



جامعة خليفة  
Khalifa University

# Run Your First ROS Program

THURSDAY, JULY 21, 2022

# Create a Catkin Workspace

```
$ cd
```

```
$ mkdir catkin_ws
```

```
$ cd catkin_ws/
```

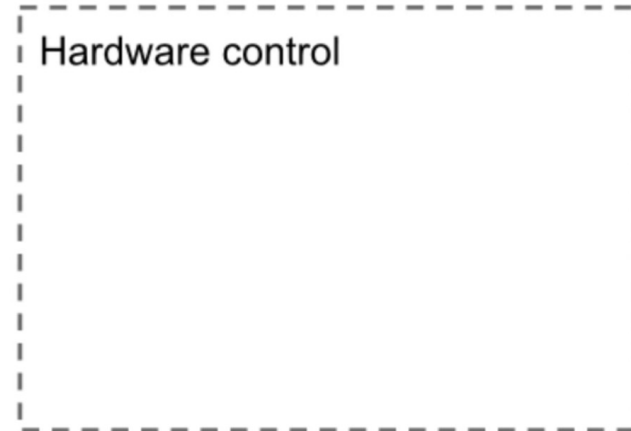
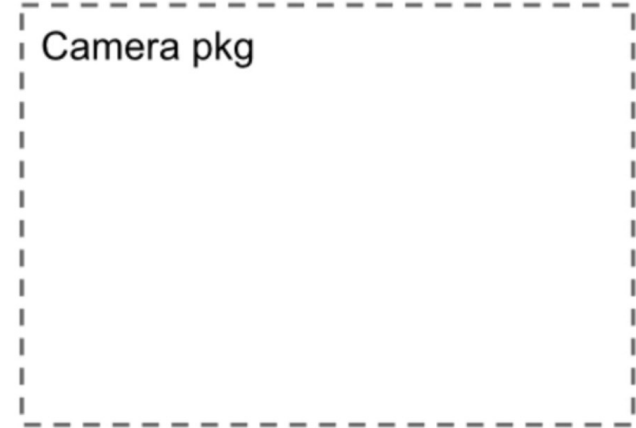
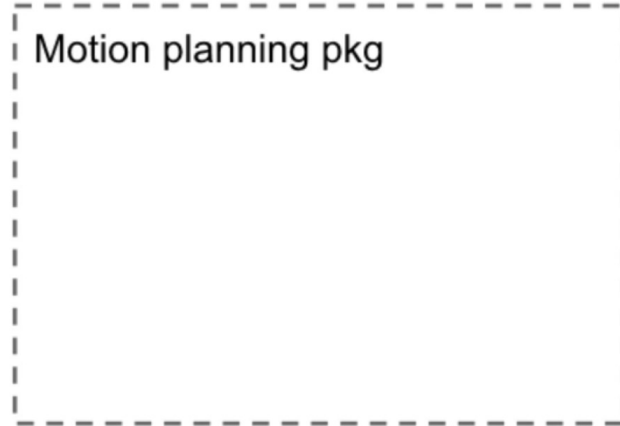
```
$ mkdir src
```

# Additional Note

To do that, add this: `source ~/catkin_ws/devel/setup.bash` in your `bashrc`, **after** the line `source /opt/ros/<your_ros_version>/setup.bash`

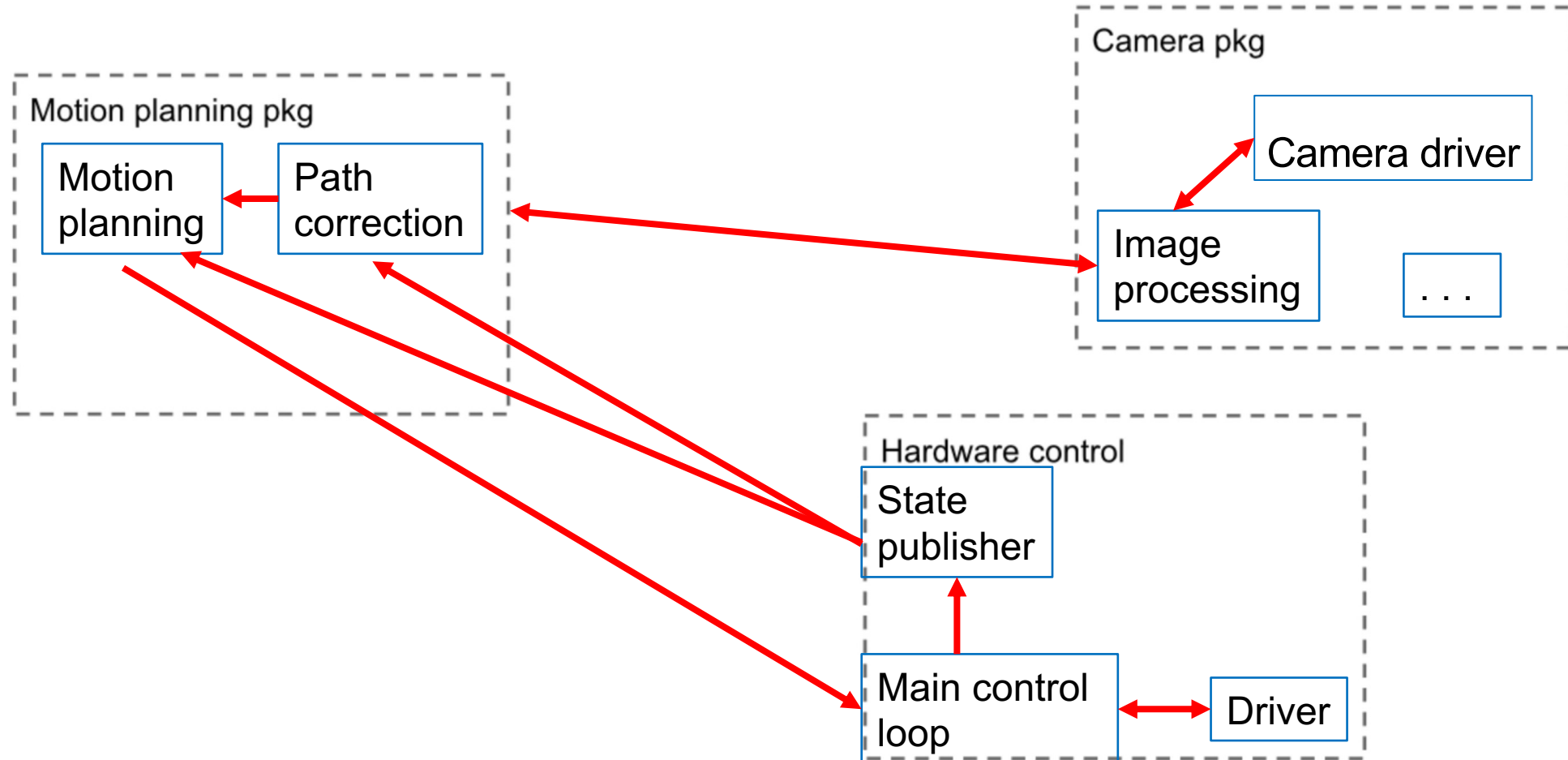
To add it directly without having to open a text editor, simply type in your terminal: `echo "source ~/catkin_ws/devel/setup.bash" >> ~/.bashrc`

# Create a ROS Package



# Create a ROS Package

# What is a Node?



# What is a Node?

- Process that perform computation
- Combined into a graph
- Communicate with each other through topics, services, parameter server

## Benefits:

- Reduce code complexity
- Fault tolerance
- Can be written in Python, C++,.....

# Your First Python Node

- Process that perform computation
- Combined into a graph
- Communicate with each other through topics, services, parameter server



# Debug Services with Command Line Tools

**Rosrun package name file name**

**roscpp list**

**roscpp info /package\_name**

**roscpp kill /package\_name**

# Visualize Your ROS Graph With rqt\_graph

# Visualize Your ROS Graph With rqt\_graph

```
rosrun rqt_graph rqt_graph
```

```
rosclear
```

```
rosrun rqt_graph rqt_graph
```

# Experiment on Services with Turtlesim

# Experiment on Nodes with Turtlesim

## Install Turtlesim

- Start the roscore:
- **\$ roscore**
- To install and start the turtlesim:
- **\$ sudo apt-get install ros-\$(rosversion -d)-turtlesim**
- **Sudo apt-get install ros-noetic-turtlesim**
- Run turtlesim:
- **\$ rosrn turtlesim turtlesim\_node**

```
snailab@snailab-System-Product-Name: ~
snailab@snailab-System-Product-Name:~$ rosrun turtlesim turtlesim_node
[ INFO] [1624745532.034452019]: Starting turtlesim with node name /turtlesim
[ INFO] [1624745532.037133888]: Spawning turtle [turtle1] at x=[5.544445], y=[5.544445], theta=[0.000000]
[ INFO] [1624745722.292990489]: Resetting turtlesim.
[ INFO] [1624745722.314960740]: Spawning turtle [turtle1] at x=[5.544445], y=[5.544445], theta=[0.000000]
[ INFO] [1624745737.957828696]: Resetting turtlesim.
[ INFO] [1624745737.978230296]: Spawning turtle [turtle1] at x=[5.544445], y=[5.544445], theta=[0.000000]
[ INFO] [1624745746.853944659]: Resetting turtlesim.
[ INFO] [1624745746.875863151]: Spawning turtle [turtle1] at x=[5.544445], y=[5.544445], theta=[0.000000]
snailab@snailab-System-Product-Name:~$ rosservice

roscore http://snailab-System-Product-Name:11311/81x26
unch-snailab-System-Product-Name-13219.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.

started roslaunch server http://snailab-System-Product-Name:40599/
ros_comm version 1.15.11

SUMMARY
=====

PARAMETERS
* /roscpp: noetic
* /rosversion: 1.15.11

NODES

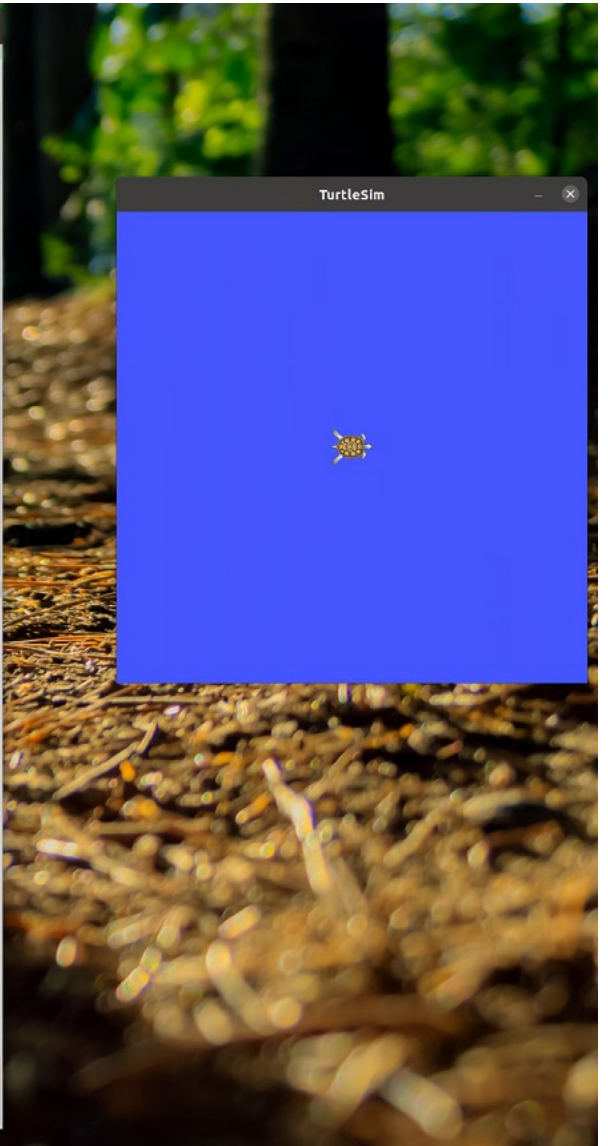
auto-starting new master
process[roscpp]: started with pid [13227]
ROS_MASTER_URI=http://snailab-System-Product-Name:11311/

setting /run_id to 2ac7011e-d6c1-11eb-bf04-df8479f94907
process[rosout-1]: started with pid [13237]
started core service [/rosout]

angular: 2.0"

snailab@snailab-System-Product-Name:~$ rosservice list
/clear
/kill
/reset
/rosout/get_loggers
/rosout/set_logger_level
/spawn
/teleop_turtle/get_loggers
/teleop_turtle/set_logger_level
/turtle1/set_pen
/turtle1/teleport_absolute
/turtle1/teleport_relative
/turtlesim/get_loggers
/turtlesim/set_logger_level
snailab@snailab-System-Product-Name:~$ rosservice call /turtle1/teleport_absolu
te
Usage: rosservice call /service [args...]

rosservice: error: Please specify service arguments
snailab@snailab-System-Product-Name:~$ rosservice call /r
/reset
/rosout/get_loggers
/rosout/set_logger_level
snailab@snailab-System-Product-Name:~$ rosservice call /reset
snailab@snailab-System-Product-Name:~$
```



# Experiment on Services with Turtlesim