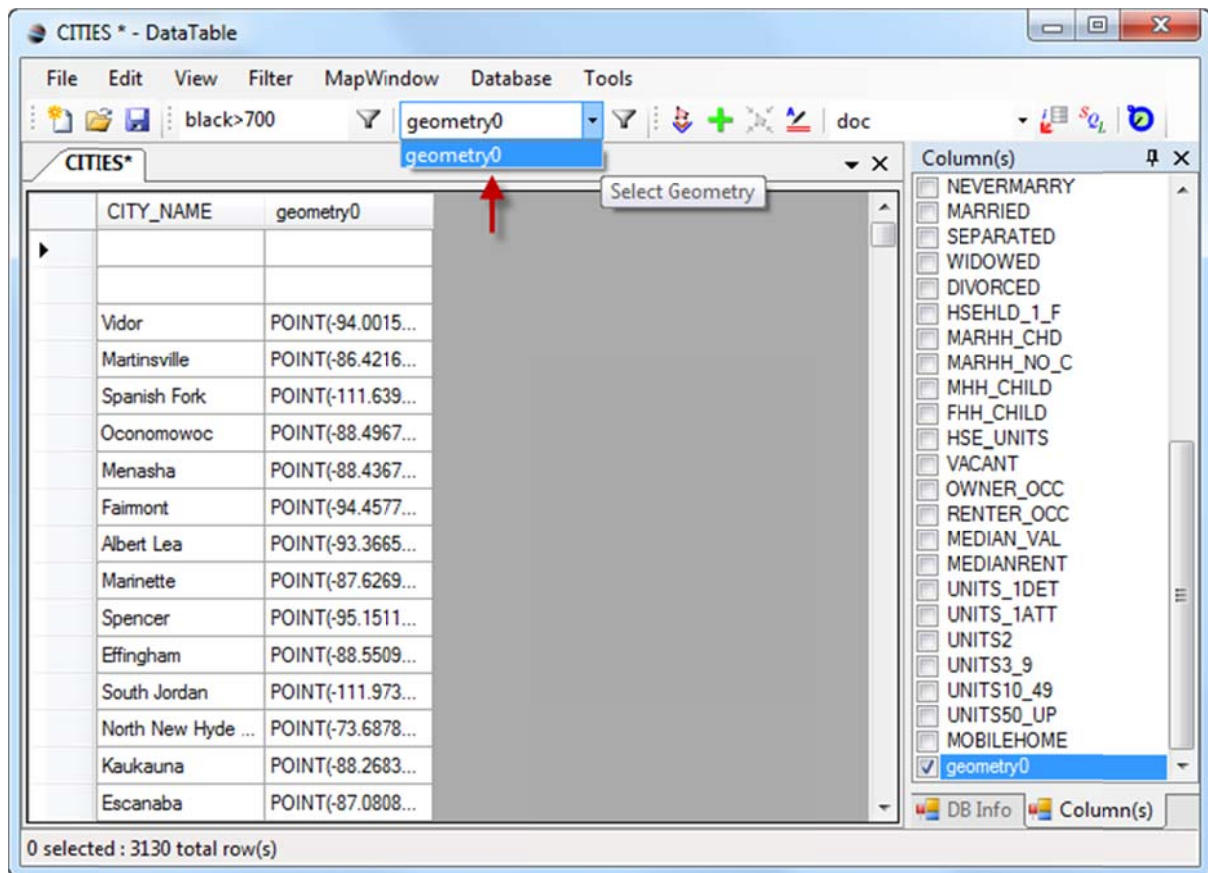
<http://msdn.microsoft.com/en-us/library/system.data.datacolumn.expression>



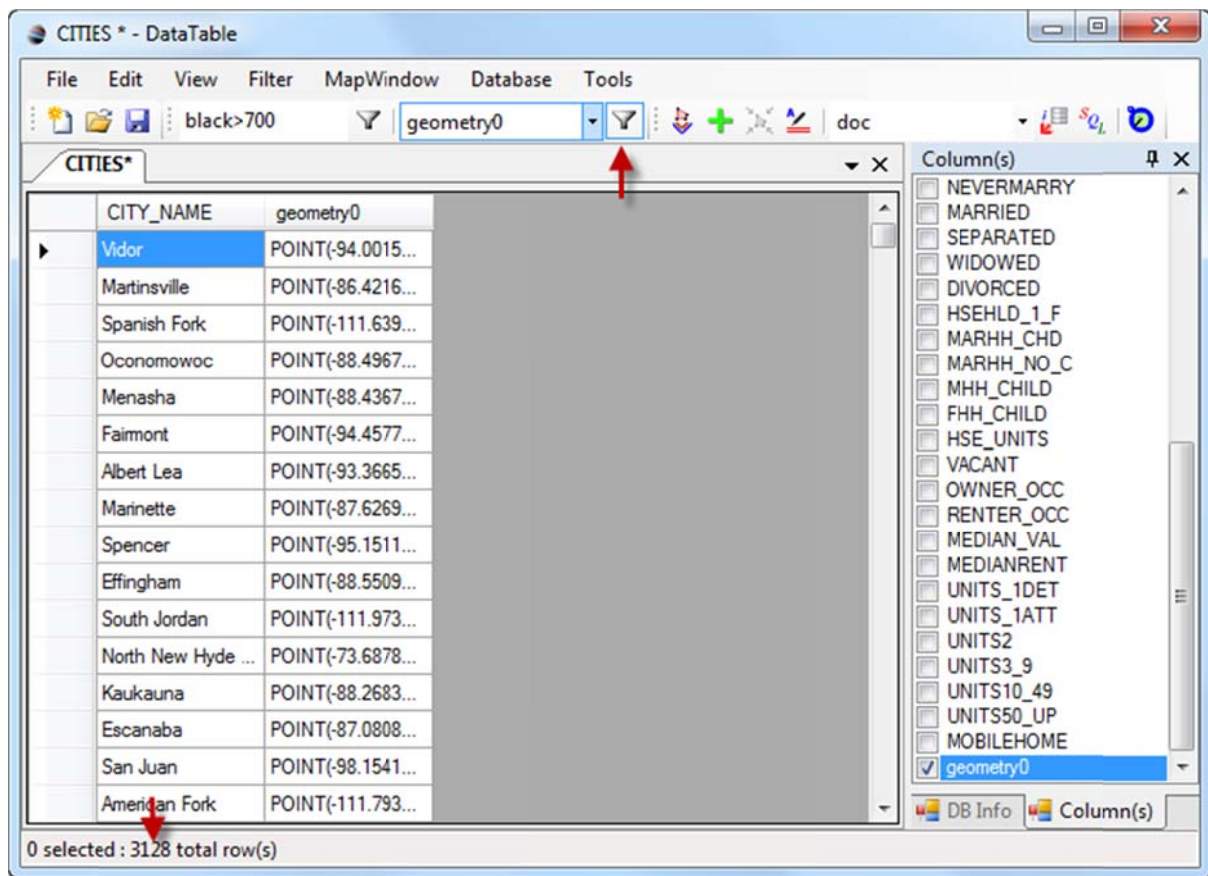
Geometry Filtering

Geometry Filtering in this program comprises of two functions. The first function is to select default geometry column in case of multiple geometry columns in current DataTable. The second function is to filter invalid geometry row of selected geometry column.

To select default geometry column, click drop down button of combo box and select the name of geometry column. In this case there is only one geometry column so it is selected automatically.



To filter invalid geometry row, click on Enable Geometry Filter button. Only filtered rows remains.

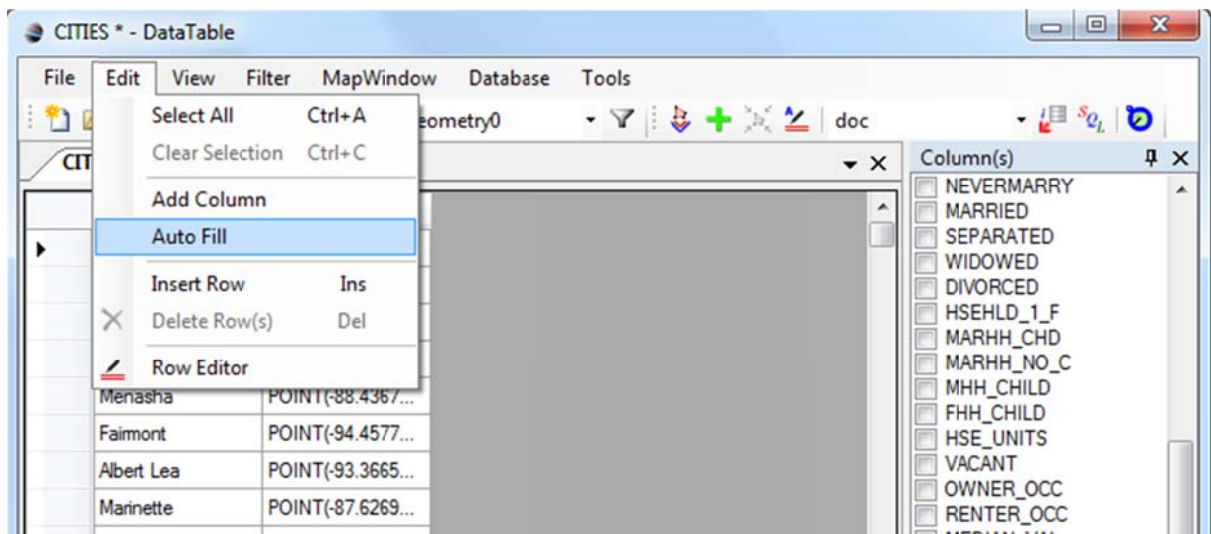


3.3.1.9. AutoFill

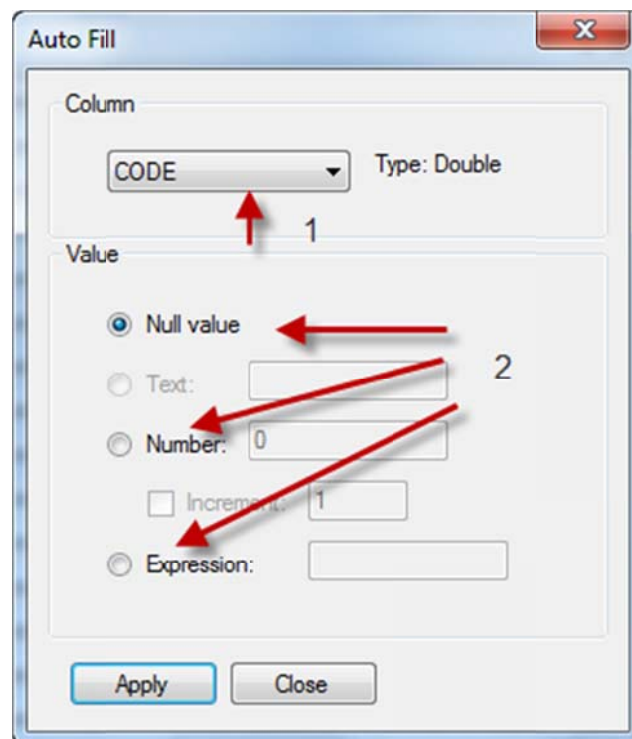
AutoFill is used to fill the column of all or selected row(s) with specified value. If you don't select any row, AutoFill will fill all rows in current DataTable. The value can be Null Value, Text, Number and Expression. The table below show value that can be filled for each data type.

	Null Value	Text	Number	Expression
Int32, Int64	Yes	No	Yes	Yes
Single, Double	Yes	No	Yes	Yes
String	Yes	Yes	Yes	No
Geometry	Yes	No	No	No
Image	Yes	No	No	No
Binary	Yes	No	No	No
Date	Yes	No	No	No

To open Auto Fill, click Edit-> Auto Fill



Select column to fill value (1) and choose what value type to fill (2).

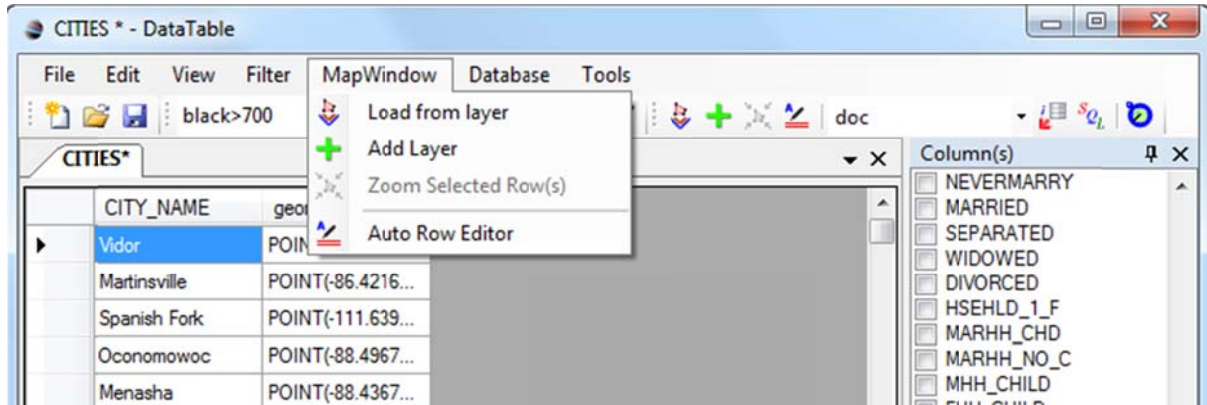


The expression follows Expression Syntax of Data Column Expression Property. You can get the details from:

<http://msdn.microsoft.com/en-us/library/system.data.datacolumn.expression>

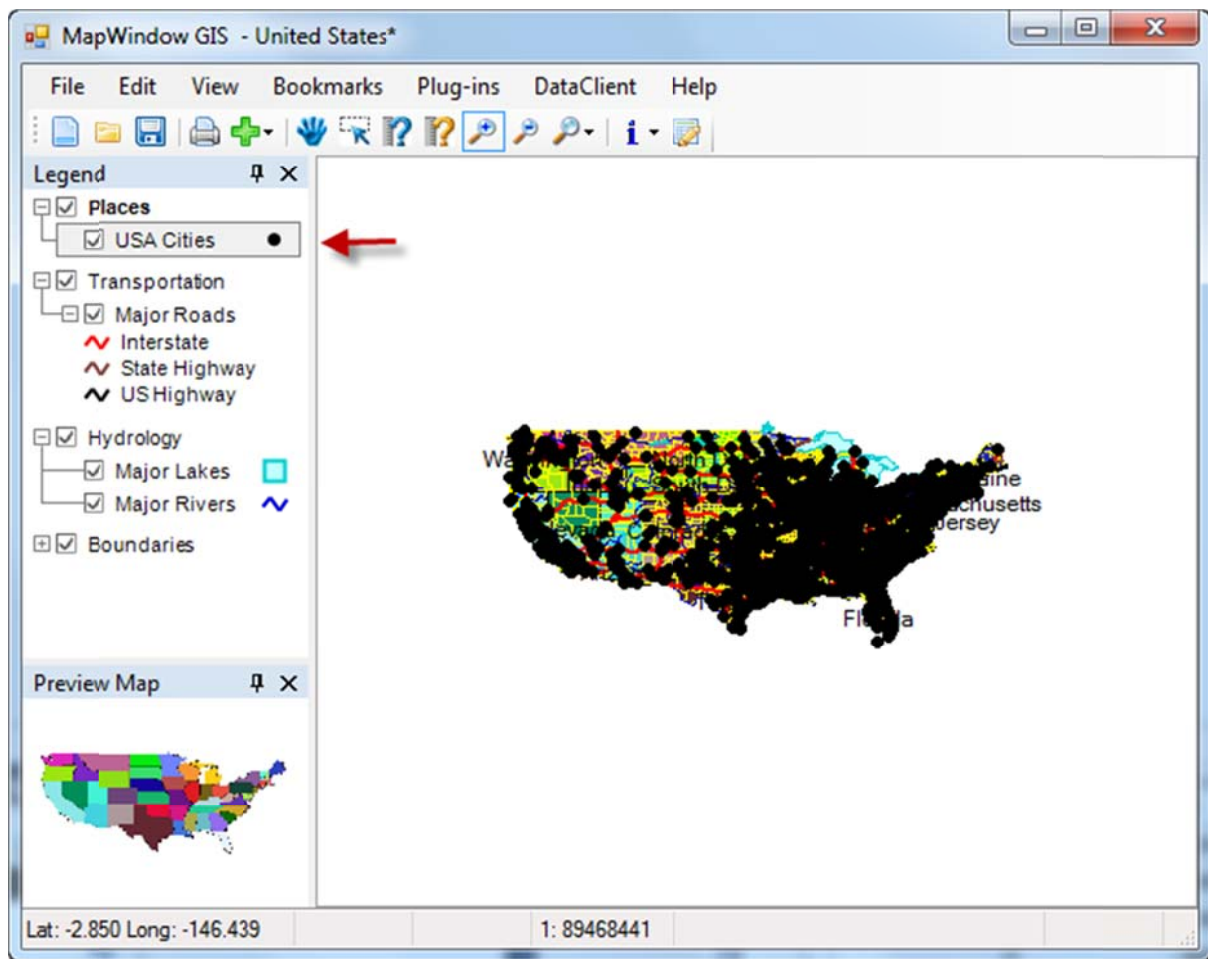
3.3.2. MapWindow Interaction

DataTable can interact with MapWindow in many ways. To interact with MapWindow, click on MapWindow menu and select submenu as follows.

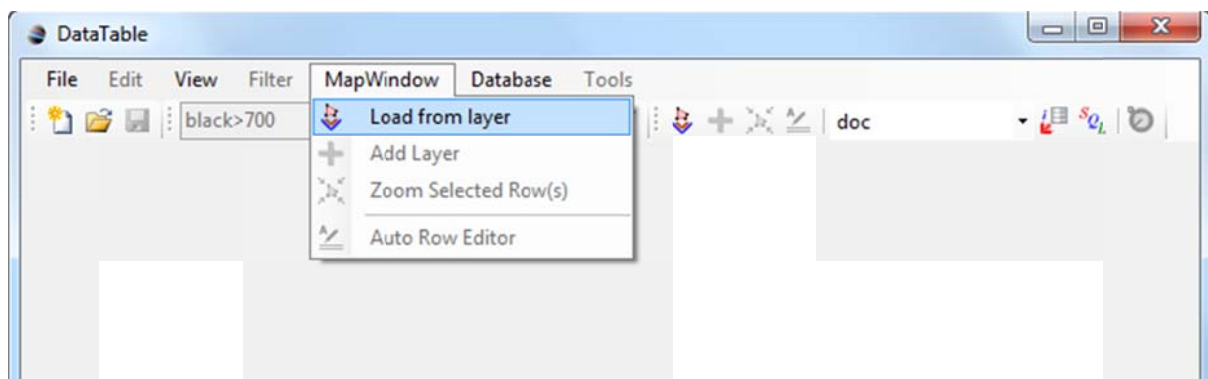


3.3.2.1. Load from layer

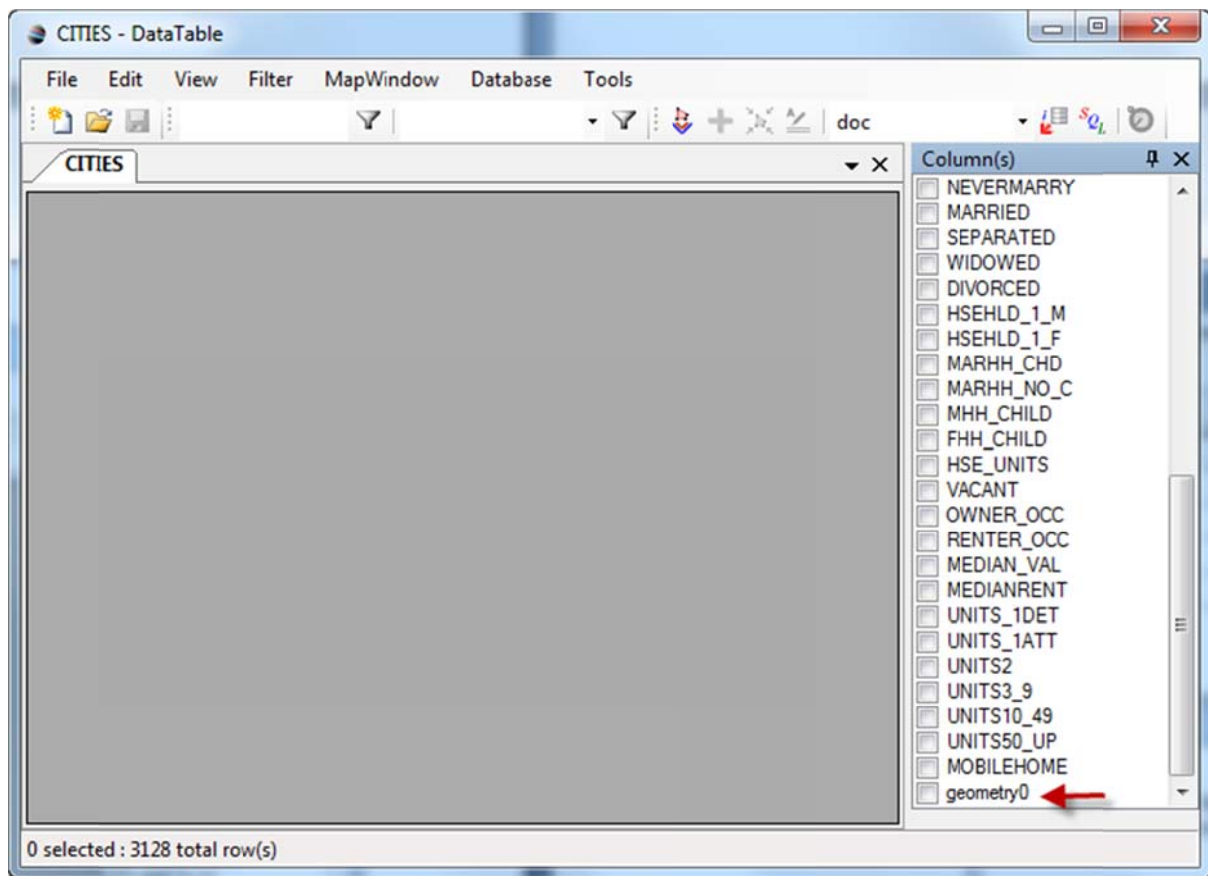
Before loading from layer, you have to make sure that there is a layer selected. The layer that can be loaded must be a shape file layer.



Then click on MapWindow->Load from layer in DataTable Window.



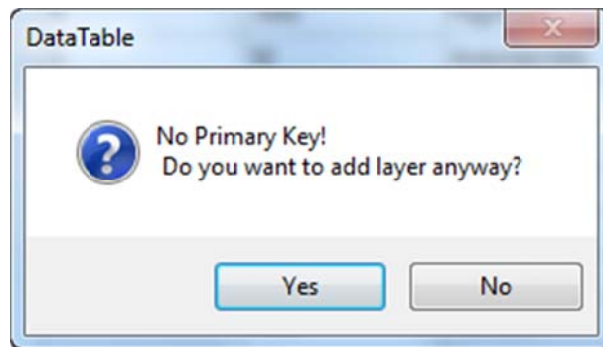
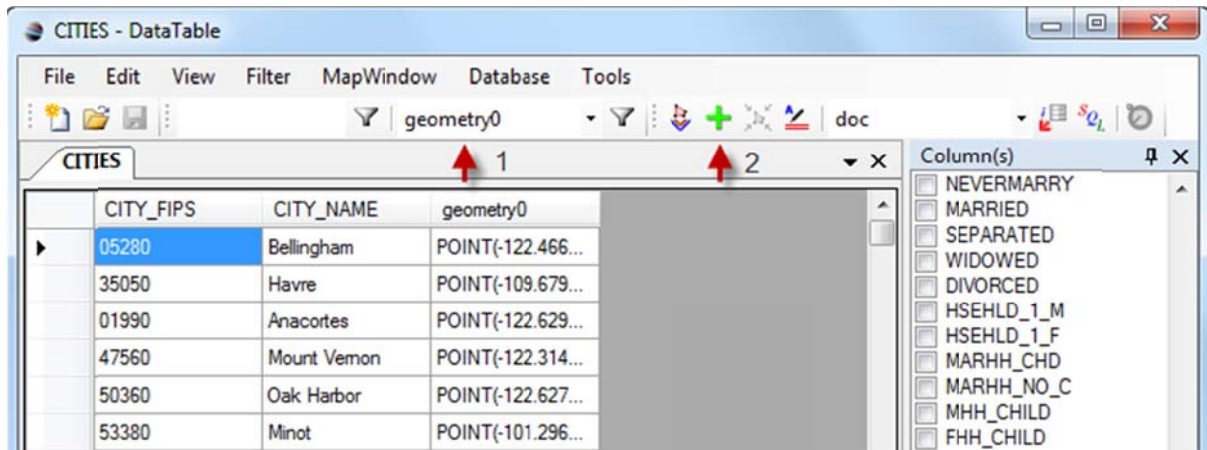
This command will load the selected layer from MapWindow and convert it to a DataTable.



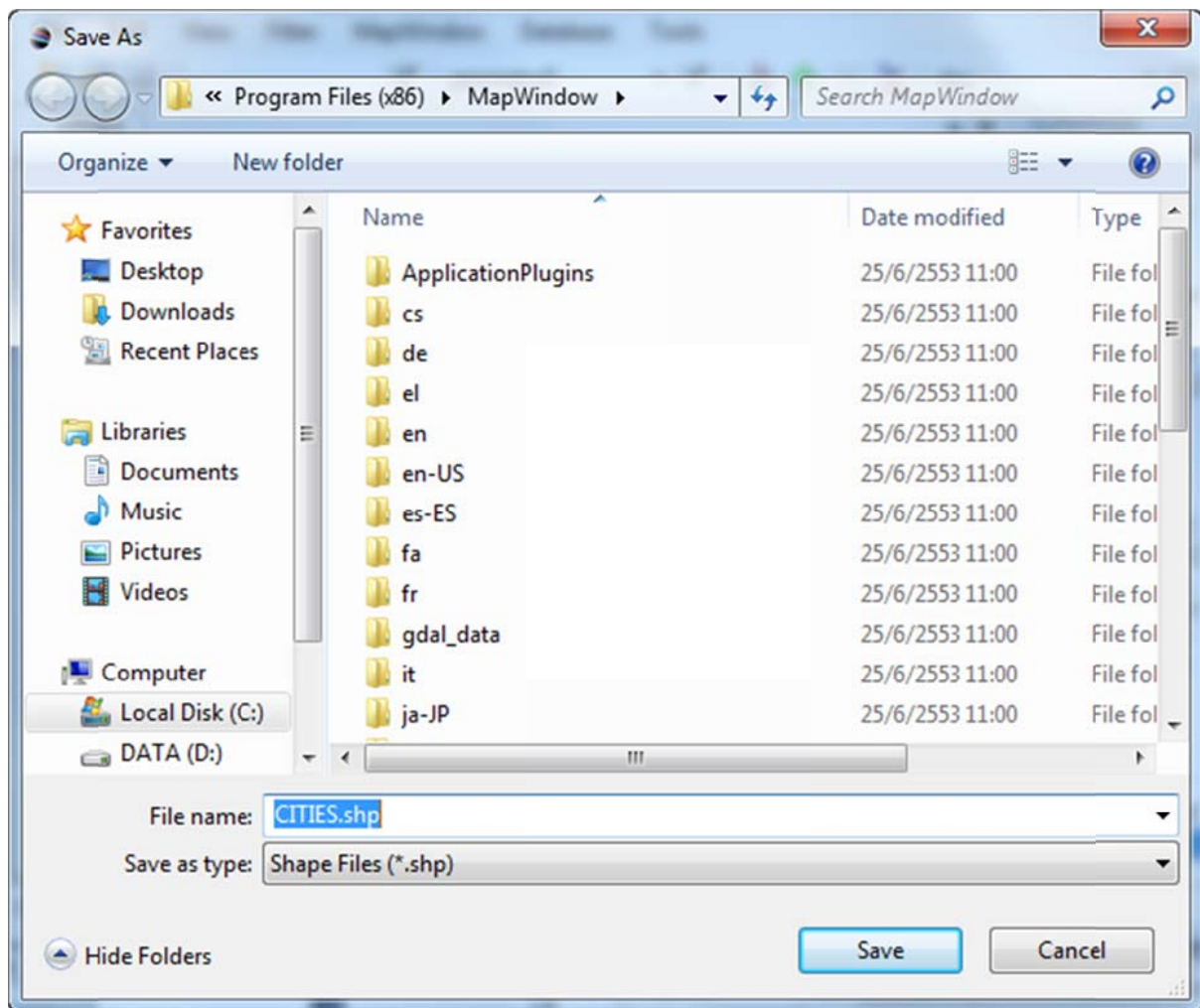
The last column “geometry0” is the column created by DataClient. This column is a geometry column holding geometry data in WKT formats. If you want to show any columns, check the columns on the right pane.

3.3.2.2. Add Layer

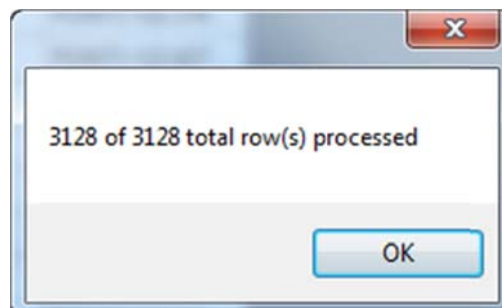
This submenu will convert current DataTable to shape file and add it to a layer in MapWindow. The DataTable that can be added must have at least one geometry column and one of these is selected. The way to select geometry column is in the topic of geometry filtering (3.3.1.8.). To add a layer, select geometry column (1) then click on MapWindow-> Add Layer or click on Add Layer button (2).



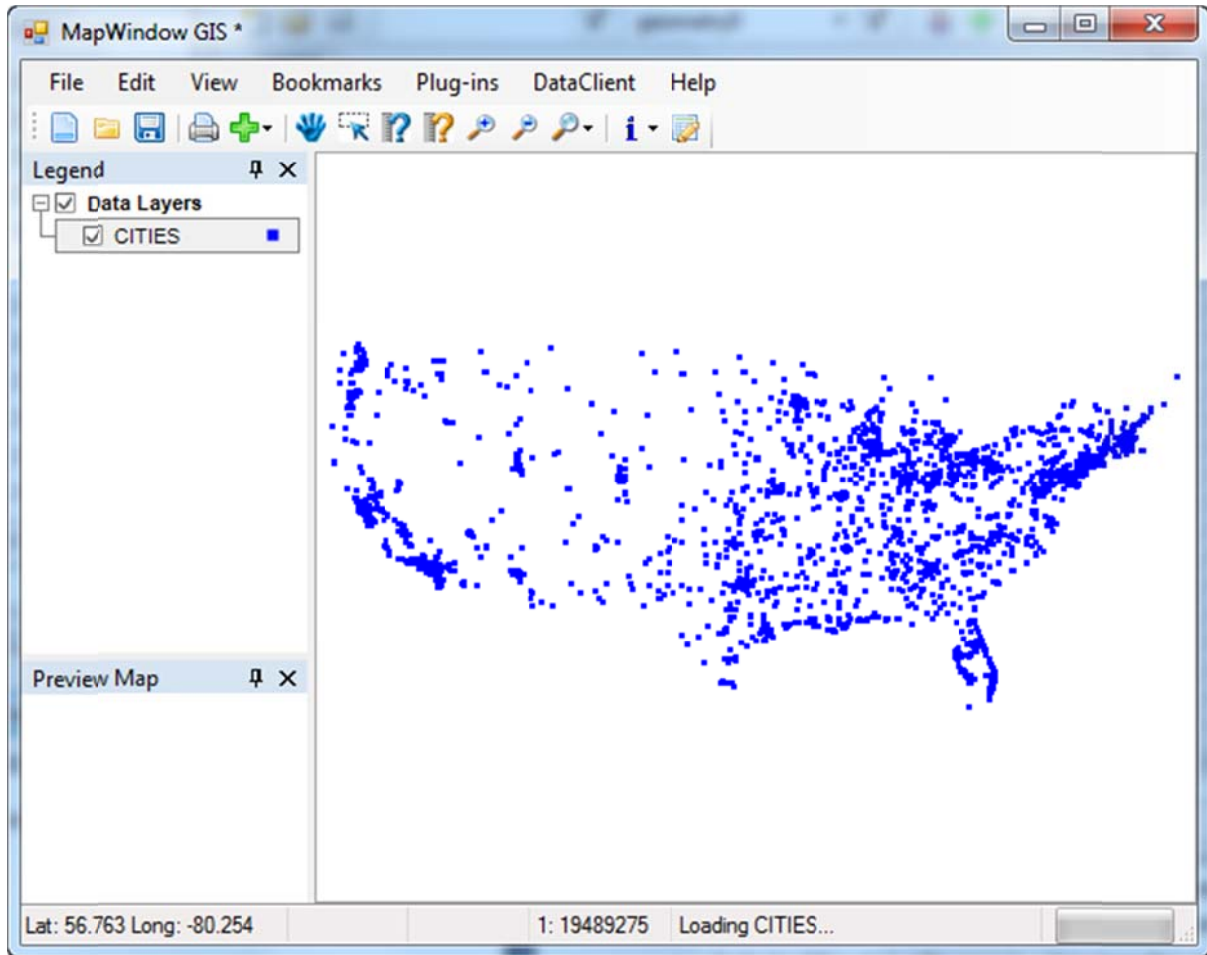
Before adding a new layer, your DataTable should have primary key. If you use DataTable without primary key to add new layer, warning dialog will be shown as above. Adding layer without primary key causes some features of DataClient not functioning such as Zoom Selected Row(s). To set new primary key, use Table Properties in the topic of DataTable Properties (3.3.1.7.). If no columns can be primary key column, you can add a new column (3.3.1.5.) and use AutoFill (3.3.1.9.) to fill unique value on that column.



Save As Dialog will appear and ask you to save new shape file before processing each row in DataTable.

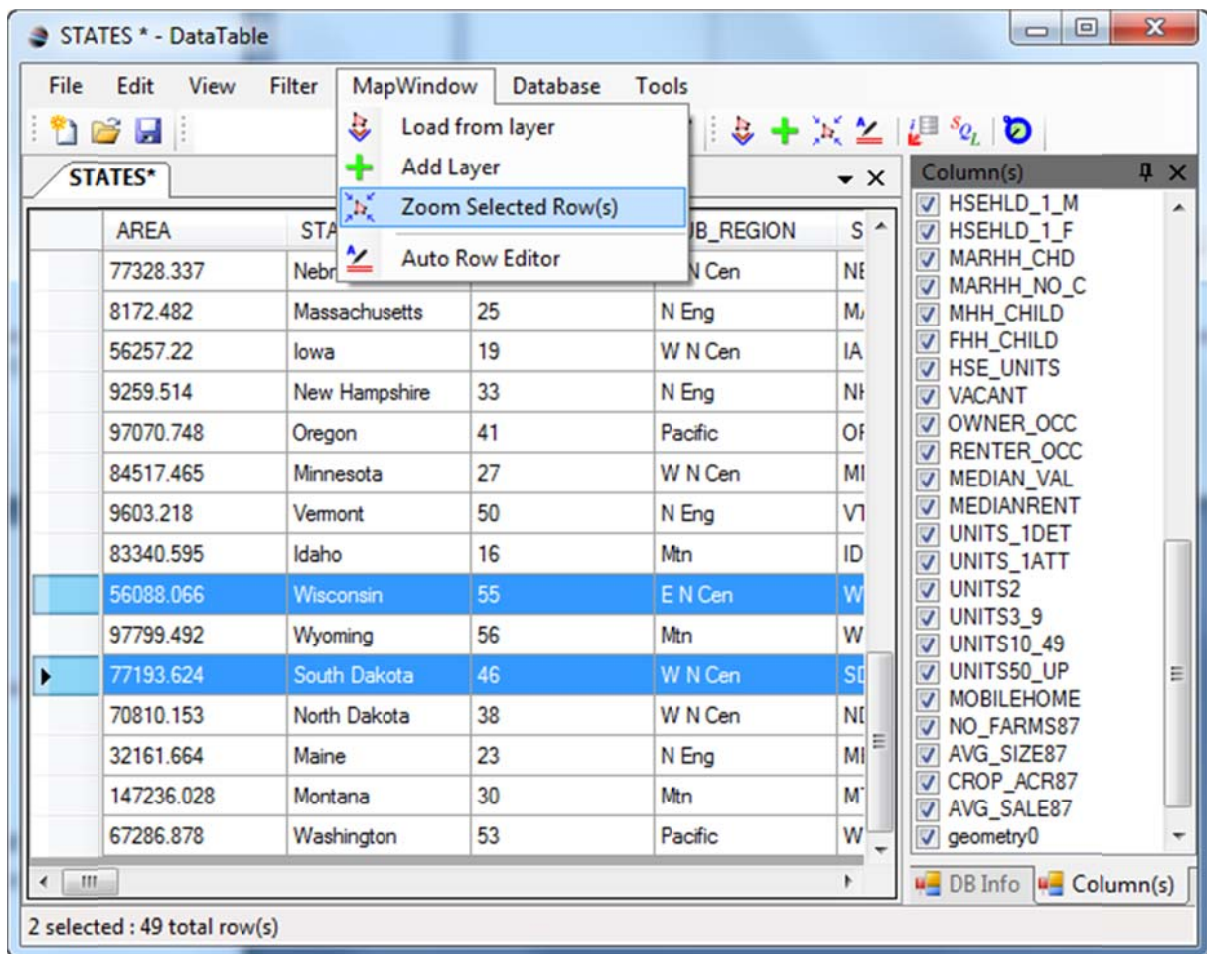


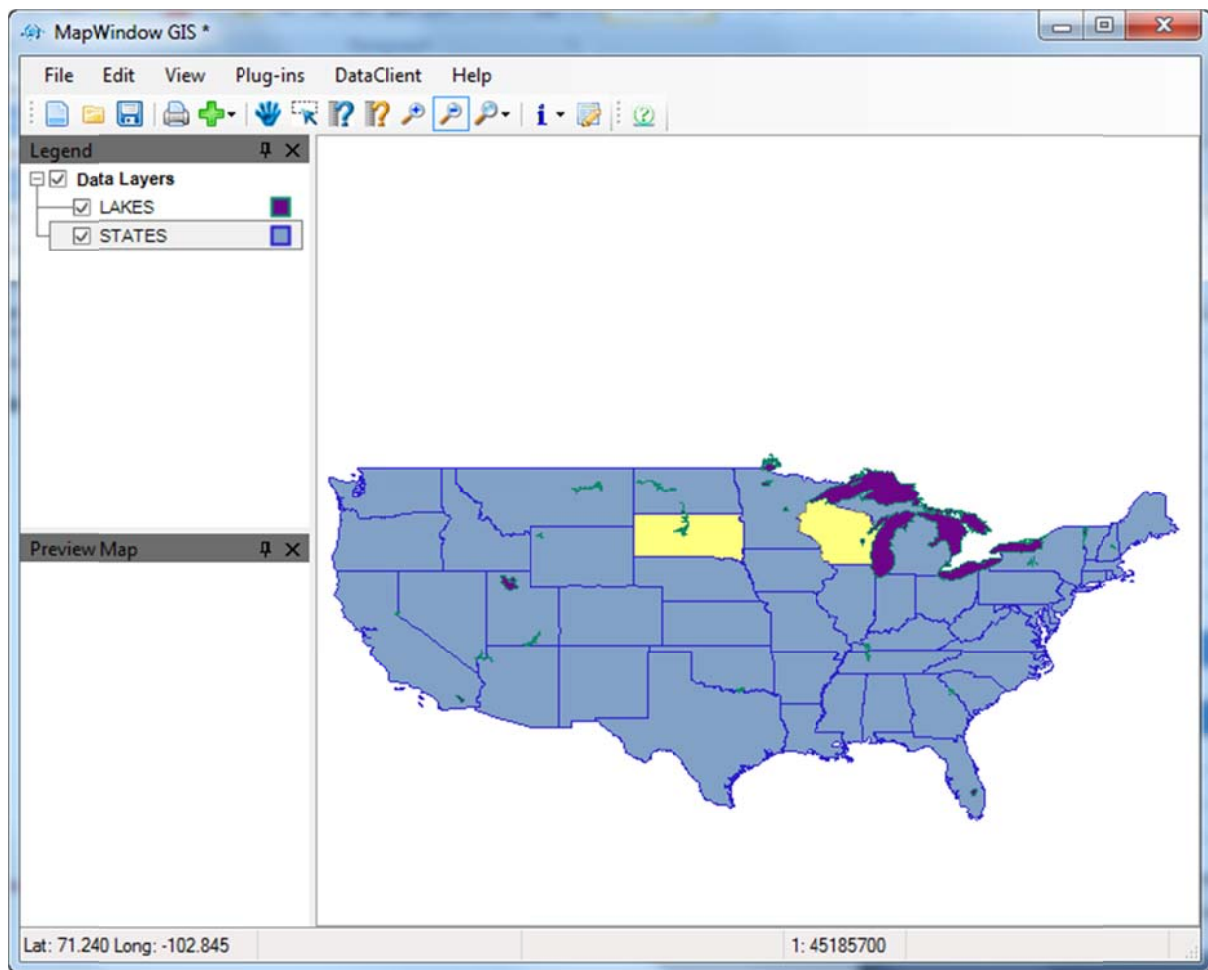
Then a new layer will be added to MapWindow.



3.3.2.3. Zoom Selected Row(s)

Before using this function, make sure that you've already added a layer from your DataTable to MapWindow and this DataTable also has primary key. If not, you can't use this function. Zoom Selected Row(s) will zoom to object on the map of MapWindow for the selected row(s) in current DataTable. The first step is to select the interested row(s). Then click MapWindow-> Zoom Selected Row(s) or click on Zoom Selected Row(s) button.





3.3.2.4. Auto Row Editor