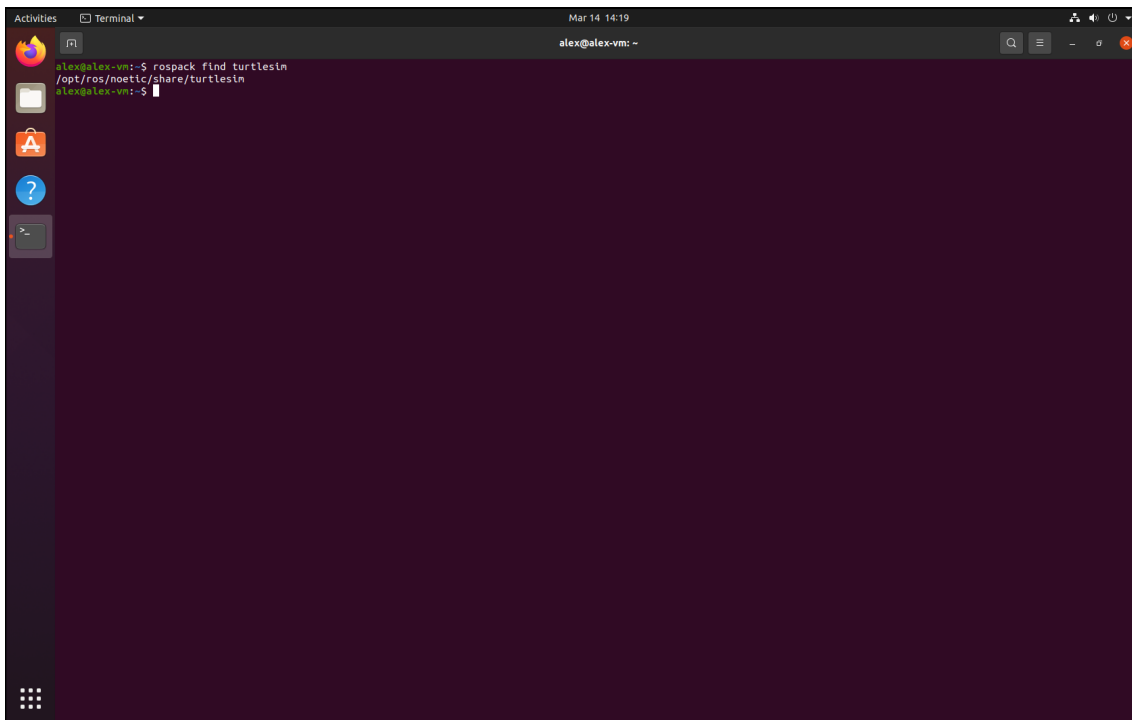


Week 2

1.1 rospack and rosls

1.1.1

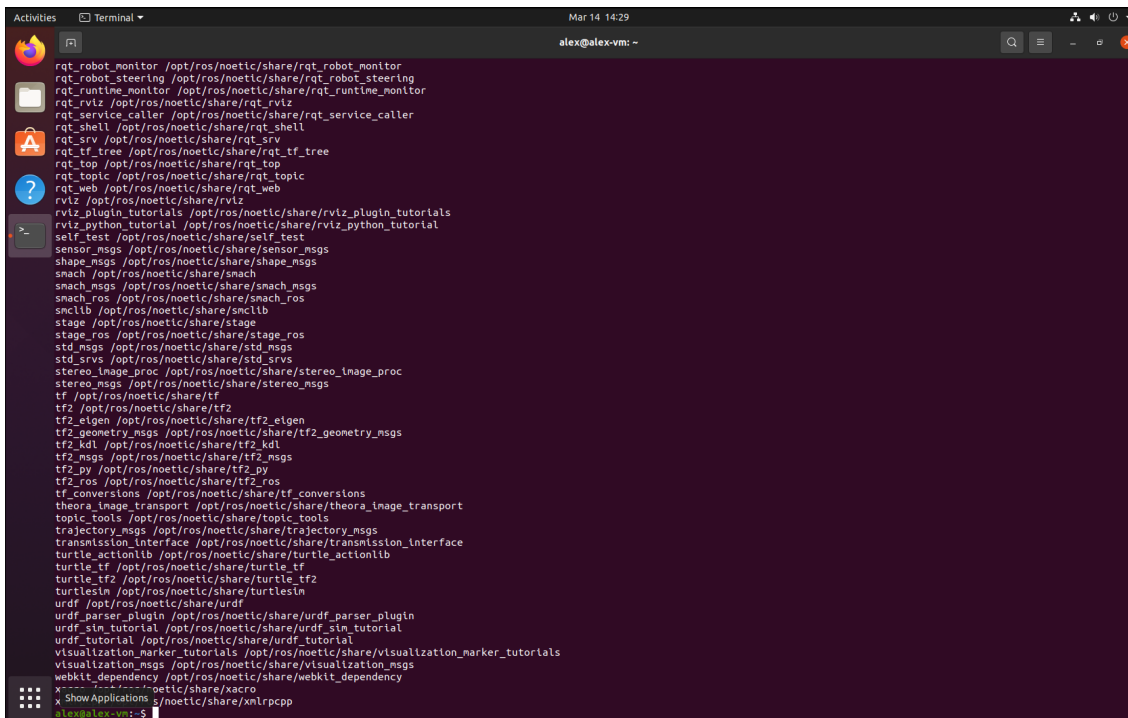
The output of this command shows the path to the `turtlesim` package.

A screenshot of a Linux terminal window. The window title is 'Terminal' and the user is 'alex@alex-vm'. The terminal shows the command 'rospack find turtlesim' being executed, which outputs the path '/opt/ros/noetic/share/turtlesim'. The terminal has a dark purple background and a light-colored text cursor.

```
alex@alex-vm:~$ rospack find turtlesim
/opt/ros/noetic/share/turtlesim
alex@alex-vm:~$
```

1.1.2

This outputs all the available packages and their filepaths

A terminal window titled 'alex@alex-vm: ~' showing the output of the 'rosls' command. The output lists various ROS packages and their installation paths, such as 'rqt_robot_monitor /opt/ros/noetic/share/rqt_robot_monitor', 'rviz /opt/ros/noetic/share/rviz', and 'xacro /opt/ros/noetic/share/xacro'. The list is extensive, covering many standard ROS tools and libraries. The terminal window has a dark background and standard Ubuntu window controls.

```
rqt_robot_monitor /opt/ros/noetic/share/rqt_robot_monitor
rqt_robot_steering /opt/ros/noetic/share/rqt_robot_steering
rqt_runtime_monitor /opt/ros/noetic/share/rqt_runtime_monitor
rqt_rviz /opt/ros/noetic/share/rqt_rviz
rqt_service_caller /opt/ros/noetic/share/rqt_service_caller
rqt_shell /opt/ros/noetic/share/rqt_shell
rqt_srv /opt/ros/noetic/share/rqt_srv
rqt_tf_tree /opt/ros/noetic/share/rqt_tf_tree
rqt_top /opt/ros/noetic/share/rqt_top
rqt_topic /opt/ros/noetic/share/rqt_topic
rqt_web /opt/ros/noetic/share/rqt_web
rviz /opt/ros/noetic/share/rviz
rviz_plugin_tutorials /opt/ros/noetic/share/rviz_plugin_tutorials
rviz_python_tutorial /opt/ros/noetic/share/rviz_python_tutorial
self_test /opt/ros/noetic/share/self_test
sensor_msgs /opt/ros/noetic/share/sensor_msgs
shape_msgs /opt/ros/noetic/share/shape_msgs
smach /opt/ros/noetic/share/smach
smach_msgs /opt/ros/noetic/share/smach_msgs
smach_ros /opt/ros/noetic/share/smach_ros
snclib /opt/ros/noetic/share/snclib
stage /opt/ros/noetic/share/stage
stage_ros /opt/ros/noetic/share/stage_ros
std_msgs /opt/ros/noetic/share/std_msgs
std_srvs /opt/ros/noetic/share/std_srvs
stereo_image_proc /opt/ros/noetic/share/stereo_image_proc
stereo_msgs /opt/ros/noetic/share/stereo_msgs
tf /opt/ros/noetic/share/tf
tf2 /opt/ros/noetic/share/tf2
tf2_eigen /opt/ros/noetic/share/tf2_eigen
tf2_geometry_msgs /opt/ros/noetic/share/tf2_geometry_msgs
tf2_kdl /opt/ros/noetic/share/tf2_kdl
tf2_msgs /opt/ros/noetic/share/tf2_msgs
tf2_py /opt/ros/noetic/share/tf2_py
tf2_ros /opt/ros/noetic/share/tf2_ros
tf_conversions /opt/ros/noetic/share/tf_conversions
theora_image_transport /opt/ros/noetic/share/theora_image_transport
topic_tools /opt/ros/noetic/share/topic_tools
trajectory_msgs /opt/ros/noetic/share/trajectory_msgs
transmission_interface /opt/ros/noetic/share/transmission_interface
turtle_actionlib /opt/ros/noetic/share/turtle_actionlib
turtle_tf /opt/ros/noetic/share/turtle_tf
turtle_tf2 /opt/ros/noetic/share/turtle_tf2
turtlesim /opt/ros/noetic/share/turtlesim
urdf /opt/ros/noetic/share/urdf
urdf_parser_plugin /opt/ros/noetic/share/urdf_parser_plugin
urdf_sim_tutorial /opt/ros/noetic/share/urdf_sim_tutorial
urdf_tutorial /opt/ros/noetic/share/urdf_tutorial
visualization_marker_tutorials /opt/ros/noetic/share/visualization_marker_tutorials
visualization_msgs /opt/ros/noetic/share/visualization_msgs
webkit_dependency /opt/ros/noetic/share/webkit_dependency
xacro /opt/ros/noetic/share/xacro
xmlrpcpp /opt/ros/noetic/share/xmlrpcpp
```

1.1.3

xmlrpcpp /opt/ros/noetic/share/xmlrpcpp

xacro /opt/ros/noetic/share/xacro

webkit_dependency /opt/ros/noetic/share/webkit_dependency

visualization_msgs /opt/ros/noetic/share/visualization_msgs

visualization_marker_tutorials /opt/ros/noetic/share/visualization_marker_tutorials

urdf_tutorial /opt/ros/noetic/share/urdf_tutorial

urdf_sim_tutorial /opt/ros/noetic/share/urdf_sim_tutorial

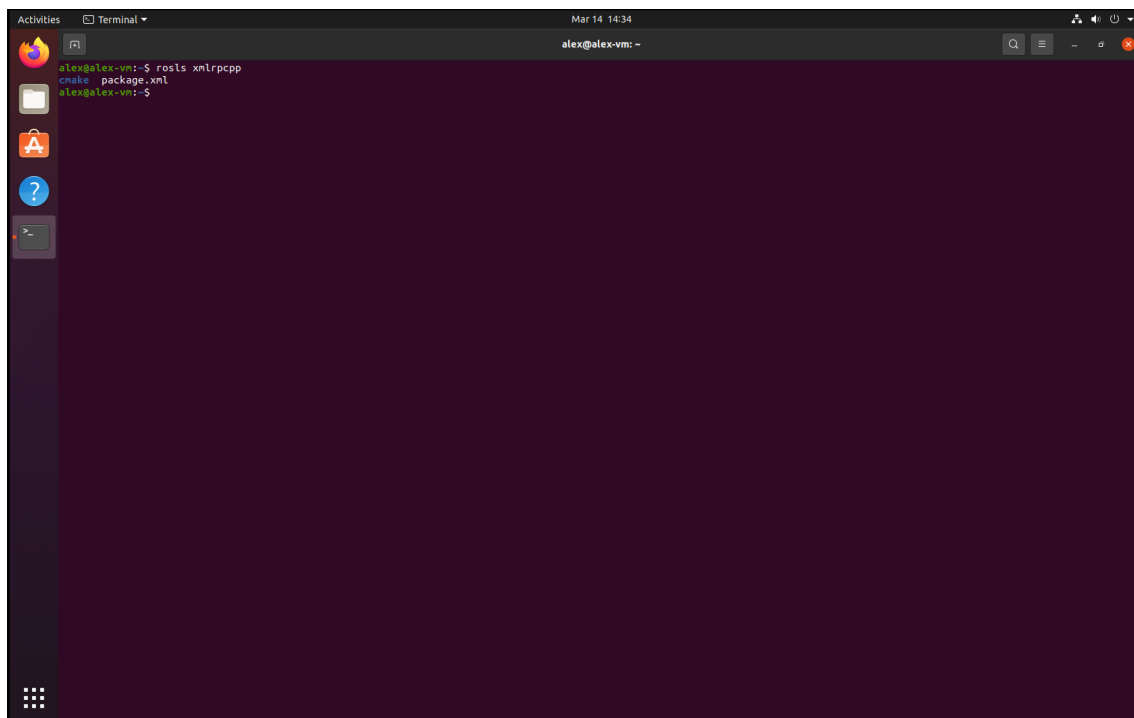
urdf_parser_plugin /opt/ros/noetic/share/urdf_parser_plugin

urdf /opt/ros/noetic/share/urdf

turtle_tf /opt/ros/noetic/share/turtle_tf

1.1.4

The output of the `rosls` command shows the contents of the package

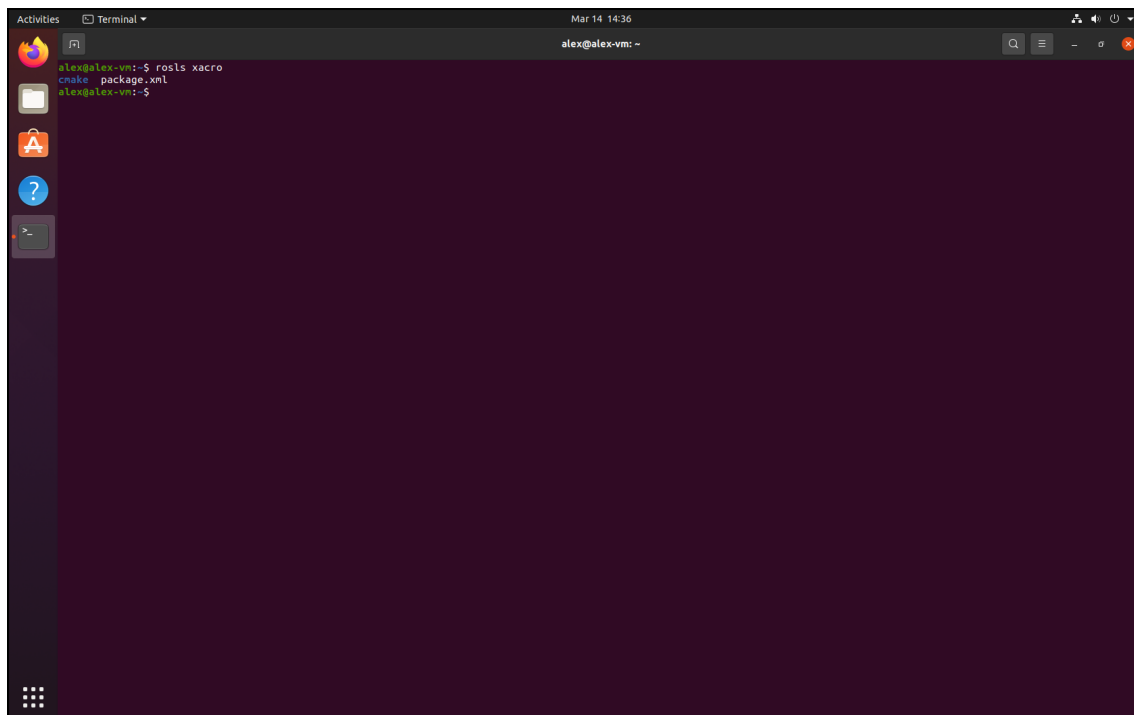


A terminal window titled 'alex@alex-vm: ~' with a dark purple background. The window shows the following commands and output:

```
alex@alex-vm:~$ rosbuild find xmlrpcpp
alex@alex-vm:~$ cat package.xml
alex@alex-vm:~$
```

The terminal window includes a sidebar on the left with icons for Activities, Terminal, Files, Applications, Help, and a terminal icon. The top bar shows the date 'Mar 14 14:34' and system status icons.

xmlrpcpp

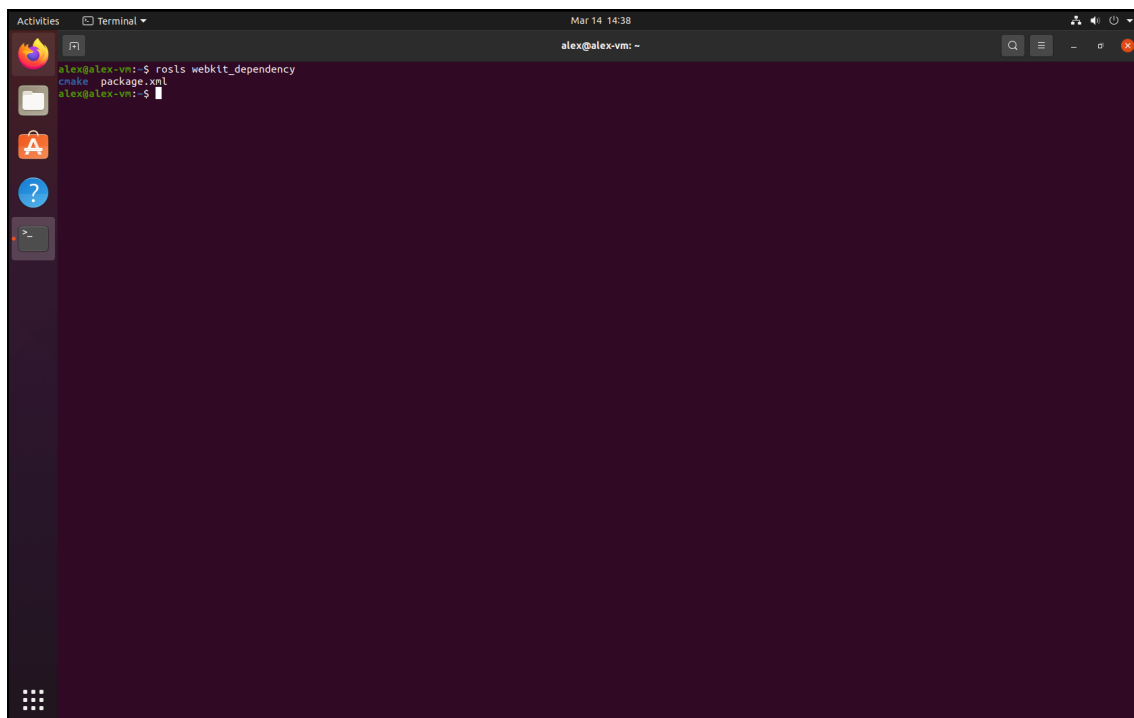


A terminal window titled 'alex@alex-vm: ~' with a dark purple background. The window shows the following commands and output:

```
alex@alex-vm:~$ rosbuild find xacro
alex@alex-vm:~$ cat package.xml
alex@alex-vm:~$
```

The terminal window includes a sidebar on the left with icons for Activities, Terminal, Files, Applications, Help, and a terminal icon. The top bar shows the date 'Mar 14 14:36' and system status icons.

xacro

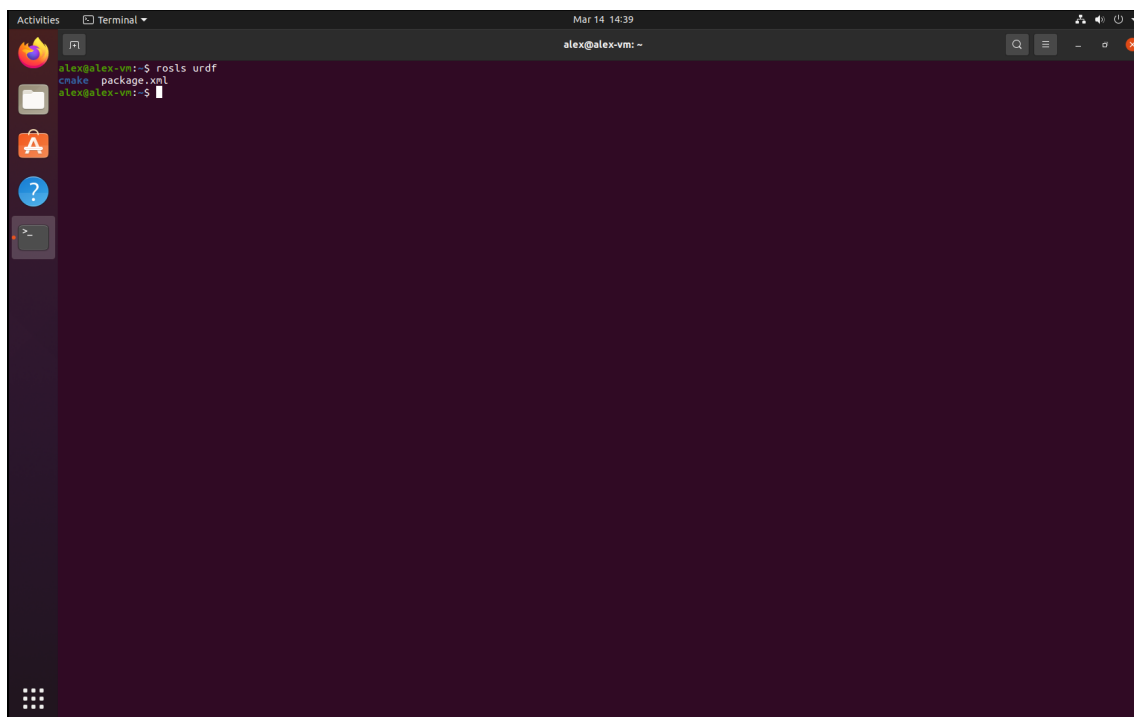


A terminal window titled 'alex@alex-vm: ~' with a dark purple background. The window shows the following commands and output:

```
alex@alex-vm:~$ rosls webkit_dependency
make package.vnl
alex@alex-vm:~$
```

The terminal window includes a sidebar on the left with icons for Activities, Terminal, and other applications. The top bar shows the date and time as 'Mar 14 14:38'.

webkit_dependency

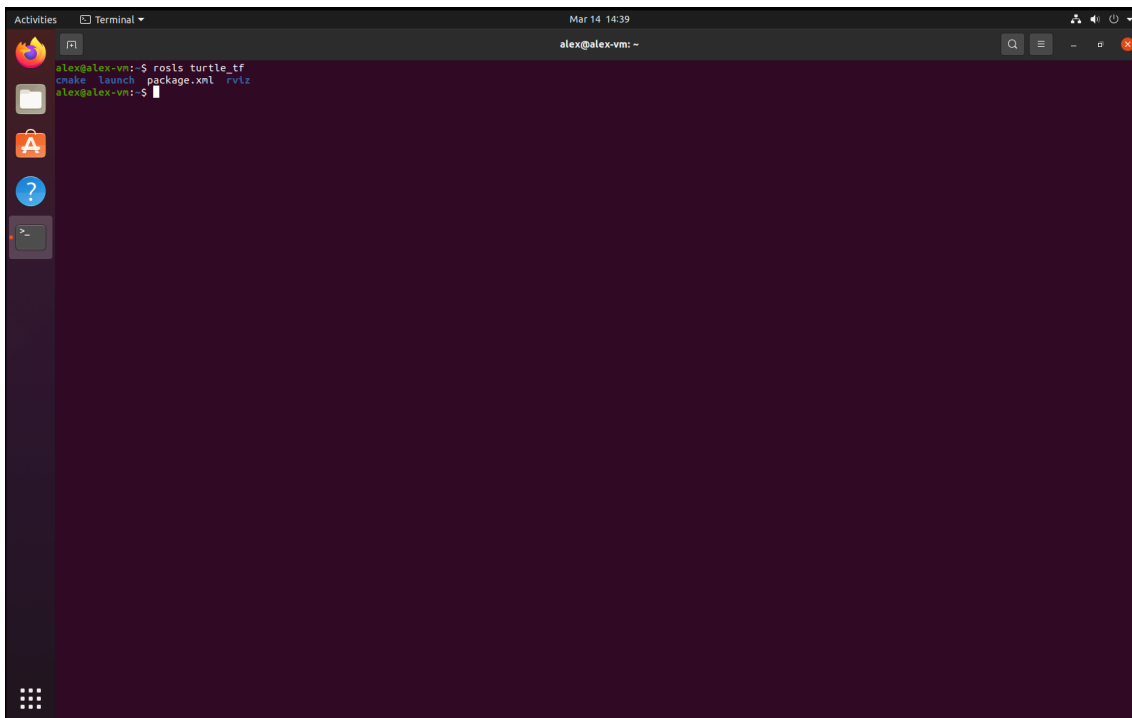


A terminal window titled 'alex@alex-vm: ~' with a dark purple background. The window shows the following commands and output:

```
alex@alex-vm:~$ rosls urdf
make package.vnl
alex@alex-vm:~$
```

The terminal window includes a sidebar on the left with icons for Activities, Terminal, and other applications. The top bar shows the date and time as 'Mar 14 14:39'.

urdf



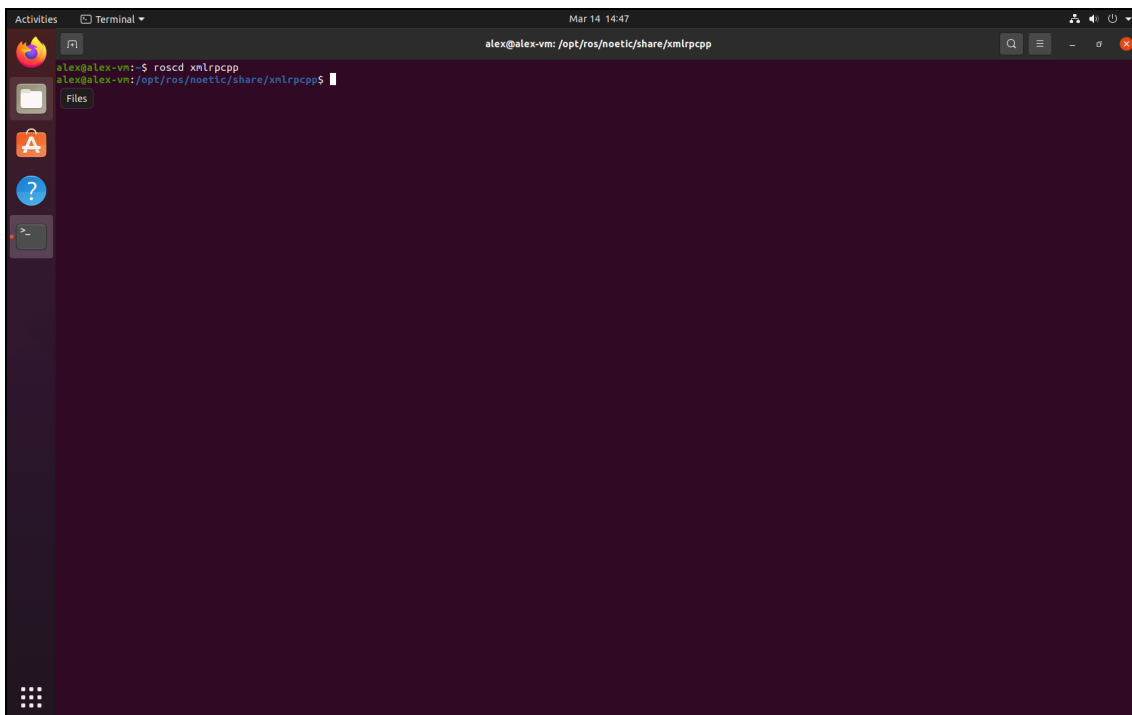
A terminal window titled 'alex@alex-vm: ~' with a dark purple background. The terminal shows the following commands and output:

```
alex@alex-vm:~$ rosls turtle_tf
create launch package.xml rviz
alex@alex-vm:~$
```

The window includes a top bar with 'Activities', 'Terminal', and the date 'Mar 14 14:39'. A sidebar on the left contains icons for a file manager, a terminal, and a help icon.

turtle_tf

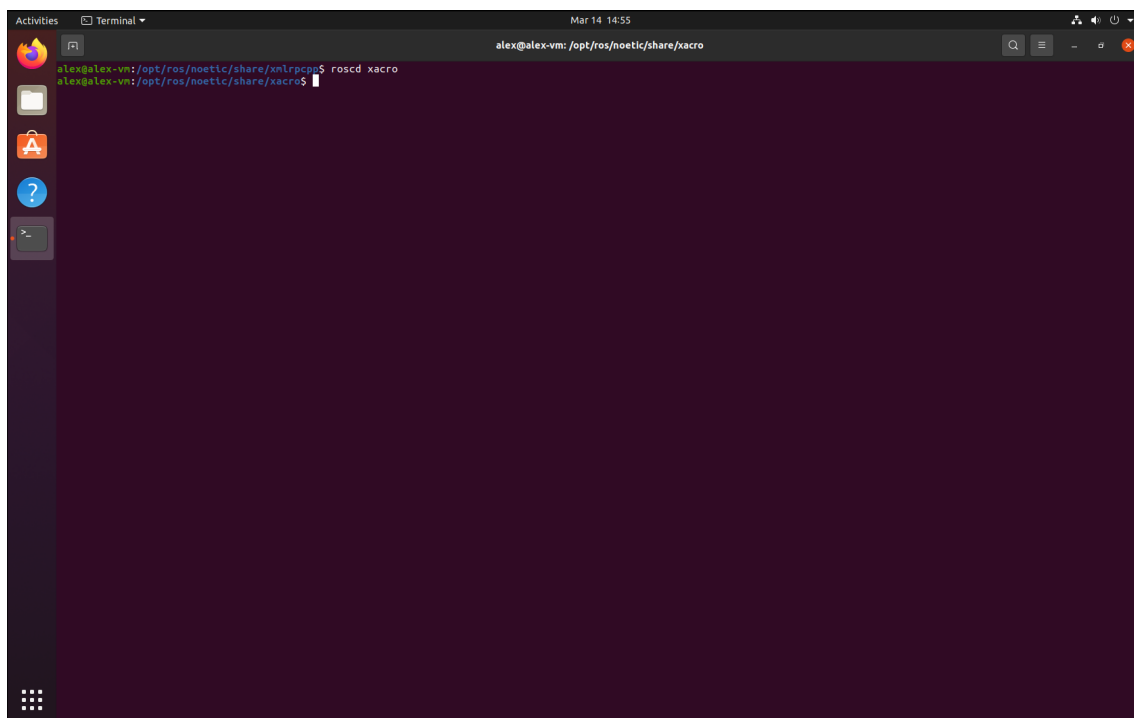
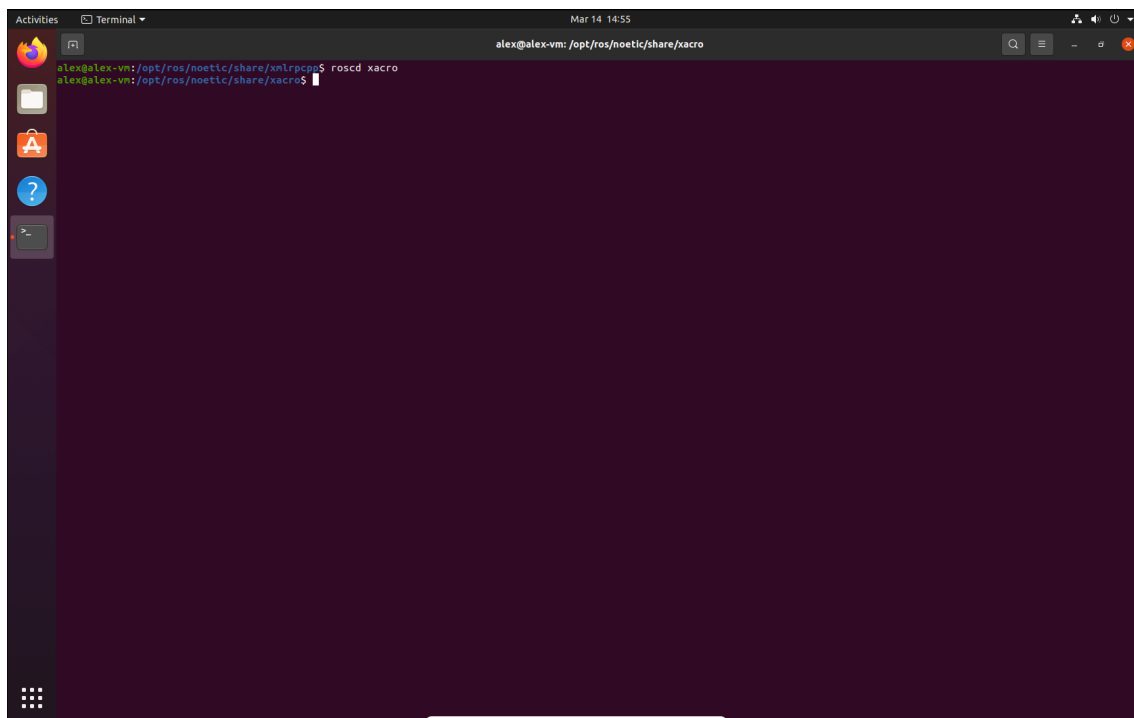
1.2 roscd

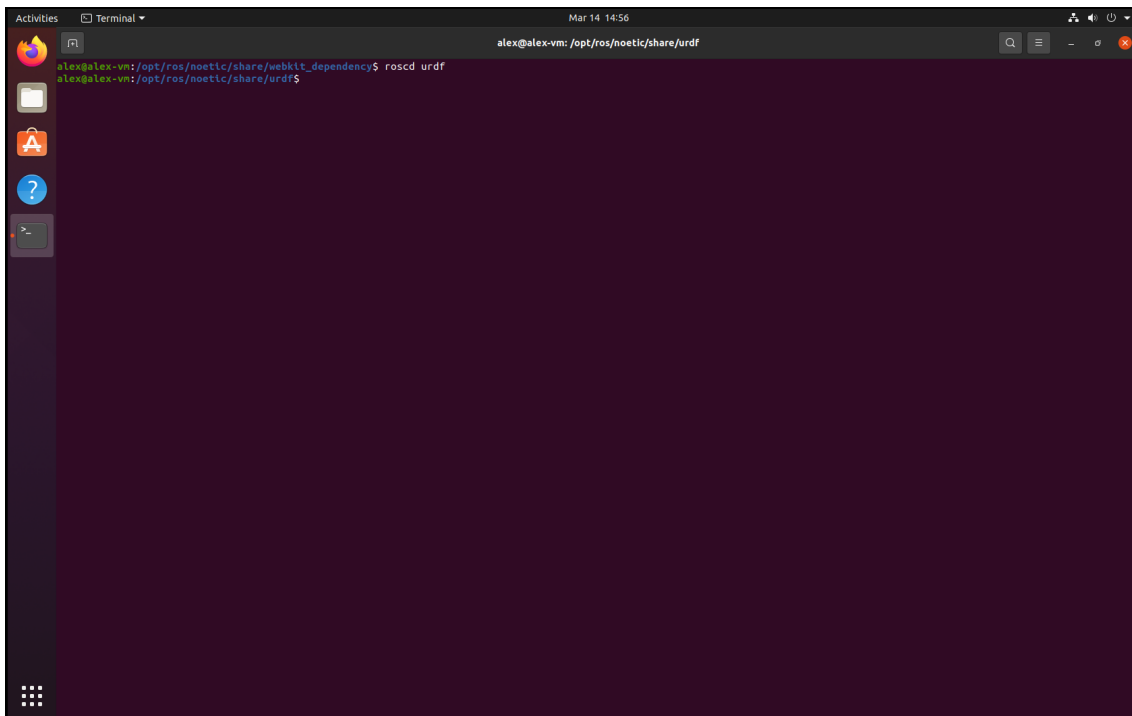


A terminal window titled 'alex@alex-vm: /opt/ros/noetic/share/xmircpp' with a dark purple background. The terminal shows the following commands and output:

```
alex@alex-vm:~$ roscd xmircpp
alex@alex-vm:/opt/ros/noetic/share/xmircpp$
```

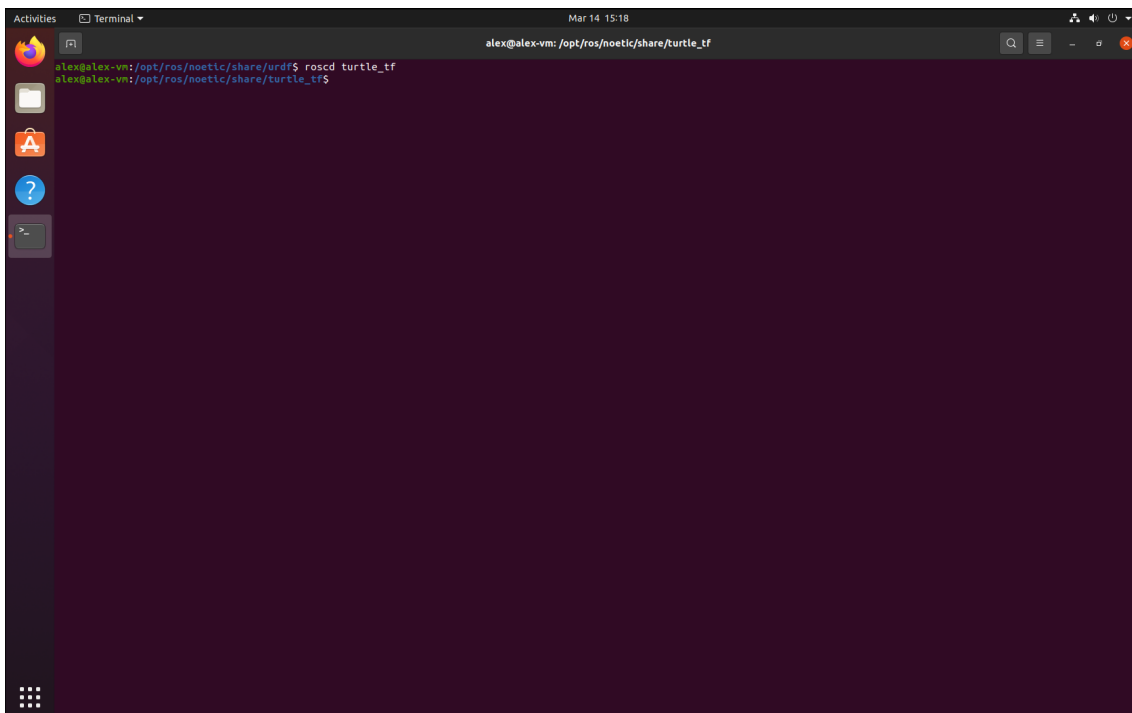
The window includes a top bar with 'Activities', 'Terminal', and the date 'Mar 14 14:47'. A sidebar on the left contains icons for a file manager, a terminal, and a help icon. The terminal title bar indicates the current directory is '/opt/ros/noetic/share/xmircpp'.





A terminal window titled "Terminal" with a dark background. The window shows the user "alex" at a prompt "alex@alex-vm: /opt/ros/noetic/share/urdf\$". The user has entered the command "roscd urdf", and the prompt has moved to the next line. The window's title bar includes the date "Mar 14 14:56" and standard window controls. On the left side, there is a vertical dock with icons for the Dash menu, Home, Applications, and a search icon.

```
alex@alex-vm: /opt/ros/noetic/share/urdf$ roscd urdf
alex@alex-vm: /opt/ros/noetic/share/urdf$
```

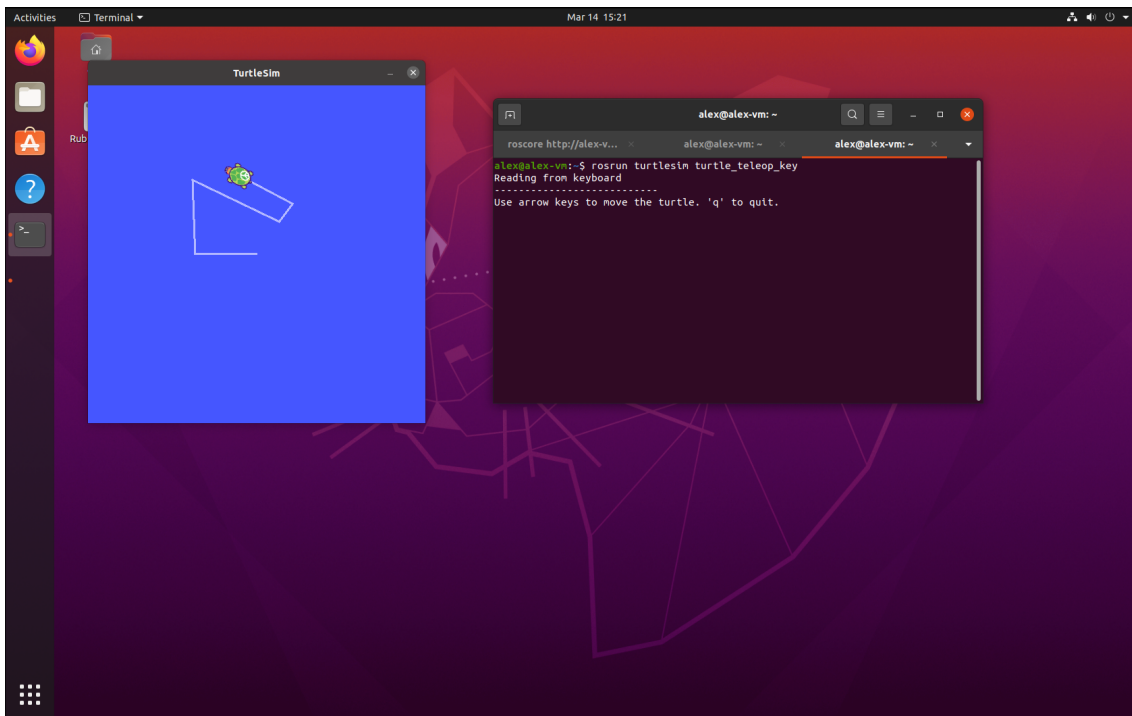


A terminal window titled "Terminal" with a dark background. The window shows the user "alex" at a prompt "alex@alex-vm: /opt/ros/noetic/share/turtle_tf\$". The user has entered the command "roscd turtle_tf", and the prompt has moved to the next line. The window's title bar includes the date "Mar 14 15:18" and standard window controls. On the left side, there is a vertical dock with icons for the Dash menu, Home, Applications, and a search icon.

```
alex@alex-vm: /opt/ros/noetic/share/turtle_tf$ roscd turtle_tf
alex@alex-vm: /opt/ros/noetic/share/turtle_tf$
```

2 roscore and rosrn

2.1



2.2

In `roslaunch turtlesim turtlesim_node` the first `turtlesim` is the package and the `turtlesim_node` is the node. In `roslaunch turtlesim turtlesim_teleop_key` `turtlesim_teleop_key` is the node name and `turtlesim` is the package name.

3 Getting information about nodes, topics and messages

3.1.1

The following nodes are running

```
/rosout
/teleop_turtle
/turtlesim
```

3.1.2

Publications

```
/rosout [roscpp_msgs/Log]
/turtle1/color_sensor [turtlesim/Color]
/turtle1/pose [turtlesim/Pose]
```

Subscriptions

```
/turtle1/cmd_vel [geometry_msgs/Twist]
```

3.1.3

Publications

```
/rosout [roscpp_msgs/Log]
/turtle1/cmd_vel [geometry_msgs/Twist]
```

Subscriptions

```
/teleop_turtle/get_loggers
/teleop_turtle/set_logger_level
```

3.2.1

```
/rosout
/rosout_agg
/turtle1/cmd_vel
/turtle1/color_sensor
/turtle1/pose
```

3.2.2

The `teleop_turtle` node is using the `turtle1/cmd_vel` topic to communicate with `turtlesim`.
`turtle1/cmd_vel` listens to messages from `teleop_turtle` and `turtlesim` listens to messages from `turtle1/cmd_vel`.

3.2.3

```
geometry_msgs/Twist
```

3.3.1

```
{
  "geometry_msgs/Vector3": {
    "linear": {
      "x": {},
      "y": {},
      "z": {}
    },
    "angular": {
      "x": {},
      "y": {},
      "z": {}
    }
  }
}
```

3.3.2

Topics are a way of communicating with other nodes via a named channel. Communication through these channels will relate only to these topics. A message contains information in a simplified format that ROS nodes can send between each other via topics.