ROS Introduction - Practical

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Agenda

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Setting up a new ROS Project

- Create a directory of the following structure:
  mkdir -p /.../<workspace_name>/src
- In root of the workspace run: **catkin_make**
- Initialize your workspace: **caktin init**
- Set up your working environment:
  source /.../<workspace_name>/devel/setup.bash
- If workspace default workspace, then add the line to your
  ~/.bashrc

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Navigation Tips

Prerequisite for these tips is that the workspace of interest overlayed the default path in $ROS_PACKAGE_PATH:
e.g. */.../<workspace_name>/src/opt/ros/kinect/share*

- Find the path to a package:
  rospack find <package>
- Navigate to your workspace or a package within:
  roscd [<package>]
- Navigate to the log files of your project:
  roscd log
- Use the *TAB* key for autocompletion.

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Hello World

- Create a package within <workspace_name>/src:
  catkin_create_pkg <package_name> [depend1] [...]
- Create a python file within the package and add code.
- Make the python file executable: **chmod +x <python_file>**
- Build the project together with the new package. In root:
  catkin_make
- Start *roscore* and execute:
  rosrun <package_name> <python_file>
- Echo published message:
  rostopic echo /<publisher>

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Hello World - Code

```python
#!/usr/bin/env python2
# -*- coding: utf-8 -*-

import rospy
from std_msgs.msg import String

def talker():
    pub = rospy.Publisher('chatter', String, queue_size=10)
    rospy.init_node('talker', anonymous=True)
    rate = rospy.Rate(10)
    while not rospy.is_shutdown():
        hello_str = "hello world %s" % rospy.get_time()
        rospy.loginfo(hello_str)
        pub.publish(hello_str)
        rate.sleep()

if __name__ == '__main__':
    try:
        talker()
    except rospy.ROSInterruptException():
        pass
```

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Analysis Tips

Prerequisite for these tips is that *roscore* and the nodes you are interested in, are running.

- Display configuration details of your workspace:
  catkin config
- Display debug information about ROS topics:
  rostopic
  - **list:** Displays a list of current topics.
  - **echo <topic>:** Displays messages published to a topic.
  - **info <topic>:** Print information about a topic.
  - **pub <topic> <msg_type> <data>**: Publish data to a topic.
- List and query ROS services:
  rosservice [list], [info <service>], ...
- Get and set ROS parameters:
  rosparam [set], [delete] <param_name> <value>
- List package dependencies:
  rospack depends1 <package>

Configuring an existing ROS Project - e.g. b-it-bots

- Nagivate to the directory in which you would like to set up the project and create the ROS workspace structure:
  mkdir -p <workspace_name>/src
- Copy the link of the git repo(s) and run inside the **src** folder:
  git clone <link>
- Compile the workspace, by navigating to root and executing:
  catkin_make
- If errors appear install the missing packages and rerun
  catkin_make

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