Contents

How to run the Farmnet Simulation in Webots

1. Make sure Python dependencies are installed for your environment. See Appendix A for details.

2. Use the provided *Installation Guide* to install Webots 2023b for your preferred OS platform.

3. Unzip the provided project source code from the *.zip file.

4. Navigate to the project directory once it has been unzipped.

5. You can run the simulation with the following command from a console/terminal prompt:

   `webots term-project-progress-1/webots/worlds/FollowWaypointsDemo.wbt`

6. In the Webots UI, you can use the button to start the simulation.

   a. IMPORTANT NOTE: We suggest that you not use the button to run the simulation as fast as possible. This may affect the physics and cause quadrotor to lose control.

7. Use the button to pause the simulation.

8. Use the button to reload the world.
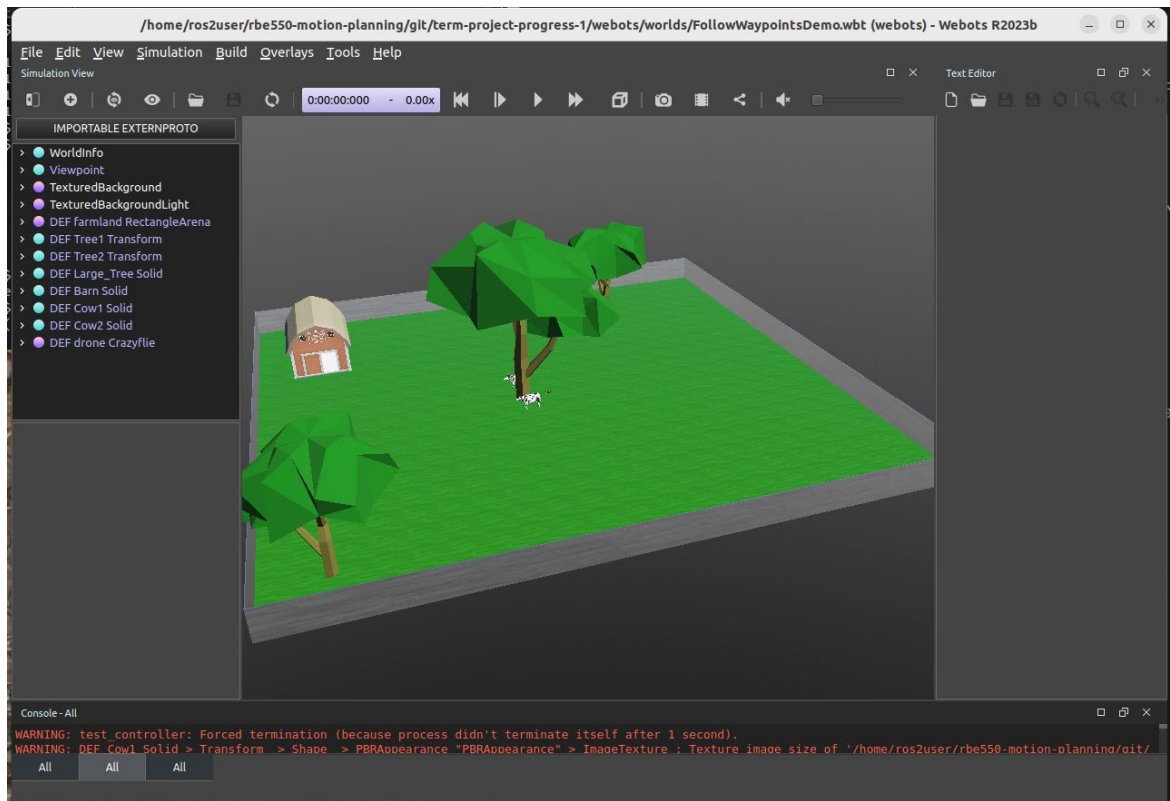
Appendix A – Python Package Dependencies

We used Python version 3.11.4. We suggest using Python 3.8 or later.

- numpy
- simple_pid
- controller – This package should be included with Webots 2023b

Appendix B – Project File Structure

File Descriptions

term-project-progress-1/webots/**worlds /FollowWaypointsDemo.wbt**

> This file provides the objects and behavior definitions for the Webots world.

term-project-progress-1/webots/controllers/**test_controller/test_controller.py**

> This file provides main file for the Farmnet quadrotor simulation.

term-project-progress-1/webots/controllers/**test_controller/astar_updated.py**

> This file contains our A* motion planning algorithm that generates a list of nodes for the trajectory.

term-project-progress-1/webots/controllers/**supervisor/supervisor.py**

Tool used to explore the scene and generate the file that contains the list of free space nodes.

To run this, you will need to comment out the "*drone Crazyflie*" from the *FollowWaypointsDemo.wbt* file. Then, uncomment the "*supervisor Robot*" from that same file. We suggest using the ⏩ button to run the supervisor exploration as fast as possible.

The *FollowWaypointsDemo.wbt* should look like the following if done correctly:

```
197    # DEF drone Crazyflie {
198    #    translation 0.0 0.0 0.01
199    #    rotation -1.82053e-07 -6.31753e-08 1 4.692820414042842e-06
200    #    controller "test_controller"
201    #    supervisor TRUE
202    # }
203
204    DEF supervisor Robot {
205      name "supervisor"
206      controller "supervisor"
207      supervisor TRUE
208    }
```

Reverse the modification to recover the Farmnet quadrotor simulation. The original *FollowWaypointsDemo.wbt* should appear as follows:

```
197    DEF drone Crazyflie {
198      translation 0.0 0.0 0.01
199      rotation -1.82053e-07 -6.31753e-08 1 4.692820414042842e-06
200      controller "test_controller"
201      supervisor TRUE
202    }
203
204    # DEF supervisor Robot {
205    #    name "supervisor"
206    #    controller "supervisor"
207    #    supervisor TRUE
208    # }
```

File Tree

```
term-project-progress-1/
├── Image
│   └── image_1.png
├── README.md
├── webots
│   ├── controllers
│   │   ├── supervisor
│   │   │   ├── freespaces.data
```

```
| | |   ├── freespaces_original.data
| | |   └── supervisor.py
| | └── test_controller
| |     ├── archive
| |     |   ├── astar_algo.py
| |     |   ├── astar.py
| |     |   ├── bb8controller.py
| |     |   ├── crazyflie.py
| |     |   ├── done.py
| |     |   ├── note.py
| |     |   ├── pid_controller.py
| |     |   ├── pidcontroller.py
| |     |   ├── PlotData.py
| |     |   ├── robot_controller.py
| |     |   └── test.py
| |     ├── astar_updated.py
| |     ├── data.txt
| |     ├── __pycache__
| |     |   └── astar_updated.cpython-310.pyc
| |     ├── scaliing_down.py
| |     ├── supervisor_controller.py
| |     └── test_controller.py
| └── worlds
|     ├── archive
|     |   └── farm.wbt
|     └── FollowWaypointsDemo.wbt
└── webots world models
    ├── 57-lowpoly-tree-v1
    |   └── LowPoly Tree v1
    |       ├── LowPoly_Tree_v1.obj
    |       └── LPTree1.mtl
    ├── Barn
    |   ├── 20955_Barn_texture.jpg
```

```
|   ├── 20955_Barn_v2_NEW.mtl
|   └── 20955_Barn_v2_NEW.obj
├── ggvuw8aw3i0w-LowTree
|   ├── Image1.png
|   ├── Image2.png
|   ├── Image3.png
|   ├── Image4.png
|   ├── Low Tree.3DS
|   ├── READ!!!.txt
|   ├── Tree low.FBX
|   ├── Tree low.max
|   ├── Tree low.mtl
|   └── Tree low.obj
└── lowpolycow
    ├── cow.3ds
    ├── cow.dae
    ├── cow.fbx
    ├── cow.obj
    └── cow.png

15 directories, 44 files
```