EN4594 Autonomous Systems
Laboratory Sheet
Pre-Lab Session

Title: Create a ROS Workspace

1. Background

A workspace is a directory containing ROS packages. The core ROS workspace that initially gets installed is called the *underlay*. When developing with ROS, you will typically have several local workspaces called *overlays* active, concurrently. With multiple overlays, you can work with several ROS distributions (e.g. Humble, Foxy, etc.) on the same computer and switch between them.

2. ROS Workspace

Inside the ROS workspace commonly there is a *src* subdirectory, where the source code of ROS packages will be located. `colcon` is the build tool to build packages inside *src* subdirectory in ROS workspace.

By default, `colcon` will create the following directories as peers of the *src* directory (Fig. 1):

- The *build* directory will be where intermediate files are stored. For each package a subfolder will be created in which e.g. CMake is being invoked.
- The *install* directory is where each package will be installed to. By default, each package will be installed into a separate subdirectory.
- The *log* directory contains various logging information about each `colcon` invocation.

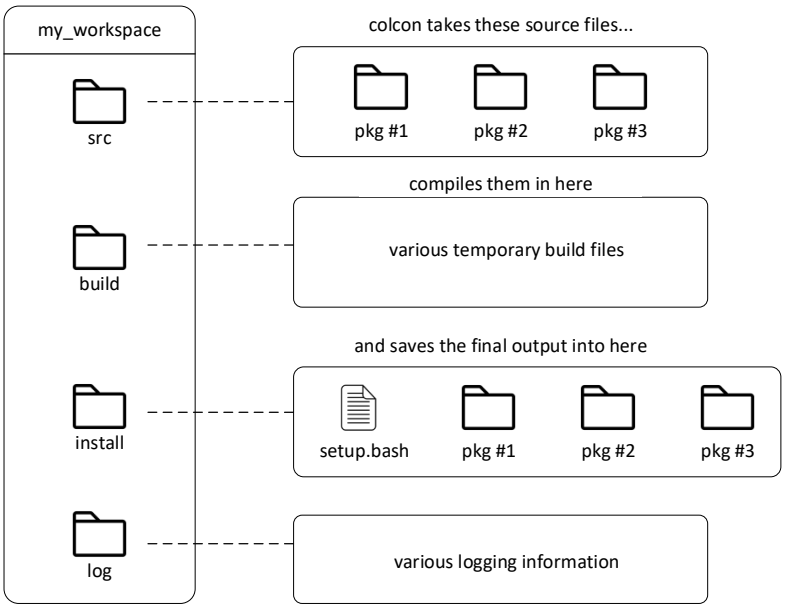

Fig. 1: Typical ROS workspace

3. Creating a Workspace

We will create a workspace named `ros2_ws` as an overlay on top of the existing ROS 2 installation (underlay). In general, it is recommended to use an overlay when you plan to iterate on a small number of packages, rather than putting all of your packages into the same workspace.

3.1. New Directory

The name of the new directory does not matter, but it is helpful to have it indicate the purpose of the workspace. Let's choose the directory name `ros2_ws`, for "development workspace". Open a new terminal and type the following:

```
mkdir -p ~/ros2_ws/src
```

3.2. Build the Workspace

Open a new terminal and navigate to the ROS workspace you just created.

```
cd ~/ros2_ws
```

You can build your packages (even if there are no packages, yet) using the command:

```
colcon build
```

You will observe that with the execution of the above command, the *build*, *install* and *log* directories are created (Fig. 2).

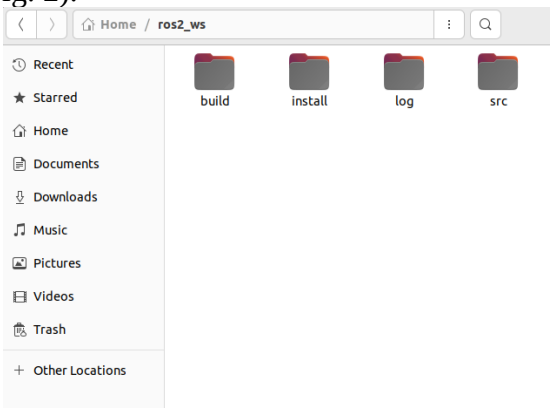

Fig. 2: ROS workspace directories

3.3. Source the Overlay

You can permanently source the overlay using the `bashrc` file.

```
echo "source <overlay local setup bash file>" >> ~/.bashrc
```

Example:

Open up a new terminal and type the following. Remember to replace the folder name to match your workspace.

```
echo "source /home/peshala/ros2_ws/install/local_setup.bash" >>
~/.bashrc
```

Finally, source the `bashrc` file.

```
source ~/.bashrc
```