

ROS - Practical Session 1

ROS Workshop at the
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Task 0: Install ROS

Task 1: Turtle Write Letters

Task 2: Turtle Drive Square

Task 3: Turtle Rename

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Installation

- ▶ Preferred platform: Ubuntu (and other UNIX based OS)
- ▶ For installation see

`www.ros.org/wiki/indigo/Installation/Ubuntu`

Examples given for Ubuntu 14.04:

- ▶ Setup your `sources.list` file (ROS server)

```
$ sudo sh -c 'echo "deb http://packages.ros.org/ros/ubuntu
$(lsb_release -sc) main" >
/etc/apt/sources.list.d/ros-latest.list'
```

- ▶ Set up your keys

```
$ sudo apt-key adv --keyserver hkp://pool.sks-keyservers.net
--recv-key 0xB01FA116
```



Setup

Update your package list and install ROS:

- ▶ `$ sudo apt-get update`
- ▶ `$ sudo apt-get install
ros-indigo-desktop-full`

Initialize `rosdep` before using ROS

- ▶ `rosdep` is a tool to manage system dependencies
- ```
$ sudo rosdep init
$ rosdep update
```

# Setup

- ▶ **Environment setup (add to `~/.bashrc`):**

```
$ source /opt/ros/indigo/setup.bash
```

- ▶ **simply type:**

```
$ echo "source /opt/ros/indigo/setup.bash" >> ~/.bashrc
$ source ~/.bashrc
```

- ▶ **Optionally: select an editor (add to `~/.bashrc`):**

```
$ export EDITOR='gedit'
```

- ▶ **Get `rosinstall` (convenient tool to download many source trees for ROS packages):**

```
$ sudo apt-get install python-rosinstall
```

# Prepare Catkin Workspace

- ▶ Create a catkin workspace:

```
$ mkdir -p ~/catkin_ws/src
$ cd ~/catkin_ws/src
$ catkin_init_workspace
```

# Prepare Catkin Workspace

- ▶ We have an empty workspace with a `CMakeLists.txt` link
- ▶ Build the workspace:

```
$ cd ~/catkin_ws/
$ catkin_make
```
- ▶ Source the new setup:

```
$ source devel/setup.bash
```
- ▶ for convenience, add it to your `.bashrc`:

```
$ echo "source ~/catkin_ws/devel/setup.bash" >> ~/.bashrc
```
- ▶ also add your workspace to the `$ROS_PACKAGE_PATH`:

```
$ echo "export ROS_PACKAGE_PATH=$ROS_PACKAGE_PATH:
~/catkin_ws" >> ~/.bashrc
```



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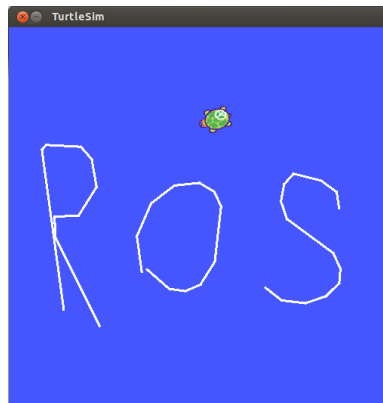
Task 3: Turtle Rename

# Turtle Write Letters

## Task:

- ▶ start the `turtlesim_node` and the `turtle_teleop_key` nodes
- ▶ use the arrow keys to write your initials (or any other letters) in the TurtleSim window
- ▶ letters must be separated from each other

## Goal:



# Turtle Write Letters

## Hints:

- ▶ to accomplish this task, you need to call ROS services
- ▶ there is a service for clearing the whole TurtleSim window as well as for setting properties of the pen the turtle is writing with
- ▶ use ROS tools to find out what these services are and how they must be called



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# Turtle Drive Square

## Task:

- ▶ start the `turtlesim_node`
- ▶ make the turtle drive a square

## Goal:



# Turtle Drive Square

## Hints:

- ▶ to accomplish this task, you need to publish ROS messages
- ▶ use ROS tools to find out on which topic and how they must be published
- ▶ find out how the parameters of the involved message work

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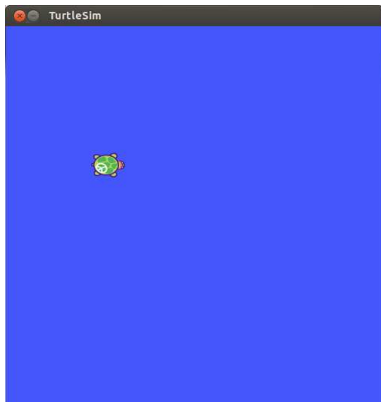
# Turtle Rename

## Task:

- ▶ start the `turtlesim_node`
- ▶ make the following commands teleport the turtle to a given position and clean the drawn line:

```
$ rosservice call
 /turtle1/beam_to
 [x] [y] [theta]
$ rosservice call
 /clean_lines
```

## Goal:





# Turtle Rename

## Hints:

- ▶ to accomplish this task, you need to rename ROS services when starting the advertising node
- ▶ first find out how to teleport the turtle to a given position and how to clean the lines
- ▶ now restart the node with the required renaming parameters