**4. Creating Map using Laser Scanner and Gmapping:** Using the Gmapping package in Rviz and Navigation Stack in ROS, create a map of the environment by the robot that explores the environment for mapping the walls and the obstacles in the map. Remember that the environment and the robot should be your environment and robot models that you have constructed in lab 3. The robot will need a LIDAR for environment mapping.
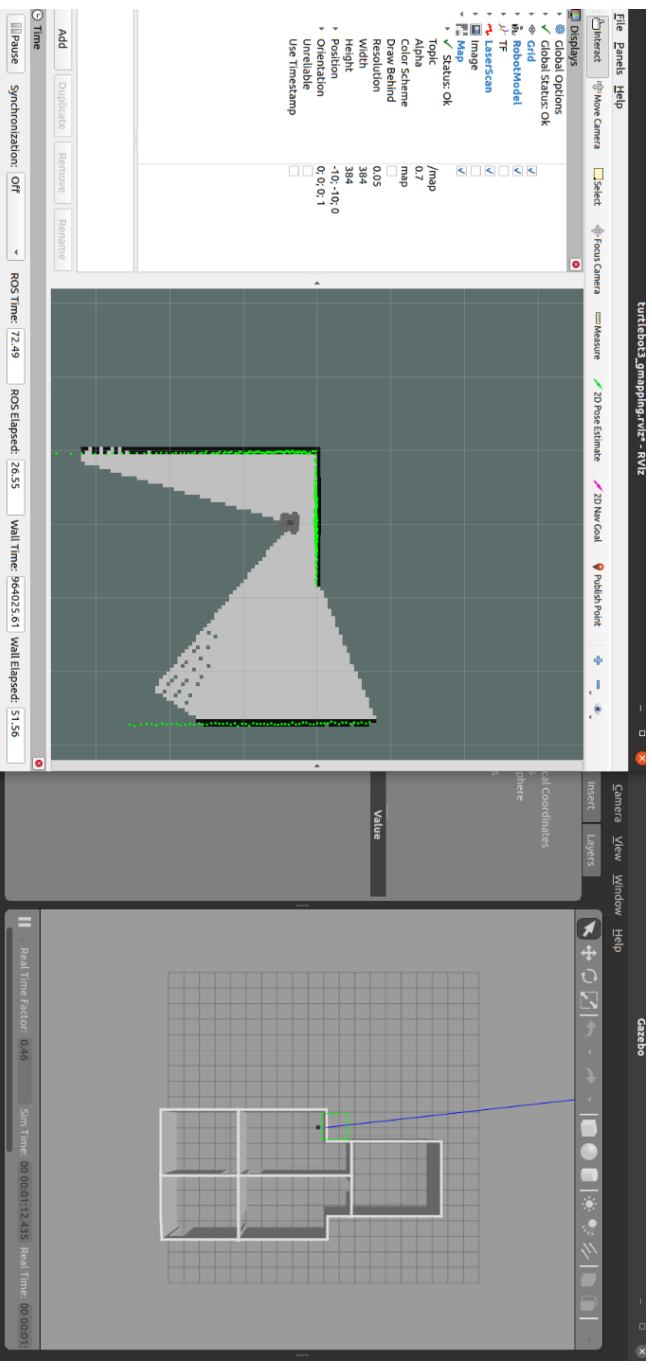
Creating the robot and adding lidar sensor and laser with it.
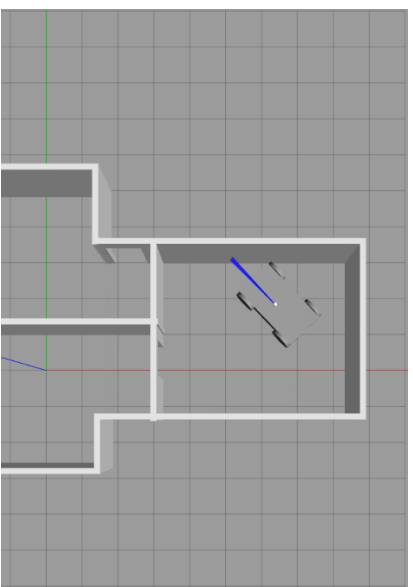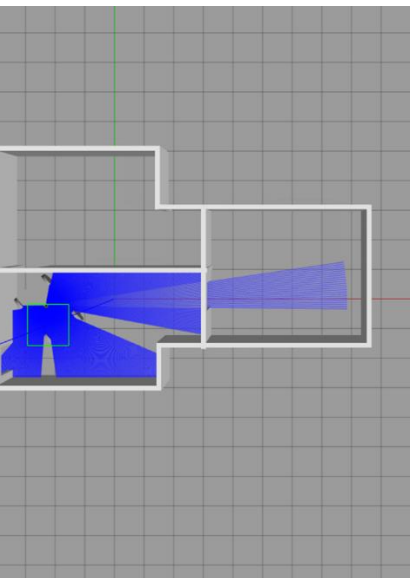
Checking if laser is working properly.

Use gmapping command to move the bot in the environment and run the rviz file using ros command.

ROS commands to perform gmapping using turtlebot in the five room setup environment created.


```
anjali@anjali-VirtualBox:~$ cd Desktop/workspace/ros_ws/turtlebot3_ws/
anjali@anjali-VirtualBox:~/Desktop/workspace/ros_ws/turtlebot3_ws/
setup.bash
anjali@anjali-VirtualBox:~/Desktop/workspace/ros_ws/turtlebot3_ws$ source devel/
BO13_MODEL=waffle_pi
anjali@anjali-VirtualBox:~/Desktop/workspace/ros_ws/turtlebot3_ws$ export TURTLE
anjali@anjali-VirtualBox:~/Desktop/workspace/ros_ws/turtlebot3_ws$ roslaunch tur
tlebot3_gazebo room_setup.launch
... logging to /home/anjali/.ros/log/cc3319f4-5e85-11ee-8c6e-051a3487bdf8/roslau
nch-anjali-VirtualBox-10335.log
Checking log directory for disk usage. This may take a while.
Press Ctrl-C to interrupt
Done checking log file disk usage. Usage is <1GB.

xacro: in-order processing became default in ROS Melodic. You can drop the optio
n.
started roslaunch server http://anjali-VirtualBox:43227/

SUMMARY
========

PARAMETERS
 * /gazebo/enable_ros_network: True
 * /robot_description: <?xml version="1....
```

anjali@anjali-VirtualBox:~/Desktop/workspace/ros_ws/turtlebot3_ws$ source devel/
setup.bash
anjali@anjali-VirtualBox:~/Desktop/workspace/ros_ws/turtlebot3_ws$ export TURTLE
BOT3_MODEL=waffle_pi
anjali@anjali-VirtualBox:~/Desktop/workspace/ros_ws/turtlebot3_ws$ roslaunch tur
tlebot3_slam turtlebot3_slam.launch slam_methods:=gmapping
... logging to /home/anjali/.ros/log/cc331f4-5e85-11ee-8c6e-051a3487bdf8/roslau
nch-anjali-VirtualBox-10719.log
Checking log directory for disk usage. This may take a while.
Press Ctrl-C to interrupt
Done checking log file disk usage. Usage is <1GB.

xacro: in-order processing became default in ROS Melodic. You can drop the optio
n.
started roslaunch server http://anjali-VirtualBox:38917/

SUMMARY
========
PARAMETERS
* /robot_description: <?xml version="1....
* /robot_state_publisher/publish_frequency: 50.0
* /robot_state_publisher/tf_prefix:

Control Your TurtleBot3!

Moving around:
        w
   a   s   d
        x

w/x : increase/decrease linear velocity (Burger : ~ 0.22, Waffle and Waffle Pi :
~ 0.26)
a/d : increase/decrease angular velocity (Burger : ~ 2.84, Waffle and Waffle Pi
: ~ 1.82)

space key, s : force stop

CTRL-C to quit

currently: linear vel 0.2400000000000007   angular vel -0.5
currently: linear vel 0.2400000000000007   angular vel -0.6
currently: linear vel 0.25000000000000006 angular vel -0.6
currently: linear vel 0.26 angular vel -0.6
currently: linear vel 0.26 angular vel -0.6
currently: linear vel 0.26 angular vel -0.6

The final map as created in rviz