

Environment

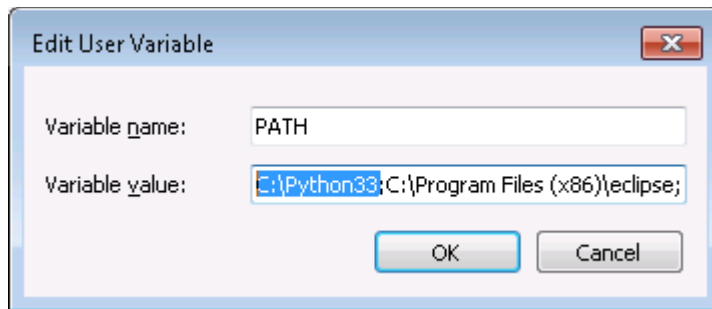
OS: Windows 7 Ultimate x64
Compiler: Visual Studio 2010
Boost: 1.57.0 (installation path is "D:\libs\boost")
CMake: 3.2.1
Python3: 3.3.5
NumPy: 1.9.1
SciPy: 0.14.0
PyQt4: 4.10.3
Pyparsing: 2.0.1
python-dateutil: 2.2
six: 1.5.2
Git: 1.9.5 (optional)

Downloading

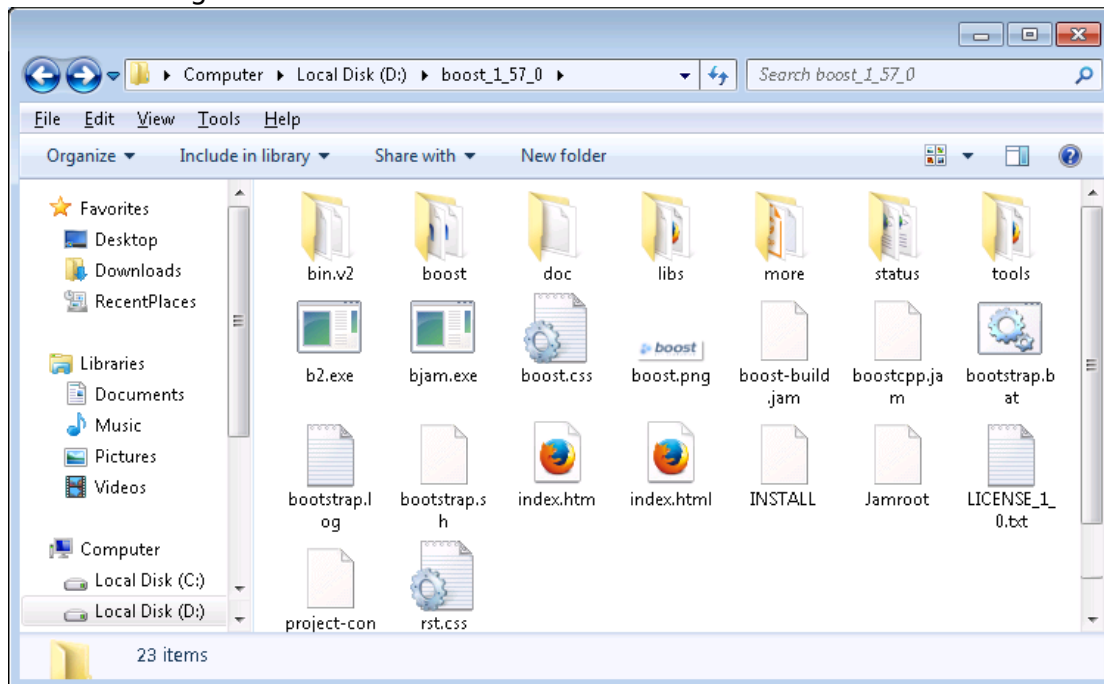
Boost: <http://sourceforge.net/projects/boost/files/boost/1.57.0/>
CMake: <http://www.cmake.org/files/v3.1/cmake-3.1.3-win32-x86.exe>
Python3: <http://www.python.org/ftp/python/3.3.5/python-3.3.5.msi>
NumPy: <http://sourceforge.net/projects/numpy/files/NumPy/1.9.1/numpy-1.9.1-win32-superpack-python3.3.exe/download>
SciPy: <http://sourceforge.net/projects/scipy/files/scipy/0.14.0/scipy-0.14.0-win32-superpack-python3.3.exe/download>
PyQt4: <http://sourceforge.net/projects/pyqt/files/PyQt4/PyQt-4.10.3/PyQt4-4.10.3-gpl-Py3.3-Qt4.8.5-x32.exe/download>
Pyparsing: <http://sourceforge.net/projects/pyparsing/files/pyparsing/pyparsing-2.0.1/pyparsing-2.0.1.win32-py3.3.exe/download>
setuptools: <https://pypi.python.org/pypi/setuptools#downloads>
python-dateutil: <https://pypi.python.org/pypi/python-dateutil/2.2>
six: <https://pypi.python.org/pypi/six/1.5.2>
Matplotlib: <http://sourceforge.net/projects/matplotlib/files/matplotlib/matplotlib-1.3.1/matplotlib-1.3.1.win32-py3.3.exe/download>
Git: <https://github.com/msysgit/msysgit/releases/download/Git-1.9.5-preview20141217/Git-1.9.5-preview20141217.exe>

Compiling Boost

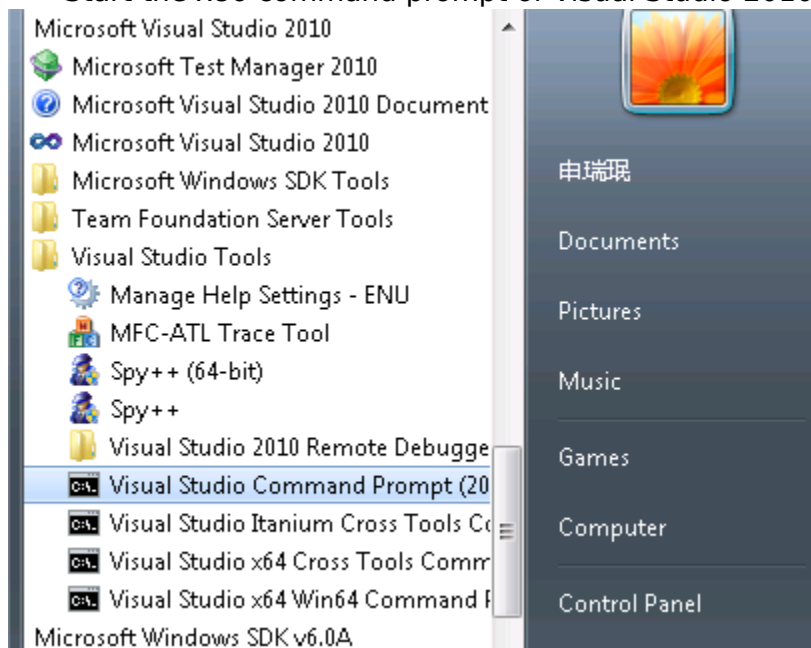
- Installing Python 3, and make sure its path is included in the PATH environment variable:



- Extracting source code files of Boost:



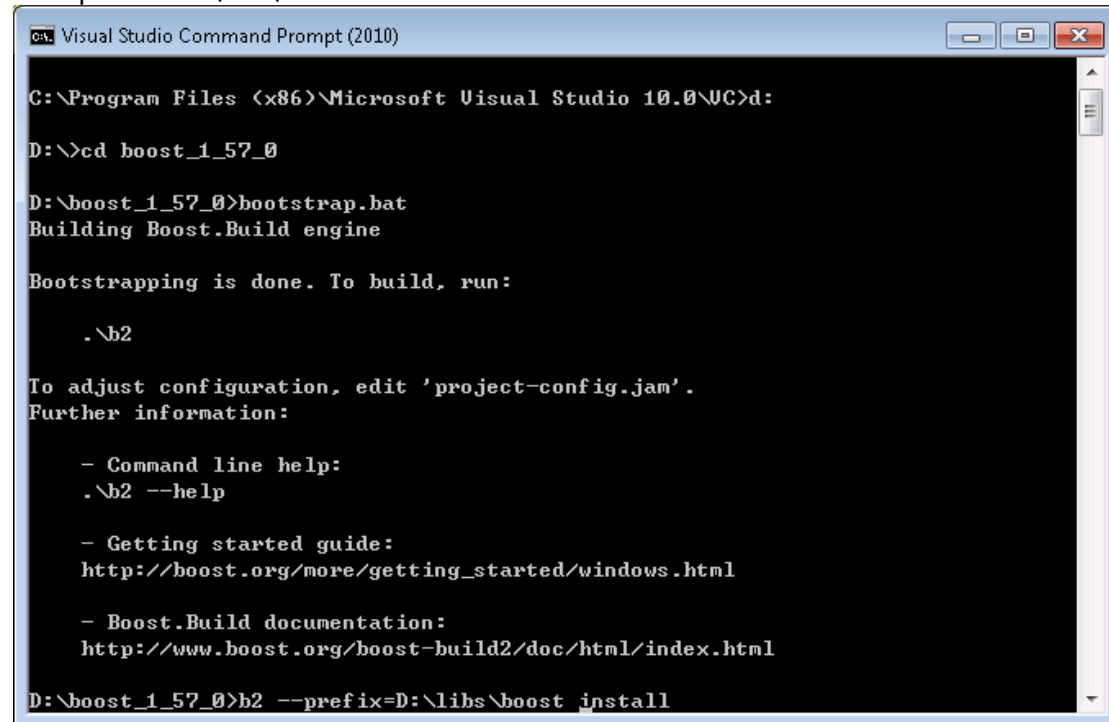
- Start the x86 command prompt of Visual Studio 2010:



- Compiling Boost (both static and shared link):

```
d:
cd D:\boost_1_57_0
bootstrap.bat
```

b2 --prefix=D:\libs\boost install



```
ca. Visual Studio Command Prompt (2010)

C:\Program Files (x86)\Microsoft Visual Studio 10.0\VC>d:

D:\>cd boost_1_57_0

D:\boost_1_57_0>bootstrap.bat
Building Boost.Build engine

Bootstrapping is done. To build, run:

    .\b2

To adjust configuration, edit 'project-config.jam'.
Further information:

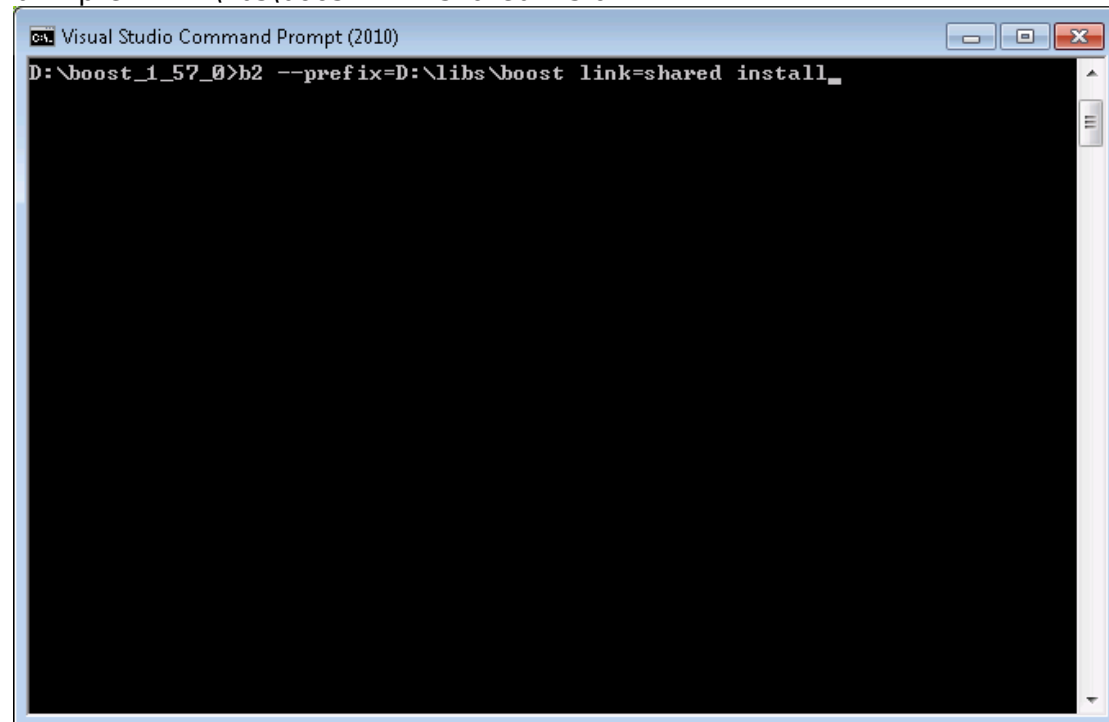
    - Command line help:
      .\b2 --help

    - Getting started guide:
      http://boost.org/more/getting_started/windows.html

    - Boost.Build documentation:
      http://www.boost.org/boost-build2/doc/html/index.html

D:\boost_1_57_0>b2 --prefix=D:\libs\boost install
```

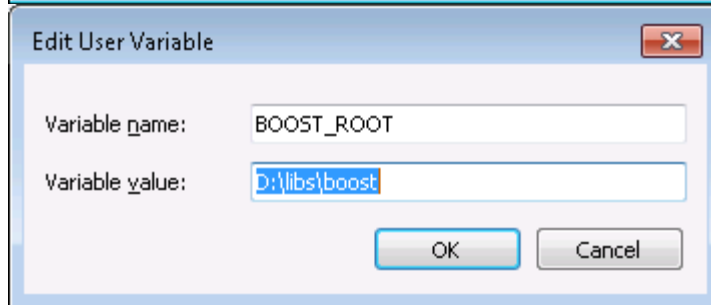
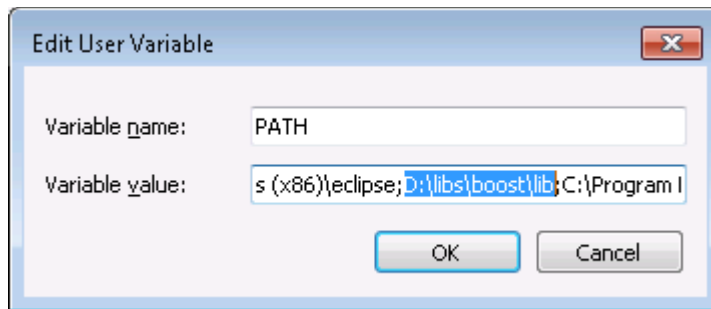
b2 --prefix=D:\libs\boost link=shared install



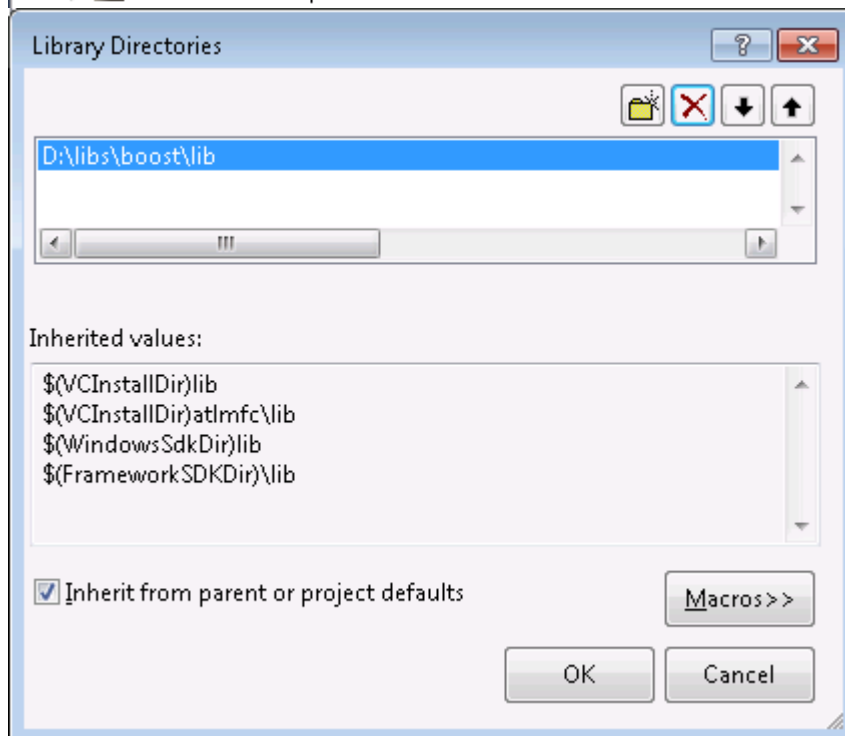
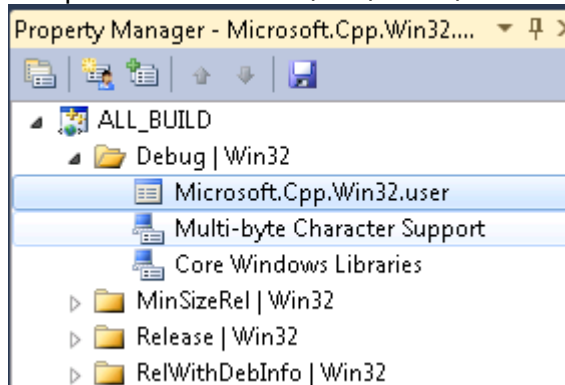
```
ca. Visual Studio Command Prompt (2010)

D:\boost_1_57_0>b2 --prefix=D:\libs\boost link=shared install_
```

- Adding the installation path of Boost “D:\libs\boost” into both the PATH and BOOST_ROOT environment variables:

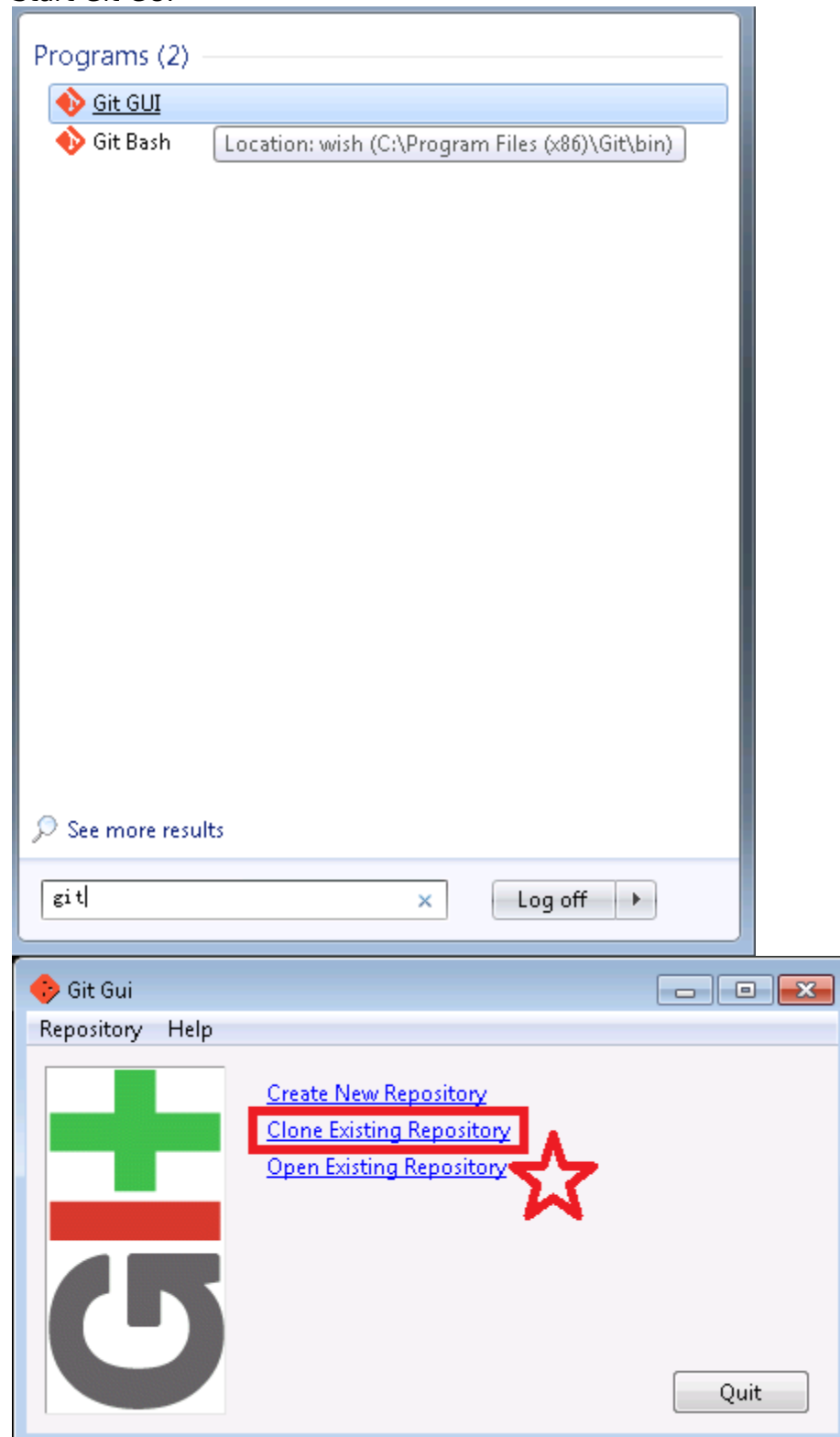


- Open the property manager of Visual Studio 2010, and adding the library path of Boost “D:\libs\boost\lib” into library directories:

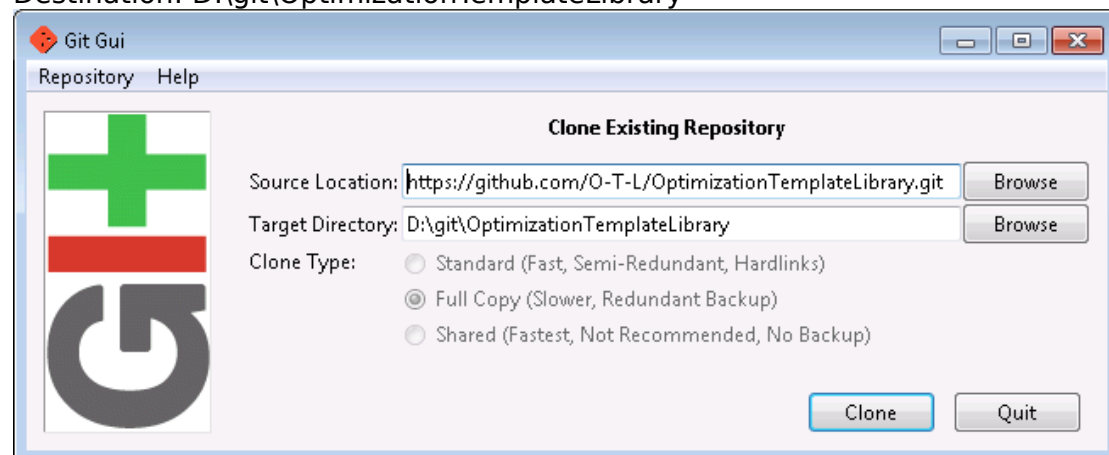


Configuring OTL

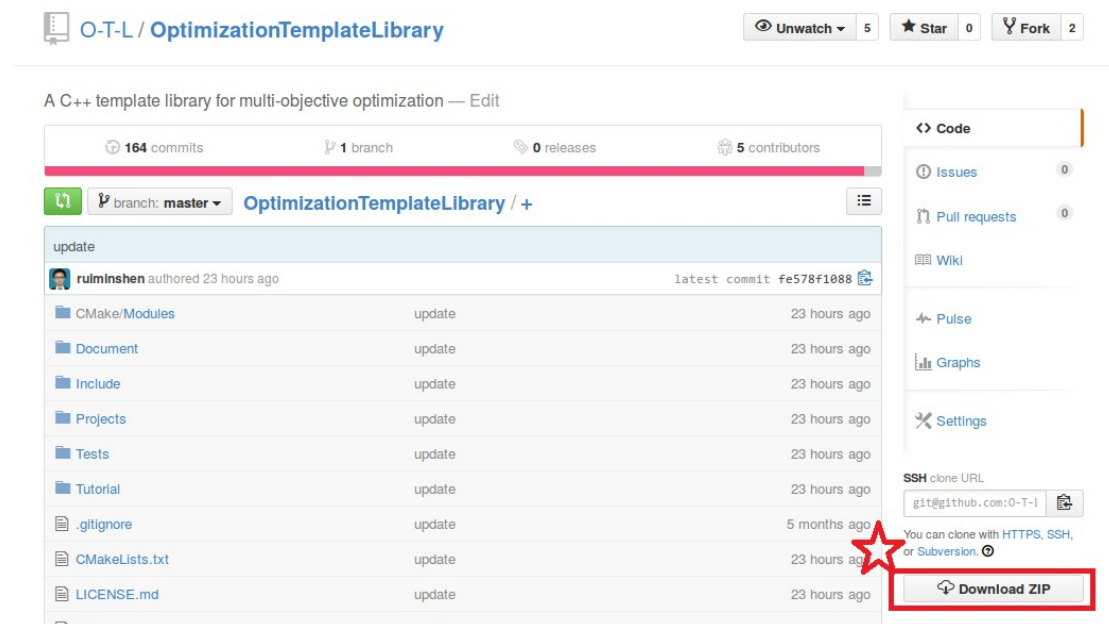
- Clone the repository (recommended):
Start Git GUI



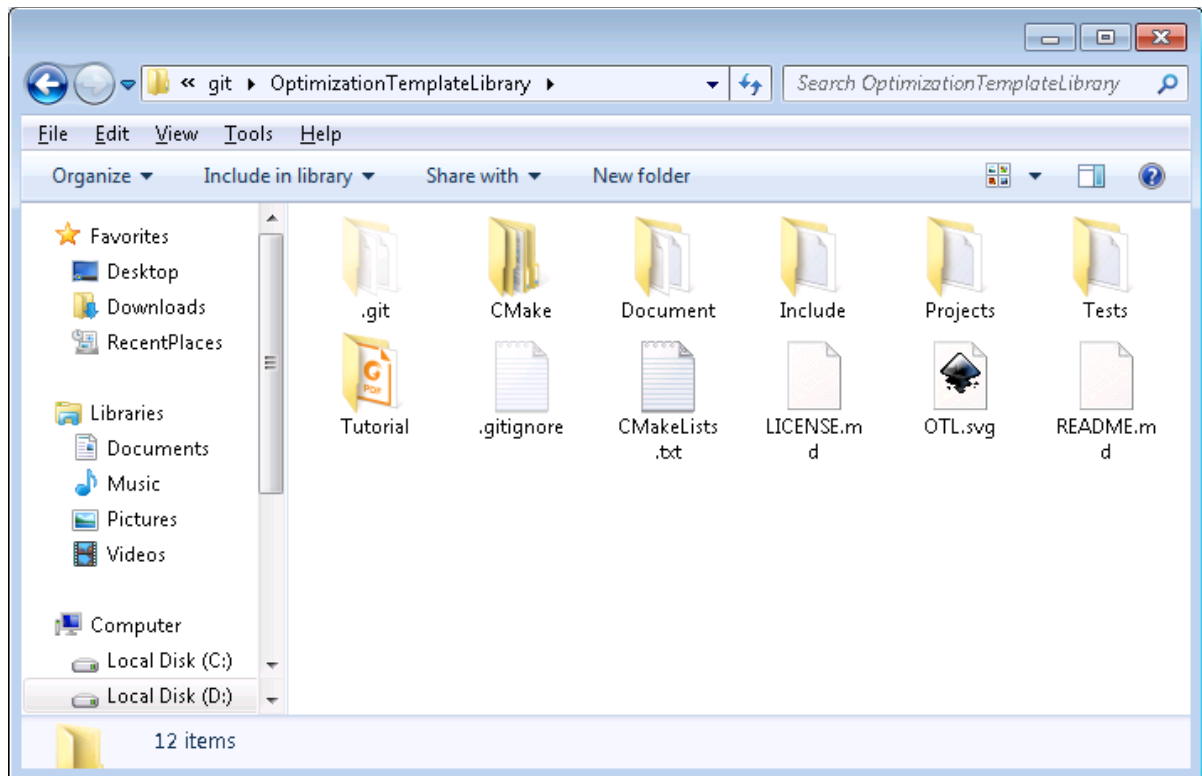
Clone URL: <https://github.com/O-T-L/OptimizationTemplateLibrary.git>
Destination: D:\git\OptimizationTemplateLibrary



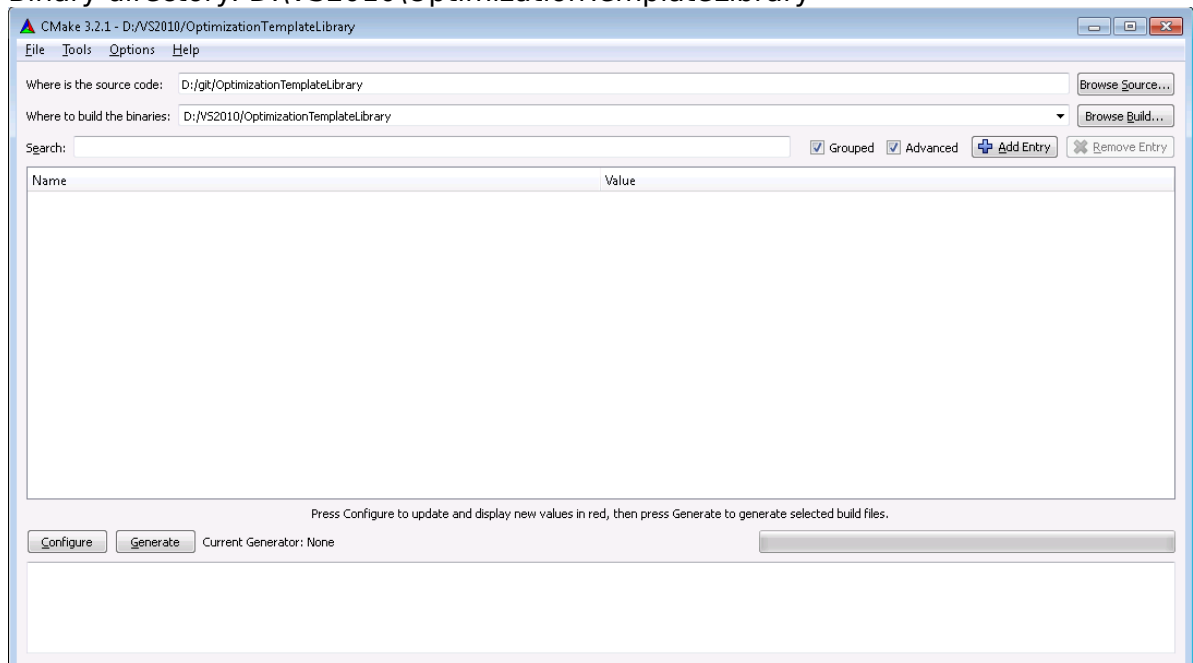
- Or downloading the source codes (if Git is not used):
Go to OTL's page: <https://github.com/O-T-L/OptimizationTemplateLibrary>
Click the "Download ZIP" button.

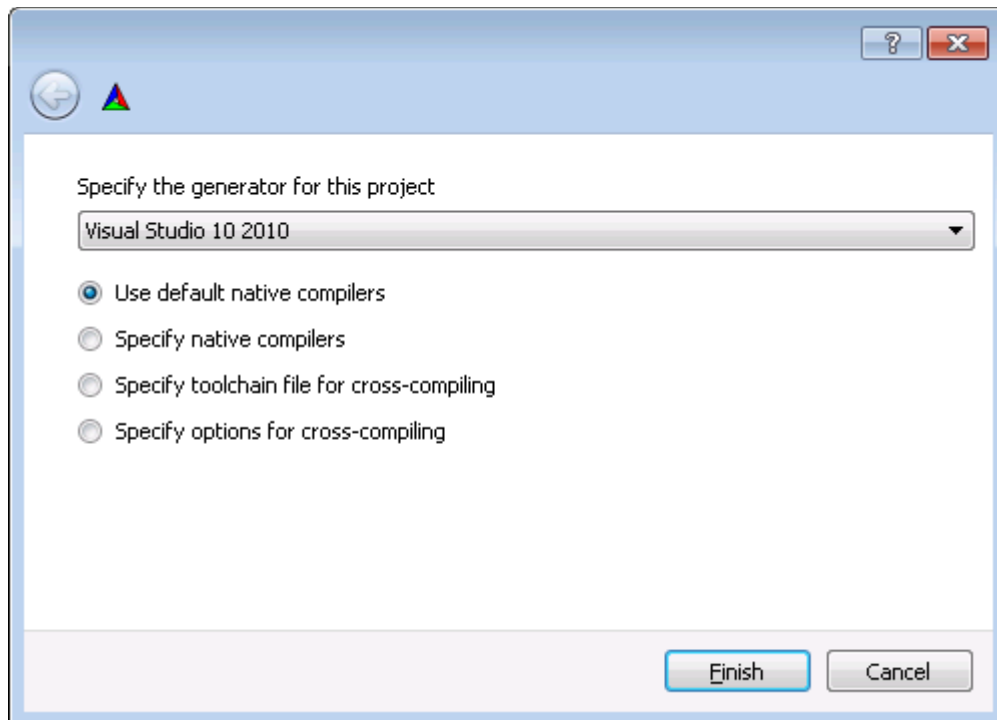


- Generating project files of Visual Studio 2010
Source code directory: D:\git\OptimizationTemplateLibrary

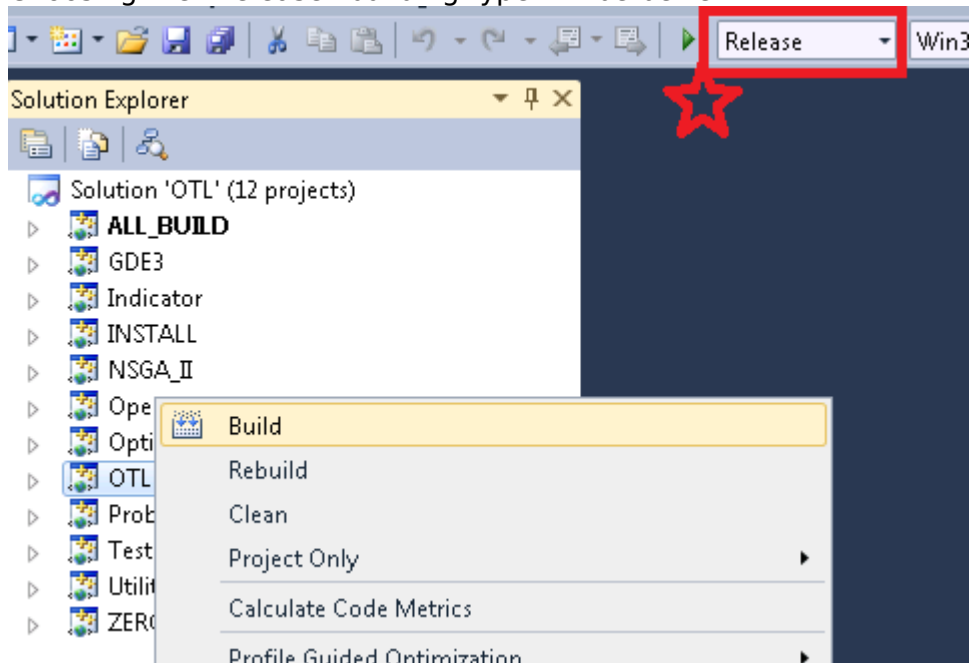


Binary directory: D:\VS2010\OptimizationTemplateLibrary

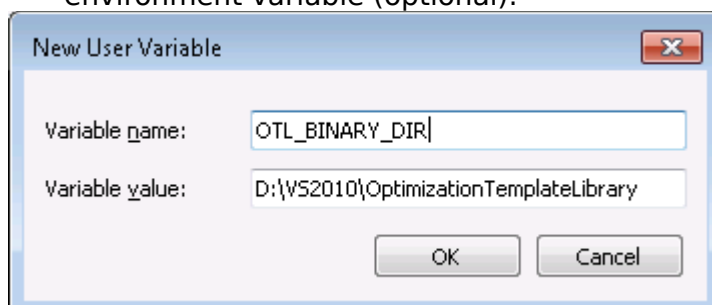




- Building the OTL project:
Choosing the “Release” building type will be better.



- Adding the binary directory of OTL “D:\VS2010\OptimizationTemplateLibrary” into the OTL_BINARY_DIR environment variable (optional):

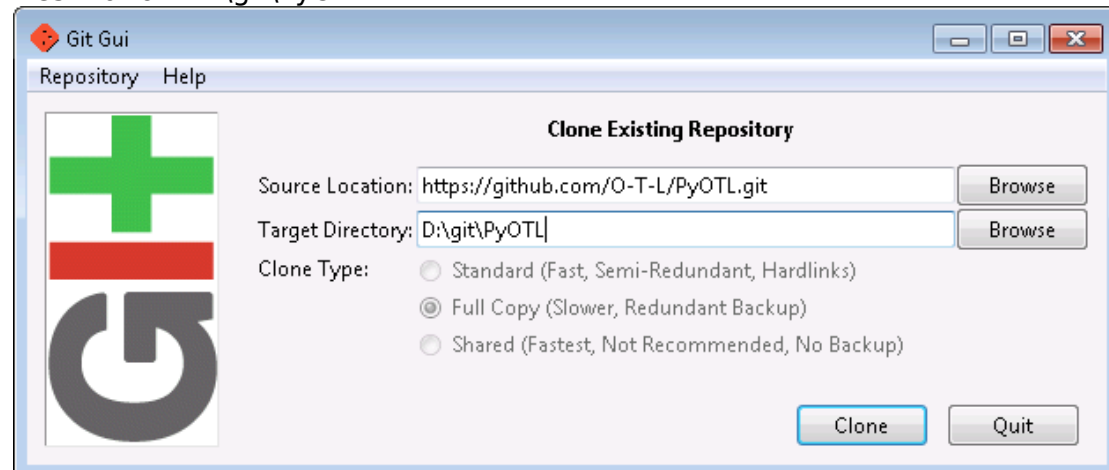


Configuring PyOTL

- Clone the repository (recommended):

Clone URL: <https://github.com/O-T-L/PyOTL.git>

Destination: D:\git\PyOTL



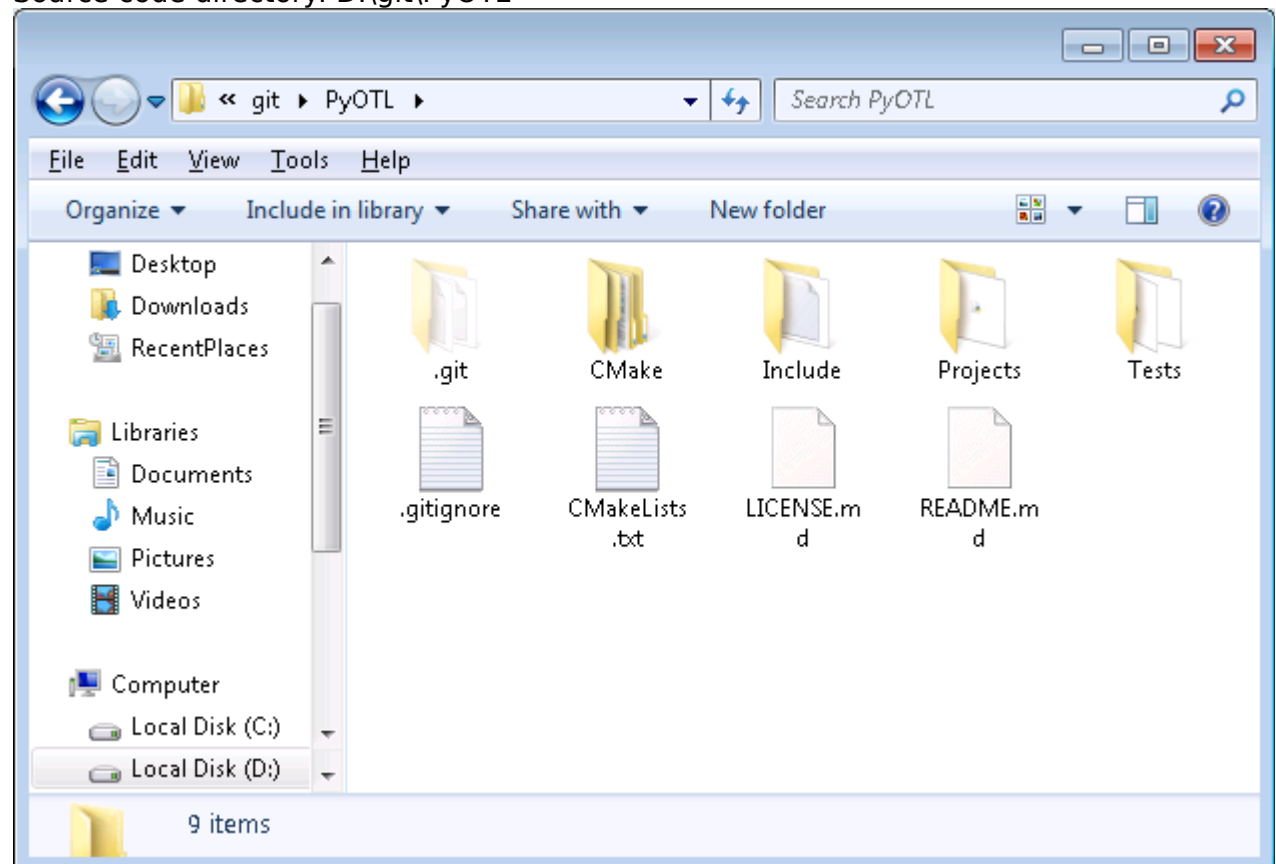
- Or downloading the source codes (if Git is not used):

Go to PyOTL's page: <https://github.com/O-T-L/PyOTL>

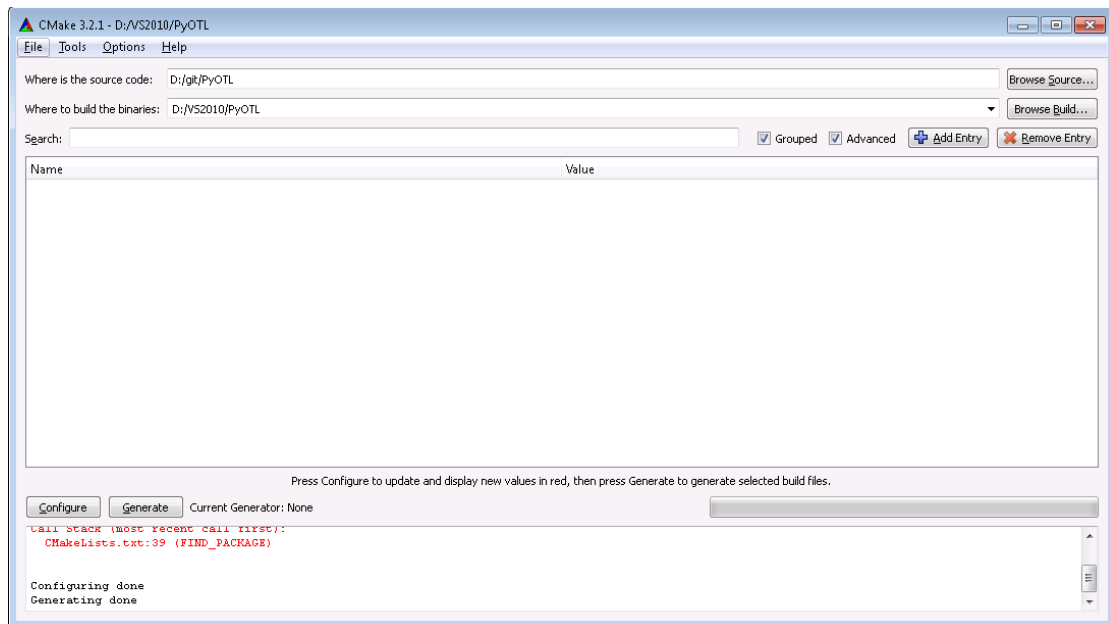
Click the "Download ZIP" button.

- Generating project files of Visual Studio 2010

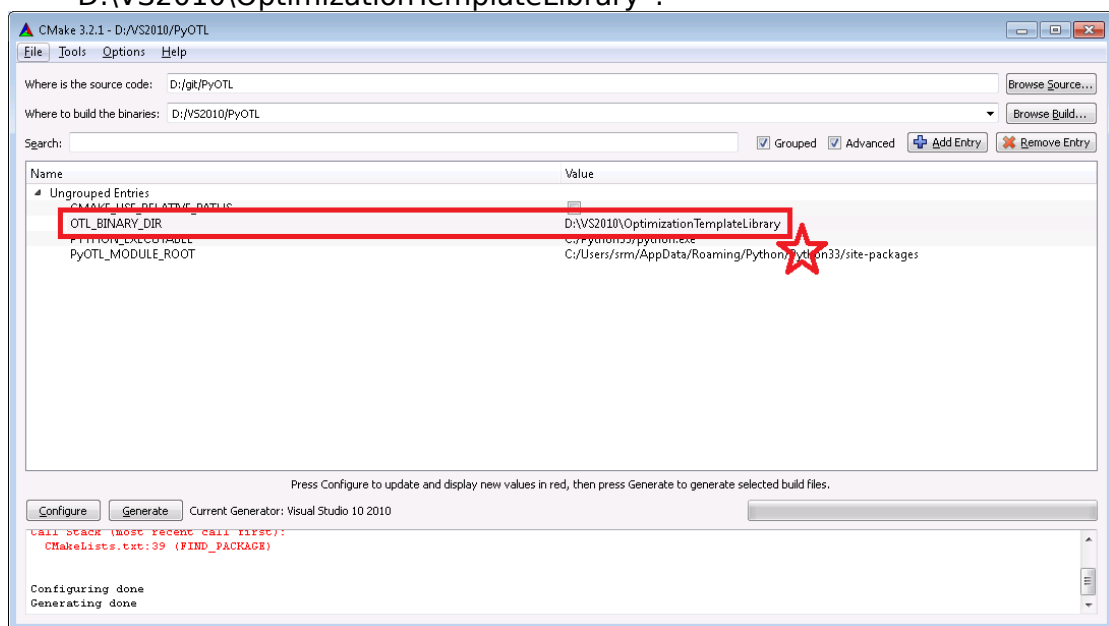
Source code directory: D:\git\PyOTL



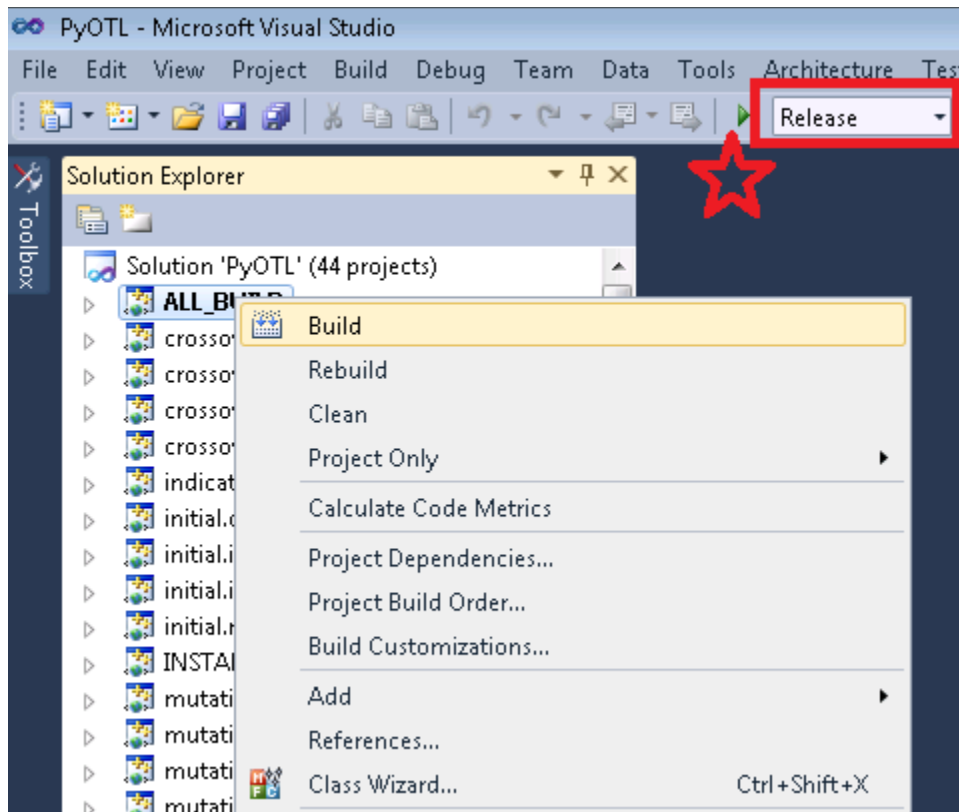
Binary directory: D:\VS2010\PyOTL



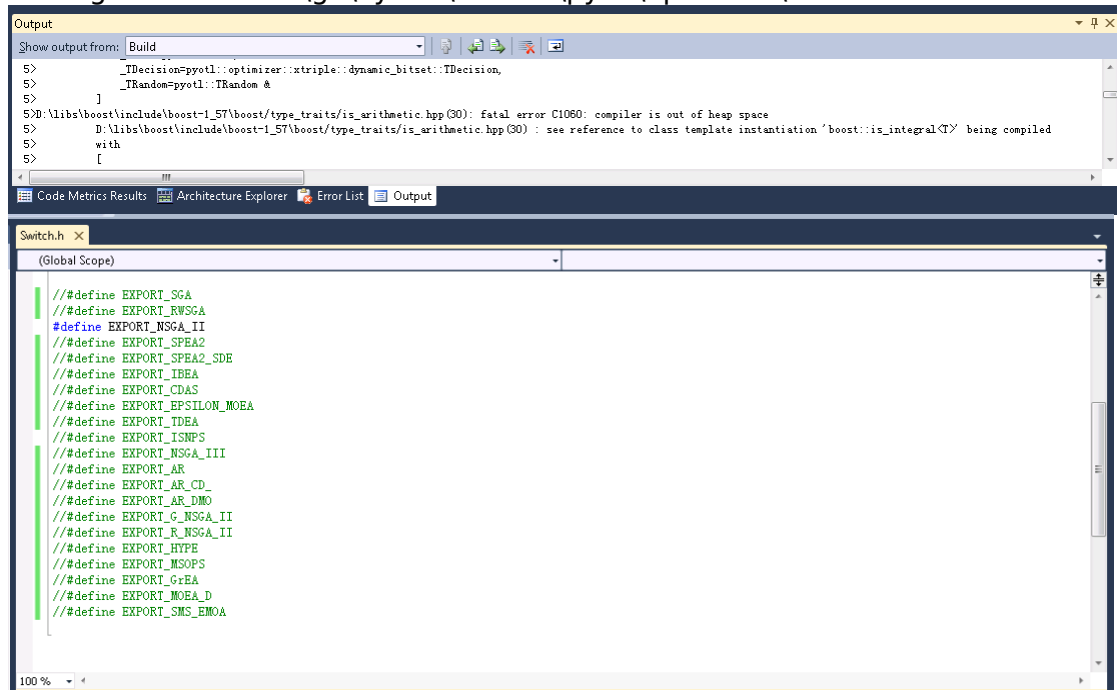
- If the OTL_BINARY_DIR environment variable is not set, then set the OTL_BINARY_DIR CMake variable into "D:\VS2010\OptimizationTemplateLibrary":



Compiling all projects of PyOTL:
Choosing the "Release" building type will be better.



- If your memory is not enough, you can disable some optimization algorithms in "D:\git\PyOTL\Include\pyotl\optimizer\Switch.h":

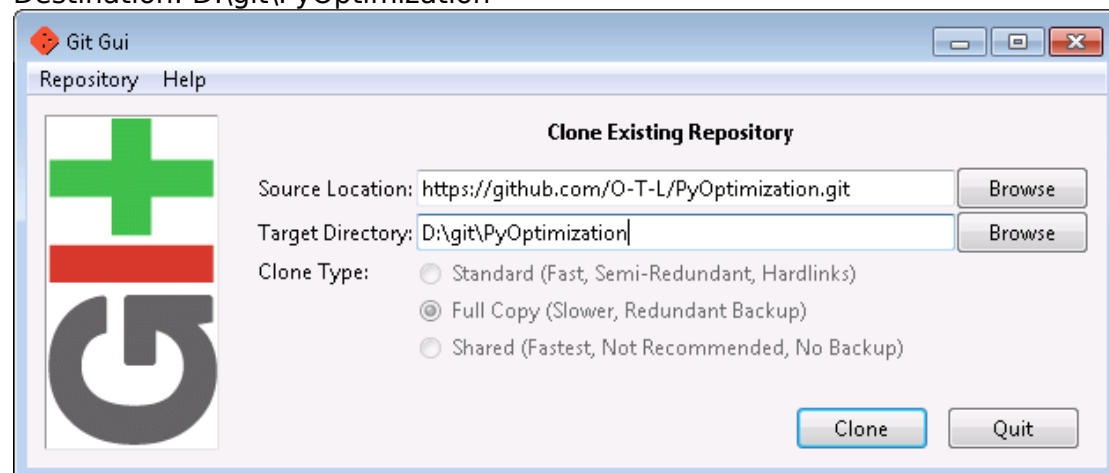


Configuring PyOptimization

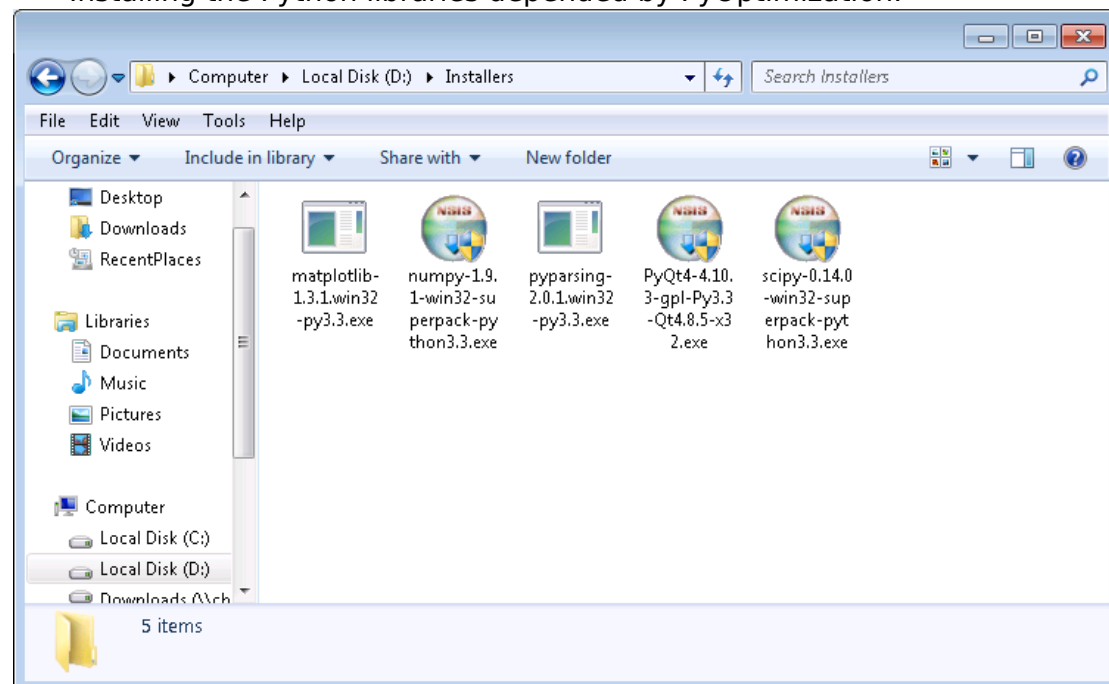
- Clone the repository (recommended):

Clone URL: <https://github.com/O-T-L/PyOptimization.git>

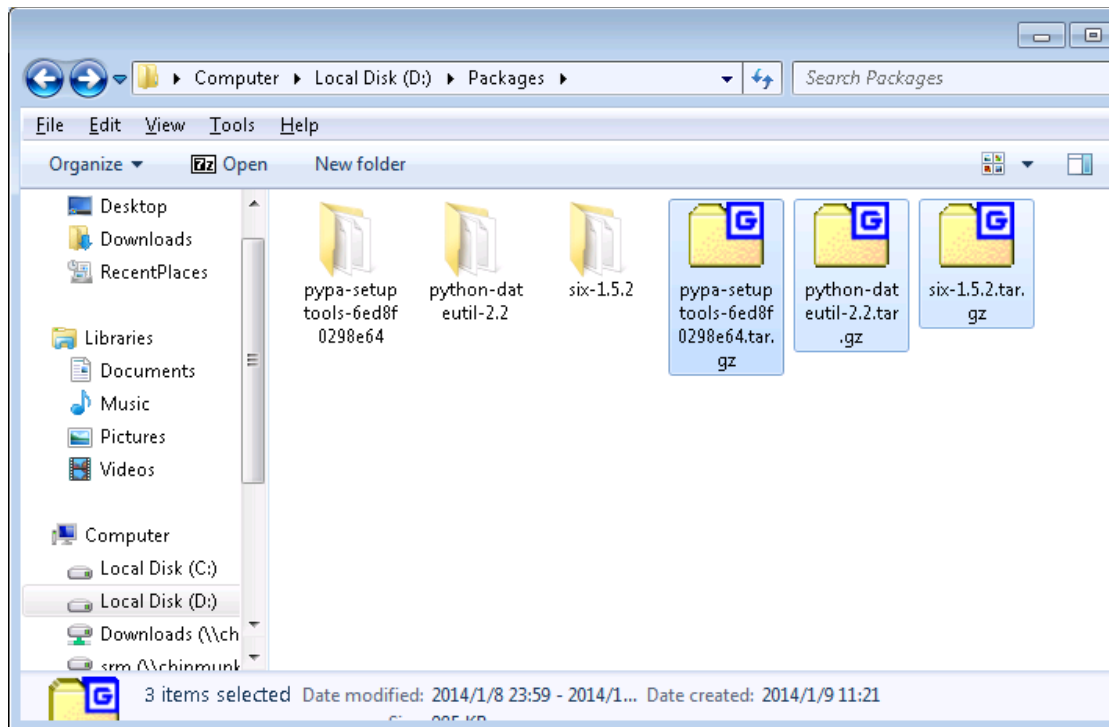
Destination: D:\git\PyOptimization



- Or downloading the source codes (if Git is not used):
Go to PyOptimization's page: <https://github.com/O-T-L/PyOptimization>
Click the "Download ZIP" button.
- Installing the Python libraries depended by PyOptimization:



- Manually compiling the Python libraries depended by PyOptimization:



- Compiling setuptools:
`python setup.py config`
`python setup.py build`
`python setup.py bdist_wininst`

```

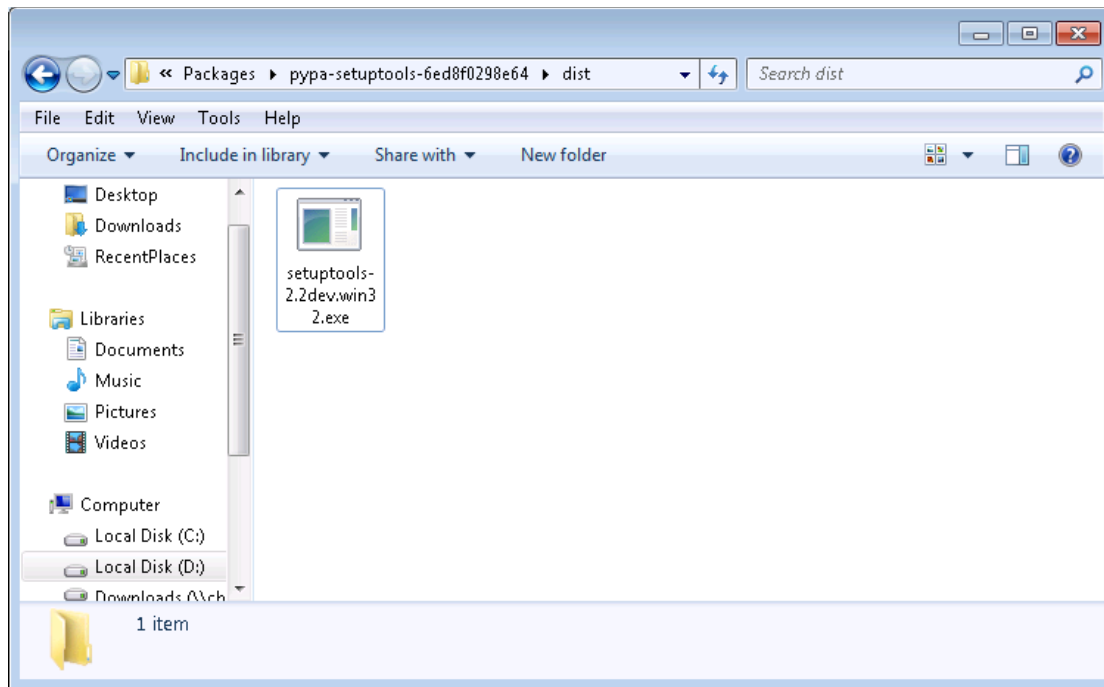
C:\Windows\system32\cmd.exe
D:\Packages\pypa-setuptools-6ed8f0298e64>python setup.py config
running config

D:\Packages\pypa-setuptools-6ed8f0298e64>python setup.py build
running build
running build_py

D:\Packages\pypa-setuptools-6ed8f0298e64>python setup.py bdist_wininst
running bdist_wininst
running build
running build_py
installing to build\bdist.win32\wininst
running install_lib
creating build\bdist.win32\wininst
creating build\bdist.win32\wininst\PURELIB
copying build\lib\easy_install.py -> build\bdist.win32\wininst\PURELIB
copying build\lib\pkg_resources.py -> build\bdist.win32\wininst\PURELIB
creating build\bdist.win32\wininst\PURELIB\setuptools
copying build\lib\setuptools\archive_util.py -> build\bdist.win32\wininst\PURELIB\setuptools
copying build\lib\setuptools\cli-32.exe -> build\bdist.win32\wininst\PURELIB\setuptools
copying build\lib\setuptools\cli-64.exe -> build\bdist.win32\wininst\PURELIB\setuptools
copying build\lib\setuptools\cli-arm-32.exe -> build\bdist.win32\wininst\PURELIB\setuptools

```

Run the installer as administrator.

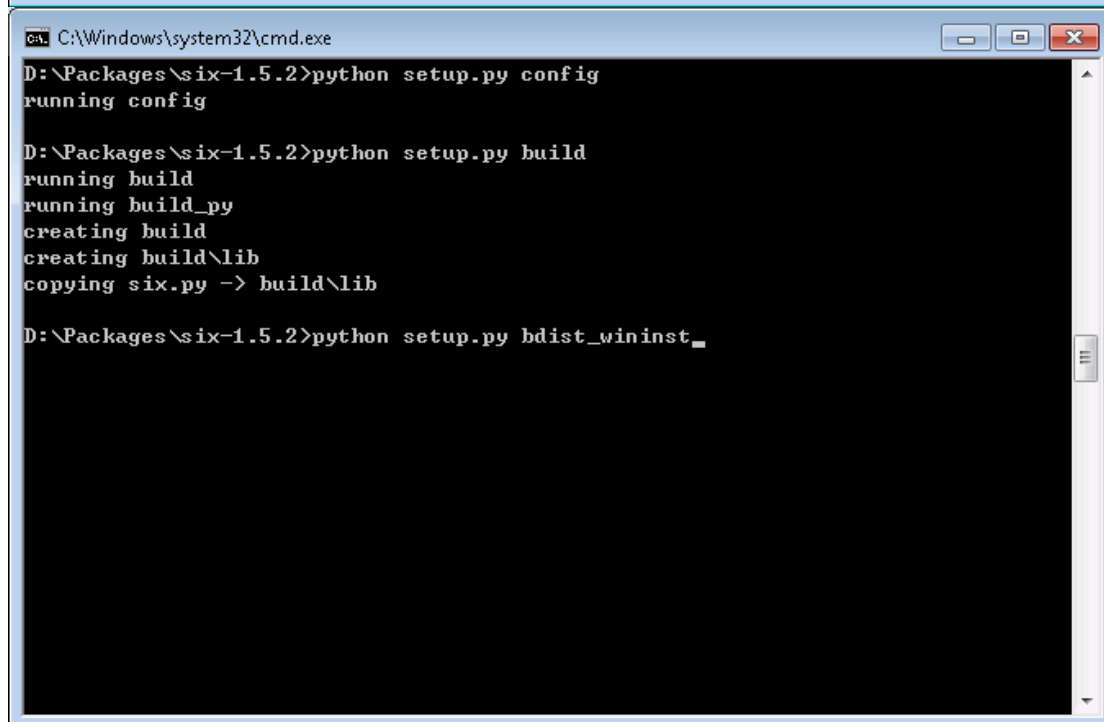
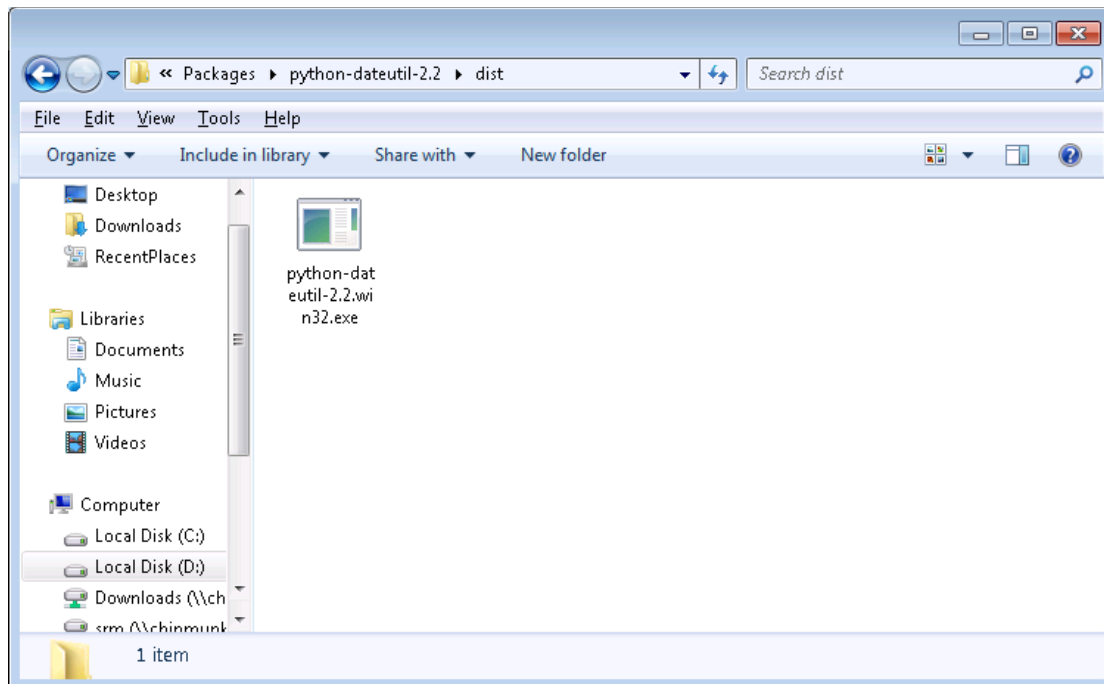


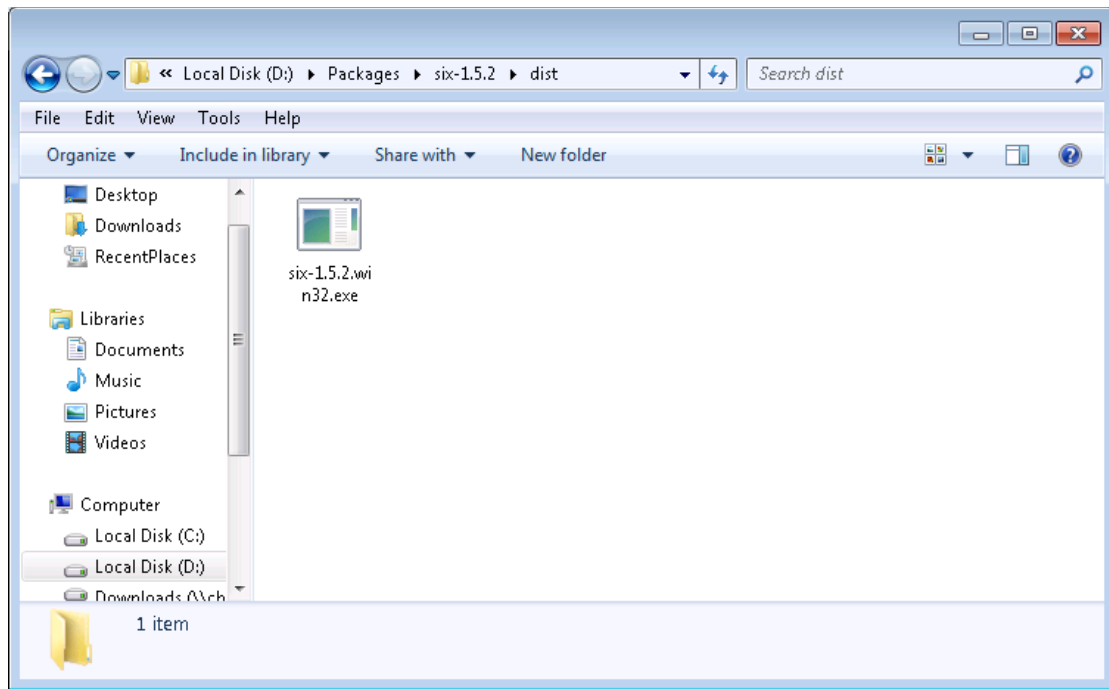
- Use the same way to compile python-dateutil and six:

```
C:\Windows\system32\cmd.exe
D:\Packages\python-dateutil-2.2>python setup.py config
running config

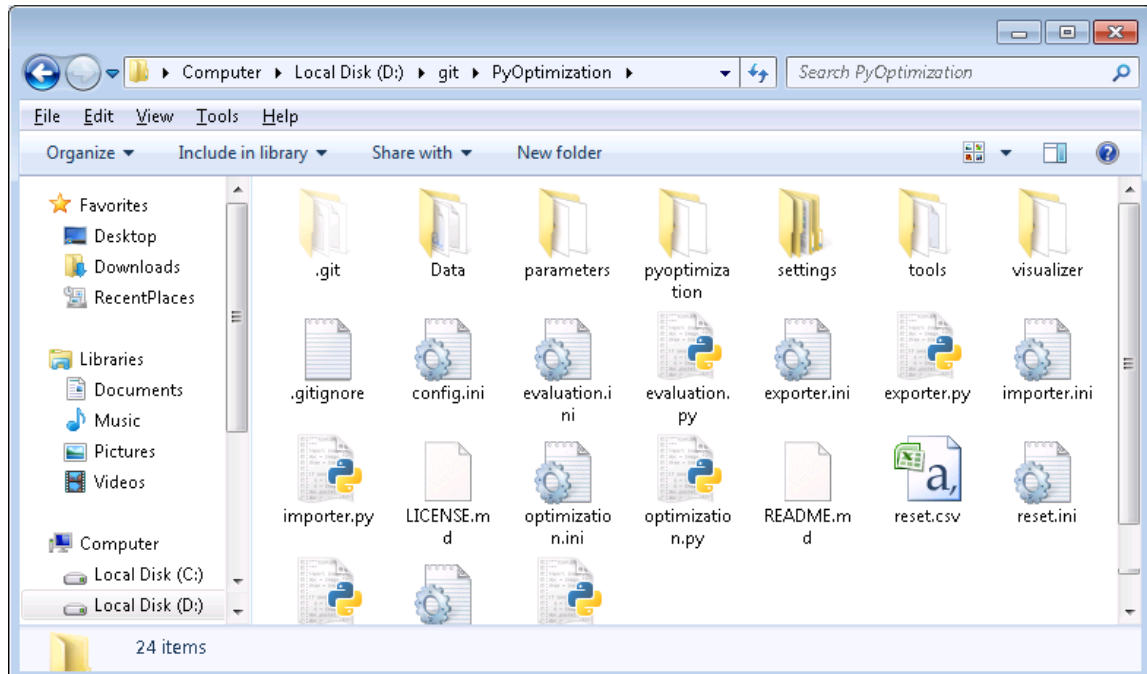
D:\Packages\python-dateutil-2.2>python setup.py build
running build
running build_py
running egg_info
writing dependency_links to python_dateutil.egg-info\dependency_links.txt
writing python_dateutil.egg-info\PKG-INFO
writing requirements to python_dateutil.egg-info\requires.txt
writing top-level names to python_dateutil.egg-info\top_level.txt
reading manifest file 'python_dateutil.egg-info\SOURCES.txt'
reading manifest template 'MANIFEST.in'
writing manifest file 'python_dateutil.egg-info\SOURCES.txt'

D:\Packages\python-dateutil-2.2>python setup.py bdist_wininst_
```





Using PyOptimization

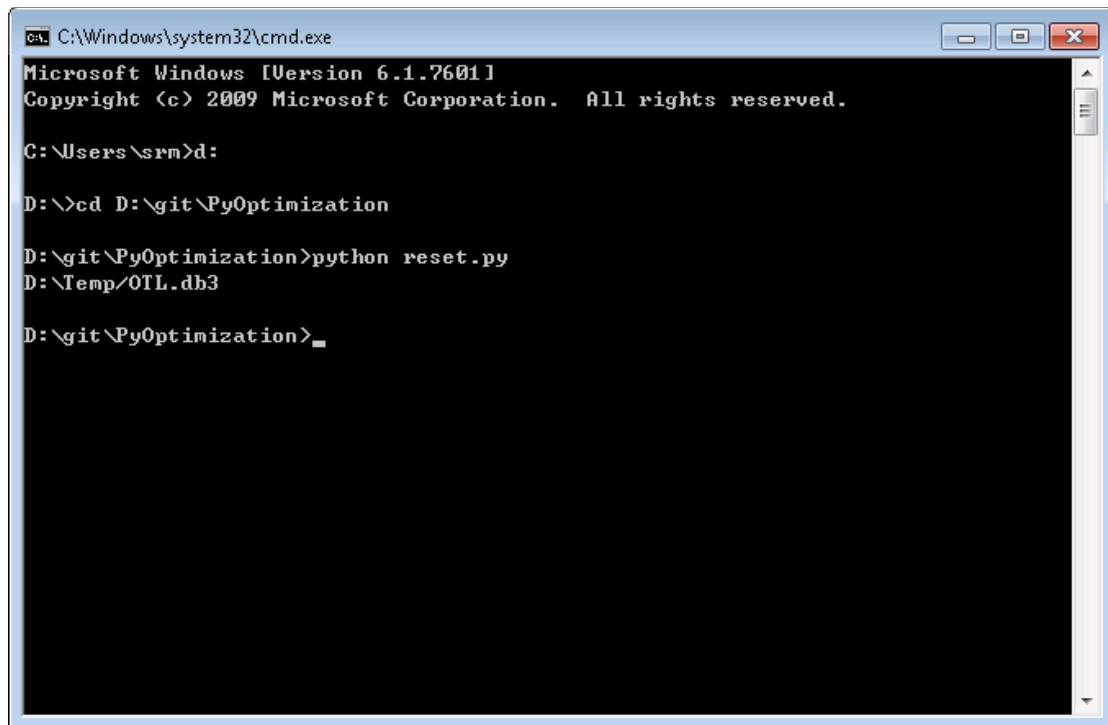


- Creating an empty database:

d:

```
cd D:\git\PyOptimization
```

```
python reset.py
```

```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

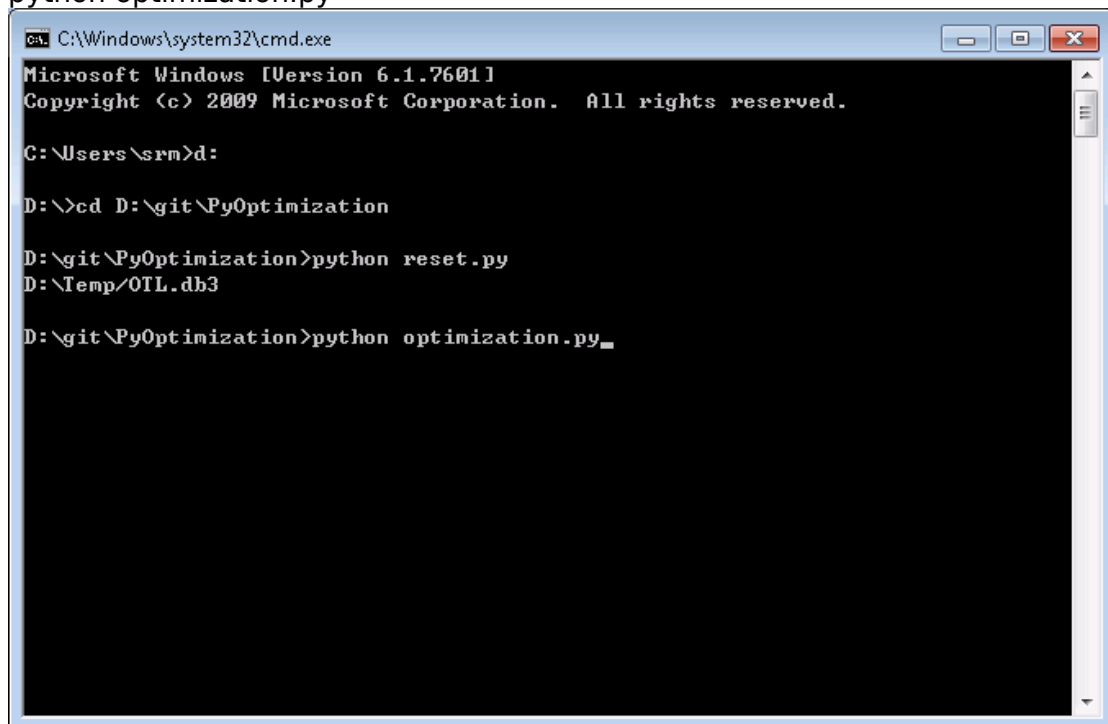
C:\Users\srm>d:

D:\>cd D:\git\PyOptimization

D:\git\PyOptimization>python reset.py
D:\Temp\OTL.db3

D:\git\PyOptimization>_
```

- Running optimization algorithms:
python optimization.py



```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\srm>d:

D:\>cd D:\git\PyOptimization

D:\git\PyOptimization>python reset.py
D:\Temp\OTL.db3

D:\git\PyOptimization>python optimization.py_
```

The data are saved in the database.

SQLite Expert Professional 3.5.34.2453

File Database Import/Export Table View SQL Transaction Scripting Tools Help

Database: OTL Table: main.otl File: D:\Temp\OTL.db3 SQLite Library: [internal] version 3.8.4.1

Database OTL Extensions Schema SQL Builder SQL Data Design DDL Scripting

RecNo uuid problem objectives evaluation decisions boundary DTLZ4 bias DTLZ_I WFG PosDec city cities MOTSP Correlate optimizer iteration interval

Click here to define a filter

1	64fa115c-0299-4ef0-b850-6472dd2c3662	DTLZ2	2	30000	11 (null)	(null)	(null)	(null)	(null)	(null)	(null)	NSGA_II	299	(r)
2	8f5564b2-2556-4f4d-a2a1-3611f41575ad	DTLZ2	2	30000	11 (null)	(null)	(null)	(null)	(null)	(null)	(null)	NSGA_II	299	(r)
3	5e5f1f45-8e69-44a3-bcd3-332ed7b8de7a	DTLZ2	2	30000	11 (null)	(null)	(null)	(null)	(null)	(null)	(null)	NSGA_II	299	(r)
4	20599e81-84b8-45b1-471c-a01dd9d7bdc3	DTLZ2	2	30000	11 (null)	(null)	(null)	(null)	(null)	(null)	(null)	NSGA_II	299	(r)
5	34ce3ed8-3d71-410a-b916-80290d02a8d5	DTLZ2	2	30000	11 (null)	(null)	(null)	(null)	(null)	(null)	(null)	NSGA_II	299	(r)
6	c21c8e98-b586-4b4c-b948-729385351987	DTLZ2	2	30000	11 (null)	(null)	(null)	(null)	(null)	(null)	(null)	NSGA_II	299	(r)
7	0a8ca212-d875-4635-966a-4de87b68cf38	DTLZ2	2	30000	11 (null)	(null)	(null)	(null)	(null)	(null)	(null)	NSGA_II	299	(r)
8	d11e3fbf-ba2d-4e67-9d57-5a09b7643747	DTLZ2	2	30000	11 (null)	(null)	(null)	(null)	(null)	(null)	(null)	NSGA_II	299	(r)
9	4375c75c-998e-44a3-b967-54b6497678d	DTLZ2	2	30000	11 (null)	(null)	(null)	(null)	(null)	(null)	(null)	NSGA_II	299	(r)
10	7205a66f-7851-4539-b128-6b61de477870	DTLZ2	2	30000	11 (null)	(null)	(null)	(null)	(null)	(null)	(null)	NSGA_II	299	(r)
11	0409989d-5304-4756-b26a-7b2b468a4653	DTLZ2	2	30000	11 (null)	(null)	(null)	(null)	(null)	(null)	(null)	NSGA_II	299	(r)
12	368d377a-b741-4c7b-8f7a-718d74b1e4d4	DTLZ2	2	30000	11 (null)	(null)	(null)	(null)	(null)	(null)	(null)	NSGA_II	299	(r)
13	558a3678-b2e5-4f2c-8261-d8ff4984b72d	DTLZ2	2	30000	11 (null)	(null)	(null)	(null)	(null)	(null)	(null)	NSGA_II	299	(r)
14	16afa348-e070-4249-9136-99fcd6f6937e	DTLZ2	2	30000	11 (null)	(null)	(null)	(null)	(null)	(null)	(null)	NSGA_II	299	(r)
15	60ffeddd-c304-49b7-8c2f-20189cd76b42	DTLZ2	2	30000	11 (null)	(null)	(null)	(null)	(null)	(null)	(null)	NSGA_II	299	(r)

<Filter is Empty> Customize...

Record 1 of 15

- Visualizing the results:
python visualize.py

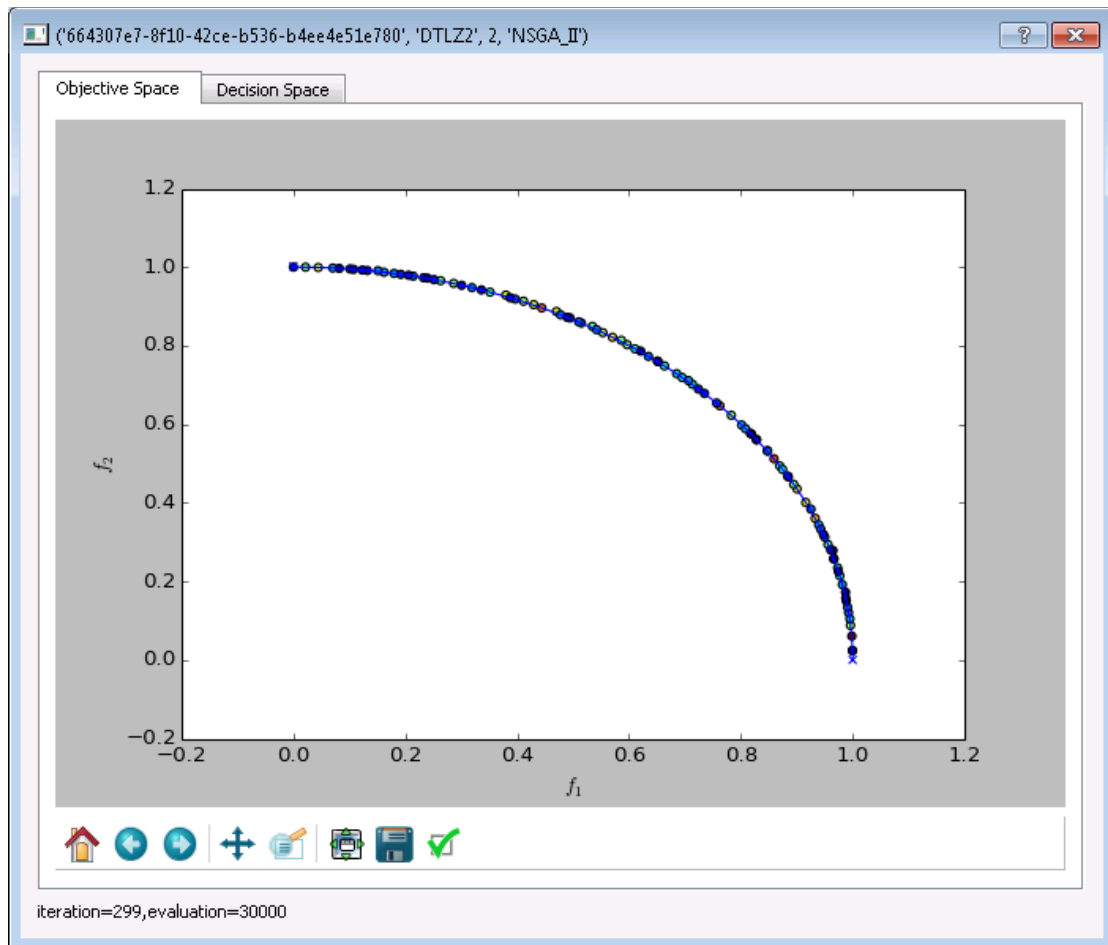
```
C:\Windows\system32\cmd.exe

D:\git\PyOptimization>python visualize.py
```

python

	uuid	problem	
1	559f1197-d59f-...	DTLZ2	2
2	664307e7-8f10-...	DTLZ2	2
3	828de5ba-b047-...	DTLZ2	2
4	8323a205-3a85-...	DTLZ2	2
5	8b0ff5fc-dd1a-...	DTLZ2	2

Refresh



- Evaluating the results:
python evaluation.py

```
C:\Windows\system32\cmd.exe

D:\git\PyOptimization>python evaluation.py
```

Selecting the desired columns (statistical variables) using SQL.

SQLite Expert Professional 3.5.34.2453

File Database Import/Export Table View SQL Transaction Scripting Tools Help

Database: OTL Table: main.otl File: D:\Temp\OTL.db3 SQLite Library: [internal] version 3.8.4.1

1 select problem,objectives,optimizer,gd,igd from otl;

2

Execute SQL Stop Query

Editable, using key field: rowid

RecNo	problem	objectives	optimizer	gd	IGD
1	DTLZ2	2	NSGA_II	0.000466168746115081	0.00504951876952474
2	DTLZ2	2	NSGA_II	0.000466168746115081	0.00504951876952474
3	DTLZ2	2	NSGA_II	0.000105455489660546	0.00500318506389444
4	DTLZ2	2	NSGA_II	0.000105455489660546	0.00500318506389444
5	DTLZ2	2	NSGA_II	0.000105455489660546	0.00500318506389444
6	DTLZ2	2	NSGA_II	0.000105455489660546	0.00500318506389444
7	DTLZ2	2	NSGA_II	0.000105455489660546	0.00500318506389444
8	DTLZ2	2	NSGA_II	0.000125177040461283	0.00522119949707326
9	DTLZ2	2	NSGA_II	0.000125177040461283	0.00522119949707326
10	DTLZ2	2	NSGA_II	0.000125177040461283	0.00522119949707326
11	DTLZ2	2	NSGA_II	0.000125177040461283	0.00522119949707326
12	DTLZ2	2	NSGA_II	7.94600858912787E-5	0.00515111761476813
13	DTLZ2	2	NSGA_II	7.94600858912787E-5	0.00515111761476813
14	DTLZ2	2	NSGA_II	7.94600858912787E-5	0.00515111761476813

<Filter is Empty> Customize...

Query executed in 35 ms Record 1 of 15 0 rows affected, 0 total

Export the data into statistical software (such as R or SPSS).

SQLite Expert Professional 3.5.34.2453

File Database Import/Export Table View SQL Transaction Scripting Tools Help

Database: OTL Table: main.otl File: D:\Temp\OTL.db3 SQLite Library: [internal] version 3.8.4.1

1 select problem,objectives,optimizer,gd,igd from otl;

2

Execute SQL Stop Query

Editable, using key field: rowid

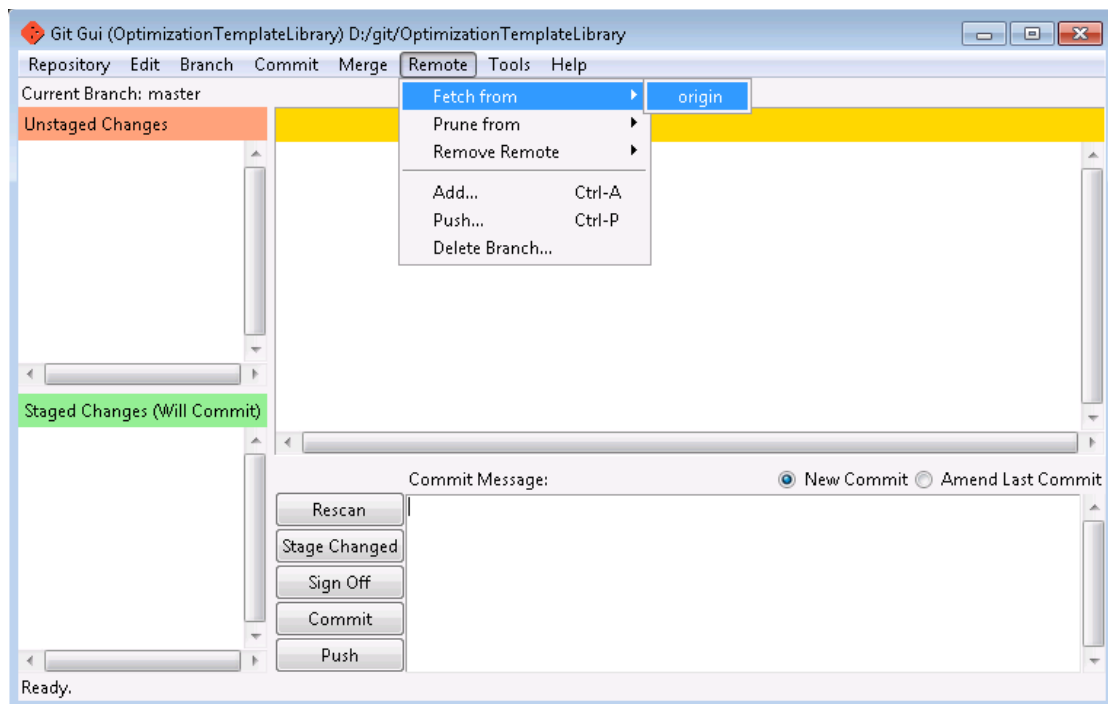
RecNo	problem	objectives	optimizer	gd	IGD
1	DTLZ2	2	NSGA_II	0.00	0.00
2	DTLZ2	2	NSGA_II	0.00	0.00
3	DTLZ2	2	NSGA_II	0.00	0.00
4	DTLZ2	2	NSGA_II	0.00	0.00
5	DTLZ2	2	NSGA_II	0.00	0.00
6	DTLZ2	2	NSGA_II	0.00	0.00
7	DTLZ2	2	NSGA_II	0.00	0.00
8	DTLZ2	2	NSGA_II	0.00	0.00
9	DTLZ2	2	NSGA_II	0.00	0.00
10	DTLZ2	2	NSGA_II	0.00	0.00
11	DTLZ2	2	NSGA_II	0.00	0.00
12	DTLZ2	2	NSGA_II	7.9	7.9
13	DTLZ2	2	NSGA_II	7.9	7.9
14	DTLZ2	2	NSGA_II	7.9	7.9
15	DTLZ2	2	NSGA_II	7.9	7.9

<Filter is Empty> Customize...

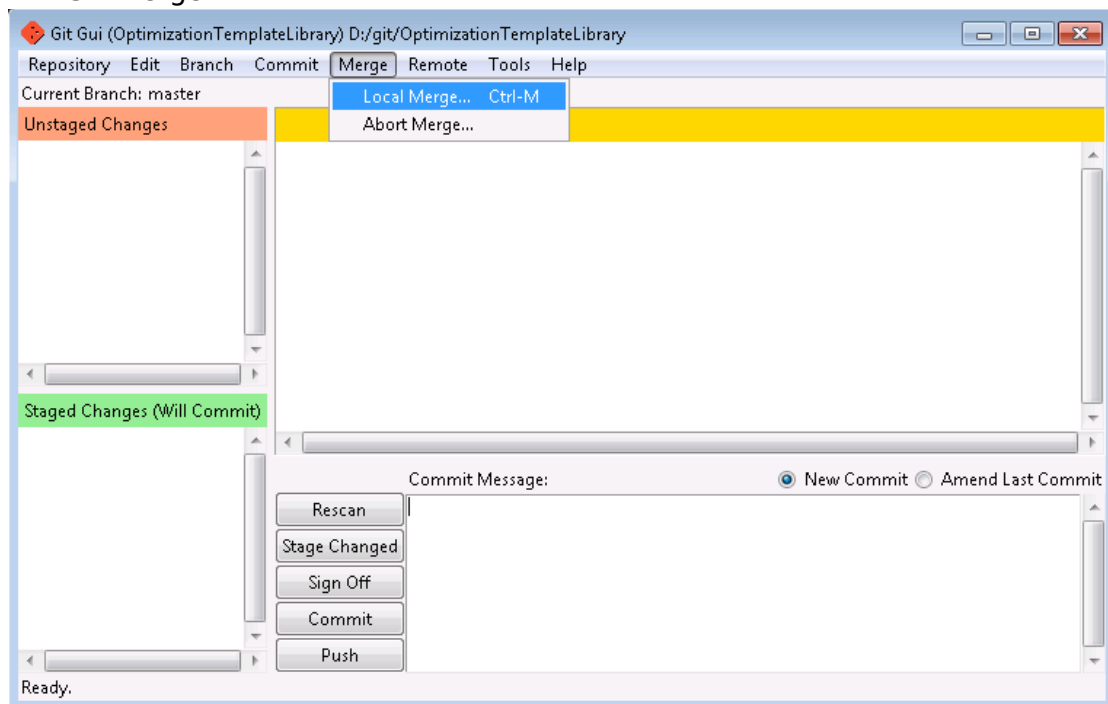
Query executed in 35 ms Record 1 of 15 0 rows affected, 0 total

Updating with Git

- Git fetch:



- **Git merge:**



- If conflict occurs, please handle it properly:

