Database Communication using LabVIEW

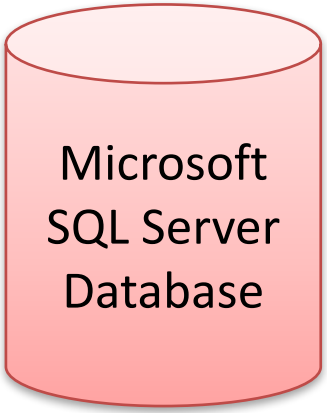
Hans-Petter Halvorsen, M.Sc.

Software

Microsoft SQL Server Express can be downloaded for free from Internet

All LabVIEW Software can be downloaded from: www.ni.com/download

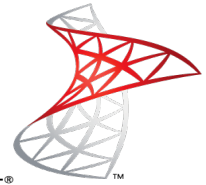
Overview



ODBC

Write/Read Data

NATIONAL INSTRUMENTS LabVIEW



Microsoft® SQL Server®

Database Management

Create Tables

LabVIEW Application with GUI that Communicate with the SQL Server

Database Systems

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Old fashion Database (Data-storage) Systems

Not too long ago, this was the only data-storage device most companies needed. Those days are over.

Database Systems

- A Database is a structured way to store lots of information. The information is stored in different tables.
- - “Everything” today is stored in databases!

Examples:

- Bank/Account systems
- Information in Web pages such as Facebook, Wikipedia, YouTube, etc.
- … lots of other examples! (Give me 5 examples)

Database Management Systems (DBMS)

- Oracle
- MySQL
- MariaDB
- Sybase
- Microsoft Access
- Microsoft SQL Server
- ... (we have hundreds different DBMS)

SQL Server

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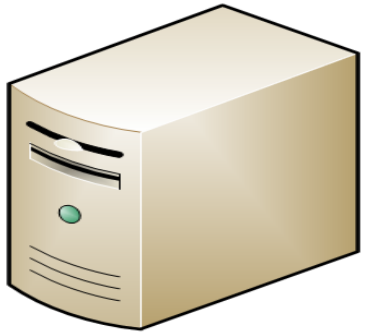
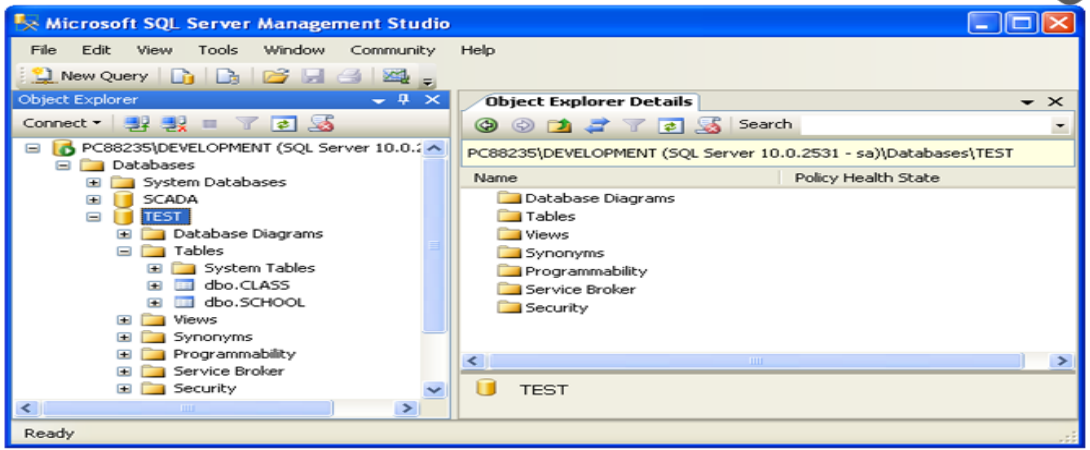
Microsoft SQL Server



Database Engine

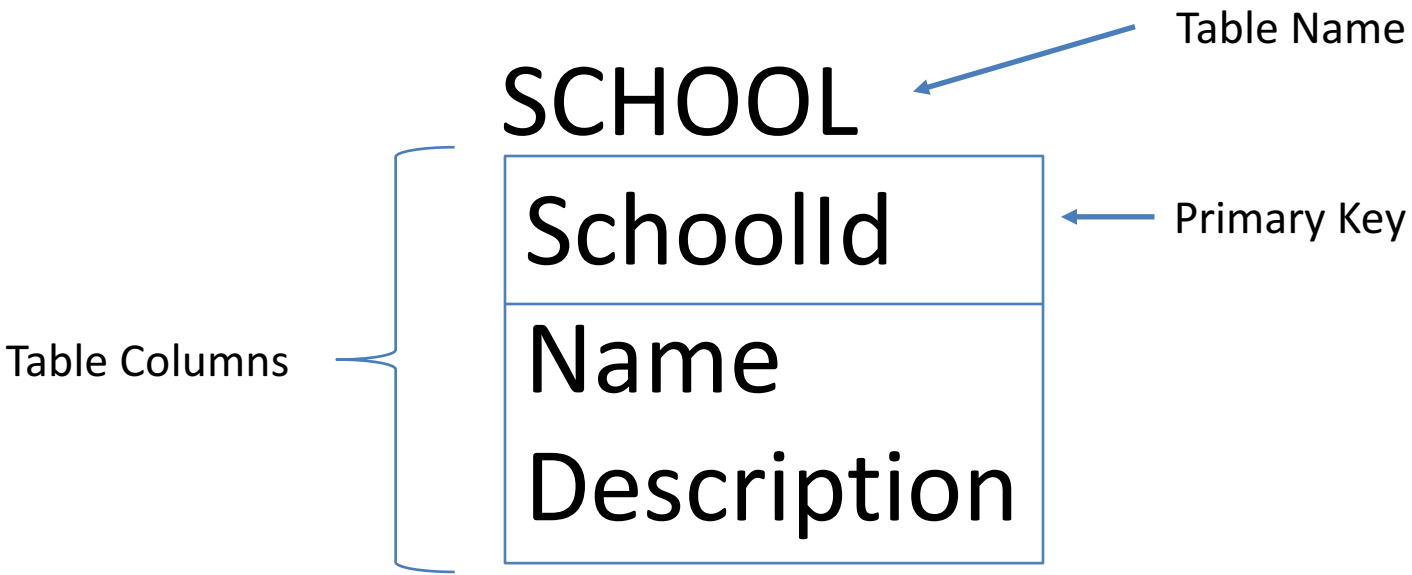
A Service running on the computer in the background

Management Studio



A Graphical User Interface to the database used for configuration and management of the database

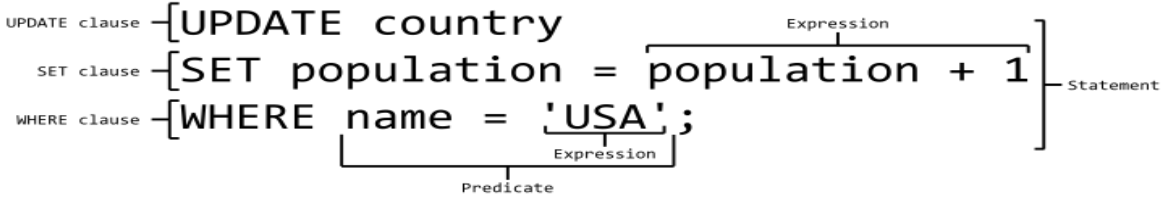
Creating Tables



Lets Create the Example from Scratch

SQL

Structured Query Language



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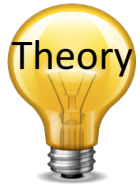
What is SQL?



- SQL – Structured Query Language
- SQL is a standard language for accessing databases – and manipulate data
- SQL is not case sensitive

Example:

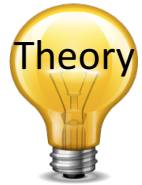
```
select SchoolId, Name from SCHOOL
```

We use the “SELECT” command in order to get data from the Database

Columns

Table

SQL – Structured Query Language



Query Examples:

- **insert** into STUDENT (Name , Number, SchoolId)
  values ('John Smith', '100005', 1)

- **select** SchoolId, Name from SCHOOL

- **select** * from SCHOOL where SchoolId > 100

- **update** STUDENT set Name='John Wayne' **where** StudentId=2

- **delete** from STUDENT **where** SchoolId=3

We have 4 different Query Types: **INSERT**, **SELECT**, **UPDATE** and **DELETE**

Lets Create some Examples from Scratch

Open Database Connectivity (ODBC)

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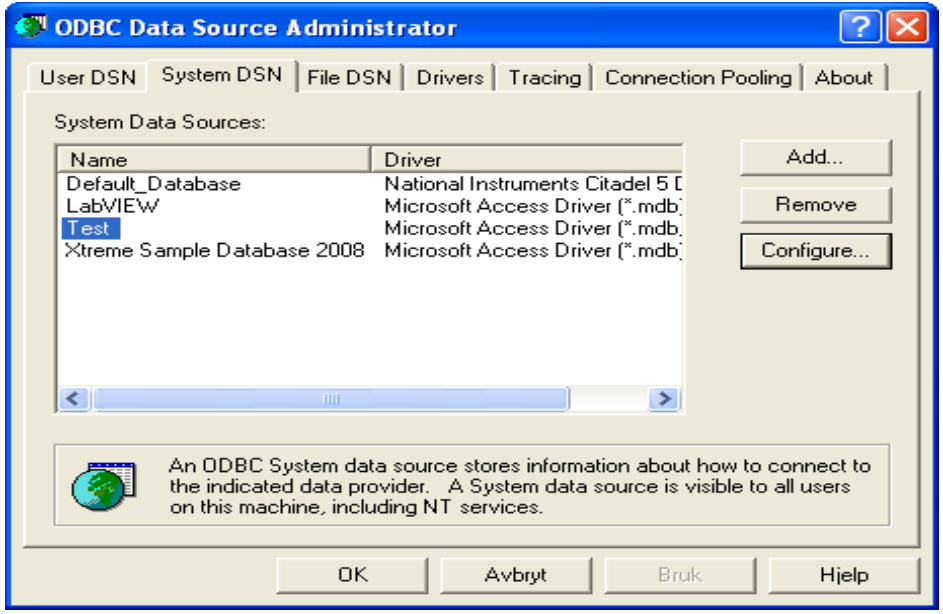
ODBC

ODBC (Open Database Connectivity) is a standardized interface (API) for accessing the database from a client. You can use this standard to communicate with databases from different vendors, such as Oracle, SQL Server, etc. The designers of ODBC aimed to make it independent of programming languages, database systems, and operating systems.

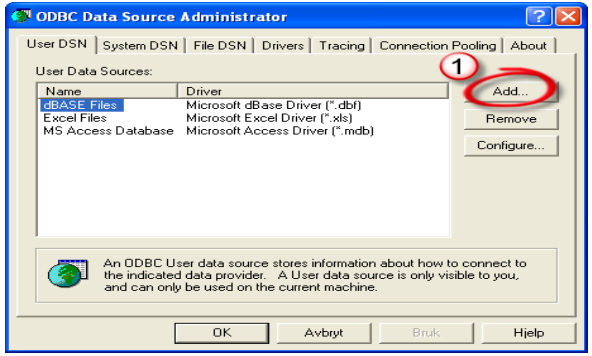
Control Panel → Administrative Tools → Data Sources (ODBC)

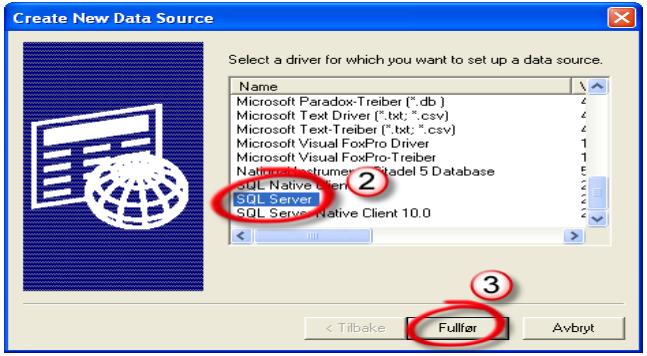


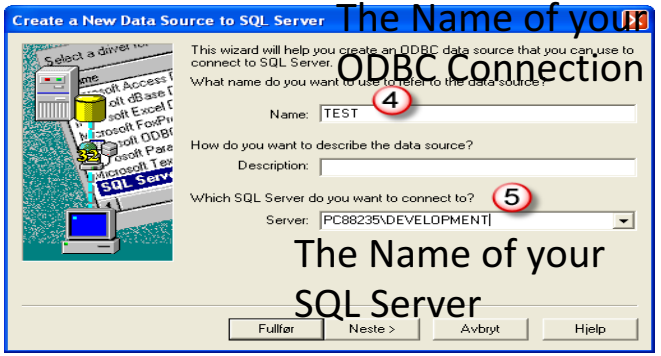
We will use this ODBC Connection later in LabVIEW in order to open the Database Connection from LabVIEW

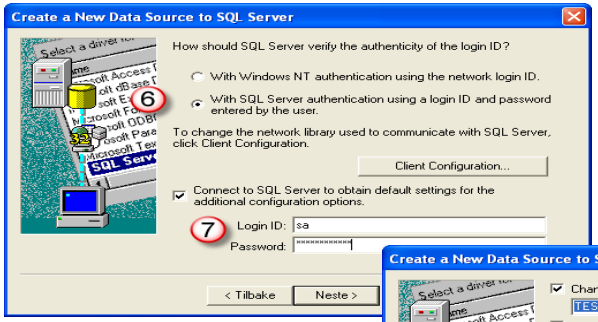
Note! Make sure to use the **32 bit** version of the ODBC Tool!

ODBC – Step by Step Instructions

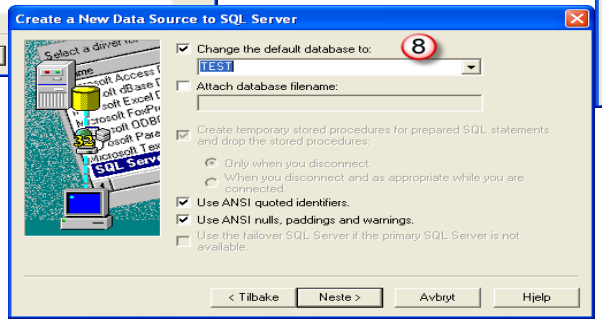




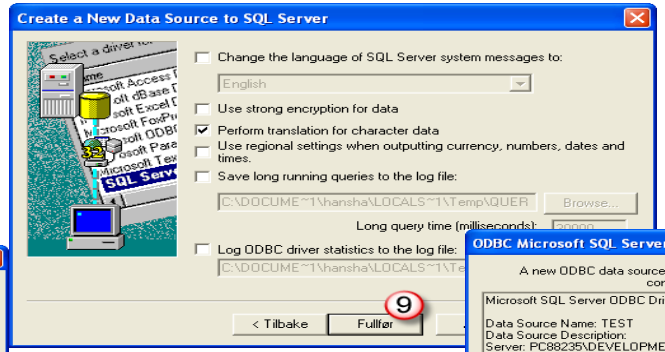




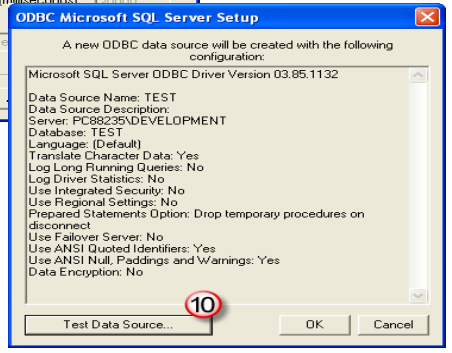
Use either Windows or SQL Server authentication (Windows is simplest to use!)



Select the Database you are using



Test your connection to see if its works



Lets Create the Example from Scratch

LabVIEW

Database Communication in LabVIEW

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LabVIEW SQL Toolkit

For Easy Database Communication using LabVIEW

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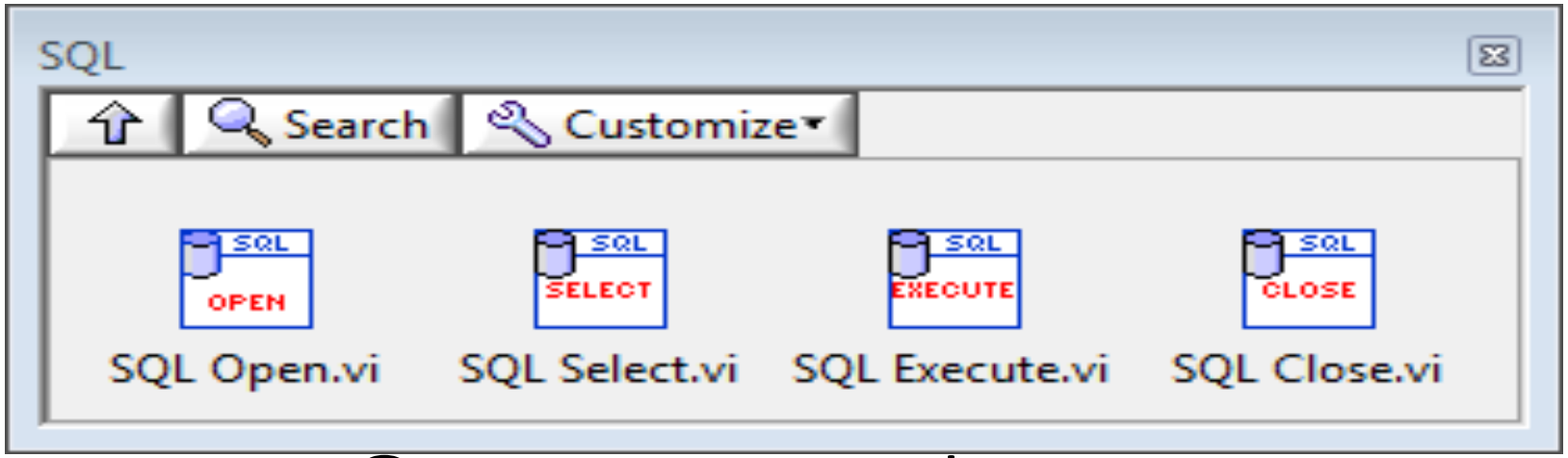
LabVIEW SQL Toolkit

For Easy Database Communication using LabVIEW



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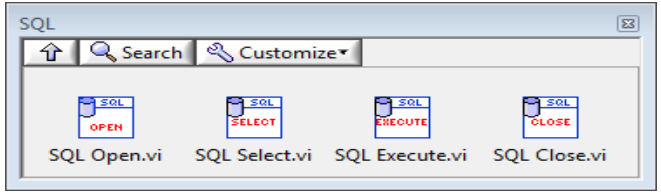
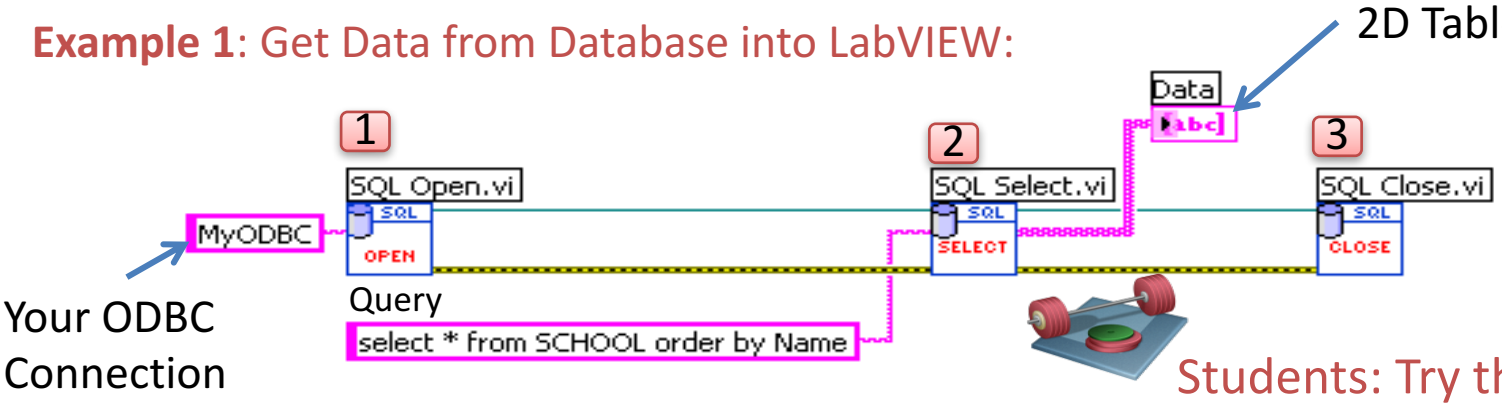
Download for free here:
http://home.hit.no/~hansha/documents/labview/code/SQLToolkit.zip

LabVIEW SQL Toolkit



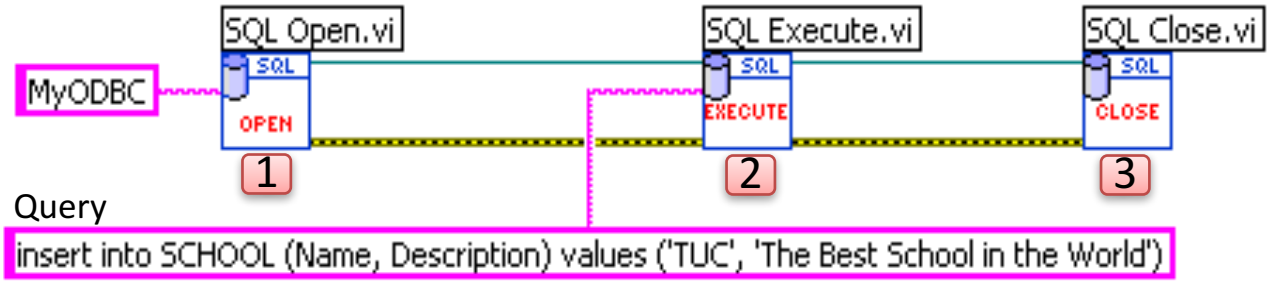
Easy Access to Database Systems from LabVIEW

Example 1: Get Data from Database into LabVIEW:



Students: Try these Examples

Example 2: Write Data to Database from LabVIEW:



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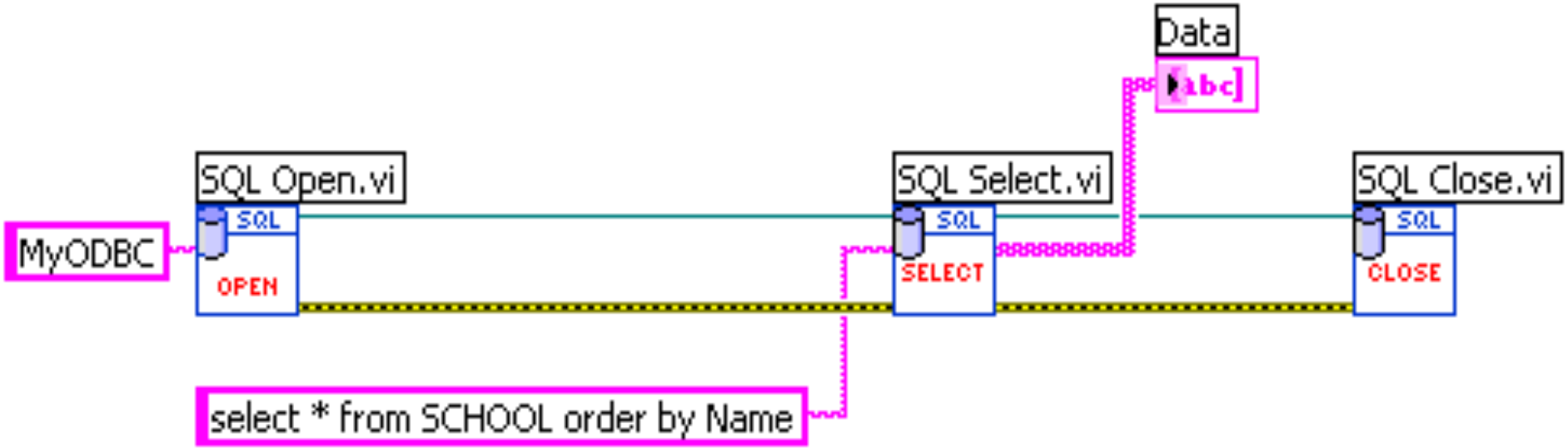
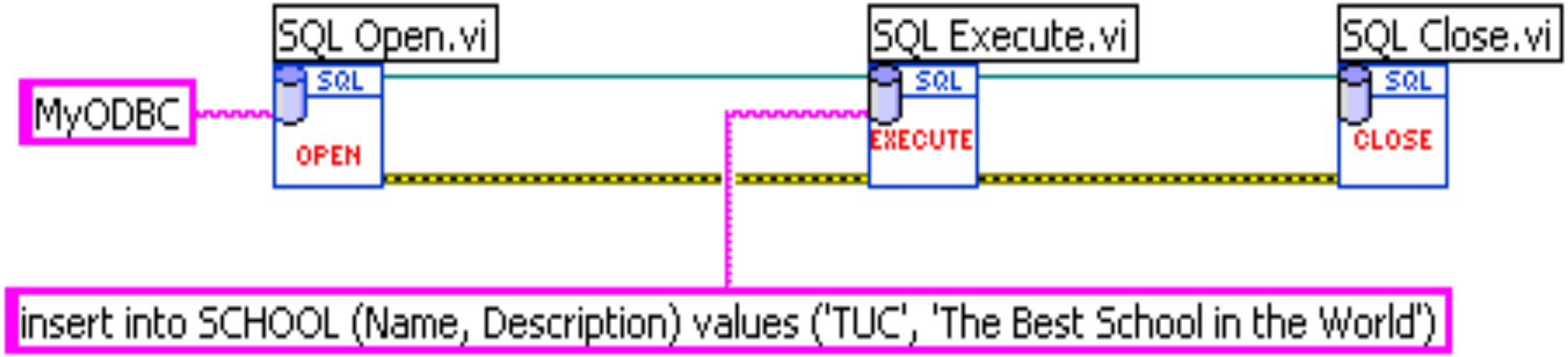


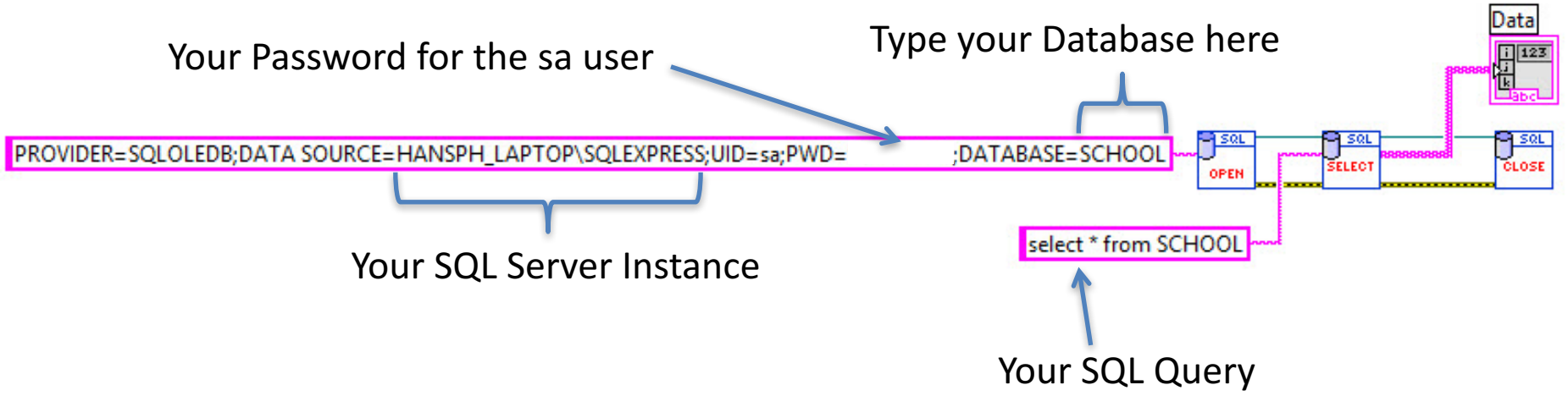
Lets Create the Example from Scratch

Example 2: Write Data to Database from LabVIEW



Lets Create the Example from Scratch

Alternative Solution: Type in the Connection String for your Database



Note! When using this method, you dont need to create an ODBC Connection first!

LabVIEW Example

Logging Measurements Data to SQL Server

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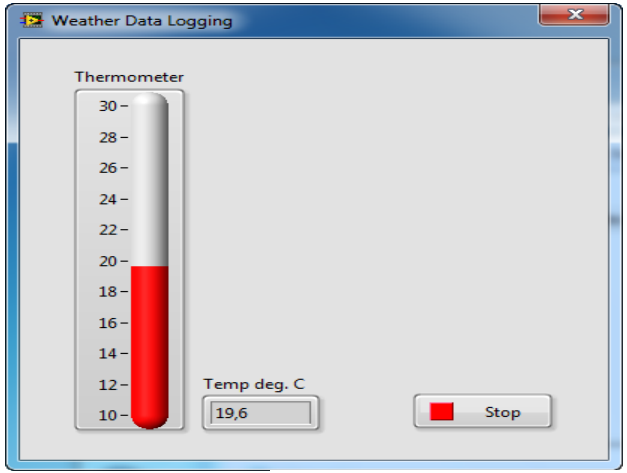
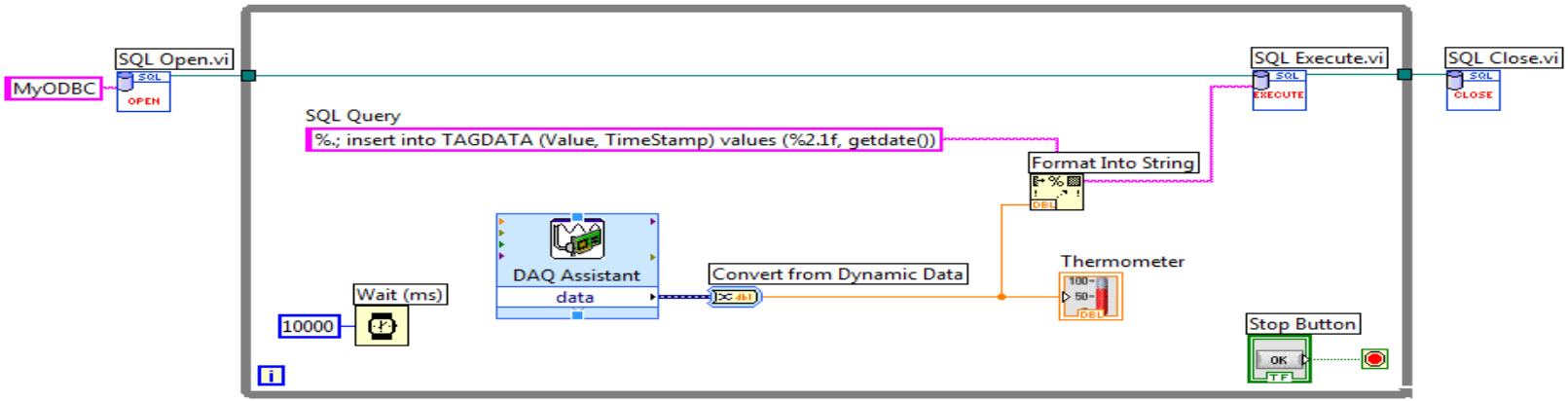
Logging Measurement Data into SQL Server Database

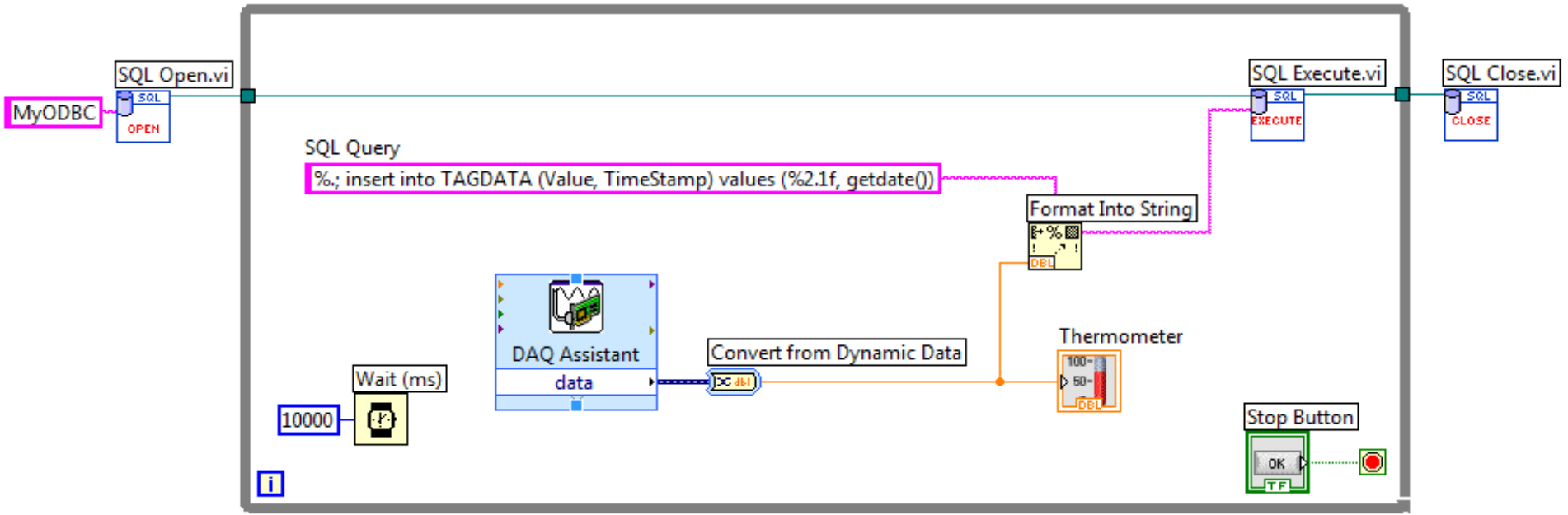


Temperature Measurements (TC-01 Thermocouple)

Note! You will need the NI DAQmx Driver



Logging Measurement Data into SQL Server Database



Lets Create the Example from Scratch

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