

Nama : Ketut Satria Wibisana
NIM : 1103213148
Kelas : TK-45-G09

Getting Started (MoveIt 1 Noetic)

1. Jalankan syntax **rosdep update** untuk memperbarui database dependensi ROS.

```
abi@LAPTOP-UVGVSCCU: ~  
46 additional security updates can be applied with ESM Apps.  
Learn more about enabling ESM Apps service at https://ubuntu.com/esm  
  
The list of available updates is more than a week old.  
To check for new updates run: sudo apt update  
  
This message is shown once a day. To disable it please create the  
/home/abi/.hushlogin file.  
abi@LAPTOP-UVGVSCCU: ~$ rosdep update  
reading in sources list data from /etc/ros/rosdep/sources.list.d  
Hit https://raw.githubusercontent.com/ros/rosdistro/master/rosdep/osx-homebrew.yaml  
Hit https://raw.githubusercontent.com/ros/rosdistro/master/rosdep/base.yaml  
Hit https://raw.githubusercontent.com/ros/rosdistro/master/rosdep/python.yaml  
Hit https://raw.githubusercontent.com/ros/rosdistro/master/rosdep/ruby.yaml  
Hit https://raw.githubusercontent.com/ros/rosdistro/master/releases/fuerte.yaml  
Query rosdistro index https://raw.githubusercontent.com/ros/rosdistro/master/index-v4.yaml  
Skip end-of-life distro "ardent"  
Skip end-of-life distro "bouncy"  
Skip end-of-life distro "crystal"  
Skip end-of-life distro "dashing"  
Skip end-of-life distro "eloquent"  
Skip end-of-life distro "foxy"  
Skip end-of-life distro "galactic"  
Skip end-of-life distro "groovy"  
Add distro "humble"  
Skip end-of-life distro "hydro"  
Skip end-of-life distro "indigo"  
Add distro "iron"  
Skip end-of-life distro "jade"  
Add distro "jazzy"  
Skip end-of-life distro "kinetic"  
Skip end-of-life distro "lunar"  
Skip end-of-life distro "melodic"  
Add distro "noetic"  
Add distro "rolling"  
updated cache in /home/abi/.ros/rosdep/sources.cache  
abi@LAPTOP-UVGVSCCU: ~$
```

2. Jalankan syntax **sudo apt update** untuk memperbarui daftar paket dan versi terbaru di repositori.

```
abi@LAPTOP-UVGVSCCU: ~$ sudo apt update  
[sudo] password for abi:  
Get:1 http://security.ubuntu.com/ubuntu focal-security InRelease [128 kB]  
Get:2 http://packages.ros.org/ros/ubuntu focal InRelease [4679 B]  
Hit:3 http://archive.ubuntu.com/ubuntu focal InRelease  
Get:4 http://archive.ubuntu.com/ubuntu focal-updates InRelease [128 kB]  
Get:5 http://packages.ros.org/ros/ubuntu focal/main amd64 Packages [825 kB]  
Get:6 http://security.ubuntu.com/ubuntu focal-security/main amd64 Packages [3272 kB]  
Get:7 http://archive.ubuntu.com/ubuntu focal-backports InRelease [128 kB]  
Get:8 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [3641 kB]  
Get:9 http://security.ubuntu.com/ubuntu focal-security/main Translation-en [481 kB]  
Get:10 http://security.ubuntu.com/ubuntu focal-security/main amd64 c-n-f Metadata [14.3 kB]  
Get:11 http://security.ubuntu.com/ubuntu focal-security/restricted amd64 Packages [3211 kB]  
Get:12 http://security.ubuntu.com/ubuntu focal-security/restricted Translation-en [449 kB]  
Get:13 http://security.ubuntu.com/ubuntu focal-security/universe amd64 Packages [1014 kB]  
Get:14 http://security.ubuntu.com/ubuntu focal-updates/restricted Translation-en [465 kB]  
Get:15 http://security.ubuntu.com/ubuntu focal-security/universe amd64 c-n-f Metadata [21.4 kB]  
Get:16 http://archive.ubuntu.com/ubuntu focal-updates/main Translation-en [558 kB]  
Get:17 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 c-n-f Metadata [17.8 kB]  
Get:18 http://archive.ubuntu.com/ubuntu focal-updates/restricted amd64 Packages [3330 kB]  
Get:19 http://archive.ubuntu.com/ubuntu focal-updates/restricted Translation-en [465 kB]  
Get:20 http://archive.ubuntu.com/ubuntu focal-updates/universe amd64 Packages [1237 kB]  
Get:21 http://archive.ubuntu.com/ubuntu focal-updates/universe Translation-en [297 kB]  
Get:22 http://archive.ubuntu.com/ubuntu focal-updates/universe amd64 c-n-f Metadata [28.3 kB]  
Fetched 19.5 MB in 6s (3882 kB/s)  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
19 packages can be upgraded. Run 'apt list --upgradable' to see them.  
N: Ignoring file 'ros-latest.listsudo' in directory '/etc/apt/sources.list.d/' as it has an invalid filename extension  
abi@LAPTOP-UVGVSCCU: ~$
```

3. Jalankan syntax **sudo apt dist-upgrade** untuk memperbarui paket yang sudah diinstal dan menjaga kompatibilitas.

```
abi@LAPTOP-UVGVSCU: ~$ sudo apt dist-upgrade
Reading package lists... Done
Building dependency tree
Reading state information... Done
Calculating upgrade... Done

Get more security updates through Ubuntu Pro with 'esm-apps' enabled:
libavresample-dev libavformat58 libpostproc-dev libavfilter7
libbz2-dev libbz2-dev libbz2-dev libbz2-dev libbz2-dev
libavdevice-dev python2.7-minimal libhdf5-103 libgraph6 python2.7
libavformat-dev libhdf5-dev libavresample-dev libbz2-dev libpostproc55
liblab-gamut1 libavutil-dev libavcodec-dev hdf5-helpers libmpi2
libhdf5-cpp-103 libavcodec58 libcdt5 libavutil56 libpathplan4 libavdevice58
libavfilter-dev libswscale5 libpython2.7 libopenmpi4 libstdc++2.0-0 libmysofal
libpython2.7-minimal libhdf5-openmpi-103 libswscale-dev libgvc6
libpython2.7-stdlib libgraphviz libavresample4 libhdf5-openmpi-dev
libhdf5-mpi-dev

Learn more about Ubuntu Pro at https://ubuntu.com/pro
The following NEW packages will be installed:
ubuntu-pro-client ubuntu-pro-client-l10n
The following packages will be upgraded:
comerr-dev distro-info-data e2fsprogs libarchive13 libcom-err2 libext2fs2 libsmclient libss2 libsmclient0 linux-libc-dev logsage nano python3-rosdistro
python3-rosdistro-modules python3-update-manager samba-libs snapd ubuntu-advantage-tools update-manager-core
19 upgraded, 2 newly installed, 0 to remove and 0 not upgraded.
Need to get 34.2 MB of archives.
After this operation, 2724 kB of additional disk space will be used.
N: Ignoring file 'ros-latest.listsudo' in directory '/etc/apt/sources.list.d/' as it has an invalid filename extension
Do you want to continue? [Y/n] y
Get:1 http://packages.ros.org/ros/ubuntu focal/main amd64 python3-rosdistro-modules all 1.0.1-1 [36.2 kB]
Get:2 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 logsage amd64 1.45.5-2ubuntu1.2 [10.2 kB]
Get:3 http://packages.ros.org/ros/ubuntu focal/main amd64 python3-rosdistro all 1.0.1-100 [3724 B]
Get:4 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 libext2fs2 amd64 1.45.5-2ubuntu1.2 [183 kB]
Get:5 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 e2fsprogs amd64 1.45.5-2ubuntu1.2 [527 kB]
Get:6 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 libsmclient amd64 2:4.15.13+dfsg-0ubuntu0.20.04.8 [59.4 kB]
Get:7 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 libsmclient0 amd64 2:4.15.13+dfsg-0ubuntu0.20.04.8 [211 kB]
Get:8 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 samba-libs amd64 2:4.15.13+dfsg-0ubuntu0.20.04.8 [5632 kB]
Get:9 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 comerr-dev amd64 2.1-1.45.5-2ubuntu1.2 [39.9 kB]
Get:10 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 libcom-err2 amd64 1.45.5-2ubuntu1.2 [9588 B]
Get:11 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 libss2 amd64 1.45.5-2ubuntu1.2 [11.3 kB]
Get:12 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 distro-info-data all 0.43ubuntu1.17 [5848 B]
```

4. Jalankan syntax **sudo apt install ros-noetic-catkin python3-catkin-tools** untuk menginstall alat Catkin dan dependensinya untuk membangun workspace.

```
abi@LAPTOP-UVGVSCU: ~$ sudo apt install ros-noetic-catkin python3-catkin-tools
Setting up ubuntu-advantage-tools (34-20.04) ...
Removing obsolete conffile /etc/ubuntu-advantage/help_data.yaml ...
Setting up update-manager-core (1:20.04.10.23) ...
Processing triggers for desktop-file-utils (0.24-1ubuntu3) ...
Processing triggers for mime-support (3.6ubuntu1) ...
Processing triggers for gnome-menus (3.36.0-1ubuntu1) ...
Processing triggers for libc-bin (2.31-0ubuntu9.16) ...
/sbin/ldconfig.real: /usr/lib/wsl/lib/libcudart.so.1 is not a symbolic link

Processing triggers for man-db (2.9.1-1) ...
Processing triggers for dbus (1.12.16-2ubuntu2.3) ...
Processing triggers for install-info (6.7.0.dfsg.2-5) ...
Processing triggers for initramfs-tools (0.136ubuntu6.7) ...
abi@LAPTOP-UVGVSCU: ~$ sudo apt install ros-noetic-catkin python3-catkin-tools
Reading package lists... Done
Building dependency tree
Reading state information... Done
ros-noetic-catkin is already the newest version (0.8.10-1focal.20210423.221558).
ros-noetic-catkin set to manually installed.
The following NEW packages will be installed:
python3-catkin-tools python3-osrf-pycommon
0 upgraded, 2 newly installed, 0 to remove and 0 not upgraded.
Need to get 183 kB of archives.
After this operation, 735 kB of additional disk space will be used.
Get:1 http://packages.ros.org/ros/ubuntu focal/main amd64 python3-osrf-pycommon all 2.0.2-1 [23.3 kB]
Get:2 http://packages.ros.org/ros/ubuntu focal/main amd64 python3-catkin-tools all 0.9.4-1 [160 kB]
Fetched 183 kB in 2s (98.8 kB/s)
N: Ignoring file 'ros-latest.listsudo' in directory '/etc/apt/sources.list.d/' as it has an invalid filename extension
Selecting previously unselected package python3-osrf-pycommon.
(Reading database ... 140859 files and directories currently installed.)
Preparing to unpack .../python3-osrf-pycommon_2.0.2-1_all.deb ...
Unpacking python3-osrf-pycommon (2.0.2-1) ...
Selecting previously unselected package python3-catkin-tools.
Preparing to unpack .../python3-catkin-tools_0.9.4-1_all.deb ...
Unpacking python3-catkin-tools (0.9.4-1) ...
Setting up python3-osrf-pycommon (2.0.2-1) ...
Setting up python3-catkin-tools (0.9.4-1) ...
N: Ignoring file 'ros-latest.listsudo' in directory '/etc/apt/sources.list.d/' as it has an invalid filename extension
abi@LAPTOP-UVGVSCU: ~$
```

5. Jalankan syntax **sudo apt install python3-wstool** untuk menginstall wstool agar dapat mengelola beberapa repositori di workspace.

```
Processing triggers for libc-bin (2.31-0ubuntu9.16) ...
/sbin/ldconfig.real: /usr/lib/wsl/lib/libcud.so.1 is not a symbolic link

Processing triggers for man-db (2.9.1-1) ...
Processing triggers for dbus (1.12.16-2ubuntu2.3) ...
Processing triggers for install-info (6.7.0.dfsg.2-5) ...
Processing triggers for intramfs-tools (0.136ubuntu6.7) ...
abi@LAPTOP-UVGVSCCU: ~$ sudo apt install ros-noetic-catkin python3-catkin-tools
Reading package lists... Done
Building dependency tree
Reading state information... Done
ros-noetic-catkin is already the newest version (0.8.10-1focal.20210423.221558).
ros-noetic-catkin set to manually installed.
The following NEW packages will be installed:
  python3-catkin-tools python3-osrf-pycommon
0 upgraded, 2 newly installed, 0 to remove and 0 not upgraded.
Need to get 183 kB of archives.
After this operation, 735 kB of additional disk space will be used.
Get:1 http://packages.ros.org/ubuntu focal/main amd64 python3-osrf-pycommon all 2.0.2-1 [23.3 kB]
Get:2 http://packages.ros.org/ubuntu focal/main amd64 python3-catkin-tools all 0.9.4-1 [160 kB]
Fetched 183 kB in 2s (98.8 kB/s)
N: Ignoring file 'ros-latest.listsudo' in directory '/etc/apt/sources.list.d/' as it has an invalid filename extension
(Reading database ... 149050 files and directories currently installed.)
Preparing to unpack .../python3-osrf-pycommon_2.0.2-1_all.deb ...
Unpacking python3-osrf-pycommon (2.0.2-1) ...
Selecting previously unselected package python3-catkin-tools.
Preparing to unpack .../python3-catkin-tools_0.9.4-1_all.deb ...
Unpacking python3-catkin-tools (0.9.4-1) ...
Setting up python3-osrf-pycommon (2.0.2-1) ...
Setting up python3-catkin-tools (0.9.4-1) ...
N: Ignoring file 'ros-latest.listsudo' in directory '/etc/apt/sources.list.d/' as it has an invalid filename extension
abi@LAPTOP-UVGVSCCU: ~$ sudo apt install python3-wstool
Reading package lists... Done
Building dependency tree
Reading state information... Done
python3-wstool is already the newest version (0.1.18-2).
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
N: Ignoring file 'ros-latest.listsudo' in directory '/etc/apt/sources.list.d/' as it has an invalid filename extension
abi@LAPTOP-UVGVSCCU: ~$
```

6. Jalankan syntax **mkdir -p ~/ws_moveit/src** untuk membuat direktori workspace, dan **cd ~/ws_moveit/src** untuk masuk ke direktori sumber workspace.

```
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for dbus (1.12.16-2ubuntu2.3) ...
Processing triggers for install-info (6.7.0.dfsg.2-5) ...
Processing triggers for intramfs-tools (0.136ubuntu6.7) ...
abi@LAPTOP-UVGVSCCU: ~$ sudo apt install ros-noetic-catkin python3-catkin-tools
Reading package lists... Done
Building dependency tree
Reading state information... Done
ros-noetic-catkin is already the newest version (0.8.10-1focal.20210423.221558).
ros-noetic-catkin set to manually installed.
The following NEW packages will be installed:
  python3-catkin-tools python3-osrf-pycommon
0 upgraded, 2 newly installed, 0 to remove and 0 not upgraded.
Need to get 183 kB of archives.
After this operation, 735 kB of additional disk space will be used.
Get:1 http://packages.ros.org/ubuntu focal/main amd64 python3-osrf-pycommon all 2.0.2-1 [23.3 kB]
Get:2 http://packages.ros.org/ubuntu focal/main amd64 python3-catkin-tools all 0.9.4-1 [160 kB]
Fetched 183 kB in 2s (98.8 kB/s)
N: Ignoring file 'ros-latest.listsudo' in directory '/etc/apt/sources.list.d/' as it has an invalid filename extension
(Reading database ... 149050 files and directories currently installed.)
Preparing to unpack .../python3-osrf-pycommon_2.0.2-1_all.deb ...
Unpacking python3-osrf-pycommon (2.0.2-1) ...
Selecting previously unselected package python3-catkin-tools.
Preparing to unpack .../python3-catkin-tools_0.9.4-1_all.deb ...
Unpacking python3-catkin-tools (0.9.4-1) ...
Setting up python3-osrf-pycommon (2.0.2-1) ...
Setting up python3-catkin-tools (0.9.4-1) ...
N: Ignoring file 'ros-latest.listsudo' in directory '/etc/apt/sources.list.d/' as it has an invalid filename extension
abi@LAPTOP-UVGVSCCU: ~$ sudo apt install python3-wstool
Reading package lists... Done
Building dependency tree
Reading state information... Done
python3-wstool is already the newest version (0.1.18-2).
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
N: Ignoring file 'ros-latest.listsudo' in directory '/etc/apt/sources.list.d/' as it has an invalid filename extension
abi@LAPTOP-UVGVSCCU: ~$ mkdir -p ~/ws_moveit/src
abi@LAPTOP-UVGVSCCU: ~$ cd ~/ws_moveit/src
abi@LAPTOP-UVGVSCCU: ~/ws_moveit/src$
```

7. Jalankan syntax **wstool init** . untuk menginisialisasi workspace dengan wstool.

```
Processing triggers for inrtaws-tools (0.136ubuntu6.7) ...
abi@LAPTOP-UVGVSCCU: ~/$ sudo apt install ros-noetic-catkin python3-catkin-tools
Reading package lists... Done
Building dependency tree
Reading state information... Done
ros-noetic-catkin is already the newest version (0.8.10-1focal.28210423.221558).
ros-noetic-catkin set to manually installed.
The following NEW packages will be installed:
  python3-catkin-tools python3-osrf-pycommon
0 upgraded, 2 newly installed, 0 to remove and 0 not upgraded.
Need to get 183 kB of archives.
After this operation, 735 kB of additional disk space will be used.
Get:1 http://packages.ros.org/ros/ubuntu focal/main amd64 python3-osrf-pycommon all 2.0.2-1 [23.3 kB]
Get:2 http://packages.ros.org/ros/ubuntu focal/main amd64 python3-catkin-tools all 0.9.4-1 [160 kB]
Fetched 183 kB in 2s (98.8 kB/s)
N: Ignoring file 'ros-latest.listsudo' in directory '/etc/apt/sources.list.d/' as it has an invalid filename extension
Selecting previously unselected package python3-osrf-pycommon.
(Reading database ... 149050 files and directories currently installed.)
Preparing to unpack .../python3-osrf-pycommon_2.0.2-1_all.deb ...
Unpacking python3-osrf-pycommon (2.0.2-1) ...
Selecting previously unselected package python3-catkin-tools.
Preparing to unpack .../python3-catkin-tools_0.9.4-1_all.deb ...
Unpacking python3-catkin-tools (0.9.4-1) ...
Setting up python3-osrf-pycommon (2.0.2-1) ...
Setting up python3-catkin-tools (0.9.4-1) ...
N: Ignoring file 'ros-latest.listsudo' in directory '/etc/apt/sources.list.d/' as it has an invalid filename extension
abi@LAPTOP-UVGVSCCU: ~/$ sudo apt install python3-wstool
Reading package lists... Done
Building dependency tree
Reading state information... Done
python3-wstool is already the newest version (0.1.18-2).
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
N: Ignoring file 'ros-latest.listsudo' in directory '/etc/apt/sources.list.d/' as it has an invalid filename extension
abi@LAPTOP-UVGVSCCU: ~/$ mkdir -p ~/ws_moveit/src
abi@LAPTOP-UVGVSCCU: ~/$ cd ~/ws_moveit/src
abi@LAPTOP-UVGVSCCU: ~/ws_moveit/src$ wstool init
Writing /home/abi/ws_moveit/src/.rosinstall
update complete.
abi@LAPTOP-UVGVSCCU: ~/ws_moveit/src$
```

8. Jalankan syntax **wstool merge -t** .

<https://raw.githubusercontent.com/moveit/moveit/master/moveit.rosinstall> untuk menggabungkan konfigurasi repositori Moveit ke workspace.

```
Need to get 183 kB of archives.
After this operation, 735 kB of additional disk space will be used.
Get:1 http://packages.ros.org/ros/ubuntu focal/main amd64 python3-osrf-pycommon all 2.0.2-1 [23.3 kB]
Get:2 http://packages.ros.org/ros/ubuntu focal/main amd64 python3-catkin-tools all 0.9.4-1 [160 kB]
Fetched 183 kB in 2s (98.8 kB/s)
N: Ignoring file 'ros-latest.listsudo' in directory '/etc/apt/sources.list.d/' as it has an invalid filename extension
Selecting previously unselected package python3-osrf-pycommon.
(Reading database ... 149050 files and directories currently installed.)
Preparing to unpack .../python3-osrf-pycommon_2.0.2-1_all.deb ...
Unpacking python3-osrf-pycommon (2.0.2-1) ...
Selecting previously unselected package python3-catkin-tools.
Preparing to unpack .../python3-catkin-tools_0.9.4-1_all.deb ...
Unpacking python3-catkin-tools (0.9.4-1) ...
Setting up python3-osrf-pycommon (2.0.2-1) ...
Setting up python3-catkin-tools (0.9.4-1) ...
N: Ignoring file 'ros-latest.listsudo' in directory '/etc/apt/sources.list.d/' as it has an invalid filename extension
abi@LAPTOP-UVGVSCCU: ~/$ sudo apt install python3-wstool
Reading package lists... Done
Building dependency tree
Reading state information... Done
python3-wstool is already the newest version (0.1.18-2).
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
N: Ignoring file 'ros-latest.listsudo' in directory '/etc/apt/sources.list.d/' as it has an invalid filename extension
abi@LAPTOP-UVGVSCCU: ~/$ mkdir -p ~/ws_moveit/src
abi@LAPTOP-UVGVSCCU: ~/$ cd ~/ws_moveit/src
abi@LAPTOP-UVGVSCCU: ~/ws_moveit/src$ wstool init
Writing /home/abi/ws_moveit/src/.rosinstall
update complete.
abi@LAPTOP-UVGVSCCU: ~/ws_moveit/src$ wstool merge -t . https://raw.githubusercontent.com/moveit/moveit/master/moveit.rosinstall
Performing actions:
Add new elements:
  geometric_shapes, moveit, moveit_msgs, moveit_resources, moveit_tutorials, moveit_visual_tools, panda_moveit_config, rviz_visual_tools, srdfdom
Config changed, maybe you need run wstool update to update SCM entries.
Overwriting /home/abi/ws_moveit/src/.rosinstall
update complete.
abi@LAPTOP-UVGVSCCU: ~/ws_moveit/src$
```

9. Jalankan syntax **wstool remove moveit_tutorials** untuk menghapus tutorial Moveit dari workspace.

```
abi@LAPTOP-UVGVSCU: ~$ sudo apt install python3-wstool
Get:2 http://packages.ros.org/ros/ubuntu focal/main amd64 python3-catkin-tools all 0.9.4-1 [160 kB]
Fetched 183 kB in 2s (98.8 kB/s)
W: Ignoring file 'ros-latest.listsudo' in directory '/etc/apt/sources.list.d/' as it has an invalid filename extension
Selecting previously unselected package python3-osrf-pycommon.
(Reading database ... 149950 files and directories currently installed.)
Preparing to unpack .../python3-osrf-pycommon_2.0.2-1_all.deb ...
Unpacking python3-osrf-pycommon (2.0.2-1) ...
Selecting previously unselected package python3-catkin-tools.
Preparing to unpack .../python3-catkin-tools_0.9.4-1_all.deb ...
Unpacking python3-catkin-tools (0.9.4-1) ...
Setting up python3-osrf-pycommon (2.0.2-1) ...
Setting up python3-catkin-tools (0.9.4-1) ...
W: Ignoring file 'ros-latest.listsudo' in directory '/etc/apt/sources.list.d/' as it has an invalid filename extension
abi@LAPTOP-UVGVSCU:~$ sudo apt install python3-wstool
Reading package lists... Done
Building dependency tree
Reading state information... Done
python3-wstool is already the newest version (0.1.10-2).
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
W: Ignoring file 'ros-latest.listsudo' in directory '/etc/apt/sources.list.d/' as it has an invalid filename extension
abi@LAPTOP-UVGVSCU:~$ mkdir -p ~/ws_moveit/src
abi@LAPTOP-UVGVSCU:~$ cd ~/ws_moveit/src
abi@LAPTOP-UVGVSCU:~/ws_moveit/src$ wstool init .
Writing /home/abi/ws_moveit/src/.rosinstall

update complete.
abi@LAPTOP-UVGVSCU:~/ws_moveit/src$ wstool merge -t . https://raw.githubusercontent.com/moveit/moveit/master/moveit.rosinstall
Performing actions:

Add new elements:
  geometric_shapes, moveit, moveit_msgs, moveit_resources, moveit_tutorials, moveit_visual_tools, panda_moveit_config, rviz_visual_tools, srdfdom

Config changed, maybe you need run wstool update to update SCM entries.
Overwriting /home/abi/ws_moveit/src/.rosinstall

update complete.
abi@LAPTOP-UVGVSCU:~/ws_moveit/src$ wstool remove moveit_tutorials # this is cloned in the next section
Overwriting /home/abi/ws_moveit/src/.rosinstall
Removed entries ['moveit_tutorials']
abi@LAPTOP-UVGVSCU:~/ws_moveit/src$
```

10. Jalankan syntax **wstool update -t .** untuk memperbarui repositori di workspace

```
abi@LAPTOP-UVGVSCU:~/ws_moveit/src$ wstool update -t .
[geometric_shapes] Fetching https://github.com/moveit/moveit_geometric_shapes.git (version noetic-devel) to /home/abi/ws_moveit/src/geometric_shapes
Cloning into '/home/abi/ws_moveit/src/geometric_shapes'...
remote: Enumerating objects: 2102, done.
remote: Counting objects: 100% (368/368), done.
remote: Compressing objects: 100% (162/162), done.
remote: Total 2102 (delta 280), reused 221 (delta 204), pack-reused 1734 (from 1)
Receiving objects: 100% (2102/2102), 580.79 KiB | 5.43 MiB/s, done.
Resolving deltas: 100% (1325/1325), done.
[geometric_shapes] Done.
[moveit] Fetching https://github.com/moveit/moveit.git (version master) to /home/abi/ws_moveit/src/moveit
Cloning into '/home/abi/ws_moveit/src/moveit'...
remote: Enumerating objects: 111708, done.
remote: Counting objects: 100% (10849/10849), done.
remote: Compressing objects: 100% (1285/1285), done.
remote: Total 111708 (delta 9222), reused 9839 (delta 8716), pack-reused 101659 (from 1)
Receiving objects: 100% (111708/111708), 69.13 MiB | 13.33 MiB/s, done.
Resolving deltas: 100% (66891/66891), done.
[moveit] Done.
[moveit_msgs] Fetching https://github.com/moveit/moveit_msgs.git (version master) to /home/abi/ws_moveit/src/moveit_msgs
Cloning into '/home/abi/ws_moveit/src/moveit_msgs'...
remote: Enumerating objects: 1742, done.
remote: Counting objects: 100% (290/290), done.
remote: Compressing objects: 100% (97/97), done.
remote: Total 1742 (delta 229), reused 200 (delta 190), pack-reused 1452 (from 1)
Receiving objects: 100% (1742/1742), 299.10 KiB | 1.17 MiB/s, done.
Resolving deltas: 100% (941/941), done.
[moveit_msgs] Done.
[moveit_resources] Fetching https://github.com/moveit/moveit_resources.git (version master) to /home/abi/ws_moveit/src/moveit_resources
Cloning into '/home/abi/ws_moveit/src/moveit_resources'...
remote: Enumerating objects: 2605, done.
remote: Counting objects: 100% (704/704), done.
remote: Compressing objects: 100% (214/214), done.
remote: Total 2605 (delta 550), reused 556 (delta 486), pack-reused 1901 (from 1)
Receiving objects: 100% (2605/2605), 36.55 MiB | 13.14 MiB/s, done.
Resolving deltas: 100% (1597/1597), done.
[moveit_resources] Done.
[moveit_visual_tools] Fetching https://github.com/moveit/moveit_visual_tools.git (version master) to /home/abi/ws_moveit/src/moveit_visual_tools
Cloning into '/home/abi/ws_moveit/src/moveit_visual_tools'...
remote: Enumerating objects: 2225, done.
```


11. Jalankan syntax `cd ~/ws_moveit/src` untuk masuk ke direktori sumber, `git clone`

https://github.com/moveit/moveit_tutorials.git -b master dan `git clone`

https://github.com/moveit/panda_moveit_config.git -b noetic-devel untuk mengkloning repositori tutorial dan konfigurasi panda MoveIt.

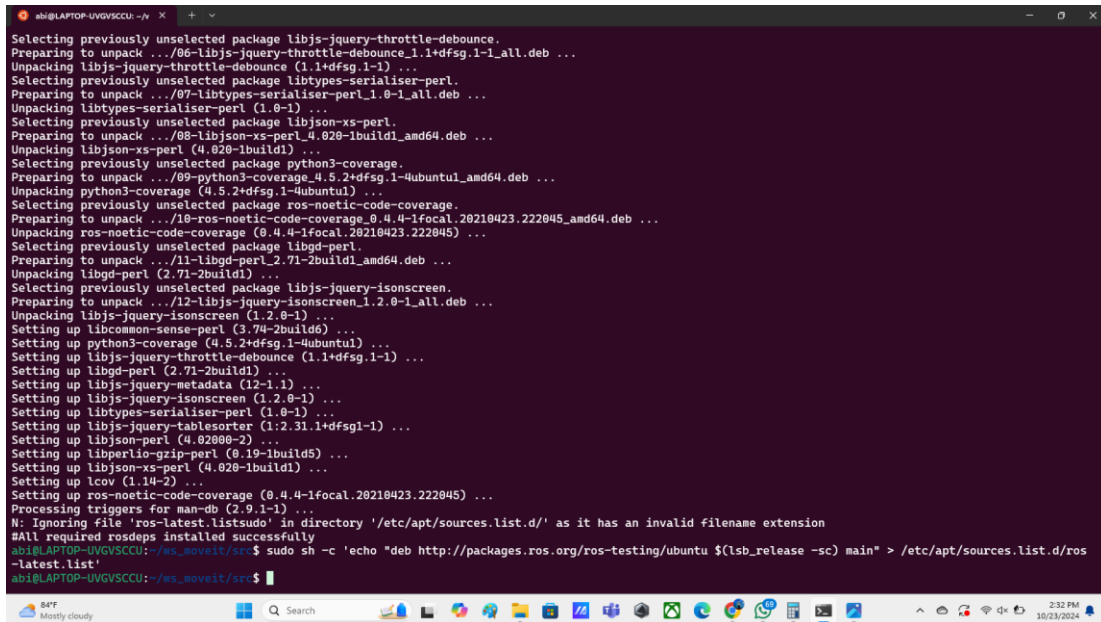
```
abi@LAPTOP-UVGVSCCU: ~$ cd ~/ws_moveit/src
[moveit_visual_tools] Done.
[panda_moveit_config] Fetching https://github.com/moveit/panda_moveit_config.git (version noetic-devel) to /home/abi/ws_moveit/src/panda_moveit_config
Cloning into 'panda_moveit_config'...
remote: Enumerating objects: 683, done.
remote: Counting objects: 100% (418/418), done.
remote: Compressing objects: 100% (145/145), done.
remote: Total 683 (delta 310), reused 305 (delta 265), pack-reused 273 (from 1)
Receiving objects: 100% (683/683), 142.95 MiB | 3.11 MiB/s, done.
Resolving deltas: 100% (444/444), done.
[panda_moveit_config] Done.
[rviz_visual_tools] Fetching https://github.com/PickNikRobotics/rviz_visual_tools (version master) to /home/abi/ws_moveit/src/rviz_visual_tools
Cloning into 'rviz_visual_tools'...
remote: Enumerating objects: 2809, done.
remote: Counting objects: 100% (421/421), done.
remote: Compressing objects: 100% (207/207), done.
remote: Total 2809 (delta 269), reused 325 (delta 196), pack-reused 2388 (from 1)
Receiving objects: 100% (2809/2809), 3.88 MiB | 4.28 MiB/s, done.
Resolving deltas: 100% (1706/1706), done.
[rviz_visual_tools] Done.
[srdfdom] Fetching https://github.com/moveit/srdfdom (version noetic-devel) to /home/abi/ws_moveit/src/srdfdom
Cloning into 'srdfdom'...
remote: Enumerating objects: 1041, done.
remote: Counting objects: 100% (186/186), done.
remote: Compressing objects: 100% (71/71), done.
remote: Total 1041 (delta 158), reused 115 (delta 115), pack-reused 855 (from 1)
Receiving objects: 100% (1041/1041), 240.60 MiB | 3.34 MiB/s, done.
Resolving deltas: 100% (550/550), done.
[srdfdom] Done.
abi@LAPTOP-UVGVSCCU: ~/ws_moveit/src$ cd ~/ws_moveit/src
abi@LAPTOP-UVGVSCCU: ~/ws_moveit/src$ git clone https://github.com/moveit/moveit_tutorials.git -b master
Cloning into 'moveit_tutorials'...
remote: Enumerating objects: 5170, done.
remote: Counting objects: 100% (412/412), done.
remote: Compressing objects: 100% (258/258), done.
remote: Total 5170 (delta 208), reused 318 (delta 149), pack-reused 4758 (from 1)
Receiving objects: 100% (5170/5170), 76.00 MiB | 10.64 MiB/s, done.
Resolving deltas: 100% (2991/2991), done.
abi@LAPTOP-UVGVSCCU: ~/ws_moveit/src$ git clone https://github.com/moveit/panda_moveit_config.git -b noetic-devel
fatal: destination path 'panda_moveit_config' already exists and is not an empty directory.
abi@LAPTOP-UVGVSCCU: ~/ws_moveit/src$
```

12. Jalankan syntax `rosdep install -y --from-paths . --ignore-src --rosdistro noetic` untuk menginstall semua dependensi yang dibutuhkan oleh workspace.

```
abi@LAPTOP-UVGVSCCU: ~/ws_moveit/src$ rosdep install -y --from-paths . --ignore-src --rosdistro noetic
executing command [sudo -H apt-get install -y libbenchmark-dev]
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libbenchmark1
Suggested packages:
  libbenchmark-tools
The following NEW packages will be installed:
  libbenchmark-dev libbenchmark1
0 upgraded, 2 newly installed, 0 to remove and 0 not upgraded.
Need to get 143 kB of archives.
After this operation, 428 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu focal/universe amd64 libbenchmark1 amd64 1.5.0-4build1 [111 kB]
Get:2 http://archive.ubuntu.com/ubuntu focal/universe amd64 libbenchmark-dev amd64 1.5.0-4build1 [32.5 kB]
Fetched 143 kB in 2s (83.0 kB/s)
N: Ignoring file 'ros-latest.listsudo' in directory '/etc/apt/sources.list.d/' as it has an invalid filename extension
Selecting previously unselected package libbenchmark1:amd64.
(Reading database ... 149182 files and directories currently installed.)
Preparing to unpack .../libbenchmark1_1.5.0-4build1_amd64.deb ...
Unpacking libbenchmark1:amd64 (1.5.0-4build1) ...
Selecting previously unselected package libbenchmark-dev.
Preparing to unpack .../libbenchmark-dev_1.5.0-4build1_amd64.deb ...
Unpacking libbenchmark-dev (1.5.0-4build1) ...
Setting up libbenchmark1:amd64 (1.5.0-4build1) ...
Setting up libbenchmark-dev (1.5.0-4build1) ...
Processing triggers for libc-bin (2.31-0ubuntu9.16) ...
/usr/lib/cron/real: /usr/lib/ssl/lib/libc.so.1 is not a symbolic link
N: Ignoring file 'ros-latest.listsudo' in directory '/etc/apt/sources.list.d/' as it has an invalid filename extension
executing command [sudo -H apt-get install -y ros-noetic-eigen-stl-containers]
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  ros-noetic-eigen-stl-containers
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 6824 B of archives.
After this operation, 39.9 kB of additional disk space will be used.
```

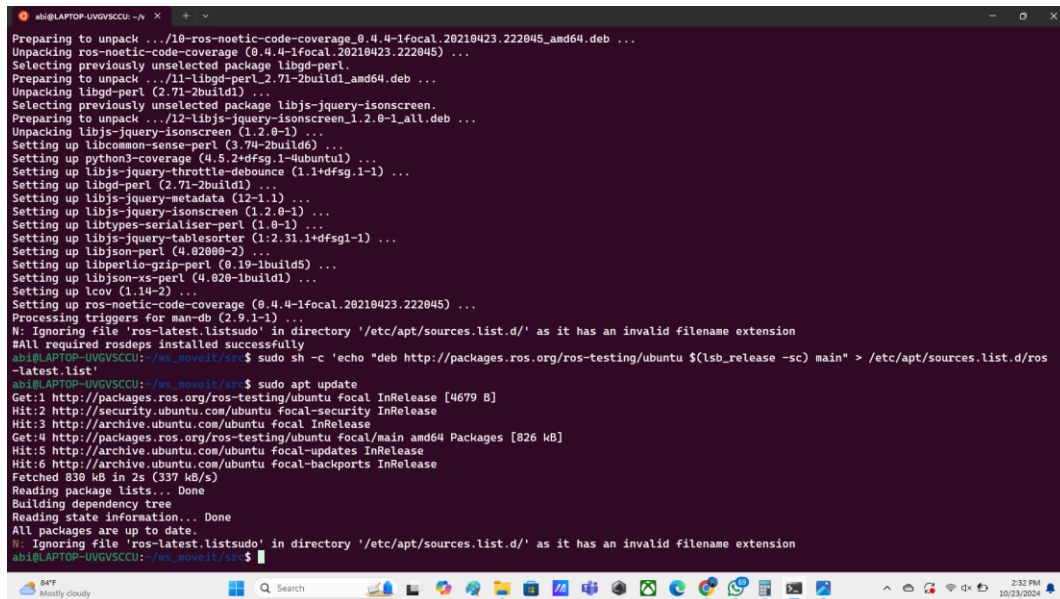
13. Jalankan syntax `sudo sh -c 'echo "deb http://packages.ros.org/ros-testing/ubuntu $(lsb_release -sc) main" > /etc/apt/sources.list.d/ros-latest.list'` untuk menambahkan repositori ROS-testing ke sources list.

```
ab1@LAPTOP-UVGVSCCU: ~/ws_moveit/src$ sudo sh -c 'echo "deb http://packages.ros.org/ros-testing/ubuntu $(lsb_release -sc) main" > /etc/apt/sources.list.d/ros-latest.list'
```



14. Jalankan syntax `sudo apt update` untuk memperbarui daftar repositori setelah menambah repositori ROS-testing.

```
ab1@LAPTOP-UVGVSCCU: ~/ws_moveit/src$ sudo apt update
```



15. Jalankan syntax **cd ~/ws_moveit** untuk masuk ke workspace utama, dan **catkin config --extend /opt/ros/\${ROS_DISTRO} --cmake-args -DCMAKE_BUILD_TYPE=Release** untuk memperluas dari ROS Noetic.

```
abi@LAPTOP-UVGVSCCU: ~/ws_moveit
Get:4 http://packages.ros.org/ros-testing/ubuntu focal/main amd64 Packages [826 kB]
Hit:5 http://archive.ubuntu.com/ubuntu focal-updates InRelease
Hit:6 http://archive.ubuntu.com/ubuntu focal-backports InRelease
Fetched 830 kB in 2s (337 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
All packages are up to date.
N: Ignoring file 'ros-latest.listsudo' in directory '/etc/apt/sources.list.d/' as it has an invalid filename extension
abi@LAPTOP-UVGVSCCU:~/ws_moveit/src$ cd ~/ws_moveit
abi@LAPTOP-UVGVSCCU:~/ws_moveit$ catkin config --extend /opt/ros/${ROS_DISTRO} --cmake-args -DCMAKE_BUILD_TYPE=Release

Profile:          default
Extending:        [explicit] /opt/ros/noetic
Workspace:        /home/abi/ws_moveit

Build Space:      [missing] /home/abi/ws_moveit/build
Devel Space:      [missing] /home/abi/ws_moveit/devel
Install Space:    [unused] /home/abi/ws_moveit/install
Log Space:        [missing] /home/abi/ws_moveit/logs
Source Space:     [exists] /home/abi/ws_moveit/src
DESTDIR:          [unused] None

Devel Space Layout: Linked
Install Space Layout: None

Additional CMake Args: -DCMAKE_BUILD_TYPE=Release
Additional Make Args:  None
Additional catkin Make Args: None
Internal Make Job Server: True
Cache Job Environments: False

Buildlisted Packages: None
Skiplisted Packages:  None

Workspace configuration appears valid.

Initialized new catkin workspace in '/home/abi/ws_moveit'
abi@LAPTOP-UVGVSCCU:~/ws_moveit$
```

16. Jalankan syntax **catkin build -j1** untuk membangun workspace Moveit 1 per 1.

```
abi@LAPTOP-UVGVSCCU: ~/ws_moveit
abi@LAPTOP-UVGVSCCU:~/ws_moveit$ catkin build -j1

Profile:          default
Extending:        [explicit] /opt/ros/noetic
Workspace:        /home/abi/ws_moveit

Build Space:      [exists] /home/abi/ws_moveit/build
Devel Space:      [exists] /home/abi/ws_moveit/devel
Install Space:    [unused] /home/abi/ws_moveit/install
Log Space:        [exists] /home/abi/ws_moveit/logs
Source Space:     [exists] /home/abi/ws_moveit/src
DESTDIR:          [unused] None

Devel Space Layout: Linked
Install Space Layout: None

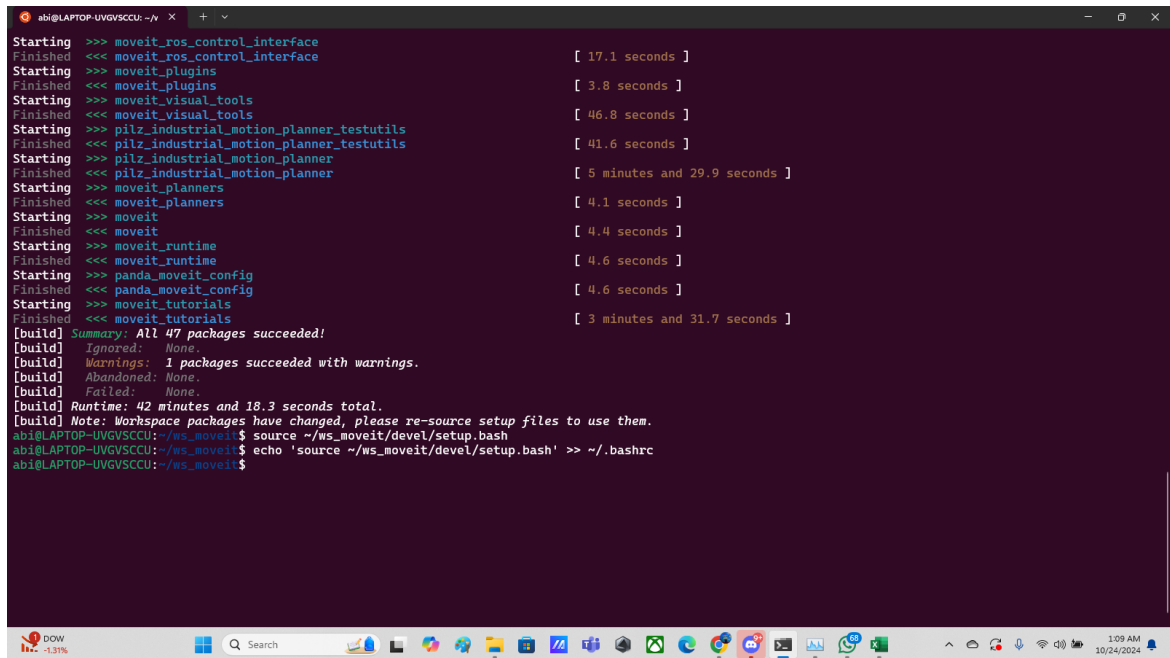
Additional CMake Args: -DCMAKE_BUILD_TYPE=Release
Additional Make Args:  -j1
Additional catkin Make Args: None
Internal Make Job Server: True
Cache Job Environments: False

Buildlisted Packages: None
Skiplisted Packages:  None

Workspace configuration appears valid.

[build] Found 47 packages in 0.0 seconds.
[build] Package table is up to date.
Starting >>> geometric_shapes [ 0.4 seconds ]
Finished <<< geometric_shapes
Starting >>> moveit_msgs [ 6.3 seconds ]
Finished <<< moveit_msgs
Starting >>> moveit_resources_fanuc_description [ 0.1 seconds ]
Finished <<< moveit_resources_fanuc_description
Starting >>> moveit_resources_fanuc_moveit_config [ 0.1 seconds ]
Finished <<< moveit_resources_fanuc_moveit_config
Starting >>> moveit_resources_panda_description [ 0.2 seconds ]
Finished <<< moveit_resources_panda_description
```


17. Jalankan **syntax source ~/ws_moveit/devel/setup.bash** untuk memuat workspace ke environment shell, dan **echo 'source ~/ws_moveit/devel/setup.bash' >> ~/.bashrc** untuk menambahkan perintah pemuatan otomatis saat terminal dibuka.



```
abi@LAPTOP-UVGVSCCU: ~/v
Starting >>> moveit_ros_control_interface
Finished <<< moveit_ros_control_interface [ 17.1 seconds ]
Starting >>> moveit_plugins
Finished <<< moveit_plugins [ 3.8 seconds ]
Starting >>> moveit_visual_tools
Finished <<< moveit_visual_tools [ 46.8 seconds ]
Starting >>> pilz_industrial_motion_planner_testutils
Finished <<< pilz_industrial_motion_planner_testutils [ 41.6 seconds ]
Starting >>> pilz_industrial_motion_planner
Finished <<< pilz_industrial_motion_planner [ 5 minutes and 29.9 seconds ]
Starting >>> moveit_planners
Finished <<< moveit_planners [ 4.1 seconds ]
Starting >>> moveit
Finished <<< moveit [ 4.4 seconds ]
Starting >>> moveit_runtime
Finished <<< moveit_runtime [ 4.6 seconds ]
Starting >>> panda_moveit_config
Finished <<< panda_moveit_config [ 4.6 seconds ]
Starting >>> moveit_tutorials
Finished <<< moveit_tutorials [ 3 minutes and 31.7 seconds ]
[build] Summary: All 47 packages succeeded!
[build] Ignored: None
[build] Warnings: 1 packages succeeded with warnings.
[build] Abandoned: None
[build] Failed: None
[build] Runtime: 42 minutes and 18.3 seconds total.
[build] Note: Workspace packages have changed, please re-source setup files to use them.
abi@LAPTOP-UVGVSCCU:~/ws_moveit$ source ~/ws_moveit/devel/setup.bash
abi@LAPTOP-UVGVSCCU:~/ws_moveit$ echo 'source ~/ws_moveit/devel/setup.bash' >> ~/.bashrc
abi@LAPTOP-UVGVSCCU:~/ws_moveit$
```