

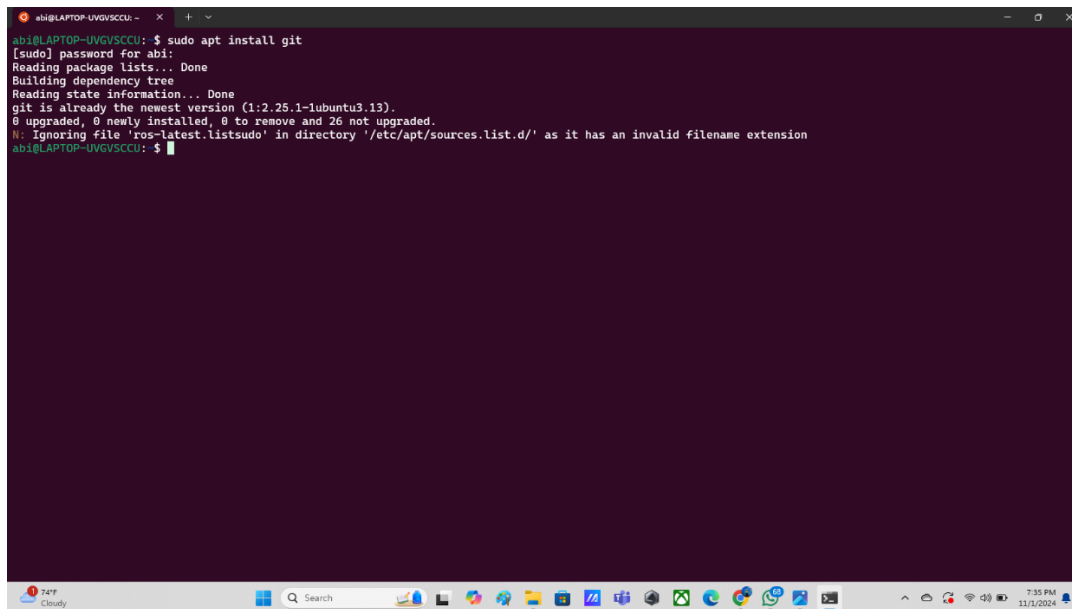
Nama : Ketut Satria Wibisana

NIM : 1103213148

Kelas : TK-45-G09

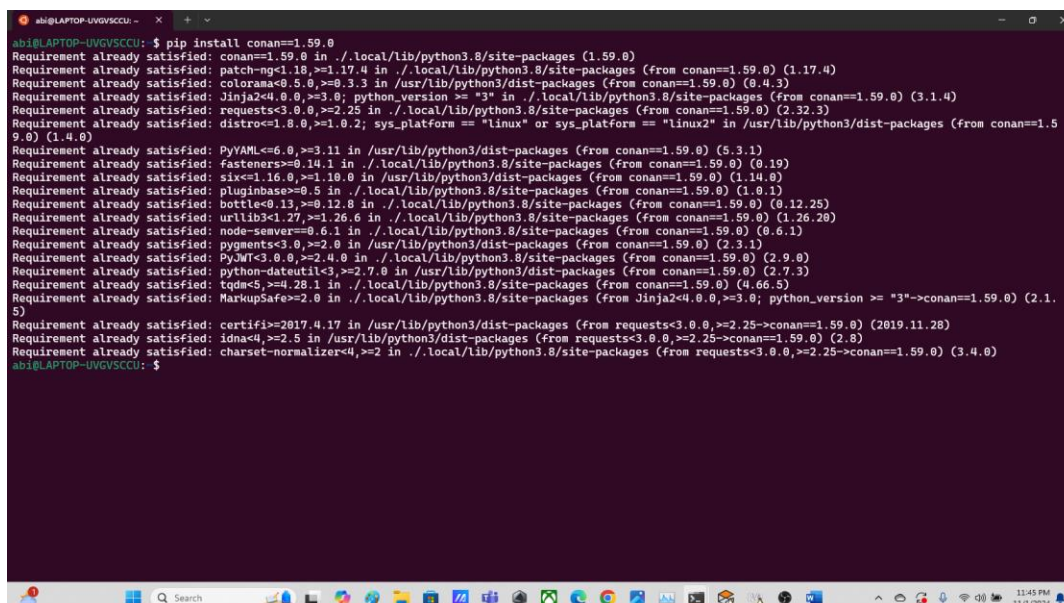
Langkah ROS Motion Planning

1. Jalankan syntax **sudo apt install git** untuk menginstall Git, yang diperlukan untuk mengunduh repositori proyek dari GitHub.



```
abi@LAPTOP-UVGVSCCU: ~$ sudo apt install git
[sudo] password for abi:
Reading package lists... Done
Building dependency tree
Reading state information... Done
git is already the newest version (1:2.25.1-1ubuntu3.13).
0 upgraded, 0 newly installed, 0 to remove and 26 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: ~$
```

2. Jalankan syntax **pip install conan==1.59.0** untuk menginstall Conan versi 1.59.0



```
abi@LAPTOP-UVGVSCCU: ~$ pip install conan==1.59.0
Requirement already satisfied: conan==1.59.0 in ./local/lib/python3.8/site-packages (1.59.0)
Requirement already satisfied: patch-ng<1.18,>=1.17.4 in ./local/lib/python3.8/site-packages (from conan==1.59.0) (1.17.4)
Requirement already satisfied: colorama<0.5.0,>=0.3.3 in /usr/lib/python3/dist-packages (from conan==1.59.0) (0.4.3)
Requirement already satisfied: Jinja2<4.0.0,>=3.0; python_version >= "3" in ./local/lib/python3.8/site-packages (from conan==1.59.0) (3.1.4)
Requirement already satisfied: requests<3.0.0,>=2.25 in ./local/lib/python3.8/site-packages (from conan==1.59.0) (2.32.3)
Requirement already satisfied: distro<1.8.0,>=1.0.2; sys_platform == "linux" or sys_platform == "linux2" in /usr/lib/python3/dist-packages (from conan==1.59.0) (1.4.0)
Requirement already satisfied: PyYAML<=6.0,>=3.11 in /usr/lib/python3/dist-packages (from conan==1.59.0) (5.3.1)
Requirement already satisfied: fasteners<0.14.1 in ./local/lib/python3.8/site-packages (from conan==1.59.0) (0.19)
Requirement already satisfied: six<=1.16.0,>=1.10.0 in /usr/lib/python3/dist-packages (from conan==1.59.0) (1.14.0)
Requirement already satisfied: pluginbase<=0.5 in ./local/lib/python3.8/site-packages (from conan==1.59.0) (1.0.1)
Requirement already satisfied: bottle<=0.13,>=0.12.0 in ./local/lib/python3.8/site-packages (from conan==1.59.0) (0.12.25)
Requirement already satisfied: urllib3<1.27,>=1.26.0 in ./local/lib/python3.8/site-packages (from conan==1.59.0) (1.26.20)
Requirement already satisfied: node-semver<=0.6.1 in ./local/lib/python3.8/site-packages (from conan==1.59.0) (0.6.1)
Requirement already satisfied: pygments<3.0,>=2.0 in /usr/lib/python3/dist-packages (from conan==1.59.0) (2.3.1)
Requirement already satisfied: PyJWT<3.0.0,>=2.4.0 in ./local/lib/python3.8/site-packages (from conan==1.59.0) (2.9.0)
Requirement already satisfied: python-dateutil<3,>=2.7.0 in /usr/lib/python3/dist-packages (from conan==1.59.0) (2.7.3)
Requirement already satisfied: tqdm<5,>=4.28.1 in ./local/lib/python3.8/site-packages (from conan==1.59.0) (4.66.5)
Requirement already satisfied: MarkupSafe<=2.0 in ./local/lib/python3.8/site-packages (from Jinja2<4.0.0,>=3.0; python_version >= "3"->conan==1.59.0) (2.1.5)
Requirement already satisfied: certifi<=2017.4.17 in /usr/lib/python3/dist-packages (from requests<3.0.0,>=2.25->conan==1.59.0) (2019.11.28)
Requirement already satisfied: idna<4,>=2.5 in /usr/lib/python3/dist-packages (from requests<3.0.0,>=2.25->conan==1.59.0) (2.8)
Requirement already satisfied: charset-normalizer<4,>=2 in ./local/lib/python3.8/site-packages (from requests<3.0.0,>=2.25->conan==1.59.0) (3.4.0)
abi@LAPTOP-UVGVSCCU: ~$
```

3. Jalankan syntax **sudo apt install python-is-python3 \ ros-noetic-amcl \ ros-noetic-base-local-planner \ ros-noetic-map-server \ ros-noetic-move-base \ ros-noetic-navfn \ libgoogle-glog-dev** untuk menginstall paket-paket ROS yang diperlukan untuk navigasi robot, pemetaan, dan perencanaan jalur.

```
abi@LAPTOP-UVGVSCCU: ~$ sudo apt install python-is-python3 \
> ros-noetic-amcl \
> ros-noetic-base-local-planner \
> ros-noetic-map-server \
> ros-noetic-move-base \
> ros-noetic-navfn \
> libgoogle-glog-dev
Reading package lists... Done
Building dependency tree
Reading state information... Done
python-is-python3 is already the newest version (3.8.2-4).
libgoogle-glog-dev is already the newest version (0.4.0-1build1).
ros-noetic-amcl is already the newest version (1.17.3-1focal.20240913.200354).
ros-noetic-base-local-planner is already the newest version (1.17.3-1focal.20240913.203453).
ros-noetic-map-server is already the newest version (1.17.3-1focal.20240913.191428).
ros-noetic-move-base is already the newest version (1.17.3-1focal.20240913.204544).
ros-noetic-navfn is already the newest version (1.17.3-1focal.20240913.203647).
0 upgraded, 0 newly installed, 0 to remove and 26 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: ~$
```

4. Jalankan syntax **git clone https://github.com/ai-winter/ros_motion_planning.git** untuk mengunduh repositori **ros_motion_planning** dari Github ke dalam direktori loka

```
abi@LAPTOP-UVGVSCCU: ~$ sudo apt install python-is-python3 \
> ros-noetic-amcl \
> ros-noetic-base-local-planner \
> ros-noetic-map-server \
> ros-noetic-move-base \
> ros-noetic-navfn \
> libgoogle-glog-dev
Reading package lists... Done
Building dependency tree
Reading state information... Done
python-is-python3 is already the newest version (3.8.2-4).
libgoogle-glog-dev is already the newest version (0.4.0-1build1).
ros-noetic-amcl is already the newest version (1.17.3-1focal.20240913.200354).
ros-noetic-base-local-planner is already the newest version (1.17.3-1focal.20240913.203453).
ros-noetic-map-server is already the newest version (1.17.3-1focal.20240913.191428).
ros-noetic-move-base is already the newest version (1.17.3-1focal.20240913.204544).
ros-noetic-navfn is already the newest version (1.17.3-1focal.20240913.203647).
0 upgraded, 0 newly installed, 0 to remove and 26 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: ~$ git clone https://github.com/ai-winter/ros_motion_planning.git
Cloning into 'ros_motion_planning'...
remote: Enumerating objects: 6169, done.
remote: Counting objects: 100% (1479/1479), done.
remote: Compressing objects: 100% (569/569), done.
error: RPC failed; curl 92 HTTP/2 stream 0 was not closed cleanly: CANCEL (err 8)
fatal: the remote end hung up unexpectedly
fatal: early EOF
fatal: index-pack failed
abi@LAPTOP-UVGVSCCU: ~$ git clone https://github.com/ai-winter/ros_motion_planning.git
Cloning into 'ros_motion_planning'...
remote: Enumerating objects: 6169, done.
remote: Counting objects: 100% (1479/1479), done.
remote: Compressing objects: 100% (569/569), done.
remote: Total 6169 (delta 802), reused 1389 (delta 811), pack-reused 4690 (from 1)
Receiving objects: 100% (6169/6169), 143.78 MiB | 583.00 KiB/s, done.
Resolving deltas: 100% (3322/3322), done.
Updating files: 100% (527/527), done.
abi@LAPTOP-UVGVSCCU: ~$
```

5. Jalankan syntax **./build.sh** untuk membangun proyek, mengompilasi kode sumber, dan menyiapkan semua dependensi yang diperlukan hingga 100%.

```
abi@LAPTOP-UVGVSCCU: $ cd scripts
-bash: cd: scripts: No such file or directory
abi@LAPTOP-UVGVSCCU: $ cd /home/abi/ros_motion_planning/scripts
abi@LAPTOP-UVGVSCCU:~/ros_motion_planning/scripts$ ./build.sh

Configuration:
[settings]
arch=x86_64
arch_build=x86_64
build_type=Release
compiler=gcc
compiler.libcxx=libstdc++
compiler.version=9
os=linux
os_build=linux
[options]
[build_requires]
[env]

conanfile.py: Installing package
Requirements
  osqp/0.6.3 from local cache - Cache
Packages
  osqp/0.6.3:6af9cc7cb931c5ad942174fd7838eb655717c709 - Cache

Installing (downloading, building) binaries...
osqp/0.6.3: Already installed!
conanfile.py: WARN: Using the new toolchains and generators without specifying a build profile (e.g: -pr:b=default) is discouraged and might cause failures and unexpected behavior
conanfile.py: Generator 'CMakeToolchain' calling 'generate()'
conanfile.py: Preset 'release' added to CMakePresets.json. Invoke it manually using 'cmake --preset release'
conanfile.py: If your CMake version is not compatible with CMakePresets (<3.19) call cmake like: 'cmake <path> -G "Unix Makefiles" -DCMAKE_TOOLCHAIN_FILE=/home/abi/ros_motion_planning/3rd/build/build/Release/generators/conan_toolchain.cmake -DCMAKE_POLICY_DEFAULT_CMP0091=NEW -DCMAKE_BUILD_TYPE=Release'
conanfile.py: WARN: Using the new toolchains and generators without specifying a build profile (e.g: -pr:b=default) is discouraged and might cause failures and unexpected behavior
conanfile.py: Generator 'CMakeDeps' calling 'generate()'
conanfile.py: Generator txt created conanbuildinfo.txt
conanfile.py: Generator cmake created conanbuildinfo.cmake
conanfile.py: Generator cmake_find_package created Findosqp.cmake
conanfile.py: Aggregating env generators

[ 77%] Built target gazebo_sfml_plugin_generate_messages_lisp
[ 77%] Built target spencer_tracking_msgs_generate_messages
[ 77%] Built target pedsim_msgs_generate_messages
[ 77%] Built target spencer_control_msgs_generate_messages
[ 77%] Built target spencer_social_relation_msgs_generate_messages
[ 77%] Built target spencer_human_attribute_msgs_generate_messages
[ 77%] Built target spencer_vision_msgs_generate_messages
[ 77%] Built target gazebo_sfml_plugin_generate_messages
[ 80%] Built target dwa_controller
[ 81%] Built target common
[ 82%] Built target controller
[ 82%] Building CXX object plugins/rviz_plugins/spencer_tracking_rviz_plugin/CMakeFiles/spencer_tracking_rviz_plugin.dir/src/moc_detected_persons_display.cpp.o
[ 82%] Building CXX object plugins/rviz_plugins/spencer_tracking_rviz_plugin/CMakeFiles/spencer_tracking_rviz_plugin.dir/src/moc_tracked_persons_display.cpp.o
[ 83%] Building CXX object plugins/rviz_plugins/spencer_tracking_rviz_plugin/CMakeFiles/spencer_tracking_rviz_plugin.dir/src/moc_social_relations_display.cpp.o
[ 83%] Building CXX object plugins/rviz_plugins/spencer_tracking_rviz_plugin/CMakeFiles/spencer_tracking_rviz_plugin.dir/src/moc_tracked_groups_display.cpp.o
[ 84%] Building CXX object plugins/rviz_plugins/spencer_tracking_rviz_plugin/CMakeFiles/spencer_tracking_rviz_plugin.dir/src/moc_person_display_common.cpp.o
[ 84%] Building CXX object plugins/rviz_plugins/spencer_tracking_rviz_plugin/CMakeFiles/spencer_tracking_rviz_plugin.dir/src/moc_human_attributes_display.cpp.o
[ 84%] Building CXX object plugins/rviz_plugins/spencer_tracking_rviz_plugin/CMakeFiles/spencer_tracking_rviz_plugin.dir/src/moc_social_activities_display.cpp.o
[ 84%] Building CXX object plugins/rviz_plugins/spencer_tracking_rviz_plugin/CMakeFiles/spencer_tracking_rviz_plugin.dir/src/moc_additional_topic_subscriber.cpp.o
[ 84%] Built target PedestrianSFMLPlugin
[ 91%] Built target path_planner
[ 91%] Built target apf_controller
[ 91%] Built target lqr_controller
[ 92%] Built target mpc_controller
[ 92%] Built target orca_controller
[ 93%] Built target rpp_controller
[ 93%] Built target pid_controller
[ 93%] Building CXX object plugins/gazebo_plugins/pedestrian_visualizer_plugin/gazebo_ped_visualizer_plugin/CMakeFiles/PedestrianVisualPlugin.dir/src/pedestrian_visual_plugin.cpp.o
[ 93%] Linking CXX shared library /home/abi/ros_motion_planning/devel/lib/libspencer_tracking_rviz_plugin.so
[ 98%] Built target spencer_tracking_rviz_plugin
[100%] Linking CXX shared library /home/abi/ros_motion_planning/devel/lib/libPedestrianVisualPlugin.so
[100%] Built target PedestrianVisualPlugin
```

6. Jalankan syntax **./main.sh** untuk menjalankan skrip utama aplikasi, yang akan memulai semua komponen yang akan diperlukan untuk motion planning.

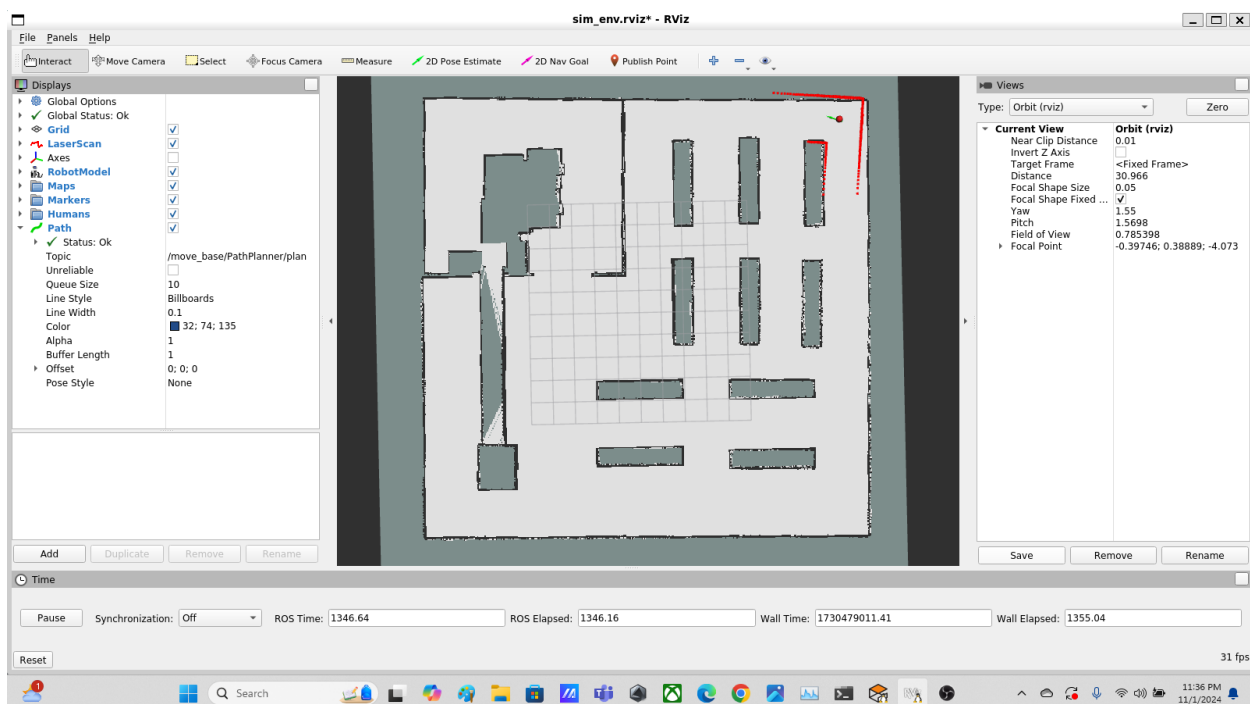
```
abi@LAPTOP-UVGVSCCU:~/ros_motion_planning/scripts$ ./main.sh
... logging to /home/abi/.ros/log/5365fda8-986c-11ef-8427-e58cebe577b8/roslaunch-LAPTOP-UVGVSCCU-12778.log
Checking log directory for disk usage. This may take a while.
Press Ctrl-C to interrupt
Done checking log file disk usage. Usage is <1GB.

xacro: in-order processing became default in ROS Melodic. You can drop the option.
started roslaunch server http://LAPTOP-UVGVSCCU:38813/

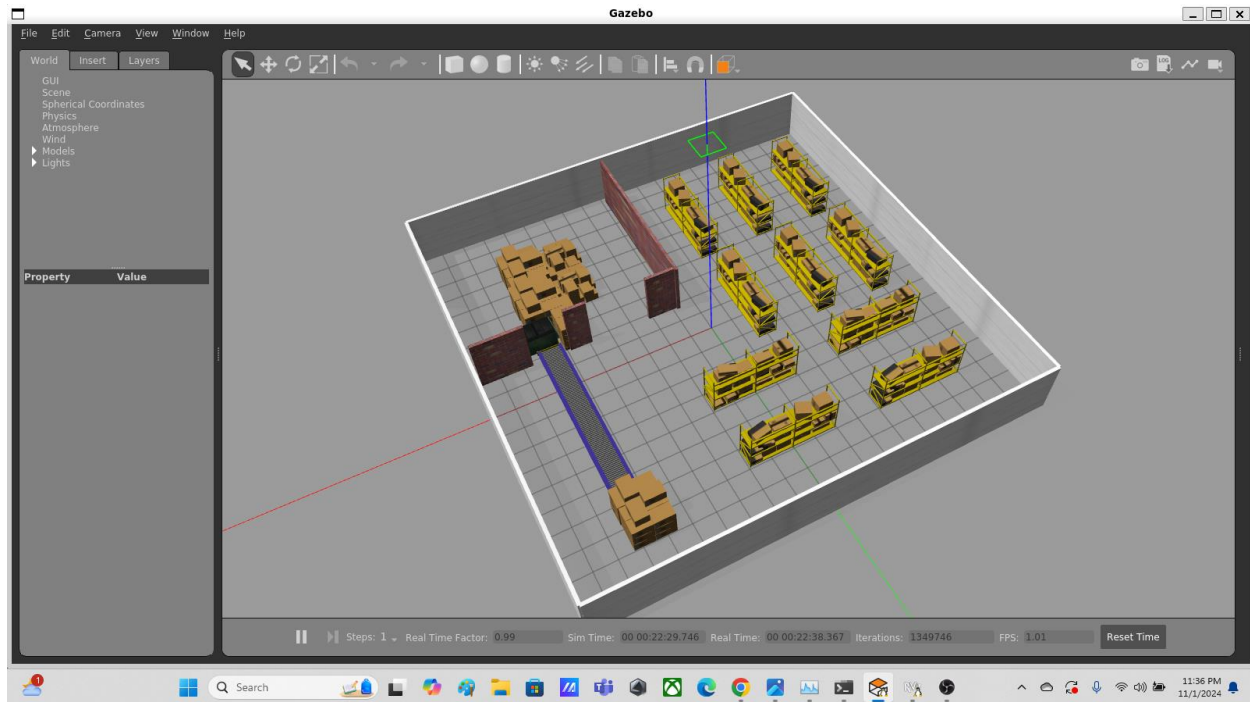
SUMMARY
=====

PARAMETERS
* /amcl/gui_publish_rate: 50.0
* /amcl/initial_pose_x: 0.0
* /amcl/initial_pose_y: 0.0
* /amcl/initial_pose_z: 0.0
* /amcl/kld_err: 0.02
* /amcl/laser_lambda_short: 0.1
* /amcl/laser_likelihood_max_dist: 2.0
* /amcl/laser_max_beams: 180
* /amcl/laser_max_range: 3.5
* /amcl/laser_model_type: likelihood_field
* /amcl/laser_sigma_hit: 0.2
* /amcl/laser_z_hit: 0.5
* /amcl/laser_z_max: 0.05
* /amcl/laser_z_rand: 0.5
* /amcl/laser_z_short: 0.05
* /amcl/max_particles: 3000
* /amcl/min_particles: 500
* /amcl/odom_alpha1: 0.1
* /amcl/odom_alpha2: 0.1
* /amcl/odom_alpha3: 0.1
* /amcl/odom_alpha4: 0.1
* /amcl/odom_model_type: diff
* /amcl/recovery_alpha_fast: 0.0
* /amcl/recovery_alpha_slow: 0.0
* /amcl/resample_interval: 1
* /amcl/transform_tolerance: 0.5
* /amcl/update_min_a: 0.2
```

7. Setelah di jalankan maka akan menampilkan Rviz dengan tampilan 2D. Pilih 2D Nav Goal lalu klik tempat tujuan robot. Mekan nanti akan mengirimkan tujuan ke robot untuk direncanakan dan diikuti.



8. Selain itu, akan menampilkan juga Gazebo dengan tampilan 3D. Gazebo ini akan menampilkan simulasi robot dalam tampilan tiga dimensi.



9. Ketika robot sudah sampai ke tujuan, maka akan menampilkan GOAL Reached! di terminal. Itu menandakan bahwa robot telah berhasil mencapai tujuan yang ditentukan.

```
/home/abi/ros_motion_plann x + -
[ INFO] [1730478329.927691897, 668.307000000]: Got new plan
[ INFO] [1730478330.429059666, 668.807000000]: Got new plan
[ INFO] [1730478330.931657057, 669.307000000]: Got new plan
[ INFO] [1730478331.434773405, 669.807000000]: Got new plan
[ INFO] [1730478331.938218787, 670.308000000]: Got new plan
[ INFO] [1730478332.442166149, 670.808000000]: Got new plan
[ INFO] [1730478332.944616280, 671.308000000]: Got new plan
[ INFO] [1730478333.446815383, 671.807000000]: Got new plan
[ INFO] [1730478333.952266261, 672.307000000]: Got new plan
[ INFO] [1730478334.453802488, 672.808000000]: Got new plan
[ INFO] [1730478334.955634052, 673.307000000]: Got new plan
[ INFO] [1730478335.469319893, 673.808000000]: Got new plan
[ INFO] [1730478335.974614523, 674.307000000]: Got new plan
[ INFO] [1730478336.482144726, 674.807000000]: Got new plan
[ INFO] [1730478336.983445478, 675.307000000]: Got new plan
[ INFO] [1730478337.488840937, 675.807000000]: Got new plan
[ INFO] [1730478338.012679576, 676.308000000]: Got new plan
[ INFO] [1730478338.515738699, 676.807000000]: Got new plan
[ INFO] [1730478339.018772093, 677.308000000]: Got new plan
[ INFO] [1730478339.524321905, 677.808000000]: Got new plan
[ INFO] [1730478340.026534090, 678.308000000]: Got new plan
[ INFO] [1730478340.530289235, 678.807000000]: Got new plan
[ INFO] [1730478341.032309758, 679.307000000]: Got new plan
[ INFO] [1730478341.534751682, 679.807000000]: Got new plan
[ INFO] [1730478342.038329126, 680.307000000]: Got new plan
[ INFO] [1730478342.541978814, 680.807000000]: Got new plan
[ INFO] [1730478343.042932619, 681.307000000]: Got new plan
[ INFO] [1730478343.545145880, 681.808000000]: Got new plan
[ INFO] [1730478344.046897194, 682.307000000]: Got new plan
[ INFO] [1730478344.550755447, 682.808000000]: Got new plan
[ INFO] [1730478345.0540092538, 683.307000000]: Got new plan
[ INFO] [1730478345.556400795, 683.807000000]: Got new plan
[ INFO] [1730478346.058400687, 684.307000000]: Got new plan
[ INFO] [1730478346.560624926, 684.807000000]: Got new plan
[ INFO] [1730478347.065244685, 685.308000000]: Got new plan
[ INFO] [1730478347.565577821, 685.807000000]: Got new plan
[ INFO] [1730478348.069550202, 686.307000000]: Got new plan
[ INFO] [1730478348.571533122, 686.807000000]: Got new plan
[ INFO] [1730478348.872883872, 687.107000000]: GOAL Reached!
```

