ME 369 : INTRODUCTION TO ROBOTICS

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ASSIGNMENT-1

TASK 1 –

Environment Validation

Observation –

The installation process was straightforward as the instructions were already given. And this introduced with a simulation environment.

Challenges –

Earlier there was a launching issue with MuJoCo inside ROS 2 using mujoco_ros but later on launched MuJoCo and loaded a robot from MuJoCo Menageries.

TASK 2 -

Serial Chain Manipulator

1) **Simulation without Gravity:-**

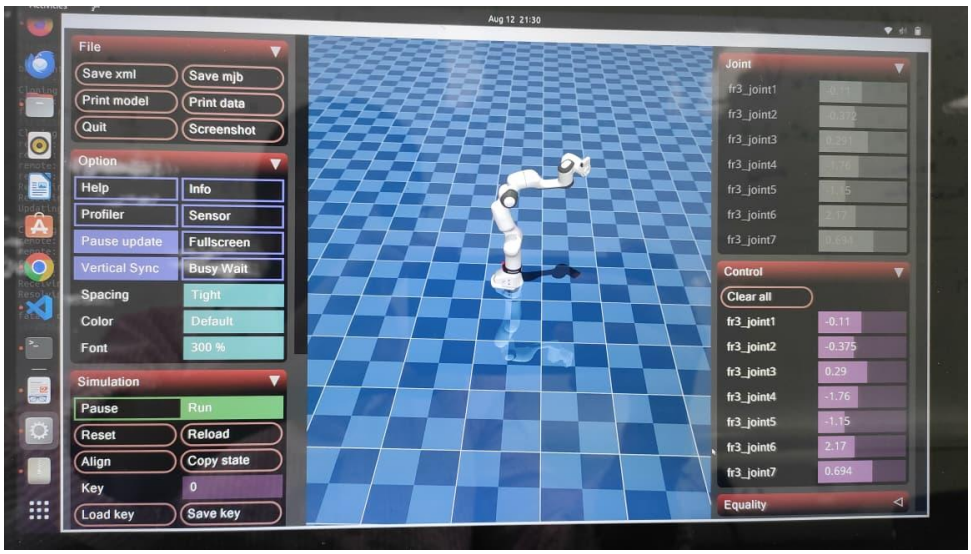

Image.1

Observation-

The Robotic Arm Franka was floating without considering any weight and also there was no downward motion. As the gravity was disabled so the robot was not falling on the ground surface.

Challenges-

As it was a simple task, so I didn't find any complication during the 1st task without Gravity.

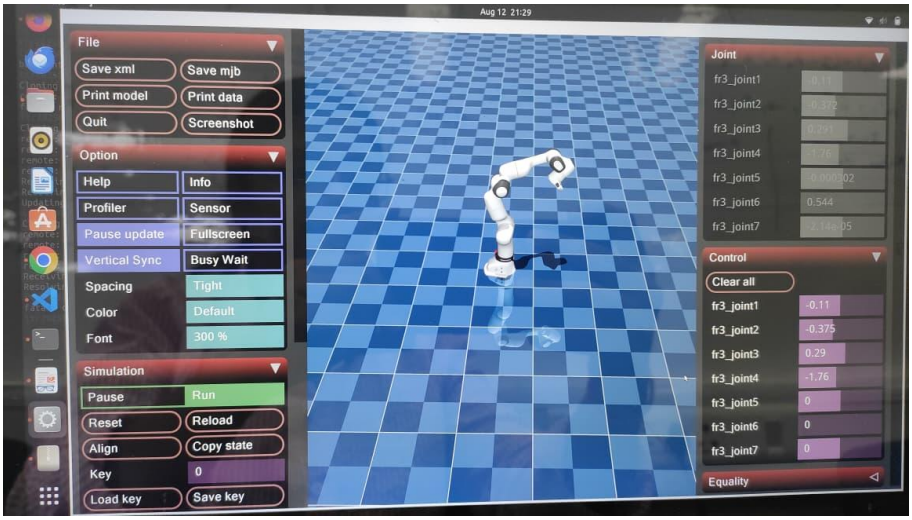

Image. 2

2) Simulation with Gravity

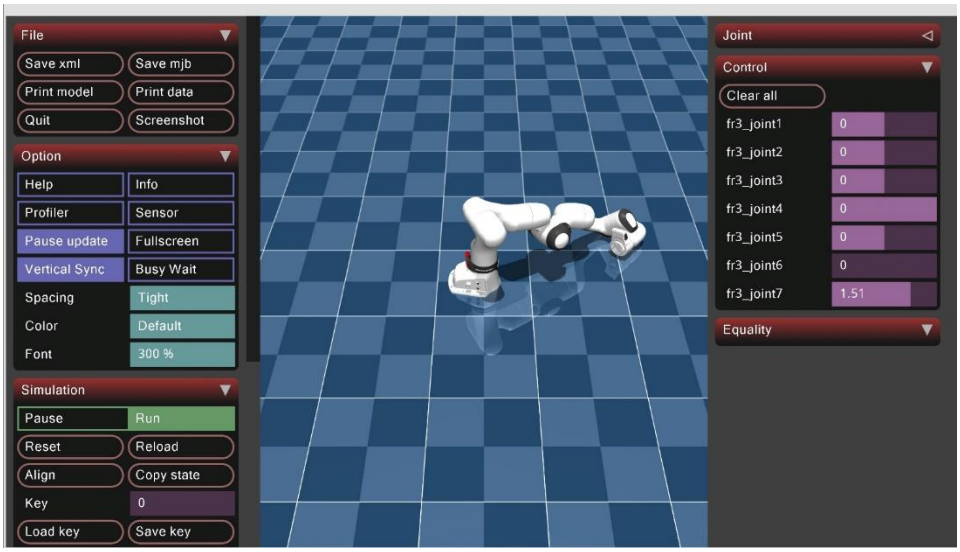

Image. 3

Observation-

When gravity is enabled in the z-direction, the robot pulls downward and is introduced with the gravitational torque.

Challenges-

Earlier, it was a little confusing like where we can apply for gravity and what the code should be for it but later it was resolved.

TASK 3 -

Wheeled Mobile Robot

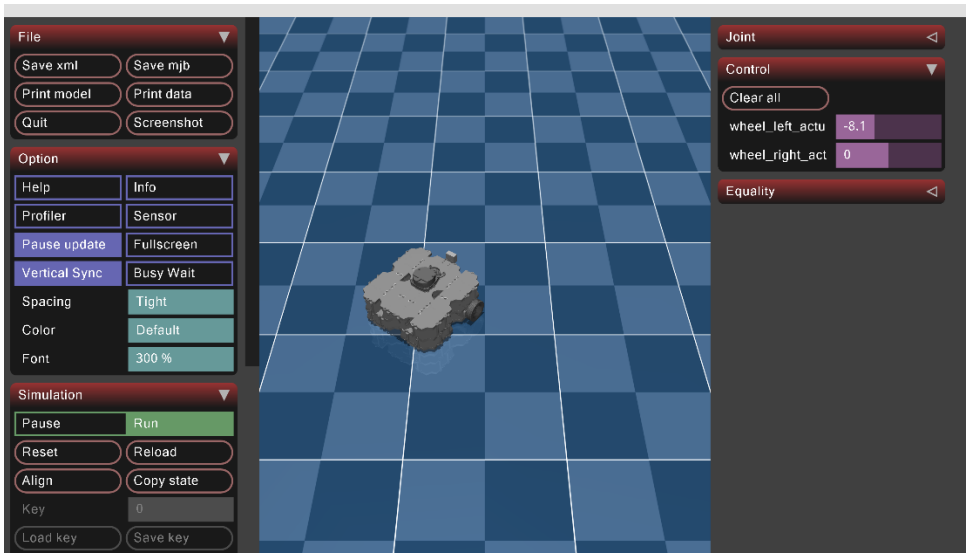

Image. 4

Observation-

The Turtlebot Waffle pi has been simulated and presented in the environment.

Challenges-

Facing difficulties in applying forces and observing it's behavior.

TASK 4 -

Quadruped Robot

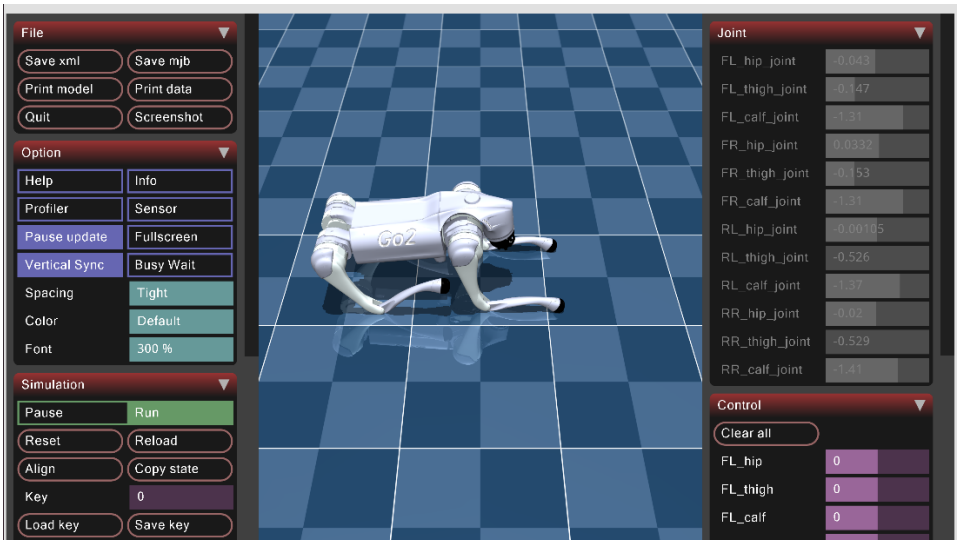

Image. 5

Observation-

Successfully loaded an Unitree Go 2 Robot under gravity in the z-direction.

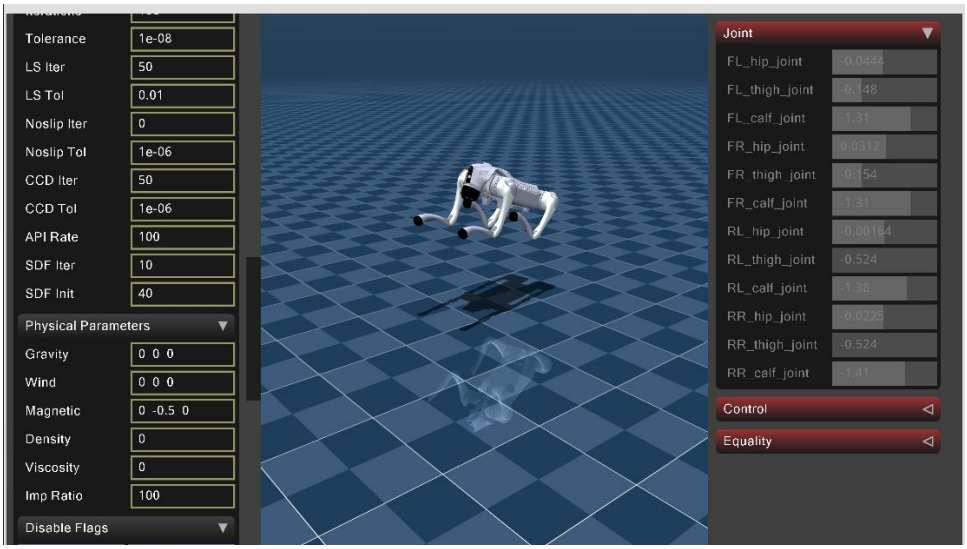

Image. 6

The above image is of the Unitree Go 2 Robot, without gravity.

Challenges-

On adjusting the controlling parameters, the legs of the robot were folding inward and due to this the robot was falling. So, somewhere it was difficult to control the robot in that environment.

CHALLENGES IN OTHER TASK-

I am facing difficulties in the last task "inverted Pendulum" given in the assignment, and in the 2nd part of the 3rd Task. Despite my efforts, I am unable to complete them.

It's my request to you, kindly guide me how to approach these task.