

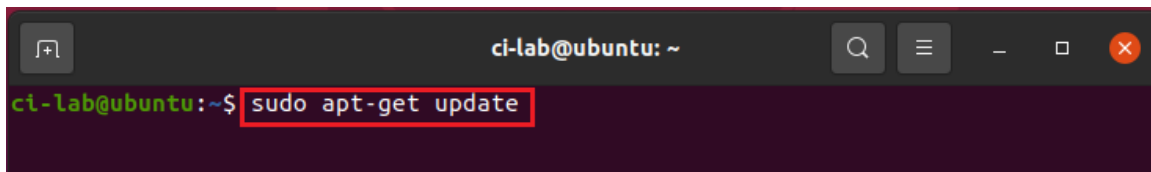
This short guide describes the steps required to install Mininet on a Linux. The guide assumes that you are running a recent version of Ubuntu. The version of Linux used in this guide is Ubuntu 20.04.2 LTS.

1 Installing Mininet from packages

Step 1. Launch a Linux terminal by holding the `Ctrl+Alt+T` keys or by clicking on the Linux terminal icon.

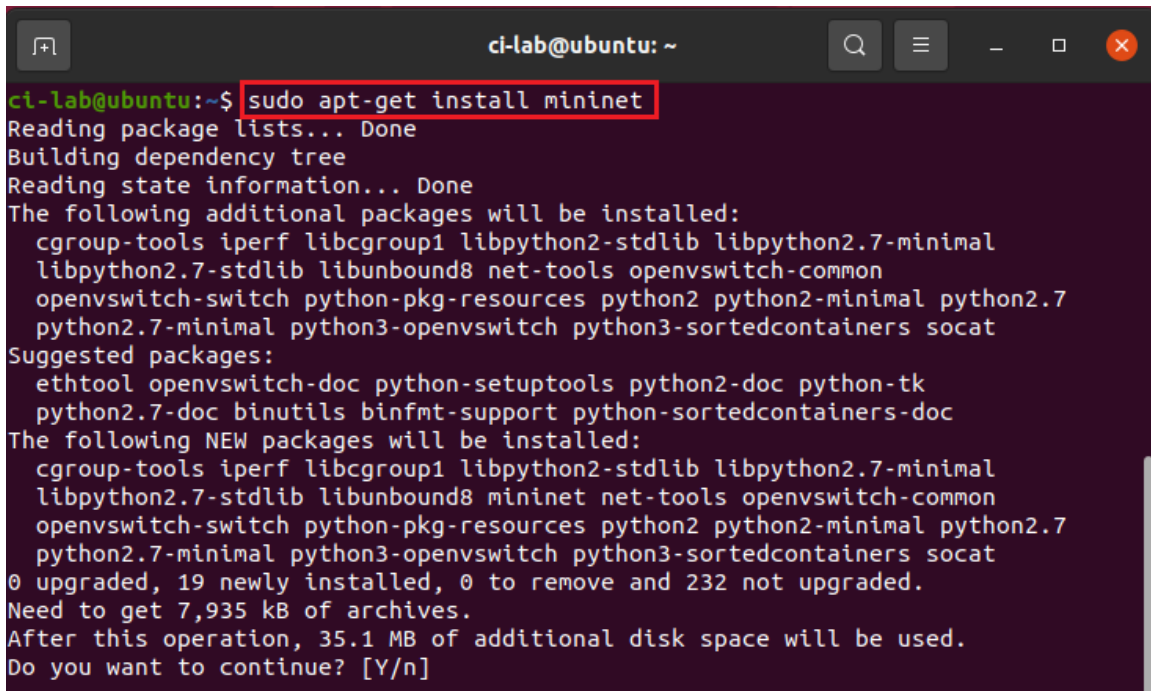
Step 2. Make sure that the list of packages from all repositories is up to date by running the following command. When prompted to enter a password, please enter the password of the account you are currently logged into.

```
sudo apt-get update
```

A terminal window titled 'ci-lab@ubuntu: ~' with search, menu, and window control icons in the title bar. The prompt 'ci-lab@ubuntu:~\$' is followed by the command 'sudo apt-get update', which is highlighted with a red rectangular box.

Step 3. Install the *mininet* package by entering the following command.

```
sudo apt-get install mininet
```

A terminal window titled 'ci-lab@ubuntu: ~' with search, menu, and window control icons in the title bar. The prompt 'ci-lab@ubuntu:~\$' is followed by the command 'sudo apt-get install mininet', which is highlighted with a red rectangular box. The output of the command is displayed below the prompt: 'Reading package lists... Done', 'Building dependency tree', 'Reading state information... Done', 'The following additional packages will be installed:', a list of additional packages, 'Suggested packages:', a list of suggested packages, 'The following NEW packages will be installed:', a list of new packages including 'mininet', '0 upgraded, 19 newly installed, 0 to remove and 232 not upgraded.', 'Need to get 7,935 kB of archives.', 'After this operation, 35.1 MB of additional disk space will be used.', and 'Do you want to continue? [Y/n]'.

```
ci-lab@ubuntu:~$ sudo apt-get install mininet
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  cgrouper-tools iperf libcgroup1 libpython2-stdlib libpython2.7-minimal
  libpython2.7-stdlib libunbound8 net-tools openvswitch-common
  openvswitch-switch python-pkg-resources python2 python2-minimal python2.7
  python2.7-minimal python3-openvswitch python3-sortedcontainers socat
Suggested packages:
  ethtool openvswitch-doc python-setuptools python2-doc python-tk
  python2.7-doc binutils binfmt-support python-sortedcontainers-doc
The following NEW packages will be installed:
  cgrouper-tools iperf libcgroup1 libpython2-stdlib libpython2.7-minimal
  libpython2.7-stdlib libunbound8 mininet net-tools openvswitch-common
  openvswitch-switch python-pkg-resources python2 python2-minimal python2.7
  python2.7-minimal python3-openvswitch python3-sortedcontainers socat
0 upgraded, 19 newly installed, 0 to remove and 232 not upgraded.
Need to get 7,935 kB of archives.
After this operation, 35.1 MB of additional disk space will be used.
Do you want to continue? [Y/n]
```

Press `Y` key on your keyboard to proceed with the installation.

Step 4. At this point, if there was no error during the installation process, you should have *mininet* installed on your machine. Issue the following command to start *mininet*'s Command Line Interface (CLI). This command creates a simple topology consisting of one switch (s1) and two hosts (h1, h2).

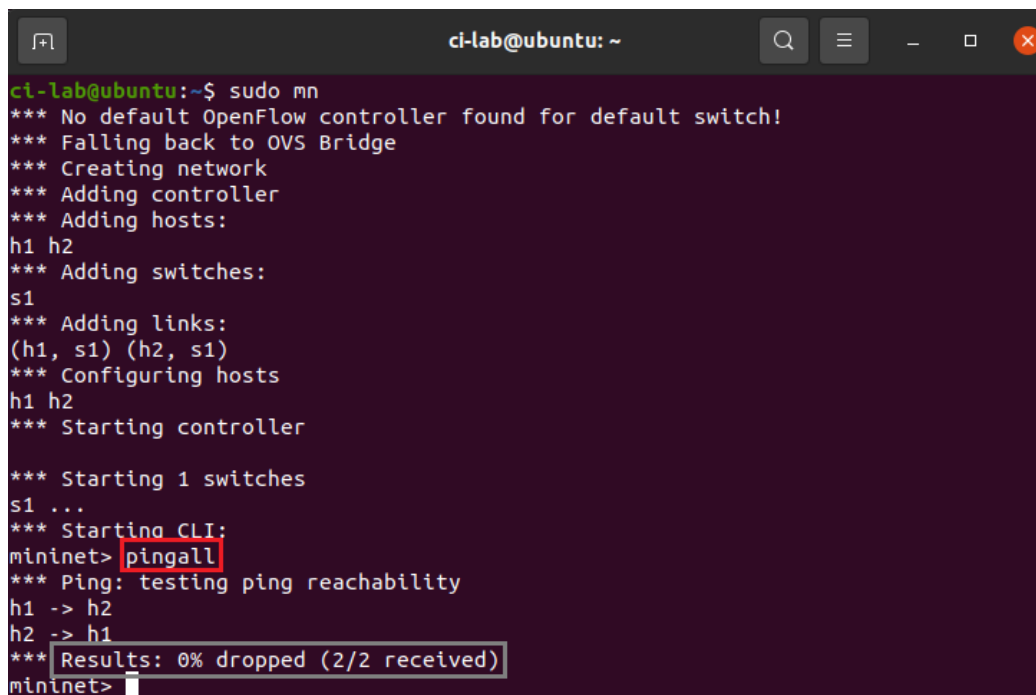
```
sudo mn
```



```
ci-lab@ubuntu: ~  
ci-lab@ubuntu:~$ sudo mn  
*** No default OpenFlow controller found for default switch!  
*** Falling back to OVS Bridge  
*** Creating network  
*** Adding controller  
*** Adding hosts:  
h1 h2  
*** Adding switches:  
s1  
*** Adding links:  
(h1, s1) (h2, s1)  
*** Configuring hosts  
h1 h2  
*** Starting controller  
  
*** Starting 1 switches  
s1 ...  
*** Starting CLI:  
mininet>
```

Step 5. By default, the Open vSwitch (OVS) package is installed when installing *mininet*. OVS is the virtual switch that will be used to connect devices in *mininet*. To test if *mininet* is working properly, issue the following command in *mininet*'s CLI.

```
mininet> pingall
```



```
ci-lab@ubuntu: ~  
ci-lab@ubuntu:~$ sudo mn  
*** No default OpenFlow controller found for default switch!  
*** Falling back to OVS Bridge  
*** Creating network  
*** Adding controller  
*** Adding hosts:  
h1 h2  
*** Adding switches:  
s1  
*** Adding links:  
(h1, s1) (h2, s1)  
*** Configuring hosts  
h1 h2  
*** Starting controller  
  
*** Starting 1 switches  
s1 ...  
*** Starting CLI:  
mininet> pingall  
*** Ping: testing ping reachability  
h1 -> h2  
h2 -> h1  
*** Results: 0% dropped (2/2 received)  
mininet>
```

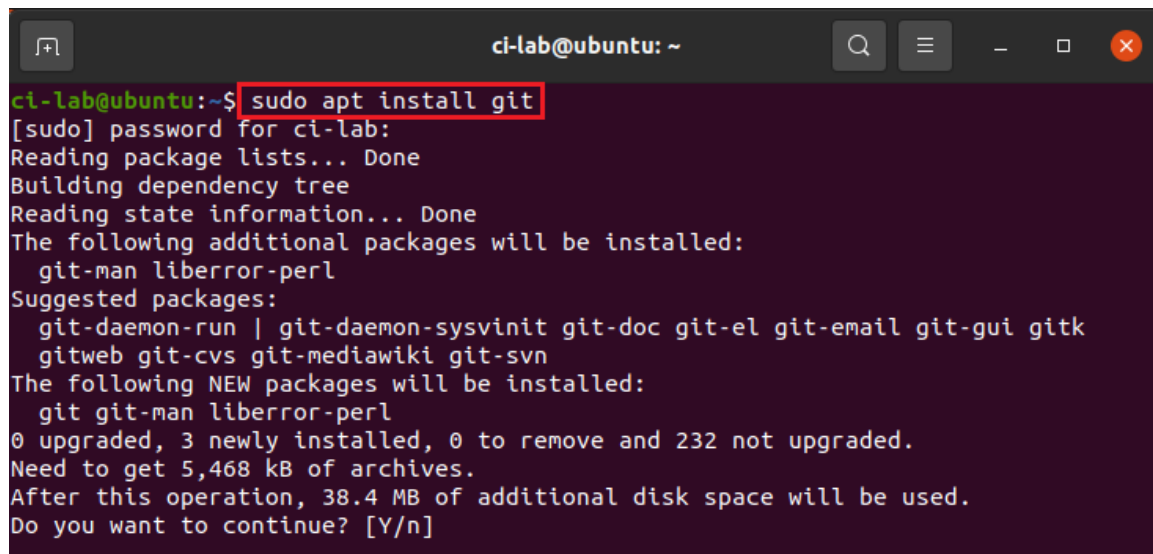
The figures above shows that h1 was able to reach h2 and h2 was able to reach h1. It also shows that 0% packets were dropped. This confirms that mininet and the virtual switch are properly installed.

2 Using Miniedit

Mininet has a Graphical User Interface (GUI) known as Miniedit. Miniedit is a simple python program that provides a GUI which allows creating and managing topologies.

Step 1. Install *git* in case it is not installed on your machine by using the following command.

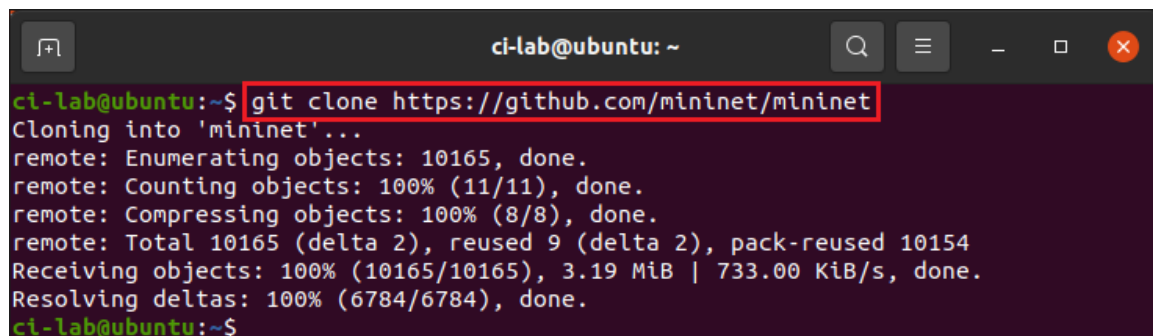
```
sudo apt-get install git
```

A terminal window titled 'ci-lab@ubuntu: ~' showing the command 'sudo apt install git' being executed. The output shows the package lists being read, the dependency tree being built, and the state information being read. It lists additional packages to be installed (git-man, liberror-perl) and suggested packages (git-daemon-run, git-daemon-sysvinit, git-doc, git-el, git-email, git-gui, gitk, gitweb, git-cvs, git-mediawiki, git-svn). It also shows the disk space requirements and asks for confirmation to continue. The command is highlighted with a red box.

```
ci-lab@ubuntu:~$ sudo apt install git
[sudo] password for ci-lab:
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  git-man liberror-perl
Suggested packages:
  git-daemon-run | git-daemon-sysvinit git-doc git-el git-email git-gui gitk
  gitweb git-cvs git-mediawiki git-svn
The following NEW packages will be installed:
  git git-man liberror-perl
0 upgraded, 3 newly installed, 0 to remove and 232 not upgraded.
Need to get 5,468 kB of archives.
After this operation, 38.4 MB of additional disk space will be used.
Do you want to continue? [Y/n]
```

Step 2. Clone the mininet repository from GitHub by using the following command on a Linux terminal.

```
git clone https://github.com/mininet/mininet
```

A terminal window titled 'ci-lab@ubuntu: ~' showing the command 'git clone https://github.com/mininet/mininet' being executed. The output shows the cloning process, including enumerating objects, counting objects, compressing objects, and receiving objects. The command is highlighted with a red box.

```
ci-lab@ubuntu:~$ git clone https://github.com/mininet/mininet
Cloning into 'mininet'...
remote: Enumerating objects: 10165, done.
remote: Counting objects: 100% (11/11), done.
remote: Compressing objects: 100% (8/8), done.
remote: Total 10165 (delta 2), reused 9 (delta 2), pack-reused 10154
Receiving objects: 100% (10165/10165), 3.19 MiB | 733.00 KiB/s, done.
Resolving deltas: 100% (6784/6784), done.
ci-lab@ubuntu:~$
```

Step 3. Install python-pip3 package in case it is not installed on your system.

```
sudo apt install python3-pip
```

```

ci-lab@ubuntu: ~
ci-lab@ubuntu:~$ sudo apt install python3-pip
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  binutils binutils-common binutils-x86-64-linux-gnu build-essential dpkg-dev
  fakeroot g++ g++-9 gcc gcc-9 libalgorithm-diff-perl
  libalgorithm-diff-xs-perl libalgorithm-merge-perl libasan5 libatomic1
  libbinutils libc-dev-bin libc6-dev libcrypt-dev libctf-nobfd0 libctf0
  libexpat1-dev libfakeroot libgcc-9-dev libitm1 liblsan0 libpython3-dev
  libpython3.8 libpython3.8-dev libpython3.8-minimal libpython3.8-stdlib
  libquadmath0 libstdc++-9-dev libtsan0 libubsan1 linux-libc-dev make
  manpages-dev python-pip-whl python3-dev python3-distutils python3-lib2to3
  python3-setuptools python3-wheel python3.8 python3.8-dev python3.8-minimal
  zlib1g-dev
Suggested packages:
  binutils-doc debian-keyring g++-multilib g++-9-multilib gcc-9-doc
  gcc-multilib autoconf automake libtool flex bison gcc-doc gcc-9-multilib
  gcc-9-locales glibc-doc libstdc++-9-doc make-doc python-setuptools-doc
  python3.8-venv python3.8-doc binfmt-support
The following NEW packages will be installed:
  binutils binutils-common binutils-x86-64-linux-gnu build-essential dpkg-dev
  fakeroot g++ g++-9 gcc gcc-9 libalgorithm-diff-perl
  libalgorithm-diff-xs-perl libalgorithm-merge-perl libasan5 libatomic1
  libbinutils libc-dev-bin libc6-dev libcrypt-dev libctf-nobfd0 libctf0
  libexpat1-dev libfakeroot libgcc-9-dev libitm1 liblsan0 libpython3-dev
  libpython3.8-dev libquadmath0 libstdc++-9-dev libtsan0 libubsan1
  linux-libc-dev make manpages-dev python-pip-whl python3-dev
  python3-distutils python3-pip python3-setuptools python3-wheel python3.8-dev
  zlib1g-dev
The following packages will be upgraded:
  libpython3.8 libpython3.8-minimal libpython3.8-stdlib python3-lib2to3
  python3.8 python3.8-minimal
6 upgraded, 43 newly installed, 0 to remove and 226 not upgraded.
Need to get 38.7 MB/45.0 MB of archives.
After this operation, 171 MB of additional disk space will be used.
Do you want to continue? [Y/n]

```

Step 4. Install *mininet* using pip3 by entering the following command.

```
sudo pip3 install mininet
```

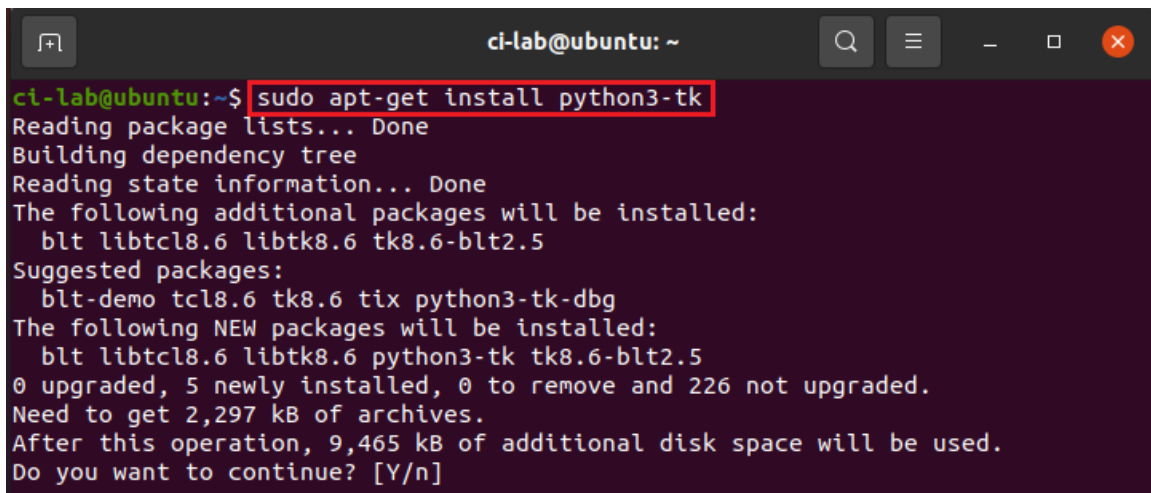
```

ci-lab@ubuntu: ~
ci-lab@ubuntu:~$ sudo pip3 install mininet
Collecting mininet
  Downloading mininet-2.3.0.dev6-py2.py3-none-any.whl (152 kB)
    | 152 kB 576 kB/s
Requirement already satisfied: setuptools in /usr/lib/python3/dist-packages (f
rom mininet) (45.2.0)
Installing collected packages: mininet
Successfully installed mininet-2.3.0.dev6
ci-lab@ubuntu:~$

```

Step 5. Install tkinter by entering the following command

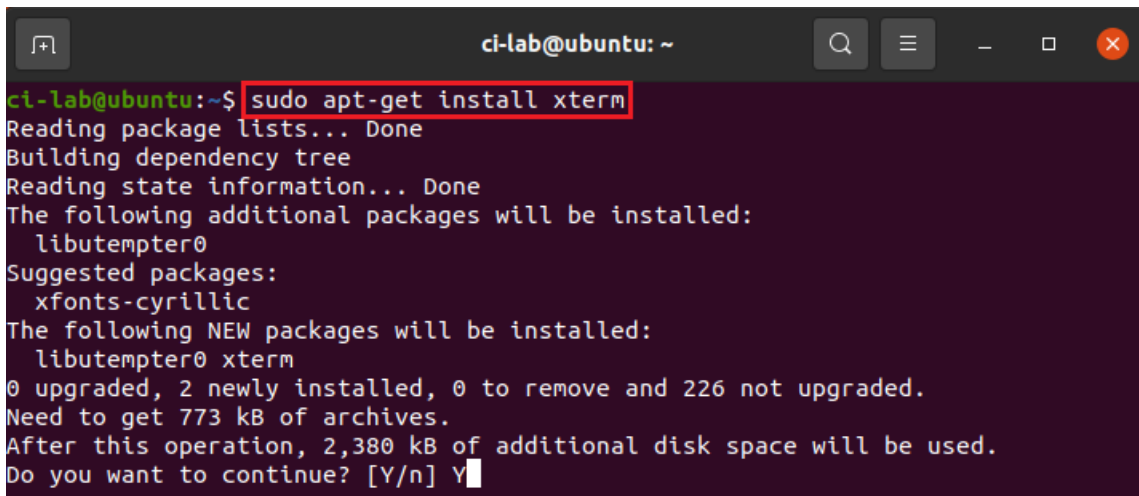
```
sudo apt-get install python3-tk
```

A terminal window titled 'ci-lab@ubuntu: ~' with search, menu, and window control icons. The command 'sudo apt-get install python3-tk' is entered and highlighted with a red box. The output shows the package lists being read, a dependency tree being built, and state information being read. It lists additional packages to be installed (blt, libtcl8.6, libtk8.6, tk8.6-bl2.5) and suggested packages (blt-demo, tcl8.6, tk8.6, tix, python3-tk-dbg). It also lists NEW packages to be installed (blt, libtcl8.6, libtk8.6, python3-tk, tk8.6-bl2.5). The summary indicates 0 upgrades, 5 new installations, 0 removals, and 226 packages not upgraded. The total size of archives to be downloaded is 2,297 kB, and the additional disk space required is 9,465 kB. The prompt asks if the user wants to continue, with '[Y/n]' as the input.

```
ci-lab@ubuntu:~$ sudo apt-get install python3-tk
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  blt libtcl8.6 libtk8.6 tk8.6-bl2.5
Suggested packages:
  blt-demo tcl8.6 tk8.6 tix python3-tk-dbg
The following NEW packages will be installed:
  blt libtcl8.6 libtk8.6 python3-tk tk8.6-bl2.5
0 upgraded, 5 newly installed, 0 to remove and 226 not upgraded.
Need to get 2,297 kB of archives.
After this operation, 9,465 kB of additional disk space will be used.
Do you want to continue? [Y/n]
```

Step 6. Install *xterm* package by entering the following command.

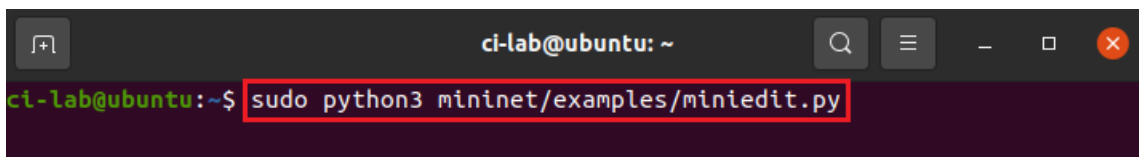
```
sudo apt-get install xterm
```

A terminal window titled 'ci-lab@ubuntu: ~' with search, menu, and window control icons. The command 'sudo apt-get install xterm' is entered and highlighted with a red box. The output shows the package lists being read, a dependency tree being built, and state information being read. It lists additional packages to be installed (libutempter0) and suggested packages (xfonts-cyrillic). It also lists NEW packages to be installed (libutempter0, xterm). The summary indicates 0 upgrades, 2 new installations, 0 removals, and 226 packages not upgraded. The total size of archives to be downloaded is 773 kB, and the additional disk space required is 2,380 kB. The prompt asks if the user wants to continue, with '[Y/n]' as the input, and 'Y' is entered.

```
ci-lab@ubuntu:~$ sudo apt-get install xterm
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libutempter0
Suggested packages:
  xfonts-cyrillic
The following NEW packages will be installed:
  libutempter0 xterm
0 upgraded, 2 newly installed, 0 to remove and 226 not upgraded.
Need to get 773 kB of archives.
After this operation, 2,380 kB of additional disk space will be used.
Do you want to continue? [Y/n] Y
```

Step 7. Check if Miniedit is ready to be started. Start Miniedit by entering the following command.

```
sudo python3 mininet/examples/miniedit.py
```

A terminal window titled 'ci-lab@ubuntu: ~' with search, menu, and window control icons. The command 'sudo python3 mininet/examples/miniedit.py' is entered and highlighted with a red box.

```
ci-lab@ubuntu:~$ sudo python3 mininet/examples/miniedit.py
```



If the output is similar to the figure above, then Miniedit is ready.

References

1. Mininet walkthrough. [Online]. Available: <http://Mininet.org>.
2. Mininet Github repo. [Online]. Available: <https://github.com/mininet/mininet>