

# Octave ODBC Toolkit 0.0.7

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ODBC functions for GNU Octave.

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To download a copy of the GNU Octave ODBC package, please visit <https://gnu-octave.github.io/octave-odbc/>.

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# 1 Installing and loading

The toolkit must be installed and then loaded to be used.

It can be installed in GNU Octave directly from the website, or can be installed in an off-line mode via a downloaded tarball.

The toolkit has a dependency on the unixODBC library in Linux, so it must be installed in order to successfully install the toolkit.

In Microsoft Windows, it uses the native odbc library.

The toolkit must be then be loaded once per each GNU Octave session in order to use its functionality.

## 1.1 Online Direct install

With an internet connection available, the octave ODBC package can be installed from the octave-odbc website using the following command within GNU Octave:

```
pkg install https://github.com/gnu-octave/octave-odbc/releases/download/v0.0.7/octave-
```

On Octave 7.2 and later, the package can be installed using the following command within GNU Octave:

```
pkg install -forge odbc
```

The latest released version of the toolkit will be downloaded and installed.

## 1.2 Off-line install

With the toolkit package already downloaded, and in the current directory when running GNU Octave, the package can be installed using the following command within GNU Octave:

```
pkg install octave-odbc-0.0.7.tar.gz
```

## 1.3 Loading

Regardless of the method of installing the toolkit, in order to use its functions, the toolkit must be loaded using the pkg load command:

```
pkg load odbc
```

The toolkit must be loaded on each GNU Octave session.

During load of the toolkit, if a table class/function is not available, the toolkit will also load the tablicious or datatypes toolkit (if available) to provide table support.

## 2 Basic Usage Overview

### 2.1 Database Configuration

A ODBC driver and datasource must be configured in order to connect to it.

The known datasources can be displayed by running the command `listDataSources`

For Windows ODBC, to modify or add additional datasources. run the command `configureODBCDataSource` to open the system ODBC configuration tool.

In Linux, configure using the configuration files or tools available for unixODBC.

### 2.2 Database Connection

A database can be connected to by using the `odbc` or `database` function.

The datasource name can be either a DSN value as returned from `listDataSources` or a DSNless connection string providing driver information to pass to a driver.

#### Example

Connection to MYSQL using DSN:

```
# connection using DSN
conn = odbc("MySQL ODBC" ,"username","password")
```

Connection using DSNless string:

```
# connection to SQLITE using DSNless string
conn = odbc("Driver=SQLite3;Database=mytest.db;", "", "")
```

To quickly read data from a table, use the `sqlread` function.

#### Example

```
data = sqlread(conn, "TestTable")
```

### 2.3 Close the database

To close the database, use the `close` function.

#### Example

```
close(conn)
```

## 3 Function Reference

The functions currently available in the toolkit are described below;

### 3.1 ODBC connection

#### 3.1.1 configureODBCDataSource

`configureODBCDataSource ()`

Open the ODBC Datasource Administrator dialog box in Windows or ODBCManageDataSources in Unix if available.

#### Inputs

None

#### Outputs

None

**See also:** `listDataSources`.

#### 3.1.2 connection

`connection`

[Class]

Connection class for a ODBC database connection

#### Object Properties

DataSource

Datasource value as passed during creation

UserName Username value as passed during creation

Password Password value as passed during creation

Message Readonly last error message

Type 'ODBC Connection Object'

ReadOnly Boolean for readonly access passed during creation

AutoCommit

Boolean for control of commit to database

LoginTimeout

Number of seconds for a login timeout

Class is created using the `odbc` or `database` function.

**See also:** `odbc`, `database`.

#### 3.1.3 sqlfind

`data = sqlfind (conn, pattern)`

`data = sqlfind (conn, pattern, propertyname, propertyvalue ...)`

Find information about table types in a database.

## Inputs

*conn*            Currently open database.

*pattern*        Name or pattern to match table in database. Use "" to match all tables.

*propertyname, propertyvalue*  
                   Property name/value pairs where known properties are:

Catalog	catalog value to match
Schema	schema value to match

Note: Currently the property values are not used in the filter process.

## Outputs

*data*            a table containing the query result. Table columns are 'Catalog', 'Schema', 'Table', 'Columns', 'Type'.

## Examples

Show all tables in the database.

```
# create sql connection to an existing database
db = database("default", "", "");
# list all tables
data = sqlfind(db, '');
```

Show information about TestTable

```
# create sql connection
db = database("default", "", "");
# list matching tables
data = sqlfind(db, 'TestTable');
```

See also: database, sqlread.

### 3.1.4 database

```
conn = database (dbname, username, password)
conn = database (dbname, username, password, propertyname,
                propertyvalue ...)
```

Create a odbc database connection

## Inputs

*dbname*        ODBC DSN connection name, or connection string

*username*      Username for connecting to database.

*password*      Password for connecting to database.

## Outputs

*conn*            A connection object for the connected database



## Examples

Open a a preconfigured default database, using blank username and password.

```
db = database("default", "", "");
```

**See also:** `odbc`, `connection`.

### 3.1.5 listDataSources

```
src = listDataSources ()
```

List available odbc datasources

#### Inputs

None

#### Outputs

*src* A table or cell structure of available data sources. The result contains fields for Name, DriverType and Vendor.

**See also:** `odbc`, `database`.

### 3.1.6 odbc

```
conn = odbc (dbname, username, password)
conn = odbc (dbname, username, password, propertyname, propertyvalue
    ...)
conn = odbc (dsnconnectstr)
```

Create an ODBC database connection

#### Inputs

*dbname* ODBC DSN connection name, or connection string

*username* Username for connecting to database.

*password* Password for connecting to database.

#### Outputs

*conn* A connection object for the connected database

## Examples

Open a preconfigured default database, using blank username and password.

```
db = odbc("default", "", "");
```

**See also:** `database`, `connection`.

## 3.2 Importing Data

### 3.2.1 executeSQLScript

```
results = executeSQLScript (conn, scriptname)
```

Run statements from a script file

## Inputs

*conn* ODBC connection object

*scriptname* Filename to read statements from. NOTE: Currently the file is expected to contain one statement per line.

## Outputs

*results* A struct with fields SQLQuery, Data and Message for each SQL statement in the file.

### 3.2.2 fetch

```
data = fetch (conn, query)
data = fetch (conn, query, propertyname, propertyvalue ...)
```

Perform SQL query *query*, and return result

## Inputs

*conn* Currently open database connection.

*sqlquery* String containing a valid select SQL query.

*propertyname, propertyvalue*

Property name/value pairs where known properties are:

MaxRows Integer value of max number of rows in the query

VariableNamingRule

String value 'preserve' (default) or 'modify' to flag renaming of variable names (currently ignored)

RowFilter rowfilter object to filter results

## Outputs

*data* a table containing the query result.

## Examples

Select all rows of data from a database tables

```
# create sql connection
db = database("default", "", "");
data = fetch(db, 'SELECT * FROM TestTable');
```

Select 5 rows of data from a database tables

```
# create sql connection
db = database("default", "", "");
data = fetch(db, 'SELECT * FROM TestTable', "MaxRows", 5);
```

**See also:** database, connection.

### 3.2.3 select

```
data = select (conn, query)
data = select (conn, query, propertyname, propertyvalue ...)
```

Perform SQL query *query*, and return result

#### Inputs

*conn*           Currently open database connection.

*query*           String containing a valid select SQL query.

*propertyname, propertyvalue*  
Property name/value pairs where known properties are:

MaxRows   Integer value of max number of rows in the query

VariableNamingRule  
String value 'preserve' (default) or 'modify' to flag renaming of variable names (currently ignored)

RowFilter   rowfilter object to filter results

#### Outputs

*data*           a table containing the query result.

#### Examples

Select all rows of data from a database tables

```
# create sql connection
db = database("default", "", "");
data = fetch(db, 'SELECT * FROM TestTable');
```

Select 5 rows of data from a database tables

```
# create sql connection
db = database("default", "", "");
data = fetch(db, 'SELECT * FROM TestTable', "MaxRows", 5);
```

**See also:** database, connection.

### 3.2.4 sqlinnerjoin

```
data = sqlinnerjoin (conn, lefttablename, righttablename)
data = sqlinnerjoin (conn, lefttablename, righttablename, "Keys",
                    keys, ...)
data = sqlinnerjoin (conn, lefttablename, righttablename, "LeftKeys",
                    keys, "RightKeys", keys, ...)
```

Perform an inner join on two tables.

Performs an inner join equivalent to 'SELECT \* from lefttable INNER JOIN righttable ON lefttable.key = righttable.key'.

## Inputs

*conn*            Previously created connection object

*lefttablename*  
                 Name of lefthand table

*righttablename*  
                 Name of righthand table

*keys*            A string or cell array of strings of column names to join against. If specified as Keys, the names will be used on lefthand and rightside of the join. If specified as LeftKeys and RightKeys, keys will be used separately for each side of the table. If no keys are provided, common named columns will be matched between the tables.

*propertyname, propertyvalue*  
                 Property name/value pairs where known properties are:  
                 MaxRows    Max number of rows to return.  
                 DataReturnFormat  
                                 Format to return data in ('table', 'structure', 'cellarray')

## Outputs

None

**See also:** database, odbcc, fetch, sqlouterjoin.

### 3.2.5 sqlouterjoin

```
data = sqlouterjoin(conn, lefttablename, righttablename)
data = sqlouterjoin(conn, lefttablename, righttablename, "Keys",
                    keys, ...)
data = sqlouterjoin(conn, lefttablename, righttablename, "LeftKeys",
                    keys, "RightKeys", keys, ...)
```

Perform an outerjoin on two tables.

Performs an outer join equivalent to 'SELECT \* from lefttable OUTER JOIN righttable ON lefttable.key = righttable.key'.

## Inputs

*conn*            Previously created connection object

*lefttablename*  
                 Name of left-hand table

*righttablename*  
                 Name of right-hand table

*keys*            A string or cell array of strings of column names to join against. If specified as Keys, the names will be used on left-hand and right-hand side of the join. If specified as LeftKeys and RightKeys, keys will be used separately for each side of the table. If no keys are provided, common named columns will be matched between the tables.

*propertyname, propertyvalue*  
                 Property name/value pairs where known properties are:  
                 MaxRows    Max number of rows to return.

DataReturnFormat

Format used to return data in ('table', 'structure', 'cellarray')

## Outputs

None

**See also:** database, odbc, fetch, sqlinnerjoin.

### 3.2.6 sqlread

```
data = sqlread(conn, tablename)
```

```
data = sqlread(conn, tablename, propertyname, propertyvalue)
```

Read data from table *tablename*

Return rows of data from table *tablename* in a database. This function is the equivalent of running `SELECT * FROM table`.

## Inputs

*conn*           Currently open database.

*tablename*   Name of a table within the database.

*propertyname, propertyvalue*

Property name/value pairs where known properties are:

MaxRows   Integer value of max number of rows in the query

VariableNamingRule

String value 'preserve' (default) or 'modify' to flag renaming of variable names (currently ignored)

RowFilter   rowfilter object to filter results

## Outputs

*data*           a table containing the query result.

## Examples

Select all rows of data from a database table

```
# create sql connection to an existing database
db = database("default", "", "");
data = sqlread(db, 'TestTable');
```

Select 5 rows of data from a database table

```
# create sql connection
db = database("default", "", "");
data = sqlread(db, 'TestTable', "MaxRows", 5);
```

**See also:** database, fetch.

## 3.3 Exporting Data

### 3.3.1 sqlwrite

```
sqlwrite (conn, tablename, data)
sqlwrite (conn, tablename, data, columntypes)
sqlwrite (conn, tablename, data, propertyname, propertyvalue ...)
```

Insert rows of data into a table.

Insert rows of data into a database table. If the table does not exist it will be created, using the ColumnType property if available otherwise, the type of input data will be used to determine field types.

#### Inputs

*conn* Previously created database connection object

*tablename* Name of table to write data to

*data* Table containing data to write to the database. Variables names are expected to match the database.

*columntypes*

Optional cell array of same size as data used if table must be created. The column types may also be passed in using the *propertyname, propertyvalue* syntax.

*propertyname, propertyvalue*

Property name/value pairs where known properties are:

ColumnType

Optional cell array of same size as the data that may be used if the table is created as part of the write operation.

#### Outputs

None

**See also:** database, odbc, sqlread.

## 3.4 Database Operations

### 3.4.1 commit

```
commit (conn)
Make permanent changes to the database.
```

#### Inputs

*conn* Currently open database.

#### Outputs

None

### 3.4.2 execute

```
execute (conn, query)
Perform SQL query query, that does not return result
```

## Inputs

*conn* Previously created database connection object

*sqlquery* A valid non-selecting SQL query string

## Outputs

None

## Examples

Create a database table and insert a row

```
# create sql connection
db = database("default", "", "");
# create table and then insert a row
execute(db, 'CREATE TABLE Test (Id INTEGER PRIMARY KEY AUTOINCREMENT, Name TEXT)');
execute(db, 'INSERT INTO Test (Name) VALUES ("Line1")');
```

**See also:** database, fetch.

### 3.4.3 rollback

`rollback (conn)`

Rollback changes to the database.

## Inputs

*conn* Currently open database.

## Outputs

None

### 3.4.4 sqlupdate

`sqlupdate (conn, tablename, data, filter)`

`sqlupdate (conn, tablename, data, filter, propertyname, propertyvalue  
...)`

Update rows of data in database.

## Inputs

*conn* Previously created database connection object

*tablename* Name of table to write data to

*data* Table containing or struct data to write to the database. Variables names are expected to match the database.

*filter* A Filter object or cell array of filter objects used to determine which rows of the table to update.

*propertyname, propertyvalue*

Property name/value pairs where known properties are:

Catalog An optional database catalog name.

Schema An optional database schema name.

## Outputs

None

## Examples

Update database where id > 1

```
# create sql connection
db = database("default", "", "");
# make a filter to select what to update
rf = rowfilter({'Id'});
rf = rf.Id > 1;
# update name where Id > 1
t = table(['Name3'], 'VariableNames', {'Name'});
sqlupdate(db, "Test", t, rf);
```

**See also:** update.

### 3.4.5 update

`update(conn, tablename, colnames, data, whereclause)`

Update columns in database.

## Inputs

*conn* Previously created database connection object

*tablename* Name of table to write data to

*colnames* cellstr of column names update. Variables names are expected to match the database.

*data* Table or struct containing data to write to the database. Column names are expected to be present in the data..

*whereclause* String WHERE condition to meet for updates.

## Outputs

None

## Examples

Update a row in the database

```
# create sql connection
db = database("default", "", "");
# update name where Id > 1
t = table(['Name3'], 'VariableNames', {'Name'});
update(db, "Test", t, "WHERE Id > 1");
```

**See also:** sqlupdate.



## 3.5 Support Functions

### 3.5.1 rowfilter

```
rowfilt = rowfilter(C)  
rowfilt = rowfilter(T)
```

Create an unconstrained rowfilter object with columns names.

#### Inputs

*C*            A column name, cell array of column names.  
*T*            A table to use for column names.

#### Outputs

*rowfilt*      a rowfilter object

#### Object Properties

Object properties are the names of the columns on creation of the filter.

Constraints can be set on a specific field of the filter by setting a comparison value for the variable name.

#### Examples

```
# create a rowfilter with 2 columns  
rf = rowfilter({'Column1', 'Column2'});  
# add a constraint for Column1 > 10  
rfc = rf.Column1 > 10
```

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