**IE 410 – INTRODUCTION TO ROBOTICS**

**Lab-8 report**

**Turtlebot3 and simulation**

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* **Installing turtlebot3**

Run following commands to install turtlebot3

$ cd ~/catkin\_ws/src/

$ git clone <https://github.com/ROBOTIS-GIT/turtlebot3_msgs.git>

$ git clone <https://github.com/ROBOTIS-GIT/turtlebot3.git>

$ cd ~/catkin\_ws && catkin\_make

After, add following line in our .bashrc file export TURTLEBOT3\_MODEL=burger

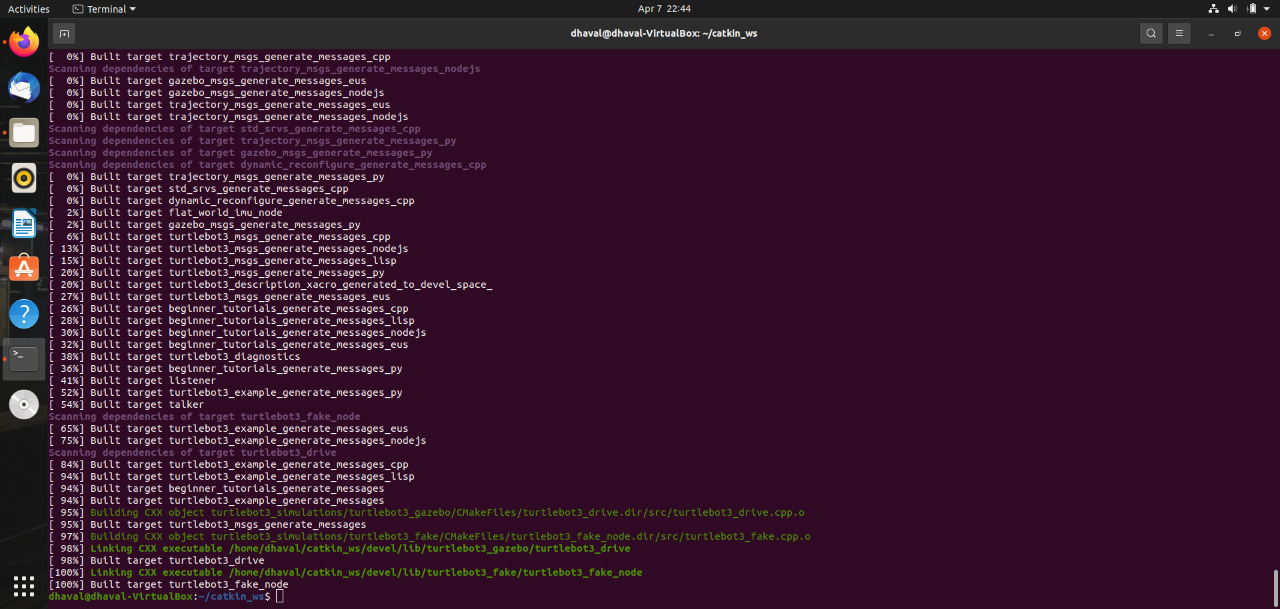
Now run the following commands

$ source ~/.bashrc

$ cd ~/catkin\_ws/src/

$ git clone <https://github.com/ROBOTIS-GIT/turtlebot3_simulations.git>

$ cd ~/catkin\_ws && catkin\_make



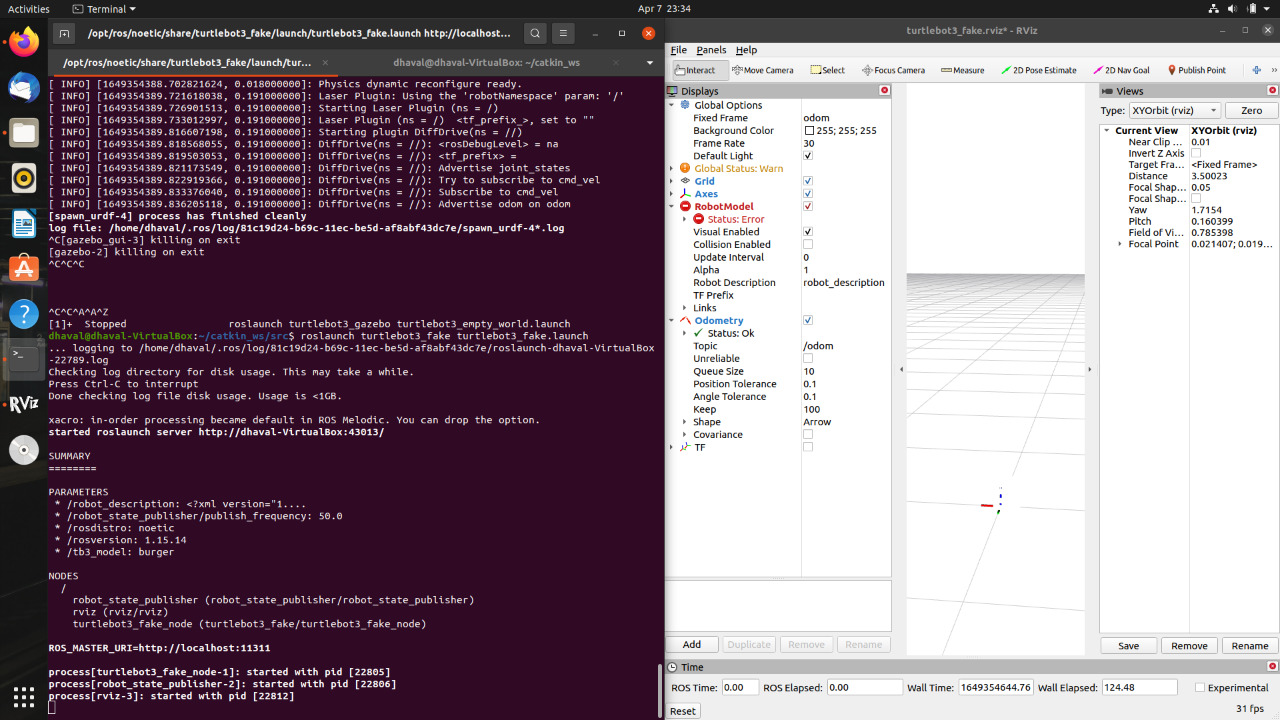
* **Simulate turtlebot3 using RViz**

Run the following command to simulate turtlebot3 using RViz.

$ roslaunch turtlebot3\_fake turtlebot3\_fake.launch

If you want to control turtlebot3 using your keyboard run the following command.

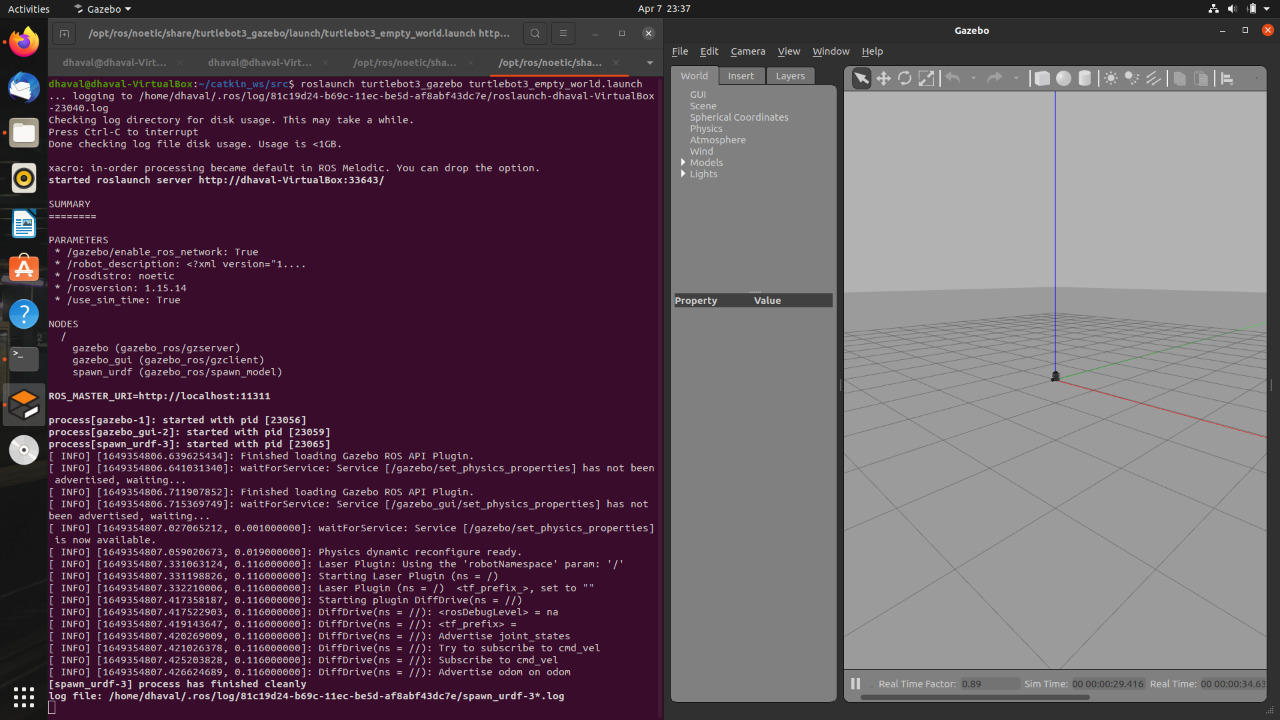
$ roslaunch turtlebot3\_teleop turtlebot3\_teleop\_key.launch



* **Simulate turtlebot3 using Gazebo**

Run the following command to simulate turtlebot3 using Gazebo.

$ roslaunch turtlebot3\_gazebo turtlebot3\_empty\_world.launch

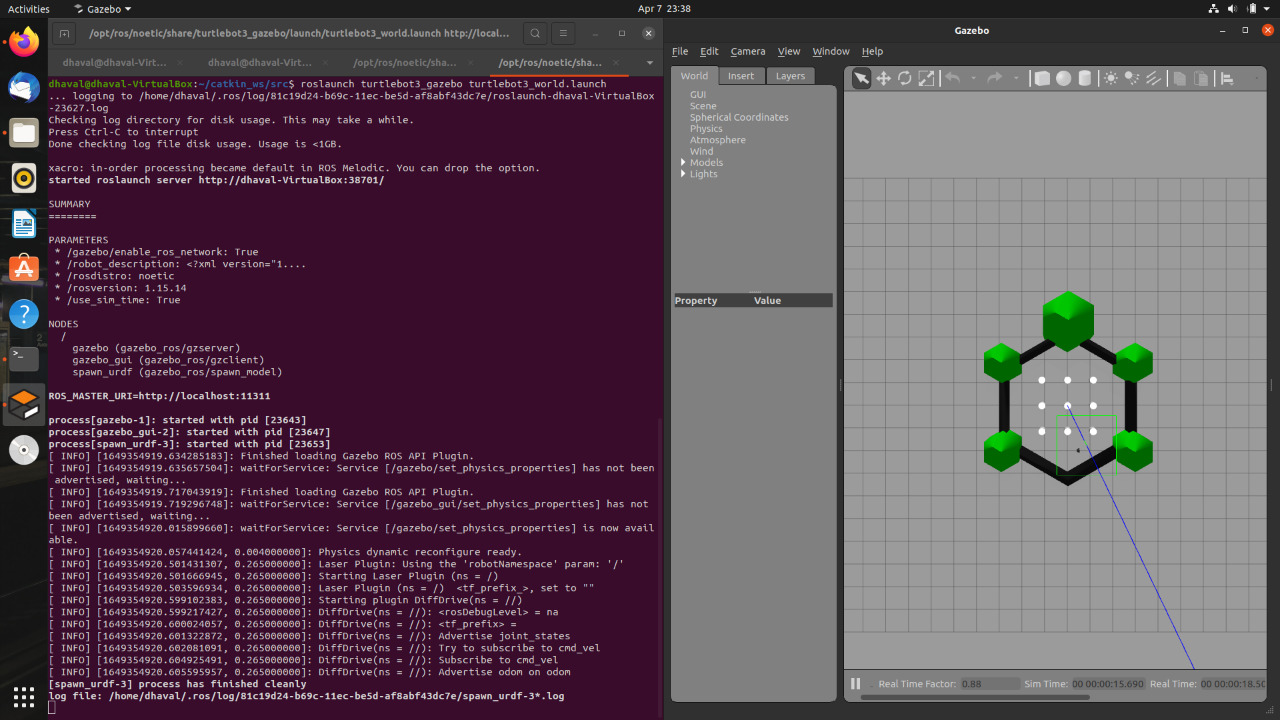


* **Managing simulation environment of turtlebot3**

Let’s look at our turtlebot3 in a different environment. This environment is often used for testing SLAM and navigation algorithms. Simultaneous localization and mapping (SLAM)

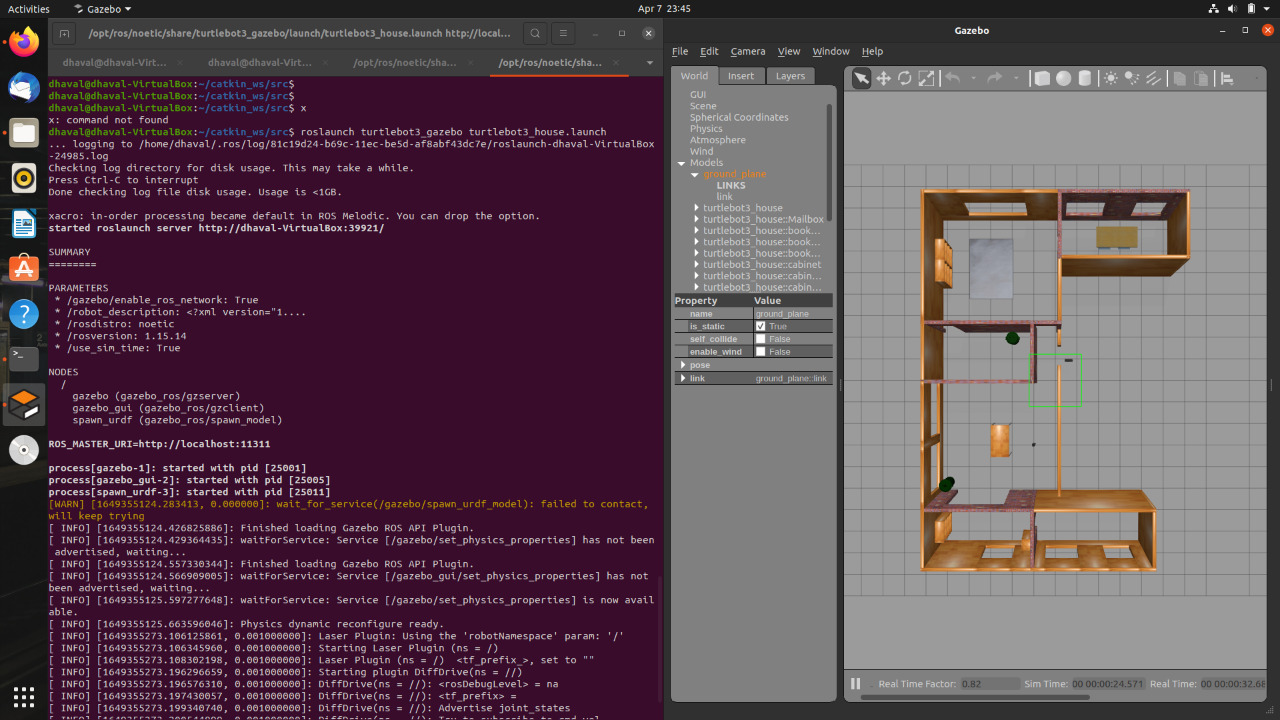
concerns the problem of a robot building or updating a map of an unknown environment while simultaneously keeping track of its location in that environment.

$ roslaunch turtlebot3\_gazebo turtlebot3\_world.launch



Type this command and wait a few minutes for the environment to load to stimulate turtlebot3 inside a house.

$ roslaunch turtlebot3\_gazebo turtlebot3\_house.launch



To move the turtlebot with your keyboard, use this command in another terminal tab:

$ roslaunch turtlebot3\_teleop turtlebot3\_teleop\_key.launch

* **Simulating SLAM with TurtleBot3**

Install the SLAM module in a new terminal window.

$ sudo apt install ros-melodic-slam-gmapping

$ roslaunch turtlebot3\_gazebo turtlebot3\_world.launch

$ roslaunch turtlebot3\_slam turtlebot3\_slam.launch slam\_methods:=gmapping

$ roslaunch turtlebot3\_gazebo turtlebot3\_simulation.launch





