

# 第一章作业教程

环境要求：ubuntu18.04，ROS melodic。进行本章作业以前应完成前置内容环境配置。

## 1.创建工作空间并进行初始化

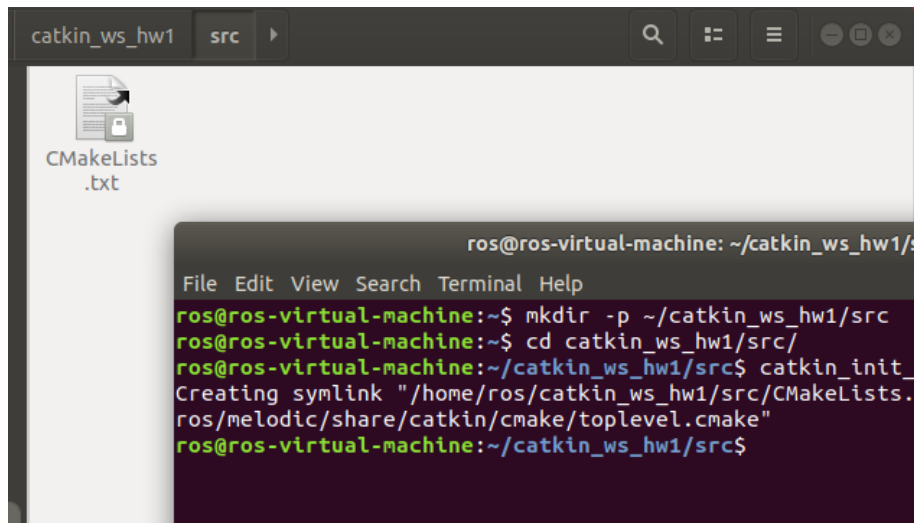
在桌面打开终端，依次输入以下代码：

`mkdir -p ~/catkin_ws_hw1/src`                      此步为递归建立文件夹

`cd ~/catkin_ws_hw1/src`                              进入到 src 子文件夹

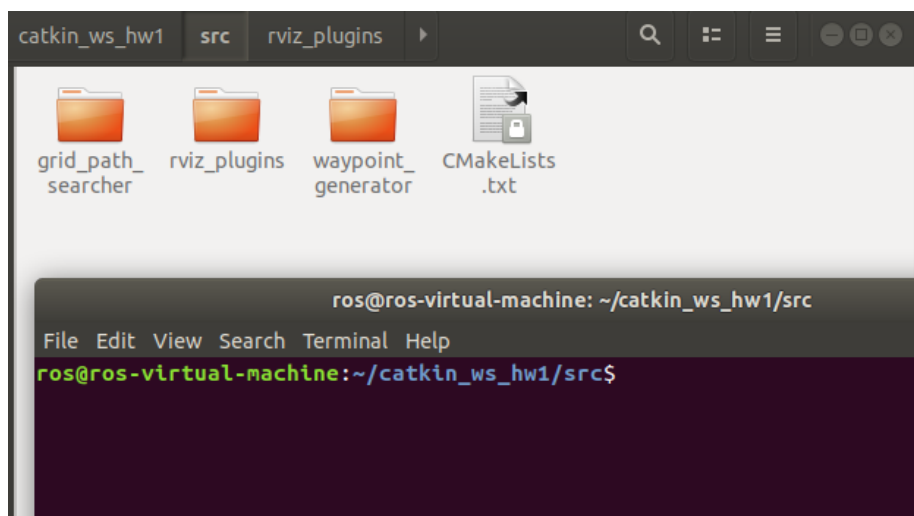
`catkin_init_workspace`                              工作空间初始化

进行此步以后，会在 src 子文件夹内看到一个 CMakeLists.txt 的配置文件



## 2.代码的编译

首先将作业压缩包中的文件复制到第 1 步建立工作空间中的 src 文件夹中



在该文件夹中打开终端，依次输入以下代码：

`cd ..`                      返回上一级目录

`catkin_make`                编译

编译结束后会看到终端中生成了三个 target。

```
ros@ros-virtual-machine: ~/catkin_ws_hw1
File Edit View Search Terminal Help
ros@ros-virtual-machine:~/catkin_ws_hw1/src$ cd ..
ros@ros-virtual-machine:~/catkin_ws_hw1$ catkin_make
Base path: /home/ros/catkin_ws_hw1
Source space: /home/ros/catkin_ws_hw1/src
Build space: /home/ros/catkin_ws_hw1/build
Devel space: /home/ros/catkin_ws_hw1/devel
Install space: /home/ros/catkin_ws_hw1/install
####
#### Running command: "cmake /home/ros/catkin_ws_hw1/src -DCATKIN_DEVEL_PREFIX=/
/home/ros/catkin_ws_hw1/devel -DCMAKE_INSTALL_PREFIX=/home/ros/catkin_ws_hw1/inst
all -G Unix Makefiles" in "/home/ros/catkin_ws_hw1/build"
####
-- The C compiler identification is GNU 7.5.0
-- The CXX compiler identification is GNU 7.5.0
-- Check for working C compiler: /usr/bin/cc
-- Check for working C compiler: /usr/bin/cc -- works
-- Detecting C compiler ABI info
-- Detecting C compiler ABI info - done
-- Detecting C compile features
-- Detecting C compile features - done
-- Check for working CXX compiler: /usr/bin/c++
-- Check for working CXX compiler: /usr/bin/c++ -- works
-- Detecting CXX compiler ABI info
-- Detecting CXX compiler ABI info - done
[100%] Built target rviz_plugins
[100%] Built target demo_node
[100%] Built target random_complex
ros@ros-virtual-machine:~/catkin_ws_hw1$
```

### 3.运行环境 rviz 的配置

在工作空间内打开终端，依次输入以下代码：

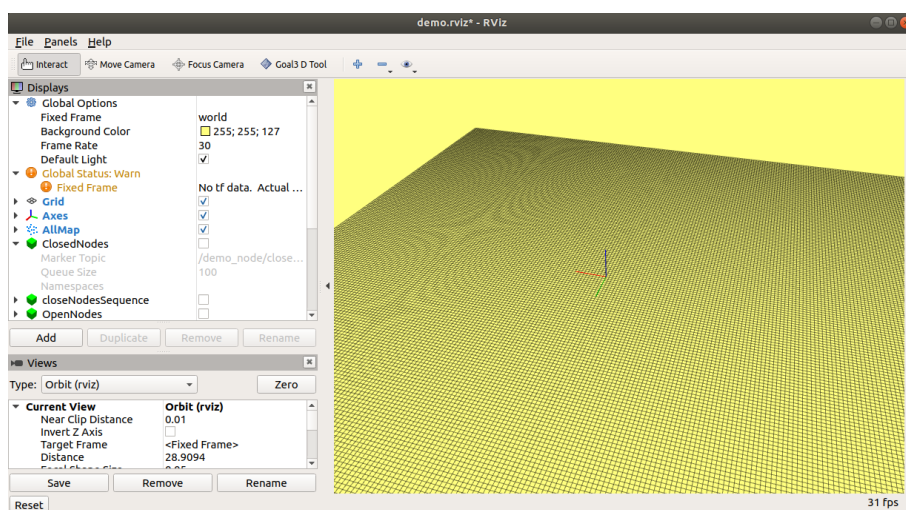
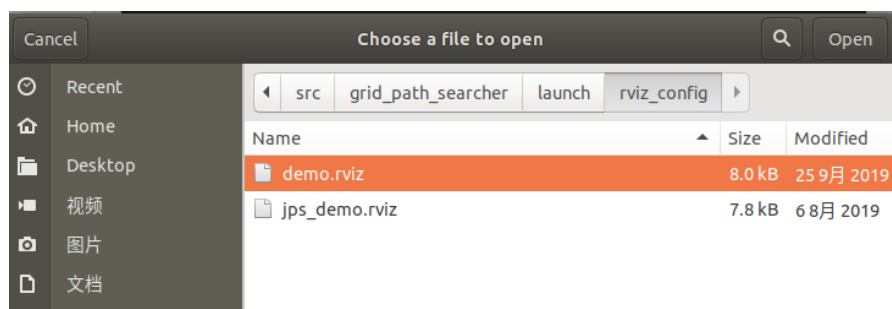
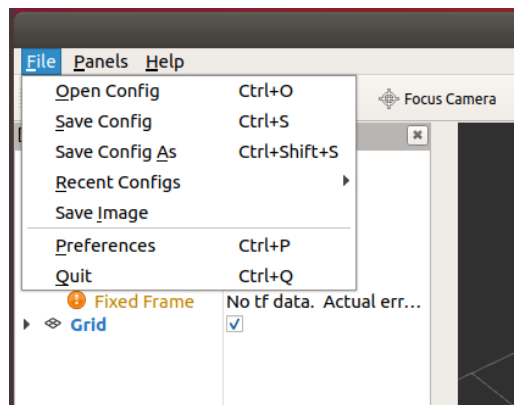
`roscore`                      启动 rosmaster

`source devel/setup.bash`        刷新环境变量,此步需要新开一个终端

`rviz`                        打开 rviz

在打开的 `rviz` 中添加地图配置文件，点击 `file-open config`，文件地址为 `~/catkin_ws/src/grid_path_searcher/launch/rviz_config/demo.rviz`。打开之后显示为初始化的地图。

```
ros@ros-virtual-machine: ~/catkin_ws_hw1
File Edit View Search Terminal Tabs Help
roscore http://ros-virtual-machine:11311/ x ros@ros-virtual-machine: ~/catkin_ws_hw1 x
ros@ros-virtual-machine:~/catkin_ws_hw1$ source devel/setup.bash
ros@ros-virtual-machine:~/catkin_ws_hw1$ rviz
[ INFO] [1709879394.346827680]: rviz version 1.13.30
[ INFO] [1709879394.346906374]: compiled against Qt version 5.9.5
[ INFO] [1709879394.346915654]: compiled against OGRE version 1.9.0 (Ghadamon)
[ INFO] [1709879394.351335726]: Forcing OpenGL version 0.
[ INFO] [1709879395.297019817]: Stereo is NOT SUPPORTED
[ INFO] [1709879395.297105879]: OpenGL device: SVGA3D; build: RELEASE; LLVM;
[ INFO] [1709879395.297133476]: OpenGL version: 3.3 (GLSL 3.3) limited to GLSL 1
.4 on Mesa system.
Gtk-Message: 14:29:58.891: GtkDialog mapped without a transient parent. This is
discouraged.
```



## 4.运行程序

在刚刚的终端中新建一个 tab，执行以下命令

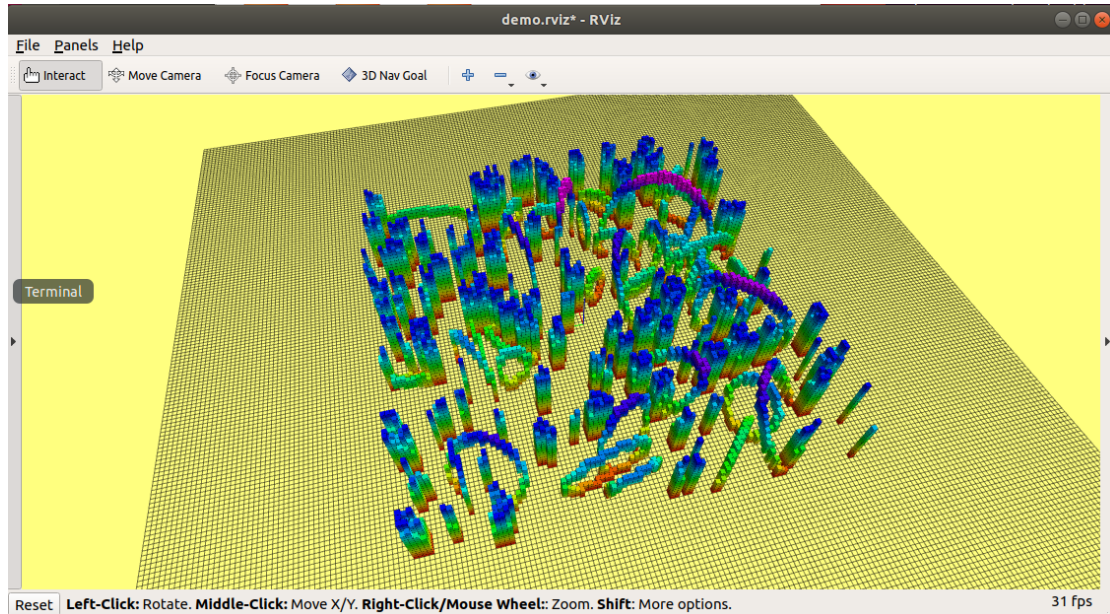
source devel/setup.bash

刷新环境变量

roslaunch grid\_path\_searcher demo.launch

运行 launch 文件

程序成功运行，点云地图显示在 rviz 中。



注：可能遇到的问题

在执行步骤 3 时，终端中可能会出现以下 error，这是由于打开 rviz 的终端没有刷新环境变量，该工作空间没有识别到地图中附带的 3D 插件。此时应该执行步骤 3 中 source 这一行程序，并再次打开 rviz，可以看到不再有报错。

```
ros@ros-virtual-machine: ~/catkin_ws_hw1
File Edit View Search Terminal Tabs Help
roscore http://ro... x ros@ros-virtual... x /home/ros/catki... x ros@ros-virtual... x
ros@ros-virtual-machine:~/catkin_ws_hw1$ rviz
[ INFO] [1709879759.886701134]: rviz version 1.13.30
[ INFO] [1709879759.886759022]: compiled against Qt version 5.9.5
[ INFO] [1709879759.886767804]: compiled against OGRE version 1.9.0 (Ghadamon)
[ INFO] [1709879759.893046728]: Forcing OpenGL version 0.
[ INFO] [1709879764.397011407]: Stereo is NOT SUPPORTED
[ INFO] [1709879764.397111394]: OpenGL device: SVGA3D; build: RELEASE; LLVM;
[ INFO] [1709879764.397268032]: OpenGL version: 3.3 (GLSL 3.3) limited to GLSL 1.4 on Mesa system.
Gtk-Message: 14:36:31.543: GtkDialog mapped without a transient parent. This is discouraged.
[ERROR] [1709879795.484281336]: PluginlibFactory: The plugin for class 'rviz_plugins/Goal3DTool' failed to load. Error: According to the loaded plugin descriptions the class rviz_plugins/Goal3DTool with base class type rviz::Tool does not exist. Declared types are rviz/FocusCamera rviz/Interact rviz/Measure rviz/MoveCamera rviz/PublishPoint rviz/Select rviz/SetGoal rviz/SetInitialPose rviz_plugins/tutorials/PlantFlag
[rospack] Error: no package given
[librospack]: error while executing command
[rospack] Error: no package given
[librospack]: error while executing command
```

执行步骤 4 时,可能会出现如下报错。这在 ros 的使用中是一个常见的错误,也是由于没有刷新环境变量所导致的,ros 终端没有识别到我们要运行的程序 demo。此时只要运行 `source devel/setup.bash`,并再运行程序就不会出现错误了。

```
/home/ros/catkin_ws_hw1/src/grid_path_searcher/launch/demo.launch http://localhost:11311
File Edit View Search Terminal Tabs Help
roscore http://ro... x ros@ros-virtual-... x /home/ros/catki... x ros@ros-virtual-... x
ros@ros-virtual-machine:~/catkin_ws_hw1$ roslaunch grid_path_searcher demo.launch
RLException: [demo.launch] is neither a launch file in package [grid_path_searcher] nor is [grid_path_searcher] a launch file name
The traceback for the exception was written to the log file
ros@ros-virtual-machine:~/catkin_ws_hw1$ source devel/setup.bash
ros@ros-virtual-machine:~/catkin_ws_hw1$ source devel/setup.bash
ros@ros-virtual-machine:~/catkin_ws_hw1$ roslaunch grid_path_searcher demo.launch
```

环境变量的刷新必须在工作空间根目录下,否则会出现以下报错。此时应该 `cd` 到相应的文件路径并进行刷新。

```
ros@ros-virtual-machine: ~/catkin_ws_hw1
File Edit View Search Terminal Tabs Help
roscore http://ro... x ros@ros-virtual-... x /home/ros/catki... x ros@ros-virtual-... x
ros@ros-virtual-machine:~/catkin_ws_hw1$ cd src/
ros@ros-virtual-machine:~/catkin_ws_hw1/src$ source devel/setup.bash
bash: devel/setup.bash: No such file or directory
ros@ros-virtual-machine:~/catkin_ws_hw1/src$ cd ..
ros@ros-virtual-machine:~/catkin_ws_hw1$ source devel/setup.bash
ros@ros-virtual-machine:~/catkin_ws_hw1$
```

正确执行, 环境变量已经刷新

执行错误, 在其他路径下找不到配置文件