Mars lite tutorials pub

0.Ubuntu 常用指令

可參考教學網站
http://www.clearpathrobotics.com/assets/guides/ros/Getting%20Started%20with%20Ubuntu.html

apt-get 指令一覽
https://b9532026.wordpress.com/2010/03/30/apt-get-指令一覽-2/

0.1 ROS

ROS官方tutorials
http://wiki.ros.org/ROS/Tutorials
程式範例參考Github
https://github.com/ros/ros_tutorials
https://github.com/markwsilliman/turtlebot/
https://github.com/pirobot/rbx1

https://github.com/leggedrobotics/ros_best_practices/tree/master/ros_package_template
HyphaROS Workshop https://github.com/Hypha-ROS
C++ tutorials https://github.com/ROBOTIS-GIT/ros_tutorials

教學網站參考資料
http://learn.turtlebot.com/

ROS101
https://www.clearpathrobotics.com/assets/guides/ros/index.html
https://github.com/majcote

1.安裝ROS

2.創建ROS工作空間

Installing and Configuring Your ROS Environment

```
export CATKIN_WS=~/catkin_ws
mkdir -p $CATKIN_WS/src
cd $CATKIN_WS
catkin_make
```

3.創建你的ROS Package

Creating a ROS Package

```
# You should have created this in the Creating a Workspace Tutorial
cd $CATKIN_WS/src
export YOUR_PACKAGE_NAME=mars_lite_tutorials
catkin_create_pkg $YOUR_PACKAGE_NAME std_msgs rospy roscpp
cd $CATKIN_WS
catkin_make
```

3.1 git clone ROS Package

```
cd $CATKIN_WS/src
git clone https://github.com/mars-robotics/mars_lite_tutorials
cd ..
```

複製 parts 裡的 Package 到 /src

```
catkin_make
```

4.要執行你建立的ROS Package 都要輸入一次

```
export CATKIN_WS=~/catkin_ws
source $CATKIN_WS/devel/setup.bash
```

or Set Your ROS Environment Variables

```
export CATKIN_WS=~/catkin_ws
```

```
echo "source $CATKIN_WS/devel/setup.bash" >> ~/.bashrc
```

ROS 中的 setup.bash 說明
https://www.twblogs.net/a/5b8e53a42b717718834460c6

5.課程中所需指令

```
roscore
```

5.1 Starting a talker node

Run a node with >> **rosrun package_name node_name**

```
rosrun mars_lite_tutorials talker.py
```

Starting a listener node

```
rosrun mars_lite_tutorials listener.py
```

Publish a message to a topic with >> **rostopic pub /topic type args**

```
rostopic pub /chatter std_msgs/String "data: 'ROS Robot Programimng Course'"
rostopic pub -r 10 /chatter std_msgs/String "data: 'ROS Robot\
 Programimng Course'"
rostopic pub -r 50 /chatter std_msgs/String "data: 'ROS Robot Programimng Course'"
```

5.2 控制Robot運動

```
rosrun mars_lite_tutorials goforward.py
```

5.3 控制Robot運動

```
rosrun mars_lite_tutorials timed_out_and_back.py
```

5.4 控制Robot運動

```
rosrun mars_lite_tutorials odom_out_and_back.py
```

5.5 控制Robot運動

```
rosrun mars_lite_tutorials odom_out_and_back_param.py _goa\
l_distance:=2.0 _linear_speed:=2.0
```

```
roslaunch mars_lite_tutorials odom_out_and_back_param.launch
```

5.6 控制Robot運動

```
rosrun mars_lite_tutorials odom_square_param.py
```

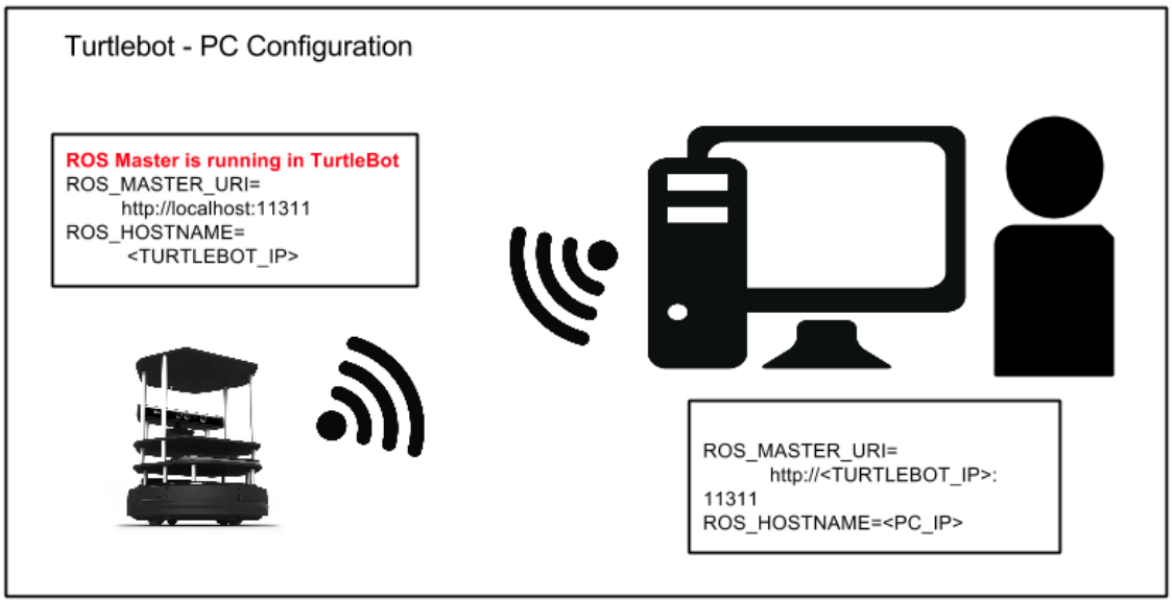
5.7 控制Robot運動

```
rosrun mars_lite_tutorials move_base_square.py
```

6. ROS Multiple Machines

參考

ROSNetworkSetup
ROSTutorialsMultipleMachines
ROSEnvironmentVariables
ROSTutorialsMultipleRemoteMachines
http://wiki.ros.org/turtlebot/Tutorials/indigo/Network%20Configuration



Robot IP
Mars-Lite no1 : 192.168.1.101

```
export ROS_MASTER_URI=http://192.168.1.101:11311
```

Remote PC Setup (User)

```
ifconfig
```

```
export ROS_HOSTNAME=192.168.1.XXX
```

Pirobot Simulation

http://wiki.ros.org/arbotix

安裝

```
sudo apt-get install -y ros-kinetic-arbotix-*
```

使用

```
roslaunch mars_lite_tutorials fake_pi_robot.launch
roslaunch mars_lite_tutorials fake_turtlebot.launch
rosrun rviz rviz -d `rospack find mars_lite_tutorials`/rviz/sim.rviz

roslaunch mars_lite_tutorials fake_move_base_blank_map.launch
rosrun rviz rviz -d `rospack find mars_lite_tutorials`/rviz/nav.rviz
```

```
rosrun ros_vslambook timed_out_and_back.py
```

rosclean purge

ROS Gazebo Simulation

Turtlebot

```
roslaunch turtlebot_gazebo turtlebot_world.launch
roslaunch turtlebot_rviz_launchers view_robot.launch
```

操作的方式

```
roslaunch turtlebot_interactive_markers interactive_markers.launch
roslaunch turtlebot_teleop keyboard_teleop.launch
```

Husky

```
roslaunch husky_gazebo husky_playpen.launch
roslaunch husky_viz view_robot.launch
roslaunch husky_navigation move_base_mapless_demo.launch
```

操作的方式

```
rosrun turtlebot_teleop turtlebot_teleop_key turtlebot_tel\
eop/cmd_vel:=/cmd_vel
rosrun turtlebot_teleop turtlebot_teleop_key turtlebot_teleop/cmd_vel:=/cmd_vel
```

```
rostopic pub /move_base_simple/goal geometry_msgs/PoseStamped '{header: {stamp: now, frame_id: "odom"}, pose: {position: {x: 3.0, y: 0.0, z: 0.0}, orientation: {x: 0, y: 0, z: 0, w: 1}}}'
```

```
$ rostopic pub /turtle1/cmd_vel geometry_msgs/Twist -r 1 -- '[2.0, 0.0, 0.0]' '[0.0, 0.0, -1.8]'
```

Husky Move Base Demo

```
roslaunch husky_gazebo husky_playpen.launch
roslaunch husky_viz view_robot.launch
roslaunch husky_navigation move_base_mapless_demo.launc
```

Husky Gmapping Demo

```
roslaunch husky_gazebo husky_playpen.launch
roslaunch husky_viz view_robot.launch
```

執行 gmapping

```
roslaunch husky_navigation gmapping_demo.launch
```

```
rosrun map_server map_saver -f ~/catkin_ws/src/mars_lite_tutorials/maps/my_map
```

Husky AMCL Demo

```
roslaunch husky_gazebo husky_playpen.launch
roslaunch husky_viz view_robot.launch
```

```
roslaunch husky_navigation amcl_demo.launch map_file:=$HOME/catkin_ws/src/mars_lite_tutorials/maps/my_map.yaml
```

Real Robot Mars-lite

```
ssh ros@192.168.1.105
```

password:

```
marslite
```

登出:

```
exit
```

啟動 Mars-lite

```
roslaunch mars_lite_bringup mars_lite_bringup.launch
```

使用遙控器遙控 Mars-lite

```
roslaunch mars_lite_teleop mars_lite_teleop_joy.launch
```

使用鍵盤遙控 Mars-lite

```
rosrun turtlebot_teleop turtlebot_teleop_key turtlebot_teleop/cmd_vel:=/mob_plat/cmd_vel
```

使用程式遙控 Mars-lite

```
mob_plat/cmd_vel
angular_speed = 0.8
```