How to Install and Run vGATE (CT example)
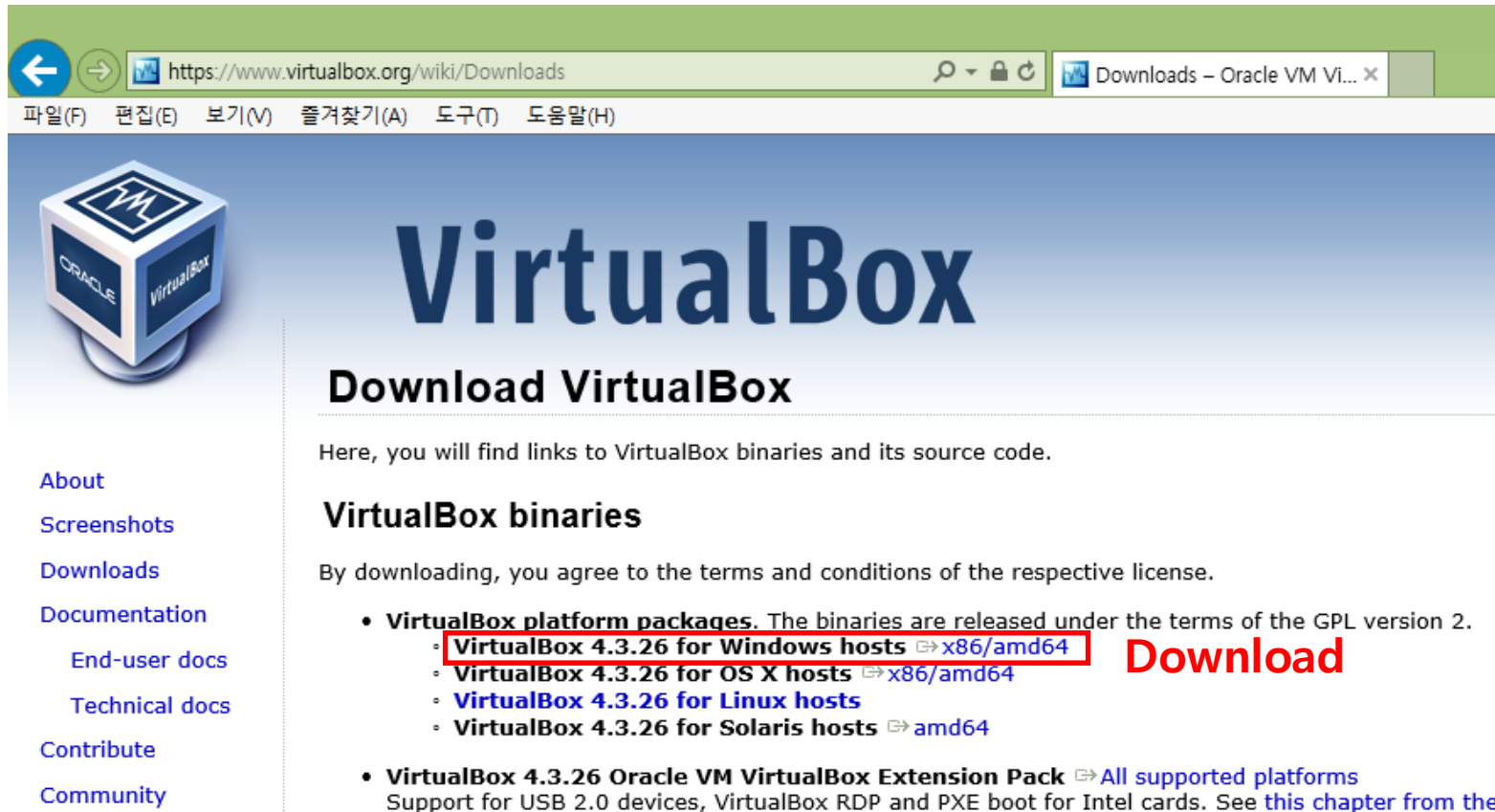
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How to Install and Run vGATE

- 1. Virtual Box installation
- 2. Install vGATE 3.0 on the virtual box
- 4. How to run **CT_example** GATE simulation
- 5. How to analyze the ROOT output file
- 6. Install the recent version ROOT

Virtual Box download

- 1. Virtual Box download
  - https://www.virtualbox.org/wiki/Downloads

vGATE 3.0 download

- 1. vGATE 3.0 download
  - http://www.opengatecollaboration.org/vGATEreleasedownload

Extract the "vGATE_v3.0.vid__1" file

"**vGATE_v3.0.vid**" file is generated after the extraction of "vGATE_v3.0.vid__1"
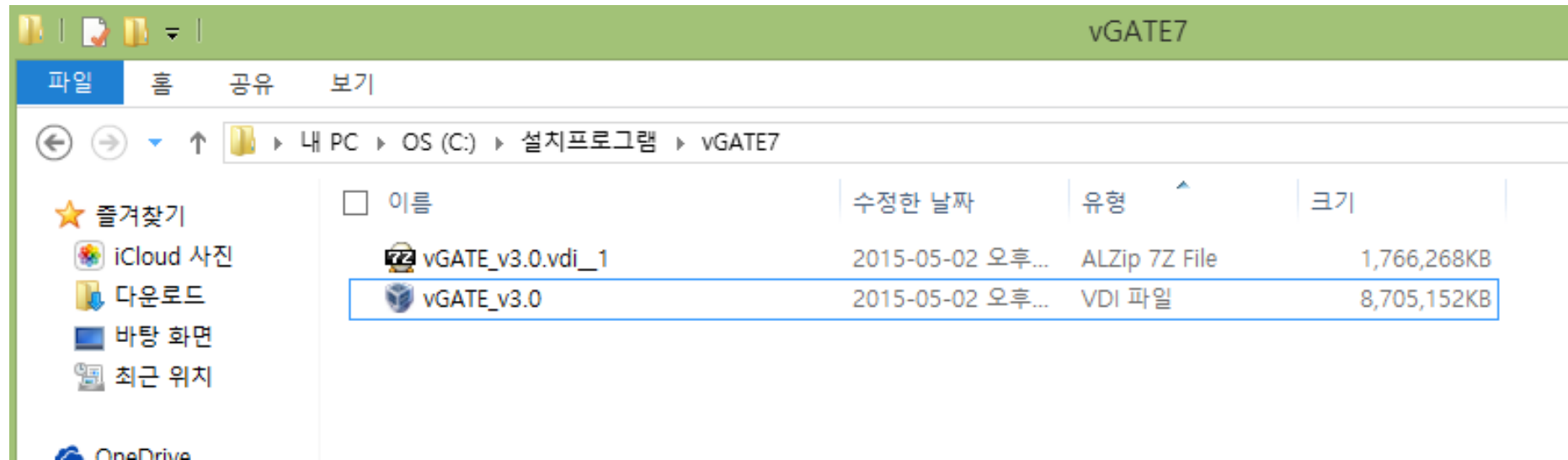
Virtual box
" 새로 만들기(New)"클릭

Linux, Ubuntu(64 bit)
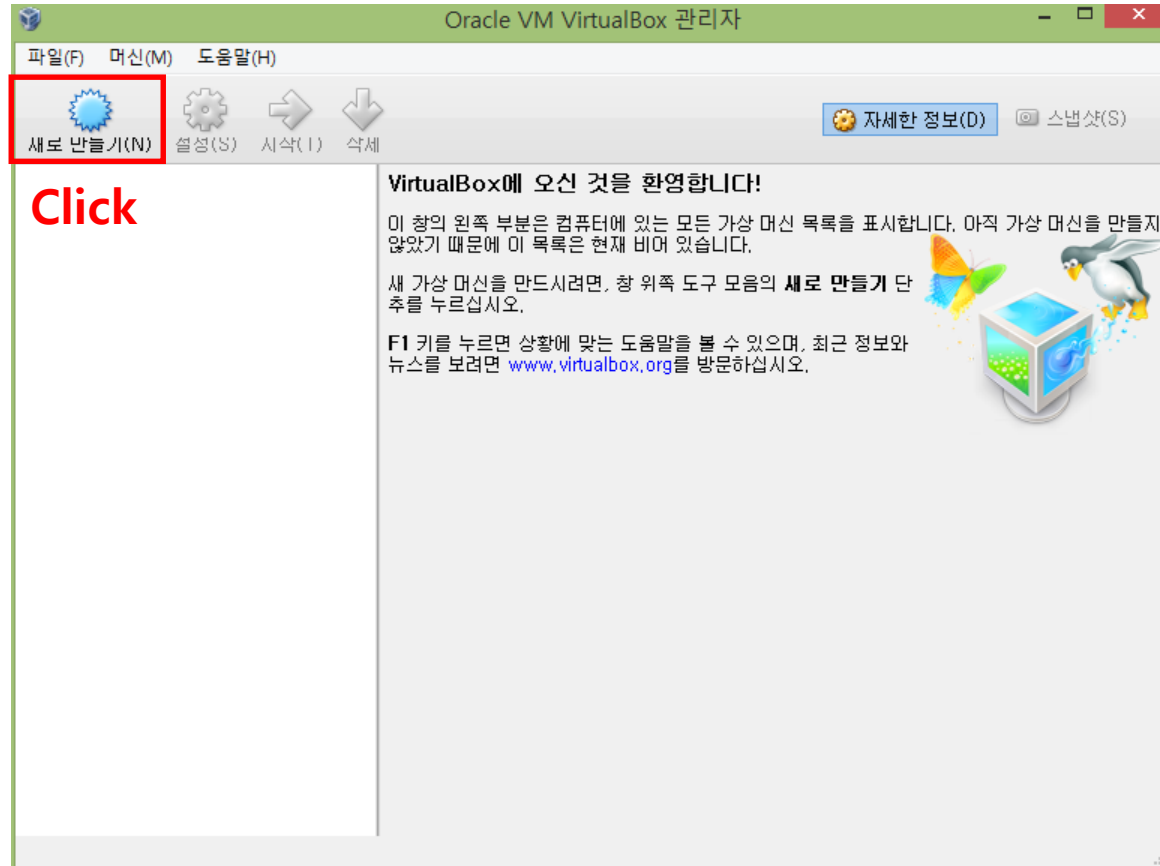
Linux, Ubuntu (64 bit)

Next
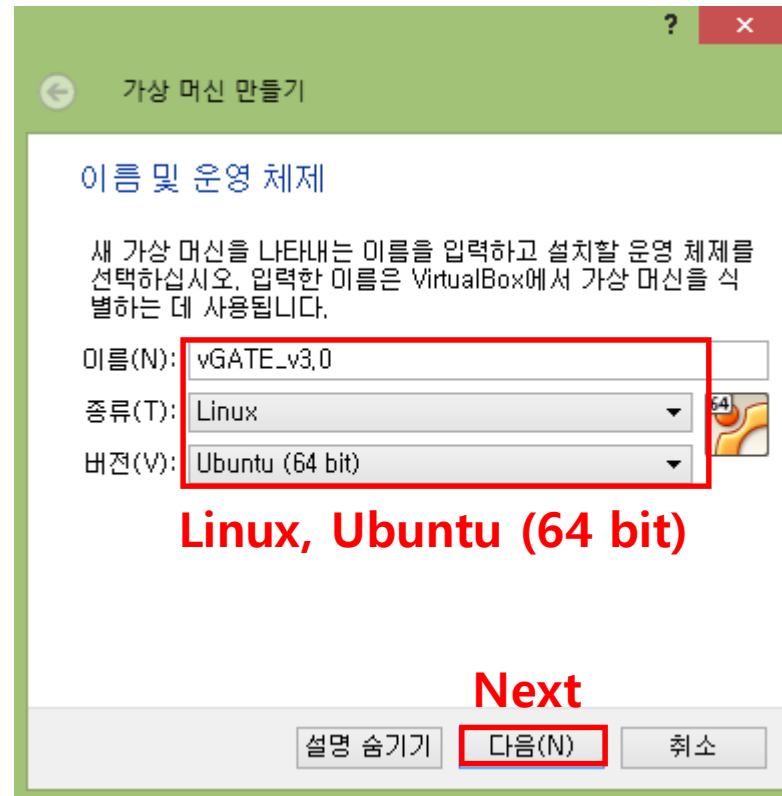
Change the memory size: 512 MB ->1000 MB
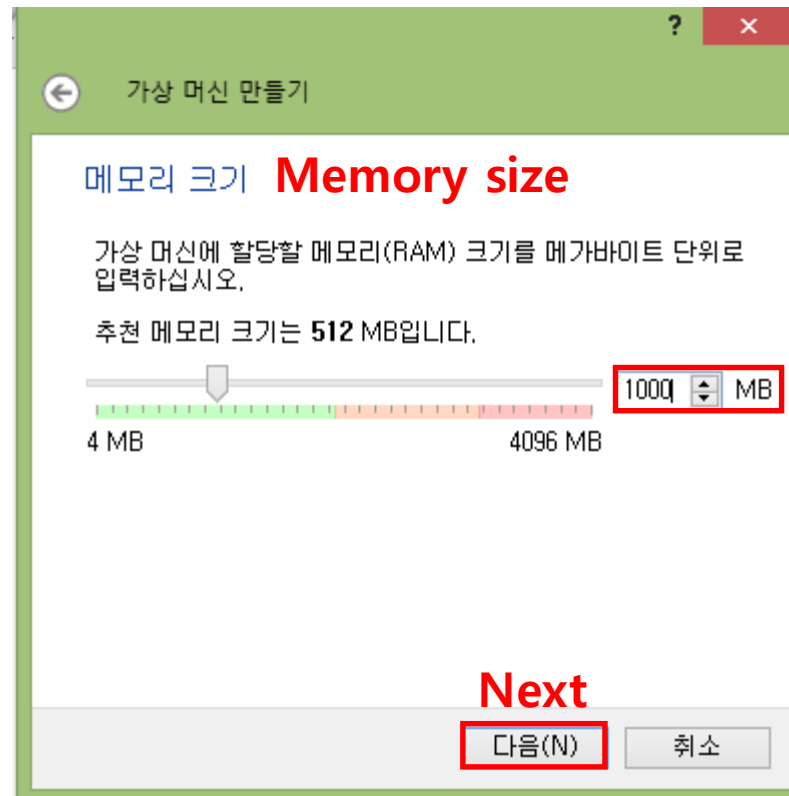
512 MB ->1000 MB

Settings-> Display -> Screen ->Set the Video memory -> OK
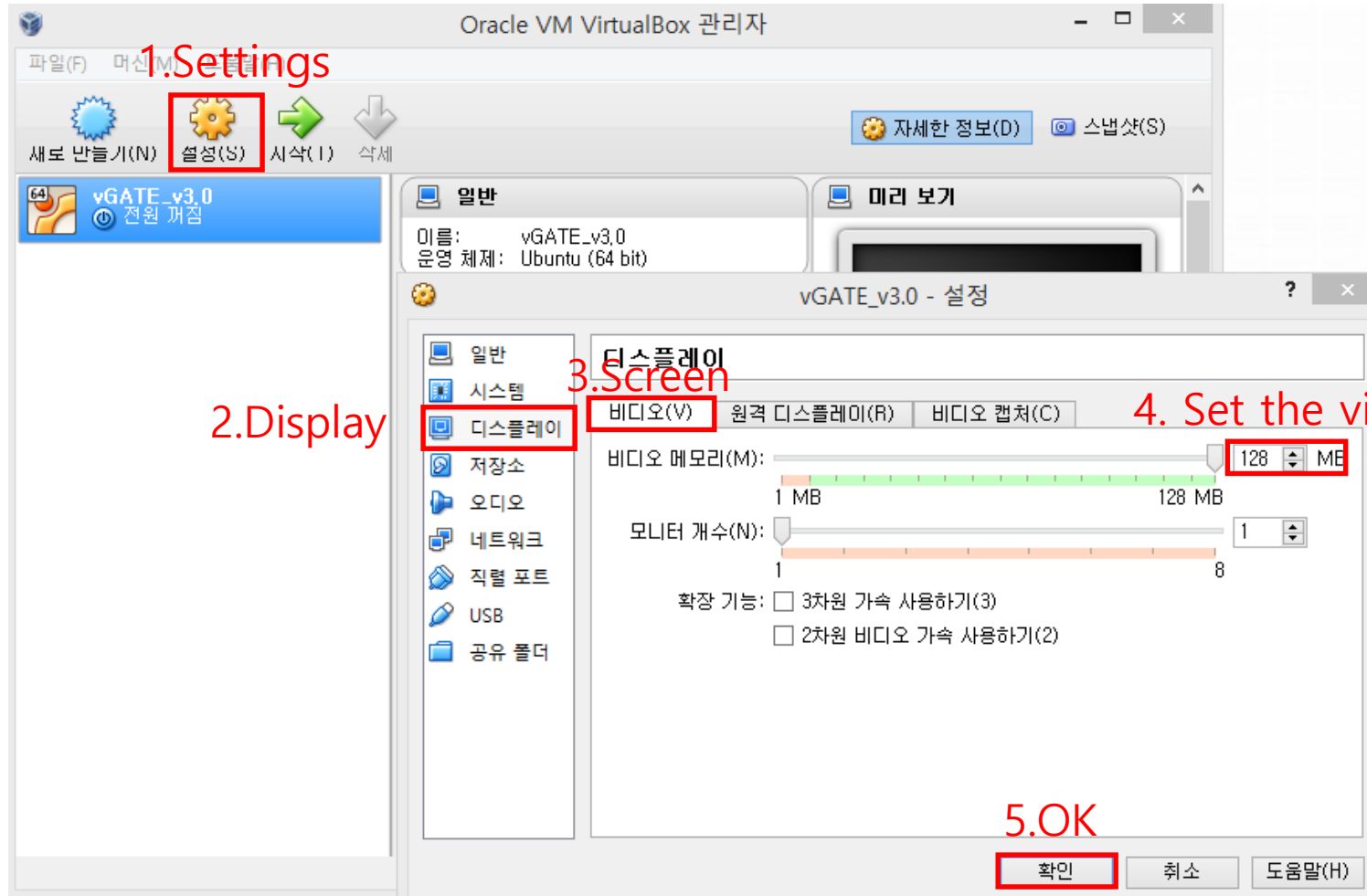
Setting -> General -> Advanced -> Drag and drop -> Bidirectional
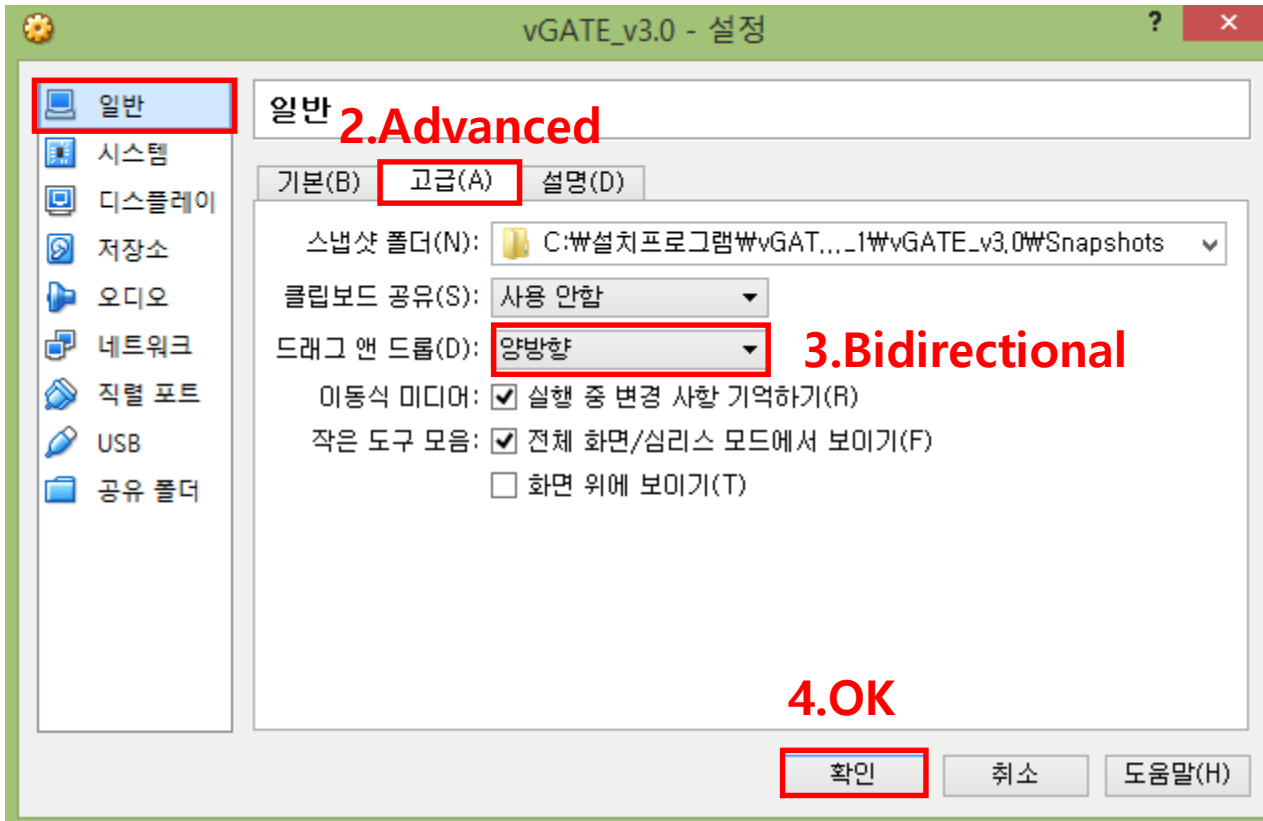
Create a virtual machine
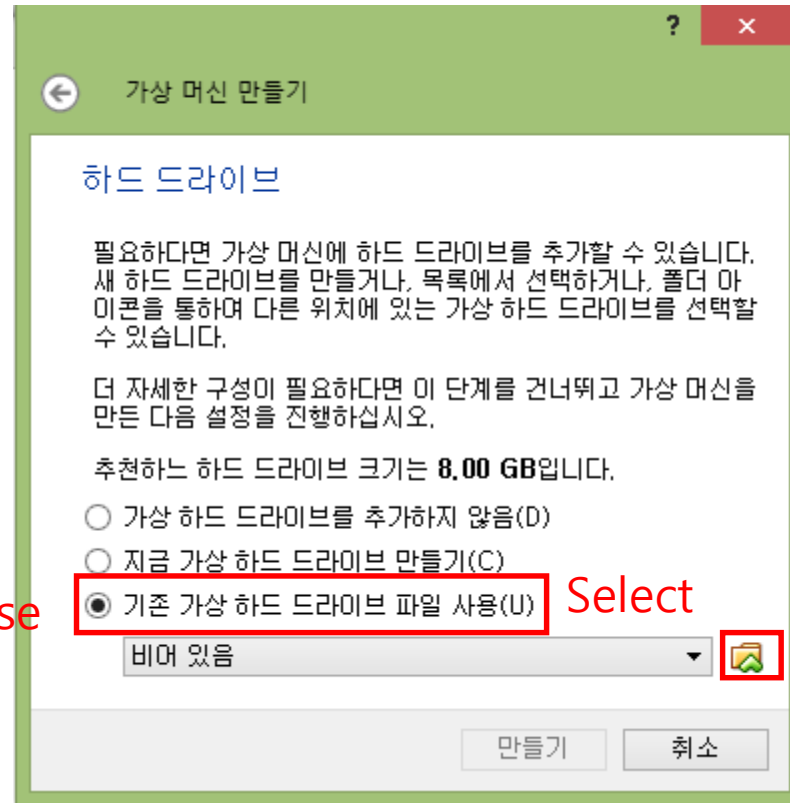
Existing virtual hard drive file use

Select

Click

Select "vGATE_v3.0.vid" file
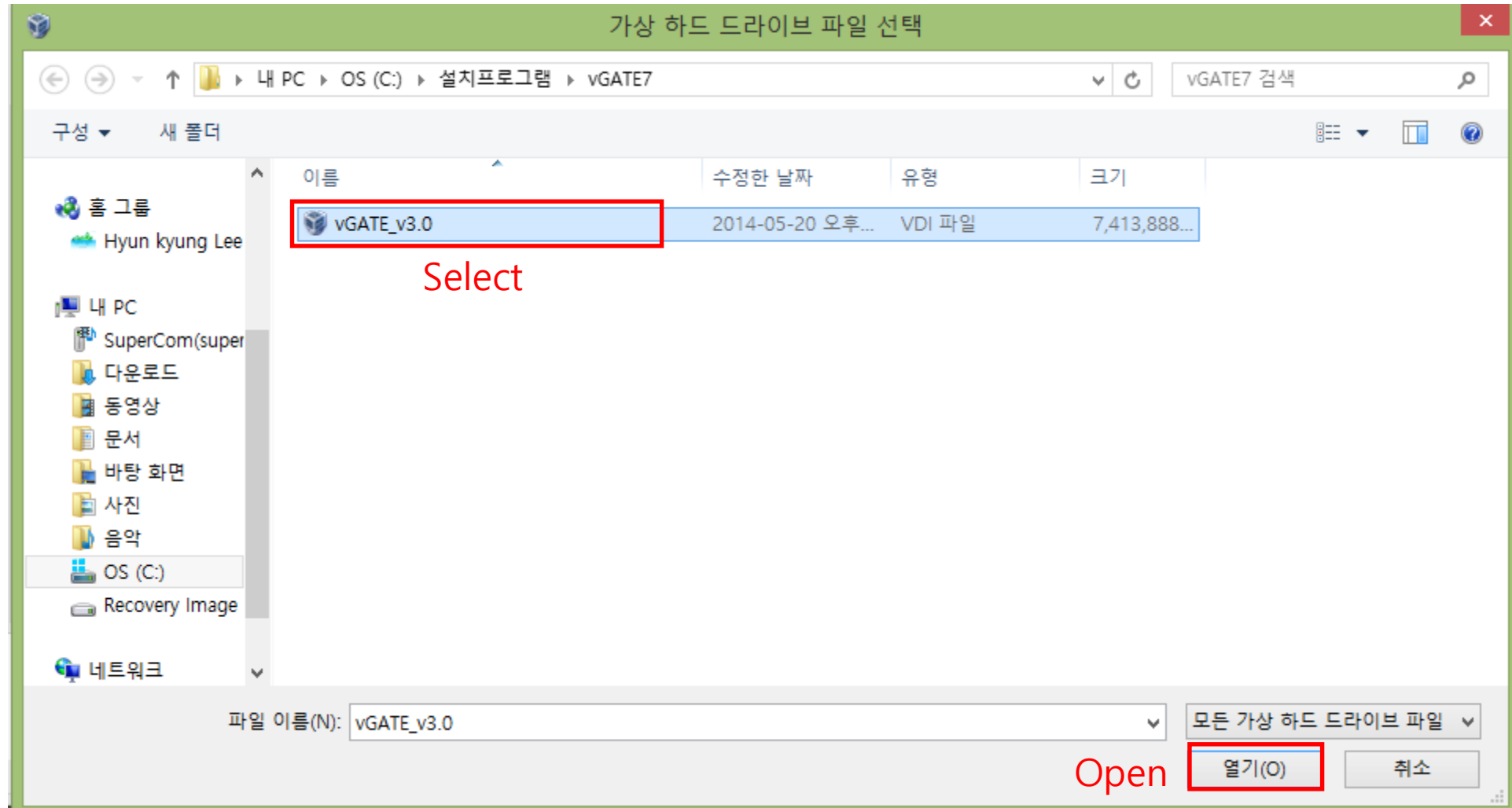
Create virtual machine (vGATE_v3.0.vid file is selected)
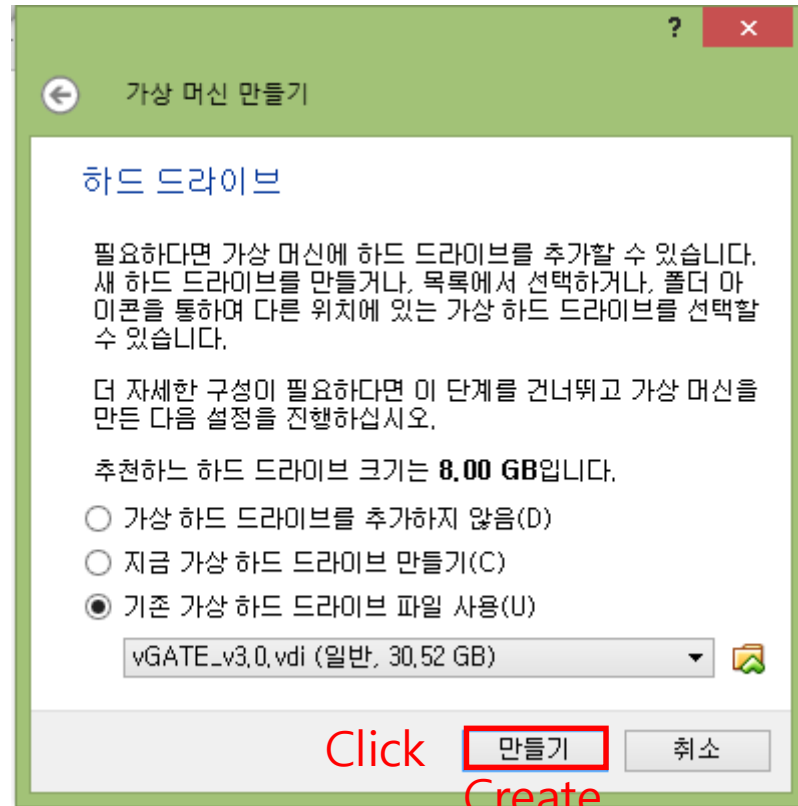
Run the vGATE_v3.0
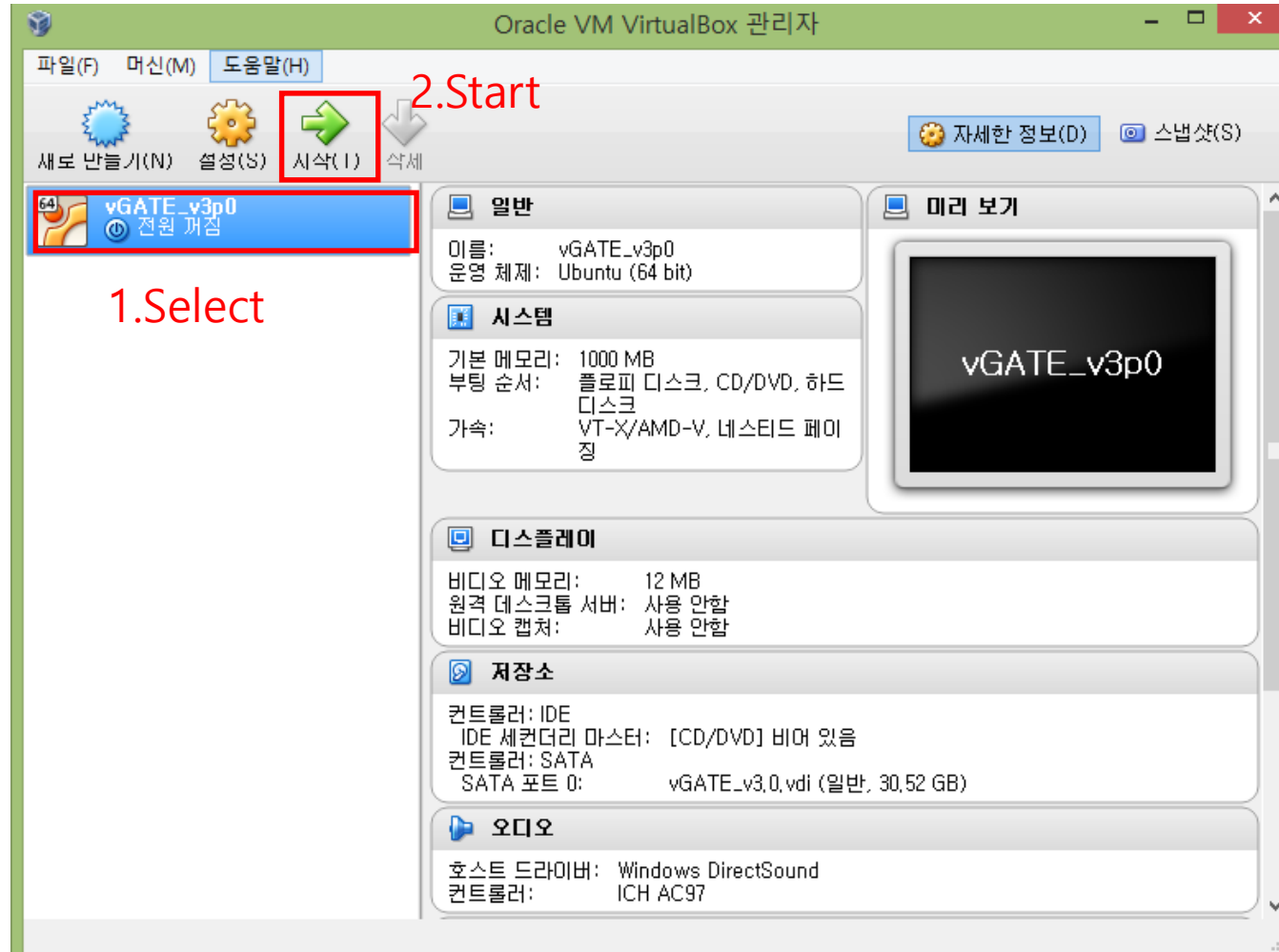
Password : **virtual**
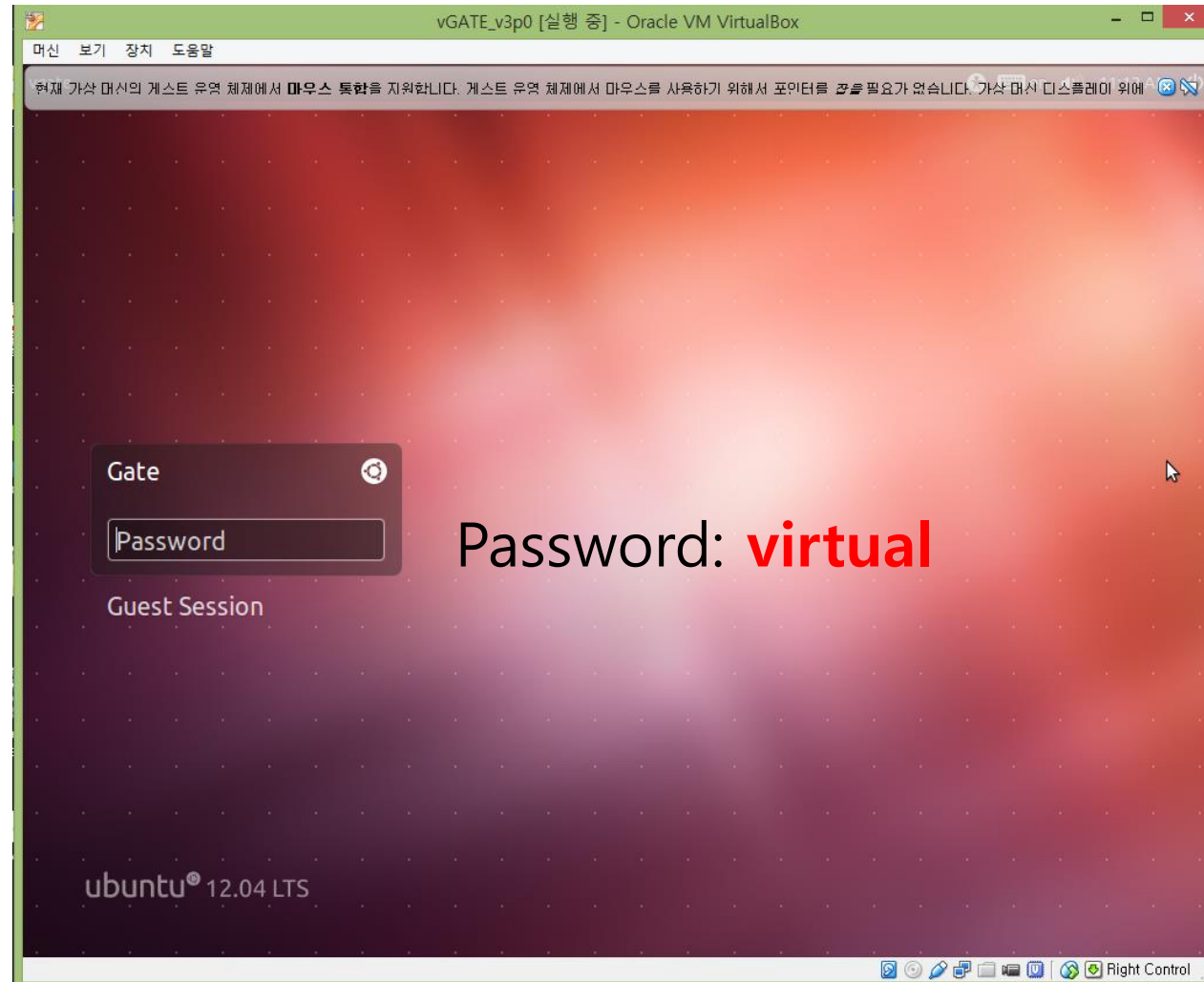
vGATE_v3.0 screen
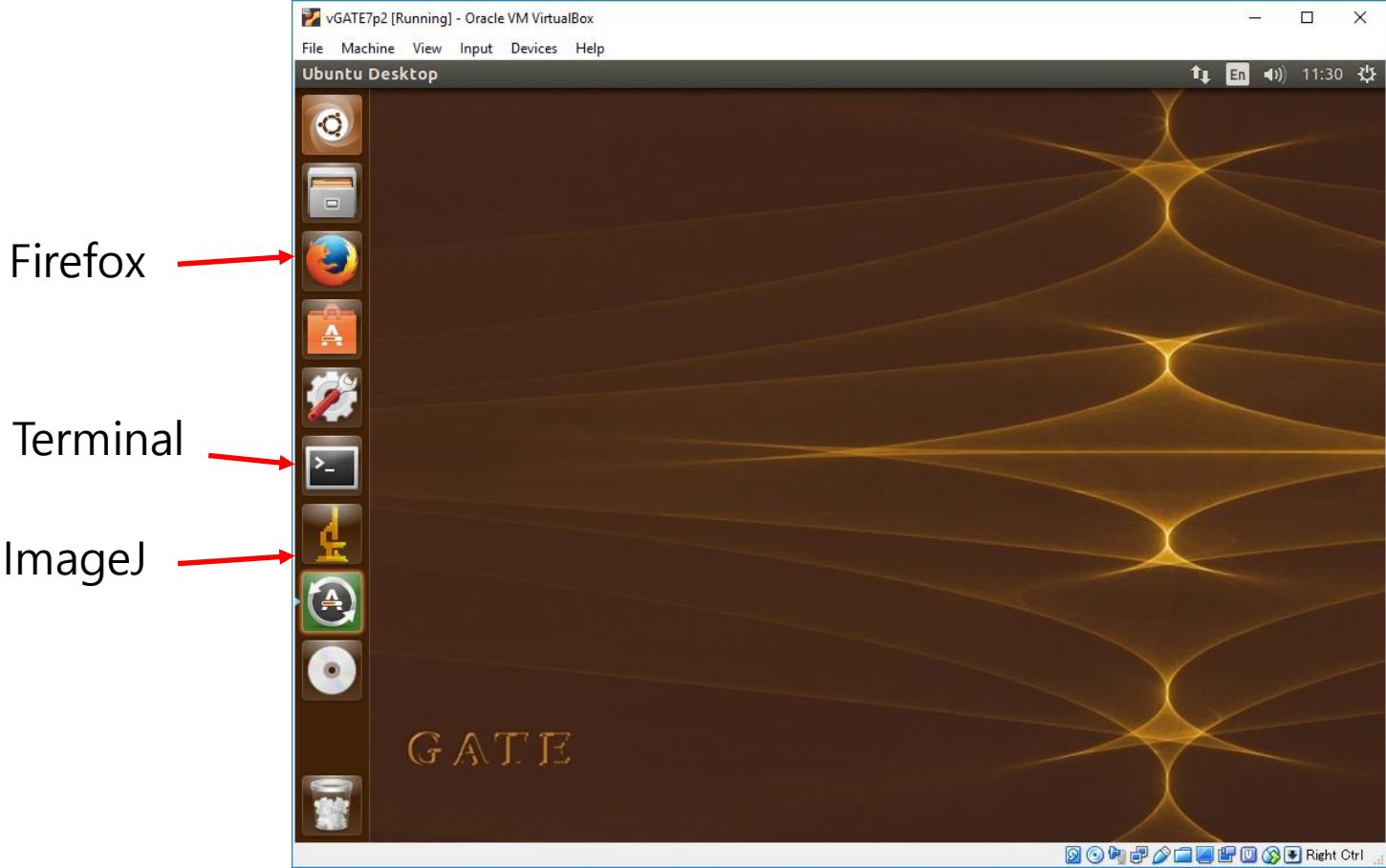
How to improve the screen resolution (Device->Insert Guest Additions CD image)
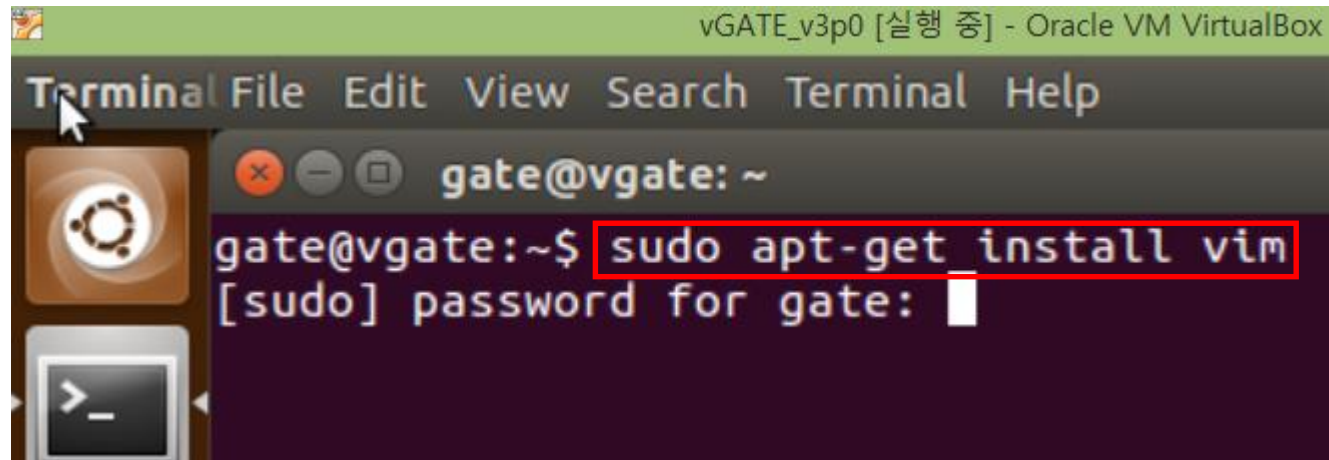
Click "Don't Upgrade"

Vi editor installation

Open a terminal and run the below command
sudo apt-get install vim

Password: **virtual**

How to run the "CT example" (small animal CT)
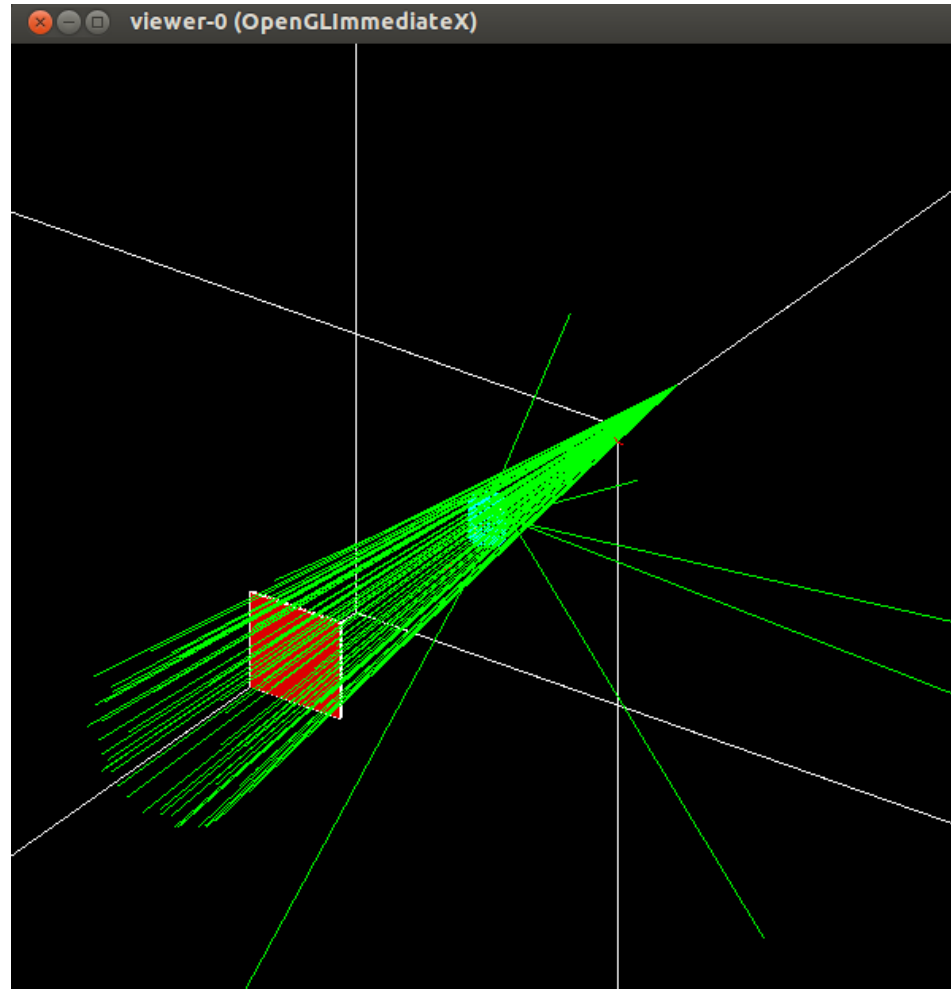
CT example simulation method(1) small animal CT!

1.Move to the CT example folder
cd /home/gate/Progs/Gate/gate_v7.0/examples/example_CT/classic
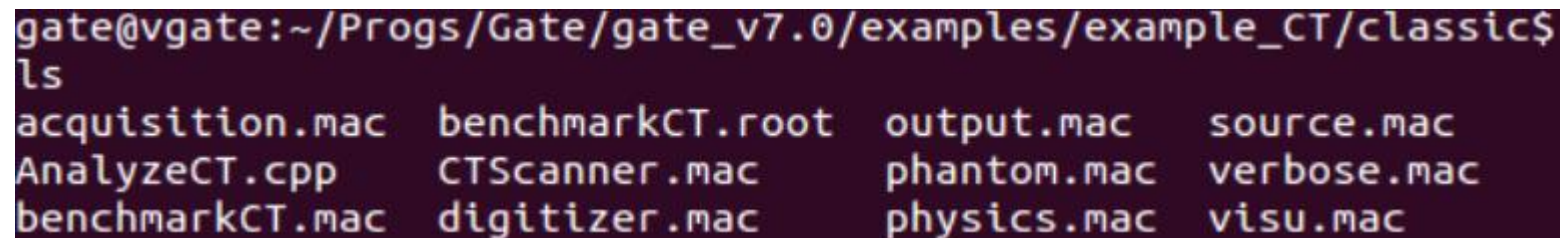

```
gate@vgate:~$ cd /home/gate/Progs/Gate/gate_v7.0/examples/examp
le_CT/classic
```
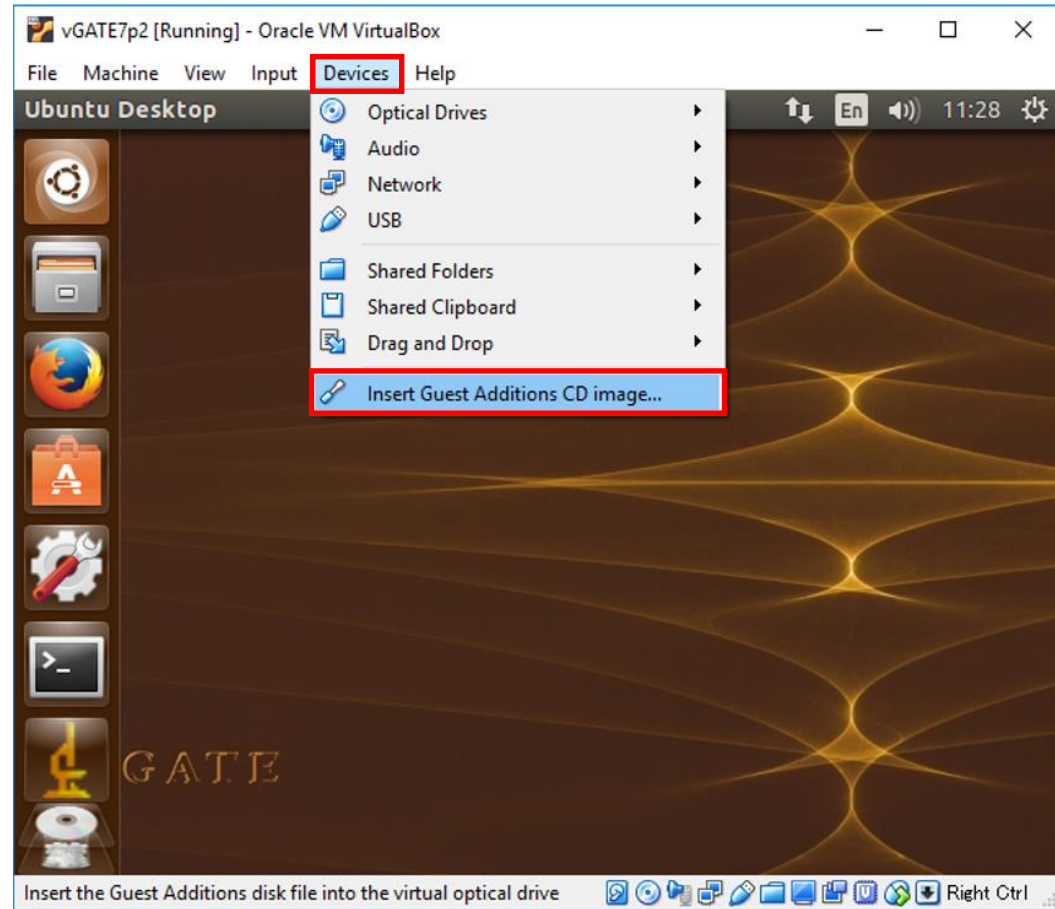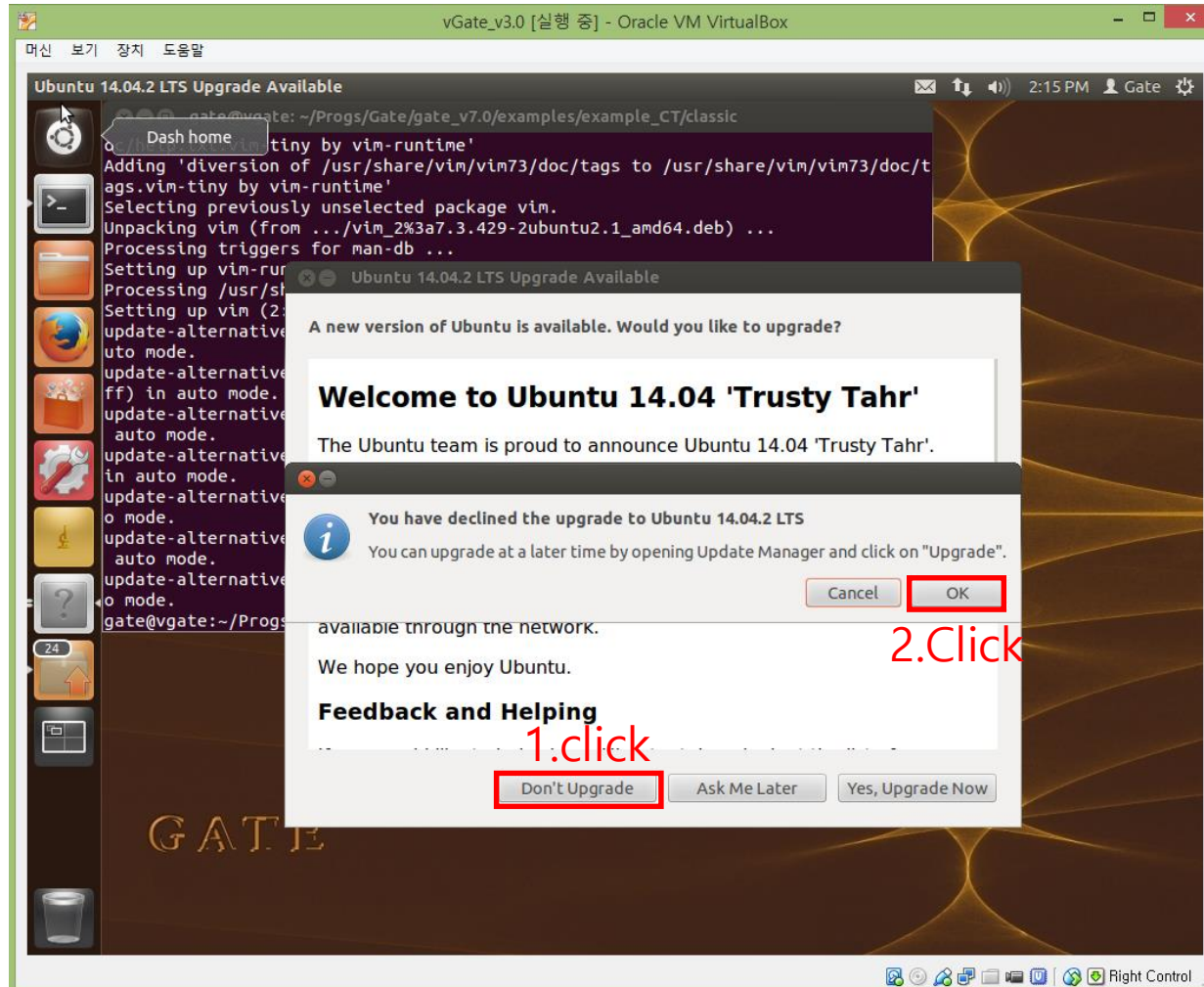
2. Check the file list in the example_CT/classic folder
ls

```
gate@vgate:~/Progs/Gate/gate_v7.0/examples/example_CT/classic$
ls
acquisition.mac    benchmarkCT.root   output.mac     source.mac
AnalyzeCT.cpp      CTScanner.mac      phantom.mac    verbose.mac
benchmarkCT.mac    digitizer.mac      physics.mac    visu.mac
```
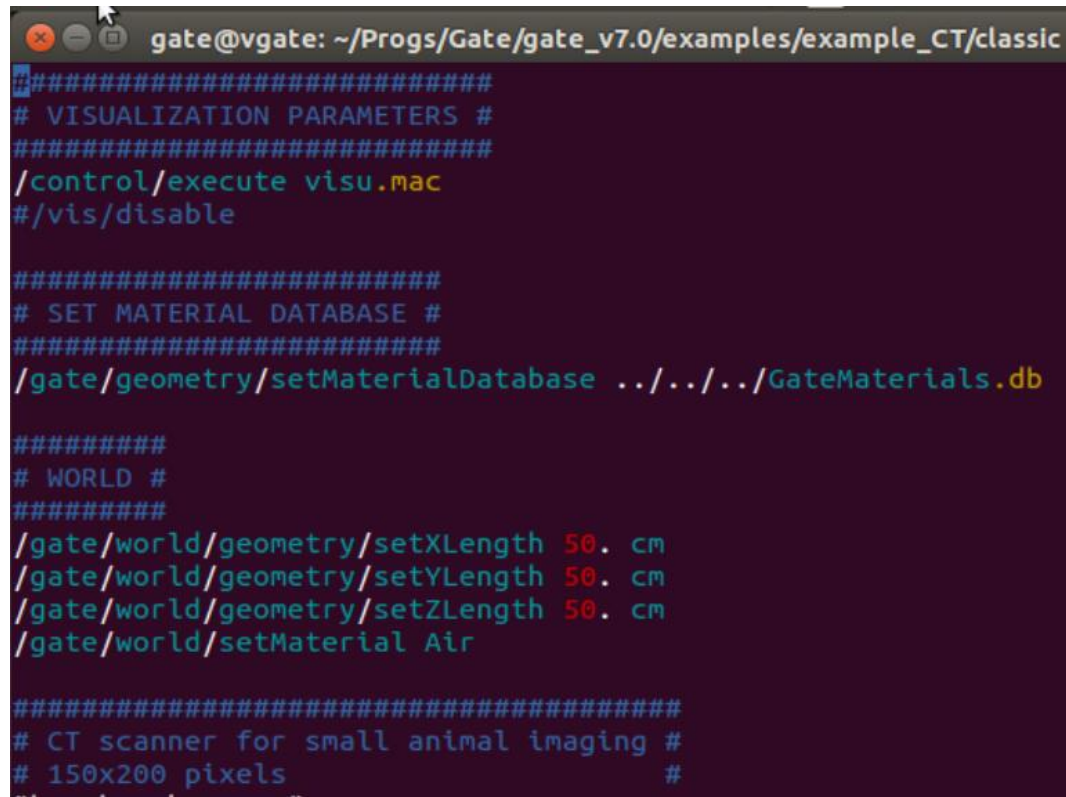
CT example simulation method(2)

3.Open the benchmarkCT.mac file using Vi editor
Vi benchmarkCT.mac

4. benchmarkCT.mac file with Vi editor

CT example simulation method (3)

5.Change to the "insert mode" by typing **insert** key

insert mode -- INSERT --

CT example simulation method(4)

6.Enable the visualization by changing as below in the vi editor
(Before) #/control/execute visu.mac -> (After) /control/execute visu.mac
(Before) /vis/disable   -> (After) #/vis/disable
/gate/world/vis/forceWireframe (Added)

Added →

insert mode

CT example simulation method(5)

7.Write and quit from vi editor (Click **Esc** button -> **shift+:** -> **wq**)

w: write
w: quit

CT example simulation method(6) small animal CT!

8.Run the GATE simulation using the below command!
Gate benchmarkCT.mac

```
gate@vgate:~/Progs/Gate/gate_v7.0/examples/example_CT/classic$
Gate benchmarkCT.mac
```

GATE simulation (W/O X-ray)
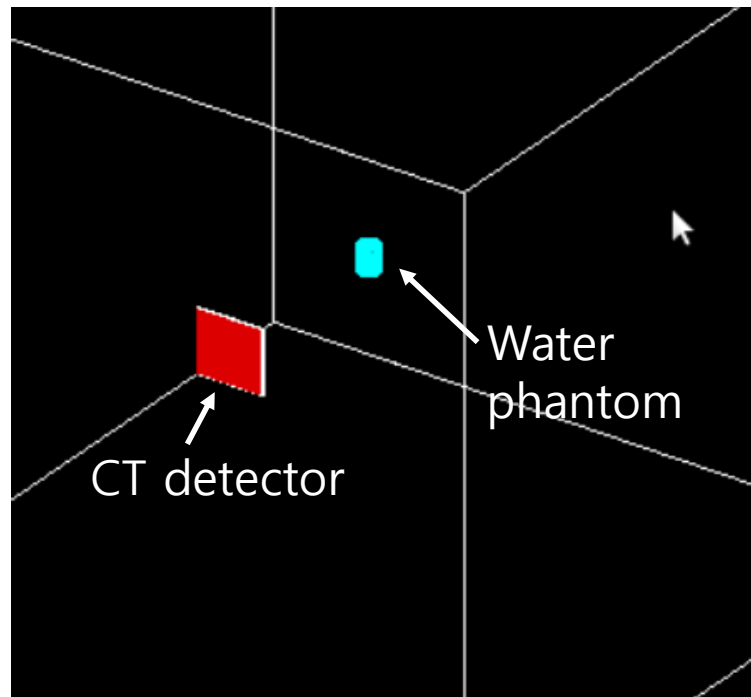
GATE simulation (W/ X-ray)
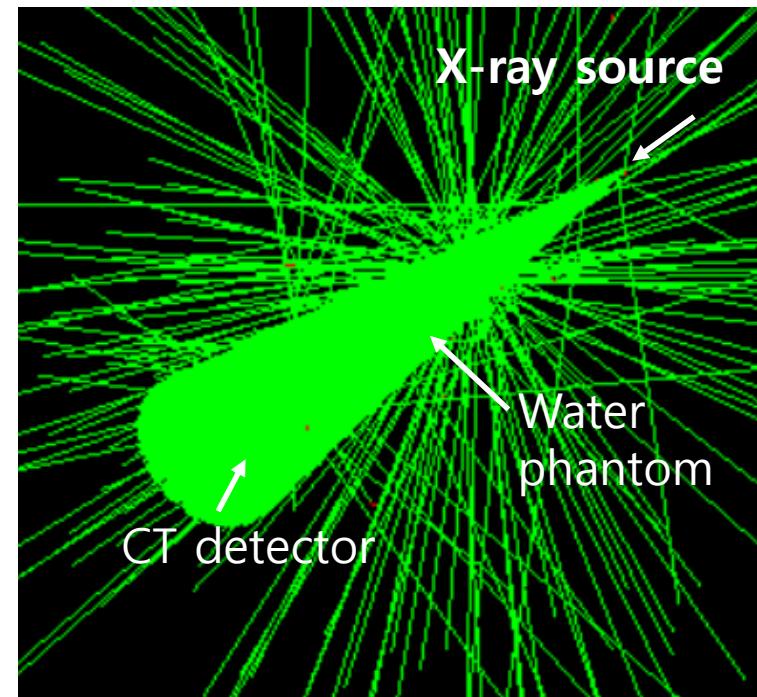
Green: X-ray

Analyze the CT example output file using ROOT (1)

Open the root file using ROOT software
root benchmarkCT.root

Analyze the CT example output file using ROOT (2)

10. Open a TBrowser
TBrowser b;

Analyze the CT example output file using ROOT (3)
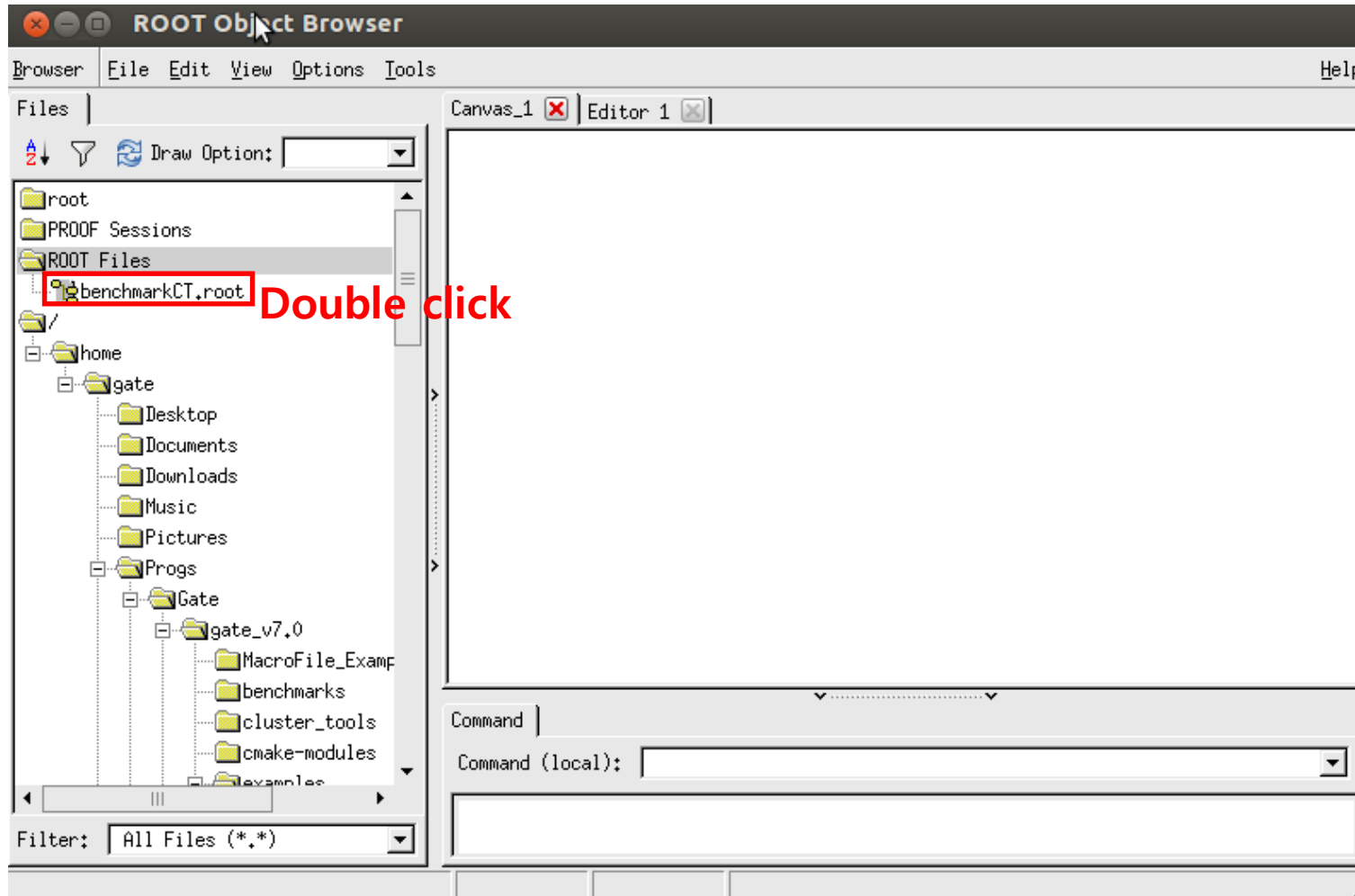
Analyze the CT example output file using ROOT (4)
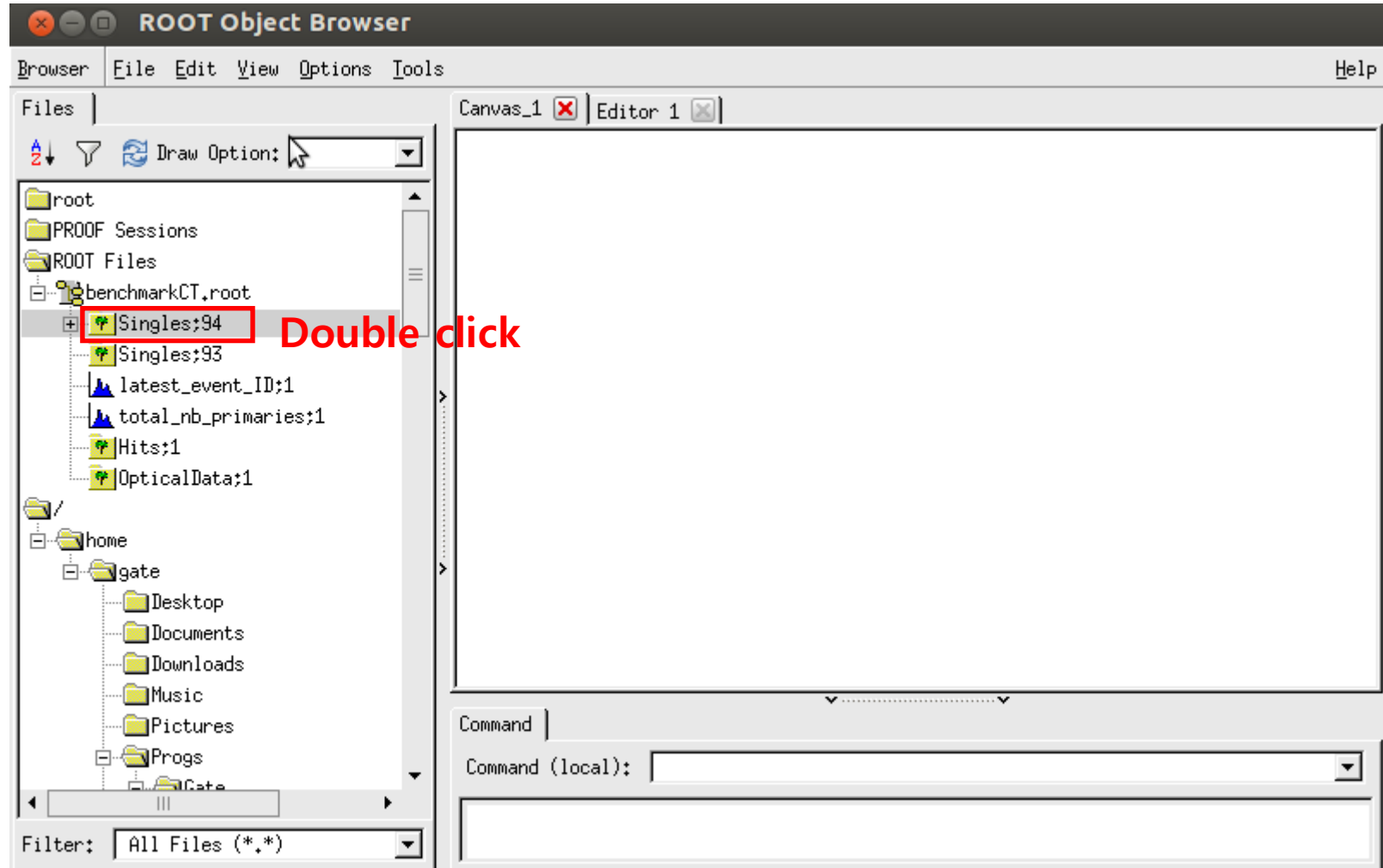
Analyze the CT example output file using ROOT (5)

"Singles.energy": Energy, position, time information of the detected X-ray

Analyze the CT example output file using ROOT (6)

Visualize the 2D detector response
Singles.Draw("globalPosY:globalPosX");
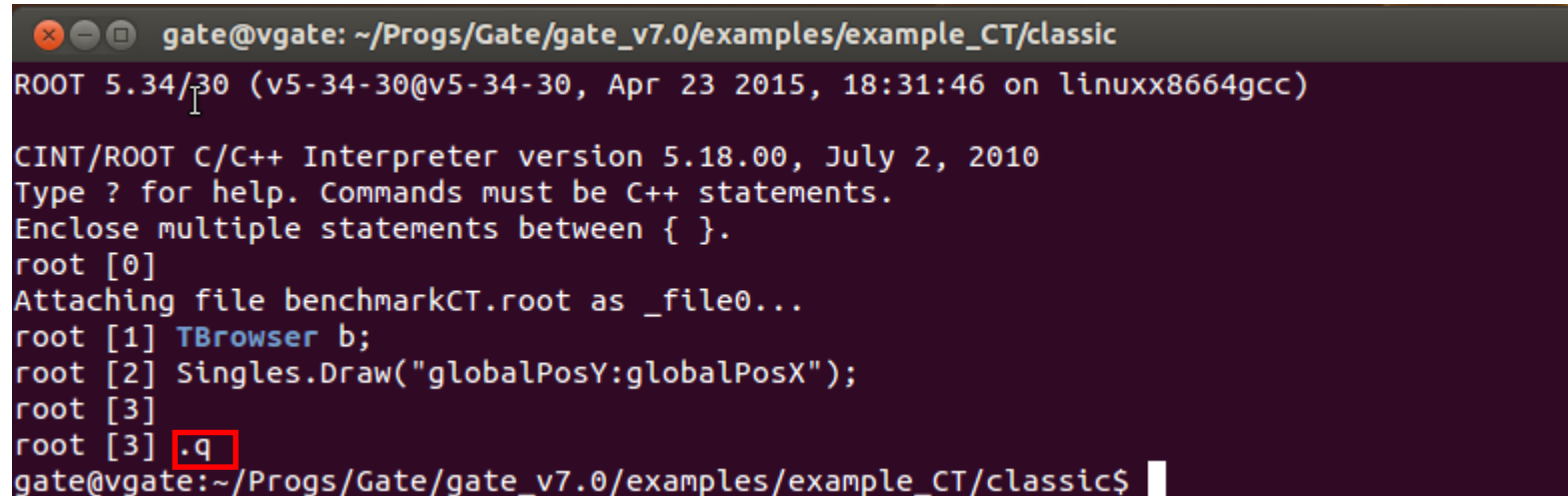
Analyze the CT example output file using ROOT (6)

Exit the ROOT software

.q

Backup

Problem> TBrowser b; command is not working in ROOT

Solution>
1.Install a new ROOT
2.Re install GATEv7.0

ROOT download
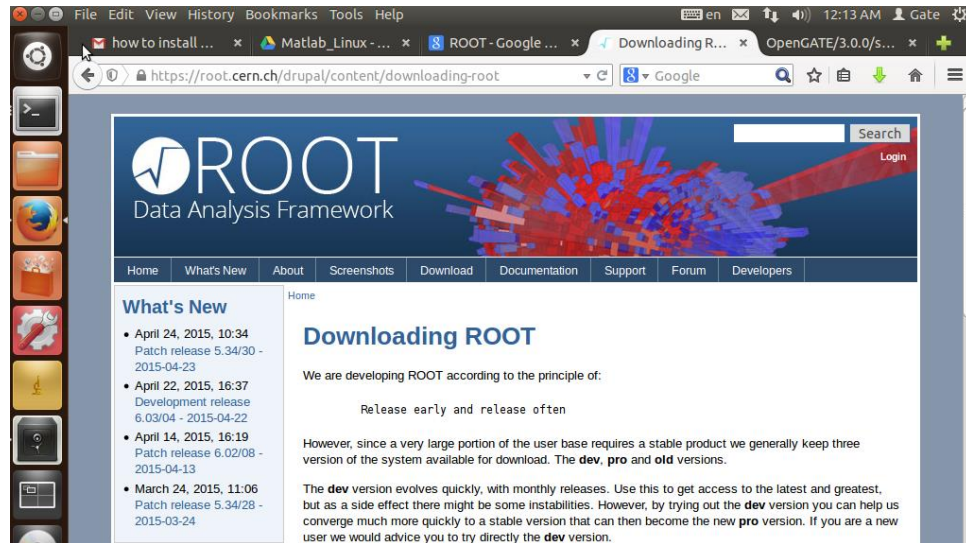
The following versions are available for download:

ROOT 6:

- **Dev**, version 6.03/04 (see also the release notes)
- **Pro**, version 6.02/08 recommended (see also the release notes)
- **Old**, version 6.00/00 (see also the release notes)

ROOT 5:

Download(Filename:**root_v5.34.30.source.tar.gz**)

- **Pro**, version 5.34/30 (see also the release notes)
- **Old**, version 5.32/04 (see also the release notes and development notes)
- **Old**, version 5.30/06 (see also the release notes and development notes)
- **Old**, version 5.28/00h (see also the release notes and development notes)

ROOT recent version install

Prerequisite: xpm, xft

1.Install xpm
sudo apt-get install libxpm-dev

```
gate@vgate:~/Progs/root$ sudo apt-get install libxpm-dev
```

2. Run update command
sudo apt-get update

```
gate@vgate:~/Progs/root$ sudo apt-get update
```

3.Install Xft
sudo apt-get install libXft-dev

```
gate@vgate:~/Progs/root$ sudo apt-get install libXft-dev
```

ROOT recent version installation

4.Extract the ROOT file
tar zxvf **root_v5.34.30.source.tar.gz**

```
gate@vgate:~/Progs$ ls
Gate  Geant4  root  root_v5.34.30.source.tar.gz
gate@vgate:~/Progs$ tar zxvf root_v5.34.30.source.tar.gz
```

5.Generate a Makefile
cd root
./configure

```
gate@vgate:~/Progs$ cd root/
gate@vgate:~/Progs/root$ ls
bin             config.log       fonts    icons    Makefile      README   tutorials
bindings        config.status    geom     include  man           roofit
build           configure        graf2d   io       math          rootx
cint            core             graf3d   lib      misc          sql
cmake           doc              gui      LICENSE  montecarlo    test
CMakeLists.txt  documentation    hist     macros   net           tmva
config          etc              html     main     proof         tree
gate@vgate:~/Progs/root$ ./configure
```

6.Compile ROOT
make
```
gate@vgate:~/Progs/root$ make
```

ROOT installation is done!

Reinstall GATEv7.0 (1)

Reinstall GATEv7.0 (2)

gate@vgate: ~/Progs/Gate/gate_v7.0-build

gate@vgate: ~/Progs/Gat...   gate@vgate: ~/Downloads   gate@vgate: ~/Downloads   gate@vgate: ~/Progs/Gat...

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CMAKE_BACKWARDS_COMPATIBILITY	2.4
CMAKE_BUILD_TYPE	Release
CMAKE_INSTALL_PREFIX	/home/gate/Progs/Gate/gate_v7.0-install
CUDA_BUILD_CUBIN	OFF
CUDA_BUILD_EMULATION	OFF
CUDA_SDK_ROOT_DIR	CUDA_SDK_ROOT_DIR-NOTFOUND
CUDA_TOOLKIT_ROOT_DIR	CUDA_TOOLKIT_ROOT_DIR-NOTFOUND
CUDA_VERBOSE_BUILD	OFF
EXECUTABLE_OUTPUT_PATH	
GATE_ANALYSIS_USE_FILE	ON
GATE_ANALYSIS_USE_GENERAL	ON
GATE_DOWNLOAD_BENCHMARKS_DATA	OFF
GATE_DOWNLOAD_EXAMPLES_DATA	OFF
GATE_USE_ECAT7	OFF
GATE_USE_GEANT4_UIVIS	ON
GATE_USE_GPU	OFF
GATE_USE_LMF	OFF
GATE_USE_OPTICAL	ON
GATE_USE_ROOT	ON
GATE_USE_SYSTEM_CLHEP	OFF
Geant496_COMPATIBILITY	ON
Geant4_DIR	/home/gate/Progs/Geant4/geant4.9.6.p03-install/lib/Gea
LIBRARY_OUTPUT_PATH	
ROOTCINT_EXECUTABLE	/home/gate/Progs/root/bin/rootcint

CMAKE_BACKWARDS_COMPATIBILITY: For backwards compatibility, what version of CMake commands and synt
Press [enter] to edit option   CMake Version 2.8.7
Press [c] to configure   Press [g] to generate and exit
Press [h] for help   Press [q] to quit without generating
Press [t] to toggle advanced mode (Currently Off)

1. Type "**C** "

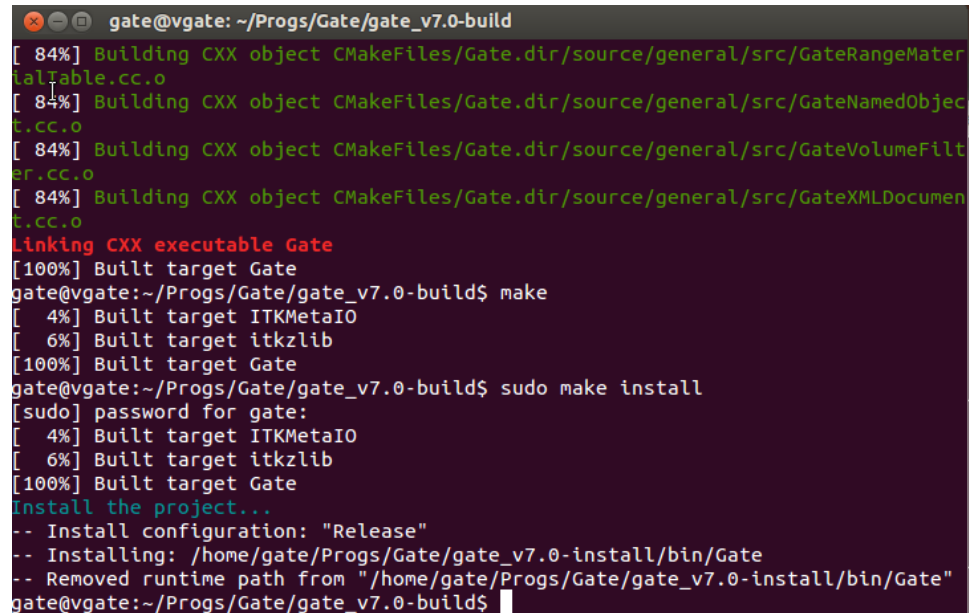2. Type "**g**"

Reinstall GATEv7.0 (2)

Compile GATEv7.0
make

`gate@vgate:~/Progs/Gate/gate_v7.0-build$ make`

Compile GATEv7.0
sudo make install

`gate@vgate:~/Progs/Gate/gate_v7.0-build$ sudo make install`

GATEv7.0 re-installation has be finished!!