# Lab 2 Report - Group 18

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**Assignment 1:**

**1.**

Based on the the turtlebot3_and_door_launch.py file, we can see that when all the arguments are set to be default; the files that will open are:

Launch files that will be included:

- **gzserver.launch.py** from package **gazebo_ros**
- **gzclient.launch.py** from package **gazebo_ros**
- **robot_state_publisher.launch.py** from package **turtlebot3_gazebo**
- **spawn_turtlebot3.launch.py** from package **turtlebot3_gazebo**

Launch files that will be skipped:

- **flaky_door_opener_launch.py** from package **prob_rob_labs**
- (skipped because run_door_opener defaults to 'false')
- **video_processor_launch.py** from package **prob_rob_vision**
- (skipped because run_vision_processor defaults to 'false')
- **image_mean_feature_x_launch.py** from package **prob_rob_labs**
- (skipped because run_vision_processor defaults to 'false')

World file used:

- door.world from package prob_rob_labs (located in prob_rob_labs/worlds/door.world)

This makes sense as by default you get a basic Gazebo simulation with a TurtleBot3 robot in the door world, but without the specialized door opening or vision processing functionality.

**2.**

lf run_door_opener:=true is set to the default then we would also have the flaky_door_opener_cmd get appended to the launch. The launch file would be **flaky_door_opener_launch.py** from the package **prob_rob_labs**.

**3.**

**(-1.5, 0.0)**

**4.**

**ros2 launch prob_rob_labs turtlebot3_and_door_launch.py x_pose:=-5.0 y_pose:=1.0**

**Assignment 2:**

**1.**

Joint which is called “hinge” in **line 132** of **hinged_glass_door/model.sdf** and its type is “**revolute**”.

**2.**

The name of the link is “**door**”, which has a mass of **41.3256 kg**.

**3.**

The topic to publish to open/close the door is “**/torque**”, which is used by the Gazebo API for SetForce() that is used to open/close the door, and the type of the topic is “**std_msgs::msg::Float64**”.

**4.**

**ros2 topic pub /hinged_glass_door/torque std_msgs/msg/Float64 "data: 10.0"**

**5.**

The minimum torque needed to open the door was **1.0 N·m**.

**Assignment 3:**

We created open_door_move_robot.py, and the command should be:
ros2 launch prob_rob_labs open_door_move_robot_launch.py

Code for assignment 3 is in “Commit d376645, ‘**finish node**’”:
https://github.com/jaiselsingh1/prob_rob_labs_ros_2_group18/commit/d376645d612d817f3aeb43cac1a43f83bd28b07d

Video screencast for assignment 3 is in “Lab2_A3_VideoScreencast_group18.mp4”:
https://drive.google.com/file/d/1R-qEumiN4yuKU42nl3wG6fUmR1xspFj2/view?usp=sharing

**Assignment 4:**

We modified open_door_move_robot.py and open_door_move_robot_launch.py,
and the command should be:
ros2 launch prob_rob_labs open_door_move_robot_launch.py robot_speed:=4.5 (or velocity desired)

Code for assignment 4 is in “Commit afa90bf, ‘**finish assignment 4**’”:
https://github.com/jaiselsingh1/prob_rob_labs_ros_2_group18/commit/afa90bf570acc91fc93ed1384229795da334985e

**Assignment 5:**
Maximum velocity that the robot can achieve: about **3.6 m/s**.

The output of the echo command:

```
---
header:
  stamp:
    sec: 675
    nanosec: 188000000
  frame_id: odom
child_frame_id: base_footprint
pose:
  pose:
    position:
      x: 14.039871506984786
      y: 0.022966541217460654
      z: 0.008662134445037226
    orientation:
      x: 0.0007918223678145909
      y: 0.0013690131162328882
      z: -0.011988136749280546
      w: 0.9999268890262457
  covariance:
  - 1.0e-05
  - 0.0
  - 0.0
  - 0.0
  - 0.0
  - 0.0
  - 0.0
  - 1.0e-05
  - 0.0
  - 0.0
  - 0.0
  - 0.0
  - 0.0
  - 0.0
  - 1000000000000.0
  - 0.0
  - 0.0
  - 0.0
  - 0.0
  - 0.0
  - 0.0
  - 1000000000000.0
  - 0.0
  - 0.0
  - 0.0
```

- 0.0
- 0.0
- 0.0
- 1000000000000.0
- 0.0
- 0.0
- 0.0
- 0.0
- 0.0
- 0.0
- 0.001
twist:
  twist:
    linear:
      **x: 3.6034015870231717**
      y: 0.00012377558312719195
      z: 0.0
    angular:
      x: 0.0
      y: 0.0
      z: -0.012748345168680014
  covariance:
  - 1.0e-05
  - 0.0
  - 0.0
  - 0.0
  - 0.0
  - 0.0
  - 0.0
  - 1.0e-05
  - 0.0
  - 0.0
  - 0.0
  - 0.0
  - 0.0
  - 0.0
  - 1000000000000.0
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  - 1000000000000.0
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- 0.0
- 1000000000000.0
- 0.0
- 0.0
- 0.0
- 0.0
- 0.0
- 0.0
- 0.001
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