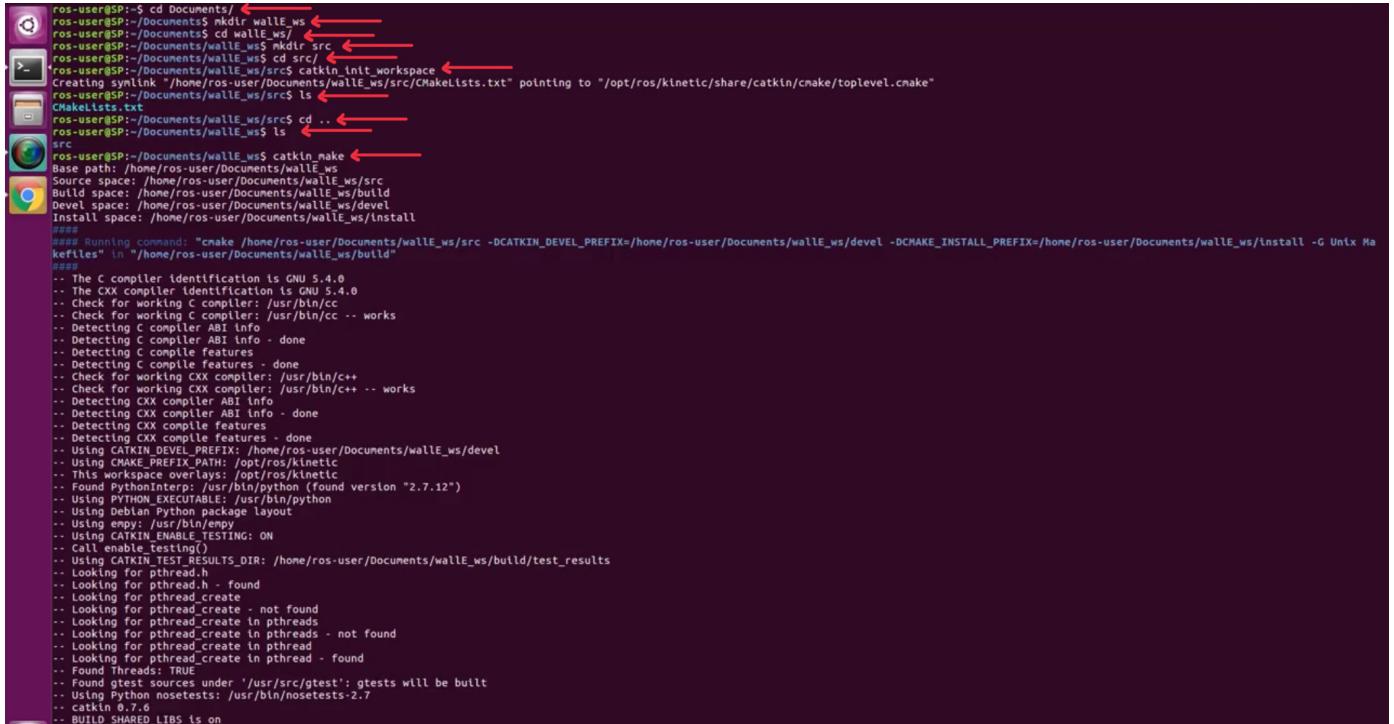


# ROS nodes

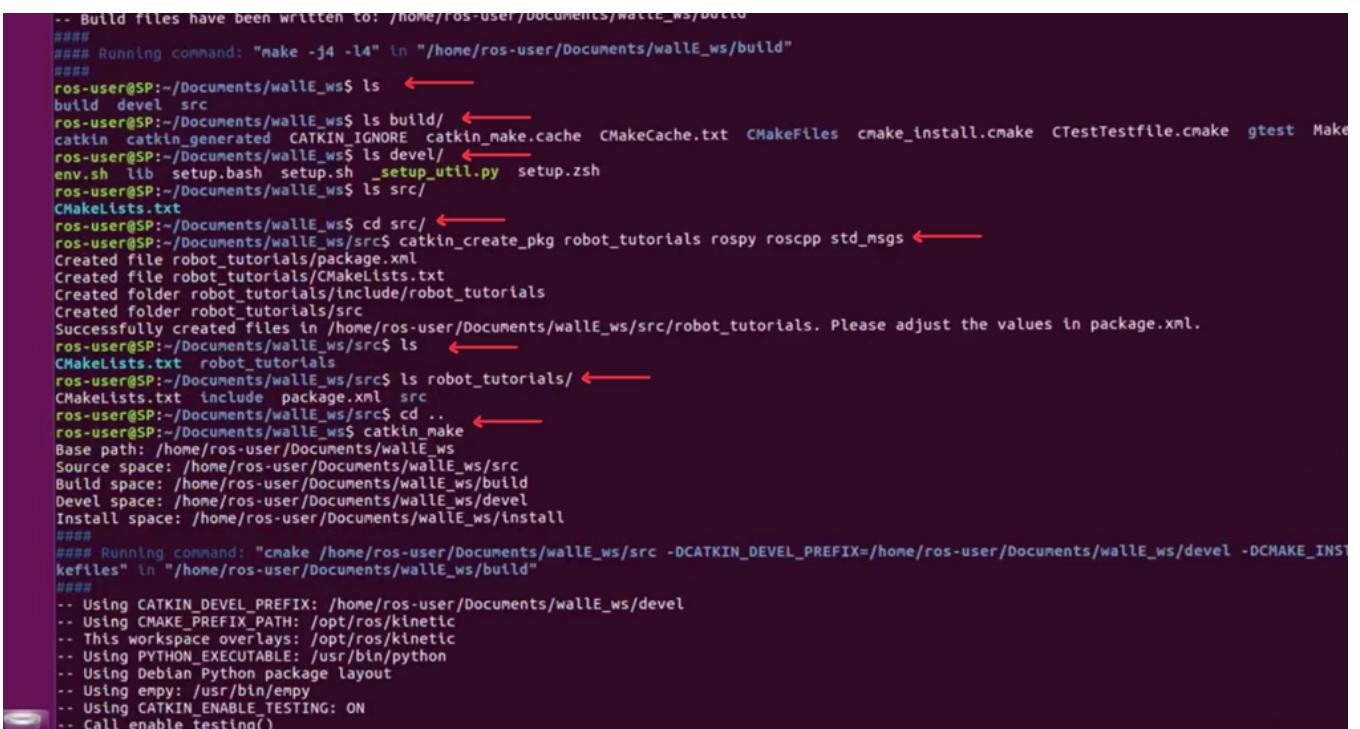
- **Create tow nodes shared a string message in a custom package (follow the below steps):**

## A. Create a ROS package and new workspace inside the package.

By writing these commands in the terminal to execute them.



```
ros-user@SP:~$ cd Documents/
ros-user@SP:~/Documents$ mkdir walle_ws
ros-user@SP:~/Documents$ cd walle_ws/
ros-user@SP:~/Documents/walle_ws$ mkdir src
ros-user@SP:~/Documents/walle_ws$ cd src/
ros-user@SP:~/Documents/walle_ws/src$ catkin_init_workspace
Creating symlink "/home/ros-user/Documents/walle_ws/src/CMakeLists.txt" pointing to "/opt/ros/kinetic/share/catkin/cmake/toplevel.cmake"
CMakeLists.txt
ros-user@SP:~/Documents/walle_ws/src$ ls ...
ros-user@SP:~/Documents/walle_ws/src$ cd ..
ros-user@SP:~/Documents/walle_ws$ ls
src
ros-user@SP:~/Documents/walle_ws$ catkin_make
Base path: /home/ros-user/Documents/walle_ws
Source space: /home/ros-user/Documents/walle_ws/src
Build space: /home/ros-user/Documents/walle_ws/build
Devel space: /home/ros-user/Documents/walle_ws/devel
Install space: /home/ros-user/Documents/walle_ws/install
#####
## Running command: "cmake /home/ros-user/Documents/walle_ws/src -DCATKIN_DEVEL_PREFIX=/home/ros-user/Documents/walle_ws/devel -DCMAKE_INSTALL_PREFIX=/home/ros-user/Documents/walle_ws/install -G Unix Makefiles" in "/home/ros-user/Documents/walle_ws/build"
#####
-- The C compiler identification is GNU 5.4.0
-- The CXX compiler identification is GNU 5.4.0
-- Check for working C compiler: /usr/bin/cc
-- Check for working C compiler: /usr/bin/cc -- works
-- Detecting C compiler ABI info
-- Detecting C compiler ABI info - done
-- Detecting C compile features
-- Detecting C compile features - done
-- Detecting CXX compiler: /usr/bin/c++
-- Check for working CXX compiler: /usr/bin/c++ -- works
-- Detecting CXX compiler ABI info
-- Detecting CXX compiler ABI info - done
-- Detecting CXX compile features
-- Detecting CXX compile features - done
-- Using CATKIN_DEVEL_PREFIX: /home/ros-user/Documents/walle_ws/devel
-- Using CMAKE_PREFIX_PATH: /opt/ros/kinetic
-- This workspace overlays: /opt/ros/kinetic
-- Found PythonInterp: /usr/bin/python (found version "2.7.12")
-- Using PYTHON_EXECUTABLE: /usr/bin/python
-- Using Debian Python package layout
-- Using envpy: /usr/bin/envpy
-- Using CATKIN_ENABLE_TESTING: ON
-- Call enable_testing()
-- Using CATKIN_RESULTS_DIR: /home/ros-user/Documents/walle_ws/build/test_results
-- Looking for pthread.h
-- Looking for pthread.h - found
-- Looking for thread.h
-- Looking for thread.h - found
-- Looking for pthread_create
-- Looking for pthread_create - not found
-- Looking for pthread_create in pthreads
-- Looking for pthread_create in pthreads - not found
-- Looking for pthread_create in pthread
-- Looking for pthread_create in pthread - found
-- Found Threads: TRUE
-- Found gtest sources under '/usr/src/gtest': gtests will be built
-- Using Python nosetests: /usr/bin/nosetests-2.7
-- catkin 0.7.6
-- BUILD_SHARED_LIBS is on
```

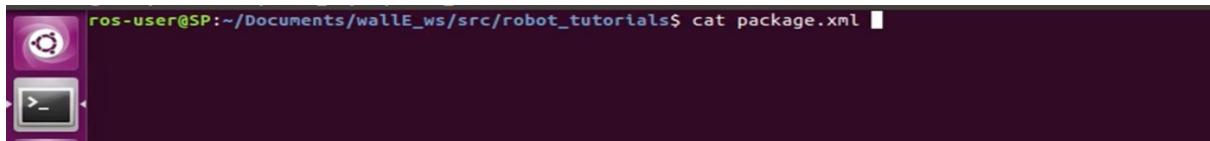


```
-- Build files have been written to: /home/ros-user/Documents/walle_ws/build
#####
## Running command: "make -j4 -l4" in "/home/ros-user/Documents/walle_ws/build"
#####
ros-user@SP:~/Documents/walle_ws$ ls
build devel src
ros-user@SP:~/Documents/walle_ws$ ls build/
catkin catkin_generated CATKIN_IGNORE catkin_make.cache CMakeCache.txt CMakeFiles cmake_install.cmake CTestTestfile.cmake gtest Makefile
ros-user@SP:~/Documents/walle_ws$ ls devel/
env.sh lib setup.bash setup.sh _setup_util.py setup.zsh
ros-user@SP:~/Documents/walle_ws$ ls src/
CMakeLists.txt
ros-user@SP:~/Documents/walle_ws$ cd src/
ros-user@SP:~/Documents/walle_ws/src$ catkin_create_pkg robot_tutorials rospy roscpp std_msgs
Created file robot_tutorials/package.xml
Created file robot_tutorials/CMakeLists.txt
Created folder robot_tutorials/include/robot_tutorials
Created folder robot_tutorials/src
Successfully created files in /home/ros-user/Documents/walle_ws/src/robot_tutorials. Please adjust the values in package.xml.
ros-user@SP:~/Documents/walle_ws/src$ ls
CMakeLists.txt robot_tutorials
ros-user@SP:~/Documents/walle_ws/src$ ls robot_tutorials/
CMakeLists.txt include package.xml src
ros-user@SP:~/Documents/walle_ws/src$ cd ..
ros-user@SP:~/Documents/walle_ws$ catkin_make
Base path: /home/ros-user/Documents/walle_ws
Source space: /home/ros-user/Documents/walle_ws/src
Build space: /home/ros-user/Documents/walle_ws/build
Devel space: /home/ros-user/Documents/walle_ws/devel
Install space: /home/ros-user/Documents/walle_ws/install
#####
## Running command: "cmake /home/ros-user/Documents/walle_ws/src -DCATKIN_DEVEL_PREFIX=/home/ros-user/Documents/walle_ws/devel -DCMAKE_INSTALL_PREFIX=/home/ros-user/Documents/walle_ws/install -G Unix Makefiles" in "/home/ros-user/Documents/walle_ws/build"
#####
-- Using CATKIN_DEVEL_PREFIX: /home/ros-user/Documents/walle_ws/devel
-- Using CMAKE_PREFIX_PATH: /opt/ros/kinetic
-- This workspace overlays: /opt/ros/kinetic
-- Using PYTHON_EXECUTABLE: /usr/bin/python
-- Using Debian Python package layout
-- Using envpy: /usr/bin/envpy
-- Using CATKIN_ENABLE_TESTING: ON
-- Call enable_testing()
```

```

Created folder robot_tutorials/include/robot_tutorials
Created folder robot_tutorials/src
Successfully created files in /home/ros-user/Documents/wallE_ws/src/robot_tutorials. Please adjust the values in package.xml.
ros-user@SP:~/Documents/wallE_ws/src$ ls
CMakeLists.txt  robot_tutorials
ros-user@SP:~/Documents/wallE_ws/src$ ls robot_tutorials/
CMakeLists.txt  include  package.xml  src
ros-user@SP:~/Documents/wallE_ws/src$ cd ..
ros-user@SP:~/Documents/wallE_ws$ catkin_make
Base path: /home/ros-user/Documents/wallE_ws
Source space: /home/ros-user/Documents/wallE_ws/src
Build space: /home/ros-user/Documents/wallE_ws/build
Devel space: /home/ros-user/Documents/wallE_ws/devel
Install space: /home/ros-user/Documents/wallE_ws/install
#####
##### Running command: "catkin /home/ros-user/Documents/wallE_ws/src -DCATKIN_DEVEL_PREFIX=/home/ros-user/Documents/wallE_ws/devel -DCMAKE_INSTALL_PREFIX=/home/ros-user/Documents/wallE_ws/install"
#####
-- Using CATKIN_DEVEL_PREFIX: /home/ros-user/Documents/wallE_ws/devel
-- Using CMAKE_PREFIX_PATH: /opt/ros/kinetic
-- This workspace overlays: /opt/ros/kinetic
-- Using PYTHON_EXECUTABLE: /usr/bin/python
-- Using Debian Python package layout
-- Using empy: /usr/bin/empy
-- Using CATKIN_ENABLE_TESTING: ON
-- Call enable_testing()
-- Using CATKIN_TEST_RESULTS_DIR: /home/ros-user/Documents/wallE_ws/build/test_results
-- Found gtest sources under '/usr/src/gtest': gtests will be built
-- Using Python nosetests: /usr/bin/nosetests-2.7
-- catkin 0.7.6
-- BUILD_SHARED_LIBS is on
-- traversing 1 packages in topological order:
--   - robot_tutorials
-- 
--++ processing catkin package: 'robot_tutorials'
-->>> add_subdirectory(robot_tutorials)
-- Configuring done
-- Generating done
-- Build files have been written to: /home/ros-user/Documents/wallE_ws/build
#####
##### Running command: "make -j4 -l4" in "/home/ros-user/Documents/wallE_ws/build"

```

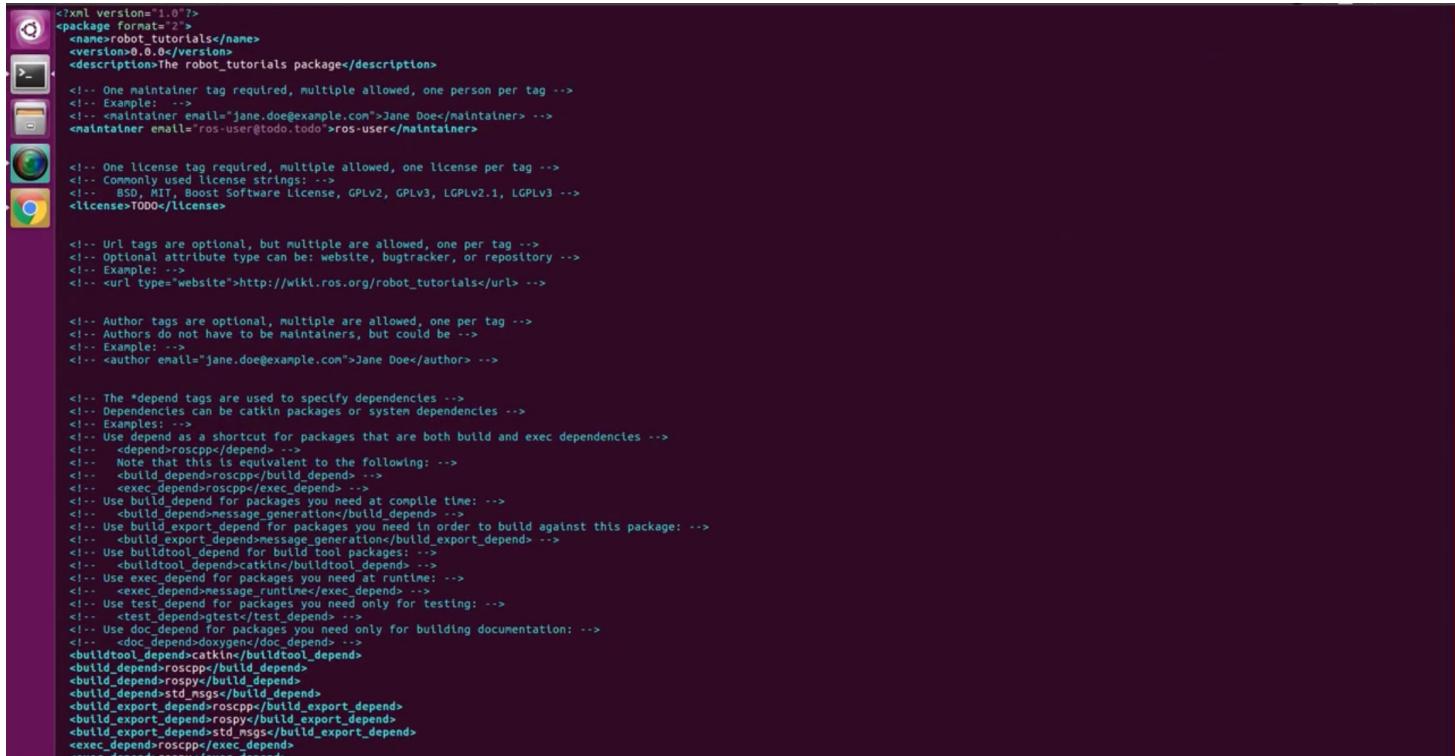


```

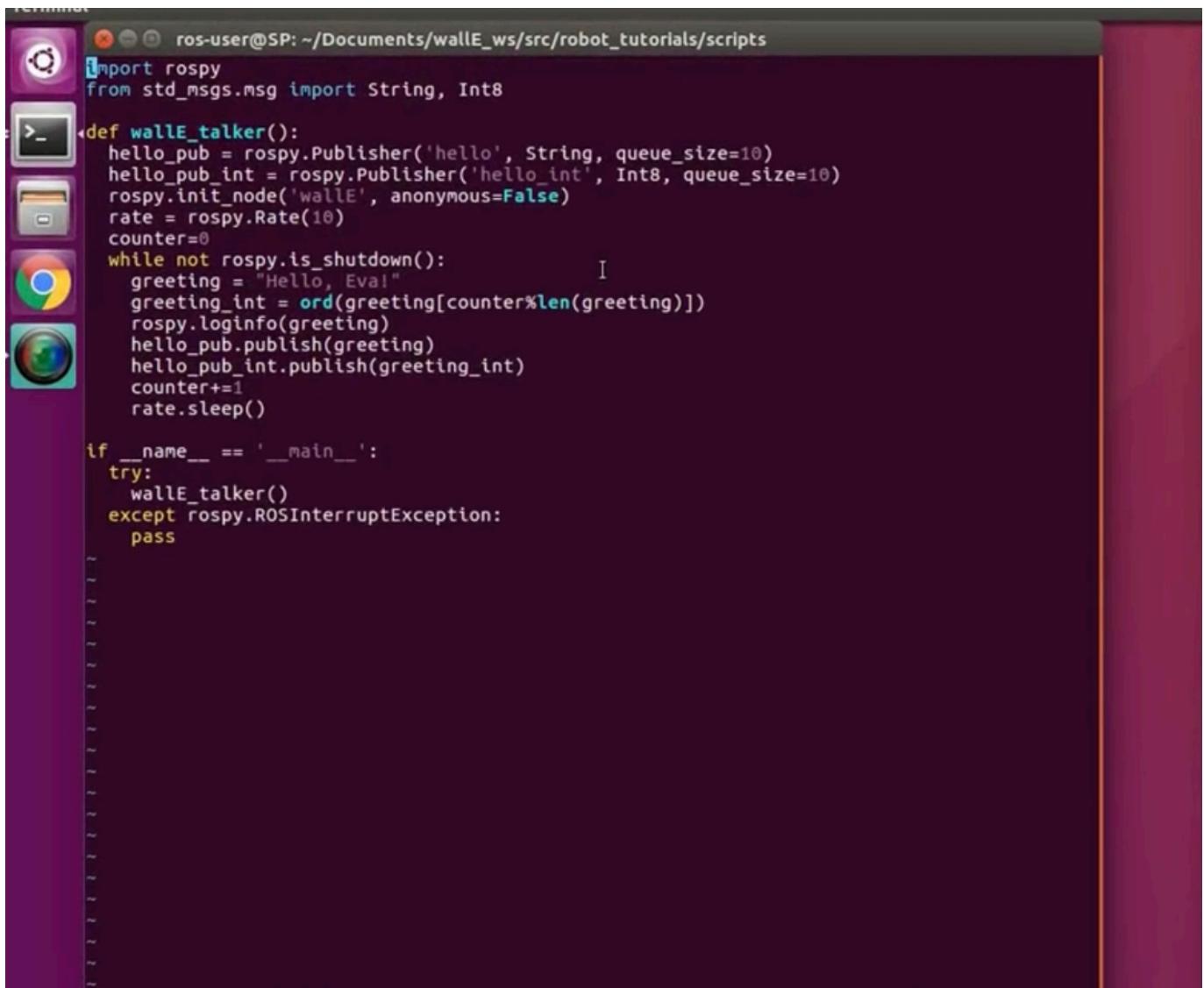
<!-- Use build_export_depend for packages you need in order to build against this package -->
<!--   <build_export_depend>message_generation</build_export_depend> -->
<!-- Use buildtool_depend for build tool packages: -->
<!--   <buildtool_depend>catkin</buildtool_depend> -->
<!-- Use exec_depend for packages you need at runtime: -->
<!--   <exec_depend>message_runtime</exec_depend> -->
<!-- Use test_depend for packages you need only for testing: -->
<!--   <test_depend>gtest</test_depend> -->
<!-- Use doc_depend for packages you need only for building documentation: -->
<!--   <doc_depend>doxygen</doc_depend> -->
<buildtool_depend>catkin</buildtool_depend>
<build_depend>roscpp</build_depend>
<build_depend>rospy</build_depend>
<build_depend>std_msgs</build_depend>
<build_export_depend>roscpp</build_export_depend>
<build_export_depend>rospy</build_export_depend>
<build_export_depend>std_msgs</build_export_depend>
<exec_depend>roscpp</exec_depend>
<exec_depend>rospy</exec_depend>
<exec_depend>std_msgs</exec_depend>

<!-- The export tag contains other, unspecified, tags -->
<export>
    <!-- Other tools can request additional information be placed here -->
</export>
</package>
ros-user@SP:~/Documents/wallE_ws/src/robot_tutorials$ vim package.xml ←

```



## B. publisher code using Python



A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window. The terminal window has a dark background and contains Python code for a ROS node named 'wallE\_talker'. The code imports rospy and std\_msgs.msg, initializes publishers for 'hello' (String) and 'hello\_int' (Int8), and runs a loop that publishes a greeting message and its ASCII value at a rate of 10 Hz. The terminal window is titled 'Terminal' and shows the path 'ros-user@SP: ~/Documents/wallE\_ws/src/robot\_tutorials/scripts'. The desktop background is red, and there are icons for the Dash, Home, and Applications in the top panel.

```
import rospy
from std_msgs.msg import String, Int8

def wallE_talker():
    hello_pub = rospy.Publisher('hello', String, queue_size=10)
    hello_pub_int = rospy.Publisher('hello_int', Int8, queue_size=10)
    rospy.init_node('wallE', anonymous=False)
    rate = rospy.Rate(10)
    counter=0
    while not rospy.is_shutdown():
        greeting = "Hello, Eva!" I
        greeting_int = ord(greeting[counter%len(greeting)])
        rospy.loginfo(greeting)
        hello_pub.publish(greeting)
        hello_pub_int.publish(greeting_int)
        counter+=1
        rate.sleep()

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

### C. subscriber code using Python

```
ros-user@SP: ~/Documents/wallE_ws/src/robot_tutorials/scripts
import rospy
from std_msgs.msg import String, Int8

def callback_str(data):
    rospy.loginfo(data.data)

def callback_int(data):
    rospy.loginfo(str(data.data))

def Eva_listener():
    rospy.init_node('Eva', anonymous=False)
    rospy.Subscriber('hello', String, callback_str)
    rospy.Subscriber('hello_int', Int8, callback_int)
    rospy.spin()

if __name__ == '__main__':
    Eva_listener()
```