Lab Preparation Document

Course: 2IRR10

Group Name: Q3 Survivors

Lab Session Number: 6

Date: 11. 6. 2025

What are the specific objectives of this lab session?

(Describe what your group aims to accomplish in this session. Be specific about tasks such as setting up hardware, testing communication protocols, or implementing a feature like obstacle avoidance.)

Since we have spent the last two lab sessions only trying to implement the Lidar subscriber we will continue with that effort, and hopefully be victorious, as otherwise our PoC will be in grave danger. Also we have created a unity project which should hopefully make use of our custom pathfinding algorithm so once we conquer the Lidar we will move on to that, so that we can fully demonstrate all the tests that we want to check in the PoC. To be more specific we are going to test the A* algorithm and our approach to handling the whole program flow.

What steps will your group take to achieve these objectives?

(Outline the key steps you plan to follow in the lab, including any setup, coding, testing, or debugging activities.)

Thanks to the newly published guide to implementing the scanner in Unity we will follow that in the begginning. On top of that we have located a number of issues with our current setup so we will:

Switch to the correct version of Unity - > Reimport the unity project (probably only a part), because there have been changes which we might not have used. - > We will check the QoS settings for the subscribers and all the steps needed for applying those changes. - > Adjust all of the project settings (changing simulated scan topic etc.) - > Test and pray! - > Add all of the stuff for the Algorithm - > Test!

What potential challenges or risks do you anticipate in this session, and how will you address them?

(Identify possible technical difficulties, hardware limitations, or software bugs that might arise, and propose strategies to manage them.)

Since this is our last lab session before filming the risks are very high. Not having enough time is probably the largest risk, together with the software/hardware bugs that we already mentioned in the last lab prep.

To mitigate the time pressure we have to give our best in terms of preparing and have multiple scenarios ready in case our main approach would be failing. Otherwise comming on time and being absolutely focused is also undeniably crucial.

To mitigate software/hardware bugs we will try to stay as close to the existing examples as possible, because that way we can troubleshoot much better which exact part is not working properly. Also I guess asking the TAs is something we can laverage.

What tools, resources, or prior knowledge will you need for this lab session?

(List any specific software, hardware components, ROS packages, or documentation you will use. Also, mention if you need to review any concepts beforehand.)

We will be heavily relying on the lidar unity C# tutorial provided on Canvas.
Otherwise teh usual suspects and at this point a lot of our work as well which we have on our github repo.

https://github.com/Unity-Technologies/ros2cs
as well as from:
https://github.com/Unity-Technologies/Unity-Robotics-Hub/tree/main/tutorials/ros_unity_integration

Apart from this, we will obviously need all of the knowledge from the previous lab sessions. to mitigate the errors we have already encountered

How does this lab session contribute to the overall progress of your project?

(Explain how the work in this session connects to previous work and supports the final implementation of the twin system.)

This lab session is basically a make or break moment for our team, because as mentioned previously it is the last one before the filming, meaning that if we can't get what we want working now we will have to deploy some sort of emergency plan, in order to achieve what we want. The importance of this session lies in making subscribers work, because if we are unable to do that there is not much we can do to make the bidirectional communication work.