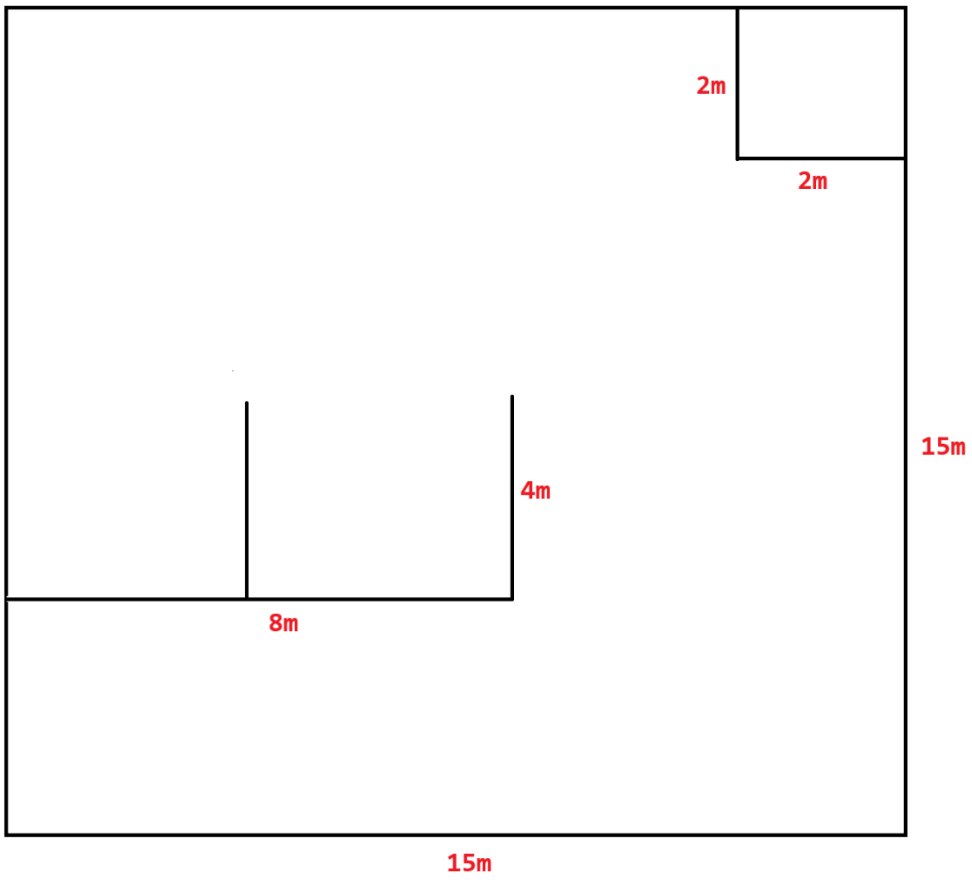
CSIP5202 - Lab 4 Portfolio (Part 1)

Last week you programmed a basic path, now we will make that path be followed better by using sensors. Over the last couple of weeks, you should have gotten used to the simulator and basic scripting to control the robot. The tasks this week combine what you have learnt and ask you to complete two tasks: wander randomly, and follow a wall around. You will need to submit your code and a report. I've included a section regarding the report at the bottom of this handout and in the assessment section. This work is the first part of the Lab Portfolio assignment forming of 22% of the unit mark.

TASK 1:

- Using the diagram below, create a map as described. The map has a wall which is the skeleton of the path to follow.
- It has some lines that indicate the ideal path that the robot should follow.
- Also, create a bounding box around the area so the robot cannot escape.



TASK 2:

- Using the map you just created the aim of this task is to set the robot's position anywhere In the bounding box, the robot should next wander randomly in the environment, if the robot sees a wall then it should follow the wall in a determined direction.
- From the statement above you will see two sub-tasks, so you could break up your code into two sections. You'll need to make a way for the robot to transition from one task to the other.
- Breaking up the tasks:
    - Random wander:
        - Consider the random distance to travel in a straight line,
        - Consider the random angle to turn to, and which random direction
        - In CoppeliaSim you cannot tell the robot how far to travel or how much to turn by so you will need to devise a way to allow the robot to travel randomly

    - Transitioning to a task
    - Wall following:
        - You could move forward at a constant rate
        - Measure the distance between the robot and the wall using one of the sensors to the side.
        - Set a threshold – or distance – away from the wall that the robot has to follow
        - If the robot travels away from the line, adjust its speed of the wheels accordingly (robot travels too far to the left, adjust the speed to rotate right)
- Remember, plotting the position data will be useful in your reports.

REPORT:

- There is no limit on the number of pages, however, **2 sides should be adequate to introduce the task, what you did and the results and conclusions**.
- You must submit your code at the end of the report as an appendix. Failure to do so may mean losing marks from the Design and Implementation criteria of the marking sheet.
- Each Lab handout will have specific instructions on what is the main purpose, which is what should guide your report content.
- You need to submit your own code, and your own reflections, so that is why we ask not to share code via the Discussion Board.
- You need to present your own experience and analysis of your experiments and results.
- The most important part is that you need to write what you HAVE LEARNED by doing this lab (I already know what you are supposed to do!)
- It is very important to draw and present your own conclusions.

- Take into account that the mark for your work will be given through the report, which should present appropriately your work, therefore it is not enough to just do the exercises (or in the case of the second assignment, develop your solution) and dump some results. You need to present your work appropriately.

- You have a few sources of information to base how your reports should be structured. The first one should be your generic knowledge of how to write reports, this is included here:
    - Every report has to have an introduction and present your own interpretation of the problem. So, do not just paste the brief's text, you need to write the interpretation of the problem in your own words.
    - For larger projects, you need to provide support for your decisions, previous knowledge and statements, which is achieved through a literature review or suitable background section.
    - Then you need to present your methodology which includes detailing your chosen alternative(s) approach to solve the problem (if available/applicable) and your experimental setup, development, etc.
    - Once you have developed and tested your solution you need to present your results and analyse/discuss them. Depending on the size of the project and report this can involve a section on results and a section on discussion. For a small lab report and coursework report, a single section on analysis of results should do.
    - Finally, no report will be complete without an explicit conclusion. The conclusions are NOT a summary of results or objectives achieved (that goes in the section above, analysis of results). The conclusion should be your own reflection on what you have learned by developing the whole project, including lessons on what could have been done better, differently and in the future.

- **Some additional recommendations:**
    - Even if you have limited results (not as good as what you expected or were required to achieve) the conclusions/reflection that you present in the report can still be good and this can allow you to achieve a higher mark than good results alone. Particularly for academic reports, in which the most important issue is what you learned, rather than what you achieved.
    - So you can demonstrate this through an excellent reflection on the work carried out during the attempt (note: this is NOT an explanation of why you could not do something, such as running out of time). If you did achieve something but it did not work as expected, if you can explain why it did not work and how could it be done

better if attempted again, then again you can get good credit for this.

- High Turnitin scores due to code used from other sources such as lab material are a nuisance. You can avoid this if they can be referenced rather than pasted in the text (e.g. mention "… these experiments were carried out using the example code from lab N …"). But if you are in any way claiming that you did additional work or achieved different/better results in a different way by using your additional code; then this code has to be included in a Turnitin readable format (i.e. not a screenshot) preferably in the appendix, so that it will be checked and therefore it can be marked as part of your work. For labs, this might not be always necessary, but for the coursework (assignment 2), code will be critical so needs to be included.
- For larger projects there would be more emphasis on the work and results, which of course is something that was not achieved that thoroughly in these short lab reports, so keep in mind that content-specific feedback was given here just to a limited degree.
- In the lab report the Background section is acceptable as long as is just a few lines long but will be very important in the coursework report. So in that report pay attention to this section also and make sure you do have a good bibliography.

Once completed, navigate to the Assessments section (on LearningZone) > Lab 4 Portfolio Submission Links and follow the submission instructions.

The deadline for submission is:

07/01/2025 @ 12:00 noon