Introduction to ROS2: Basics, Motion, and Vision

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Recap

to install turtles sim

```
sudo apt install ros-humble-turtlesim
```

to start turtles sim

```
ros2 run turtlesim turtlesim_node
```

https://docs.ros.org/en/foxy/Tutorials/Beginner-CLI-Tools/Introducing-Turtlesim/Introducing-Turtlesim.html

Recap

1. How can we see the "turtlesim" node information?
2. Can you find out what is the topic that can be used to move the turtle?
3. Which topic or service can be used to set the speed?
4. How can we know the current pose of the robot?
5. Is there way to reset the robot back to its initial pose?
6. Can turtle change its color?

How can we see the "turtlesim" node information

to get turtles sim info

ros2 node info /turtlesim

```
Node [/turtlesim]
Publications:
 * /rosout [rosgraph_msgs/Log]
 * /turtle1/color_sensor [turtlesim/Color]
 * /turtle1/pose [turtlesim/Pose]

Subscriptions:
 * /turtle1/cmd_vel [unknown type]

Services:
 * /clear
 * /kill
 * /reset
 * /spawn
 * /turtle1/set_pen
 * /turtle1/teleport_absolute
 * /turtle1/teleport_relative
 * /turtlesim/get_loggers
 * /turtlesim/set_logger_level


contacting node http://op-X299-UD4-Pro:44807/ ...
Pid: 4355
Connections:
```

Let's try to change robot's speed

information about topics

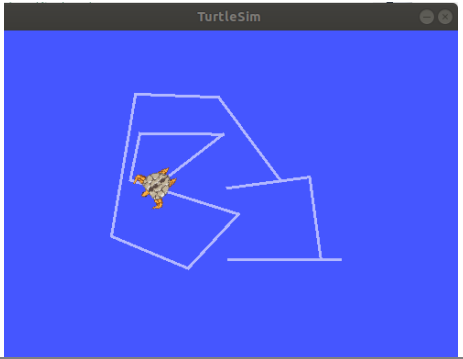
ros2 topic echo <topic> print messages to screen
ros2 topic find <topic> checking topic by its type
ros2 topic bw <topic> bandwidth, i.e., data size, used by topic
ros2 topic hz <topic> publishing rate
ros2 topic info <topic> information about the topic
ros2 topic type <topic> check topic's type
ros2 topic list <topic> list down all the active topics
ros2 topic pub <topic> publish data to the specified topic

To see more information about each command, use -h, e.g., rostopic type -h

Let’s try to change robot’s speed

to control robot using teleoperation

```
ros2 run turtlesim turtle_teleop_key
```



Let’s try to change robot’s speed

to check the speed

ros2 topic type /turtle1/cmd_vel
ros2 topic info /turtle1/cmd_vel
ros2 interface show geometry_msgs/msg/Twist

to publish velocity

ros2 topic pub [topic] [msg_type] [args]
ros2 topic pub -r 1 /turtle1/cmd_vel geometry_msgs/msg/Twist
"linear: x: 0.0 y: 0.0 z: 0.0 angular: x: 0.0 y: 0.0 z: 0.0"

How to reset the robot?

information about services

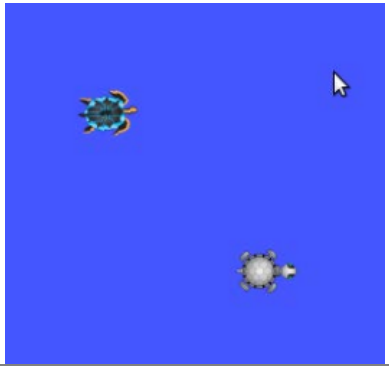
ros2 service list list down active services
ros2 service find mes-type checking services by its message-type
ros2 service info print service details
ros2 service type <service> print service type
ros2 service args <topic> service arguments
ros2 service call <topic> call service with the arguments

To see more information about each command, use -h, e.g., rosservice type -h

How to add new robot

to add new robot

ros2 service call /spawn turtlesim/srv/Spawn "x: 2.2, y: 2.0, theta: 0, name: ’node4’"



Parameter Server Capabilities

information about parameters

ros2 param list list down all the parameter names
ros2 param delete <parameter> remove parameter from the server
ros2 param get print value of the parameter
ros2 param load file load the parameters from a file
ros2 param set <parameter value> assign parameter to value
ros2 param dump file save parameters to a file