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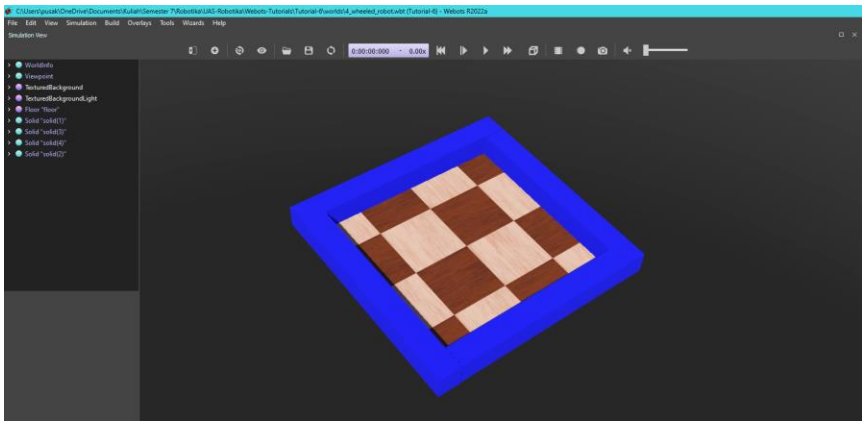
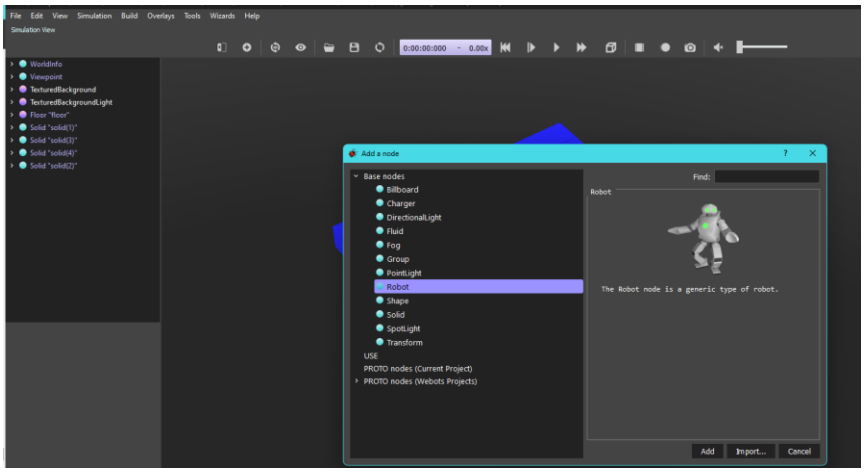
NIM : 1103194021

Tutorial 6 : 4-Wheeled Robot

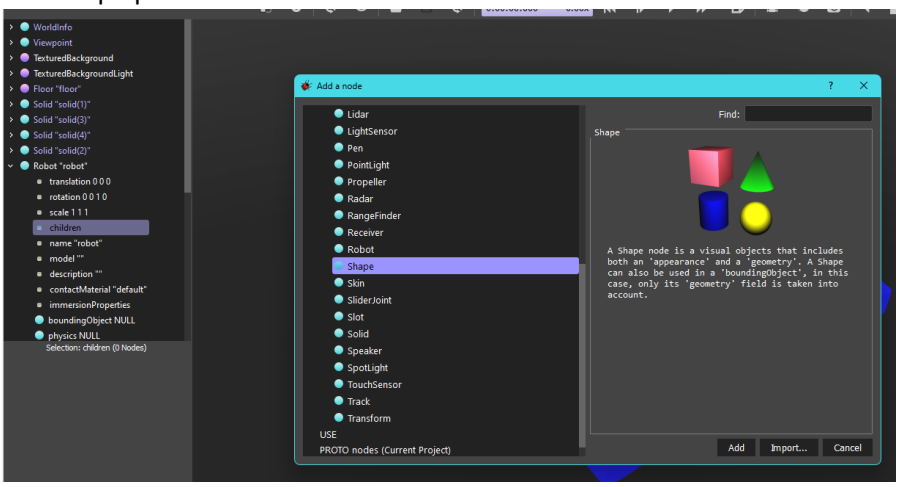
1. Duplikat project tutorial 5 lalu berinama world 4_wheeled_robot.wbt
2. Hapus semua node, kecuali wall dan arena



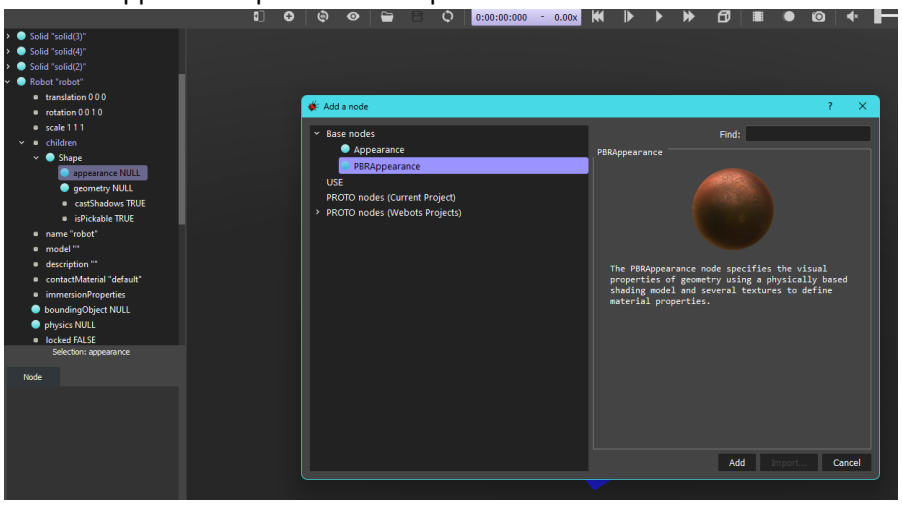
3. Tambahkan node robot



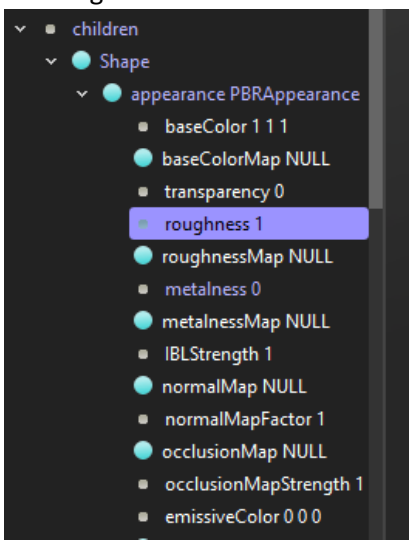
4. Add shape pada children Robot



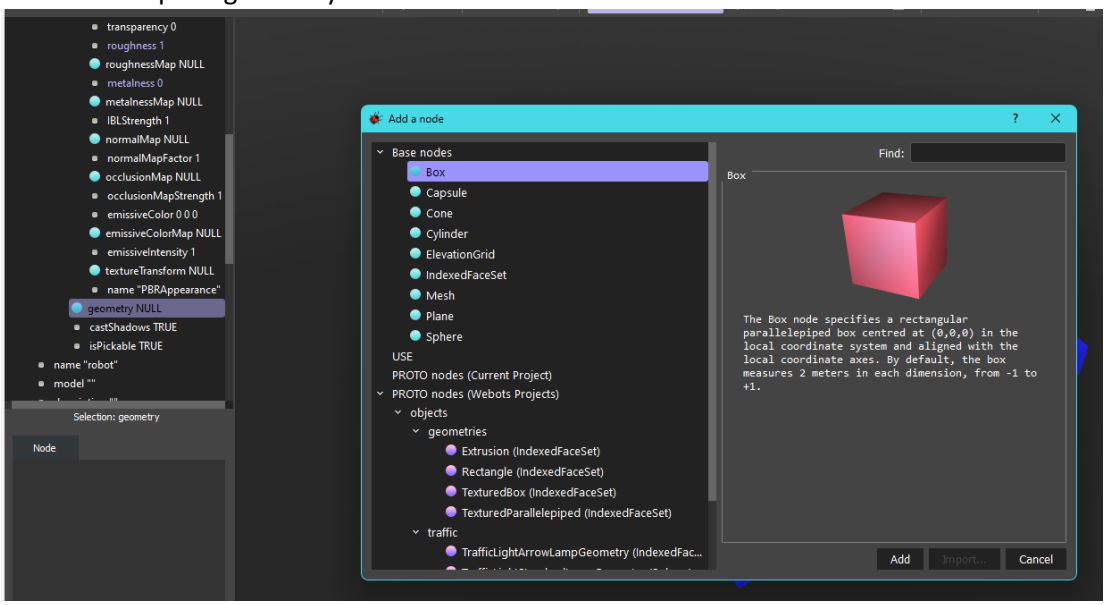
5. Add PBRAppearance pada node shape



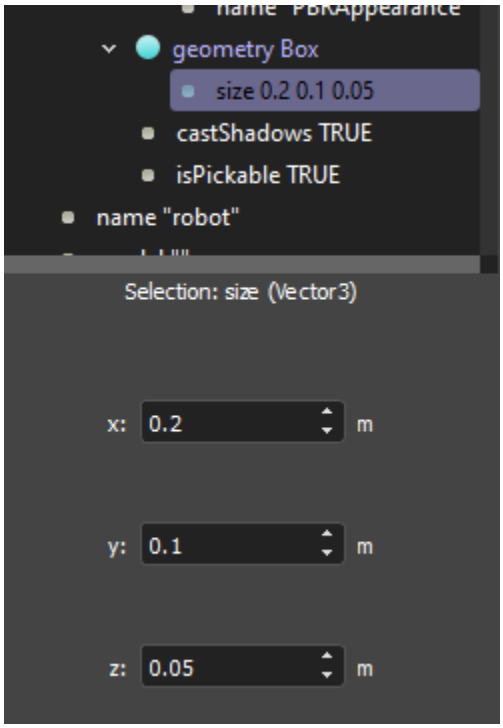
6. Set roughness = 1 dan metalness = 0



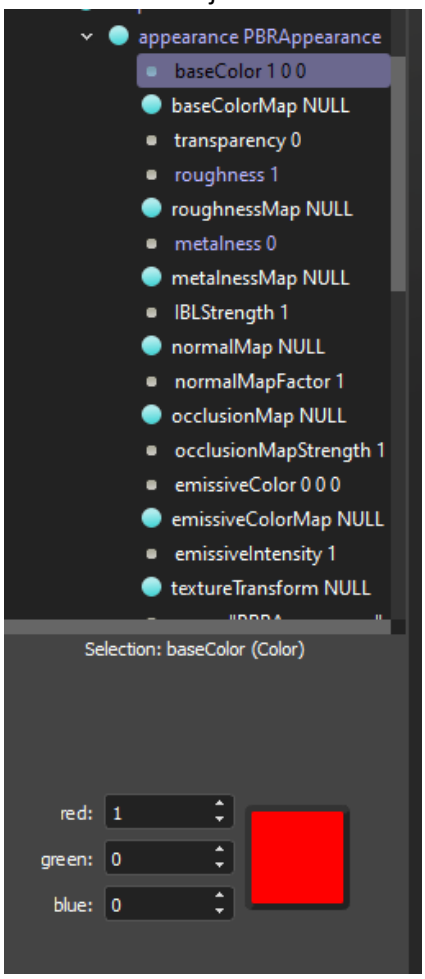
7. Lalu add box pada geometry



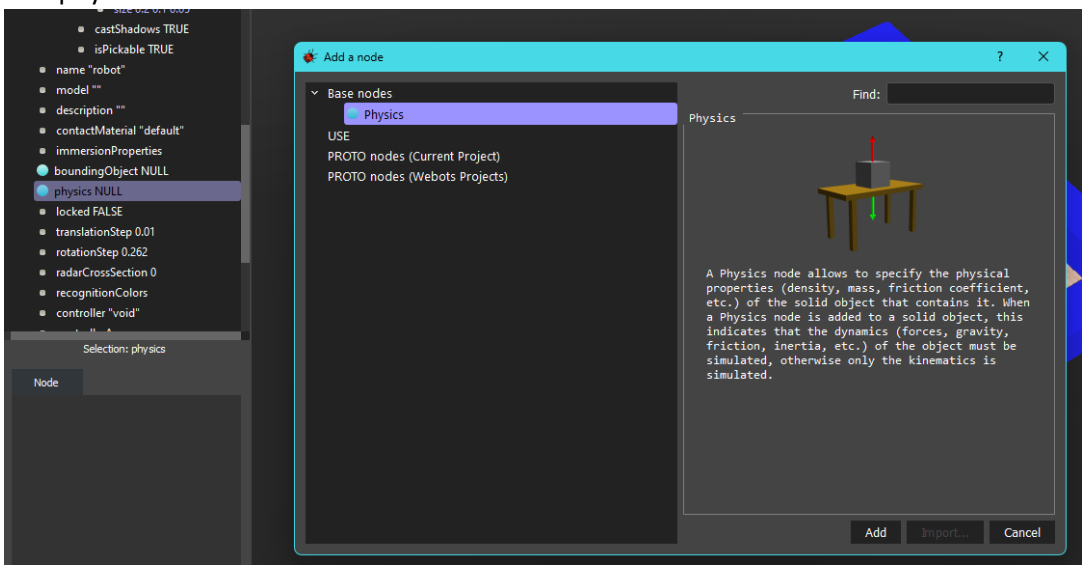
8. Set size box = 0.2 0.1 0.05



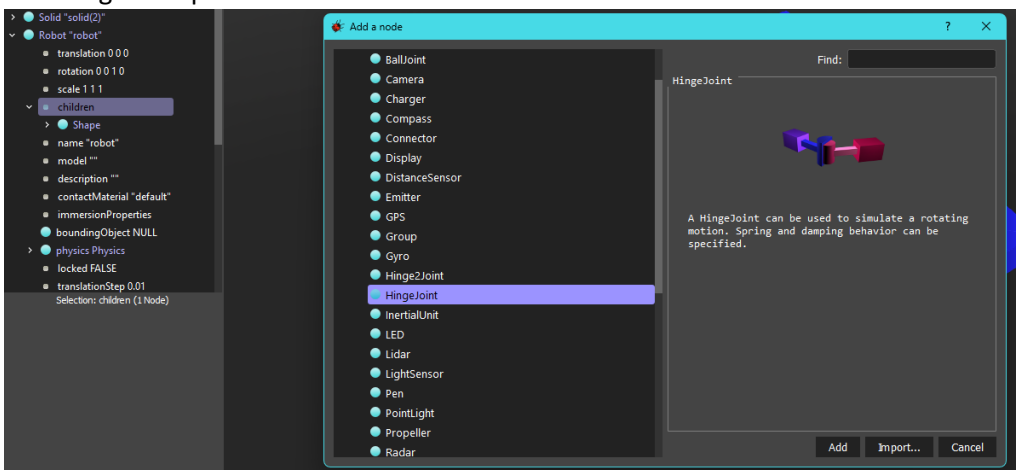
9. Ubah warna menjadi merah



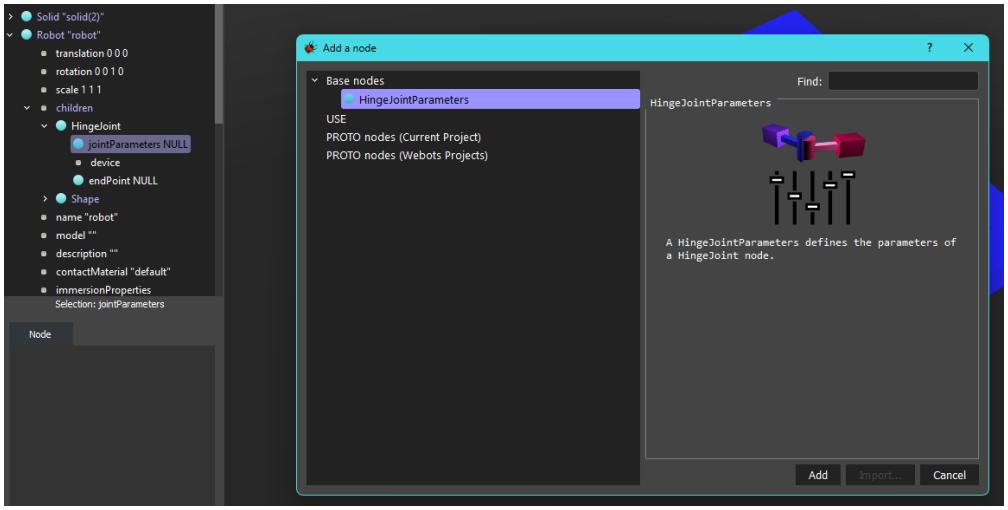
10. Add physics



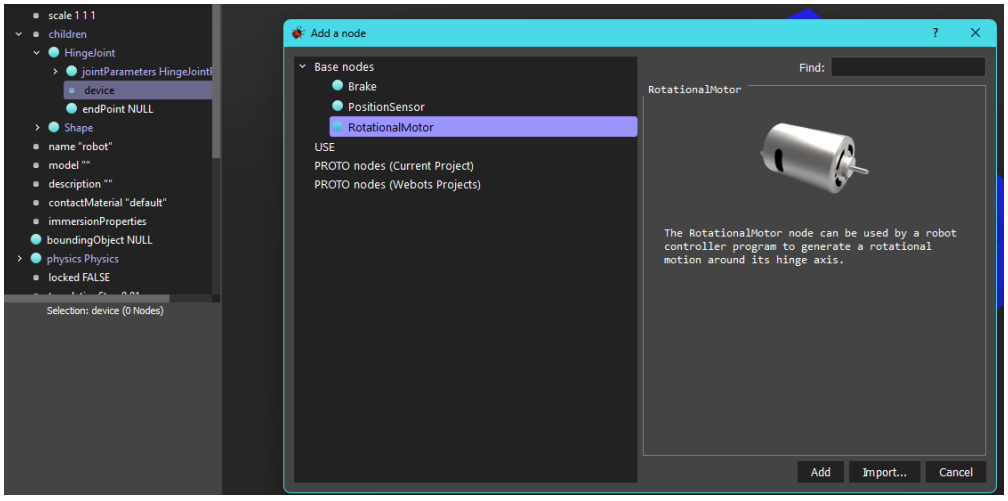
11. Add HingeJoint pada children robot



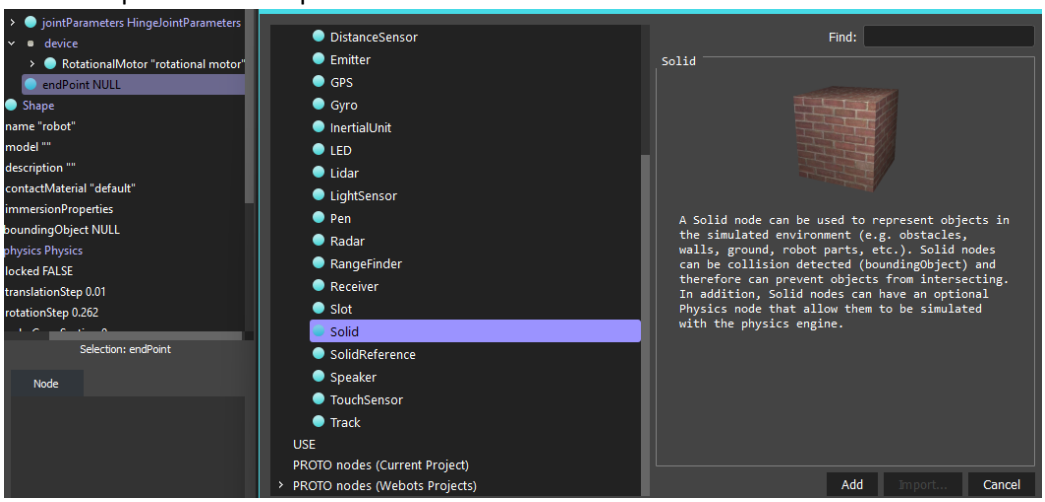
12. Lalu add HingeJointParameters pada joinParameter



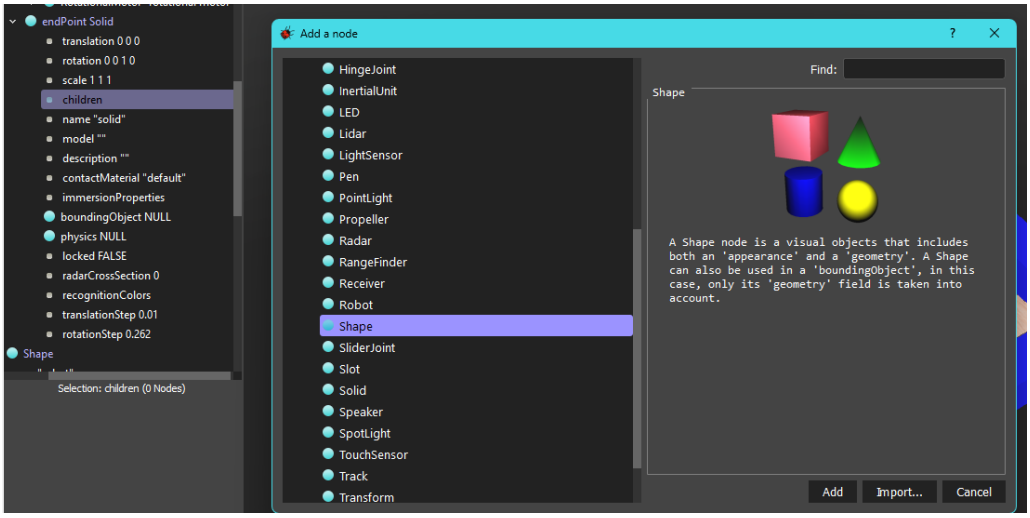
13. Add Rotational motor pada node device



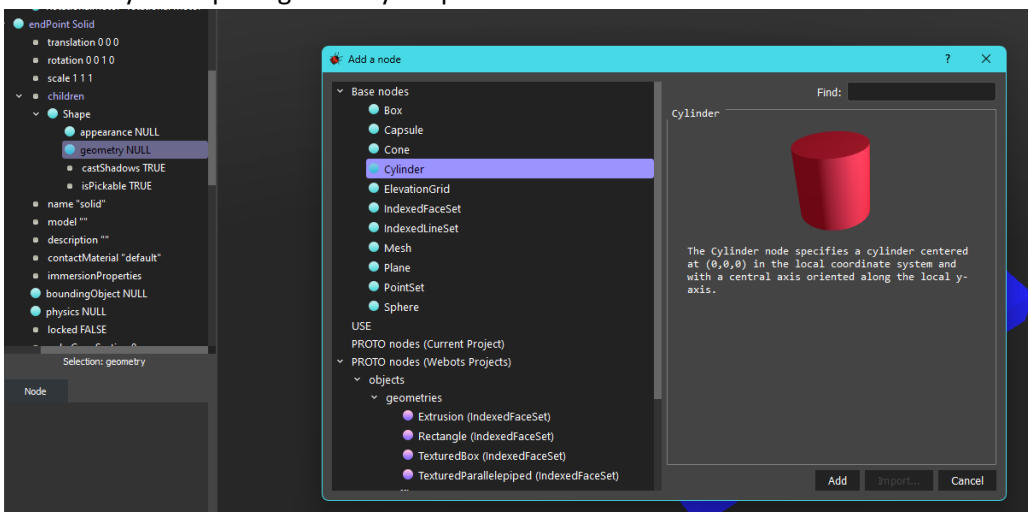
14. Add solid pada node endpoint



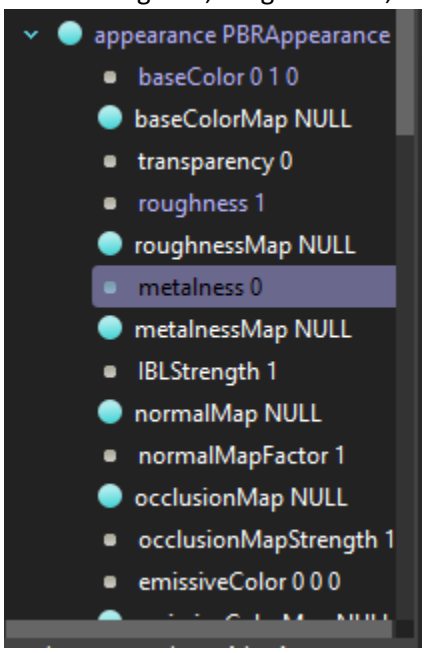
15. Lalu add shape pada children nya



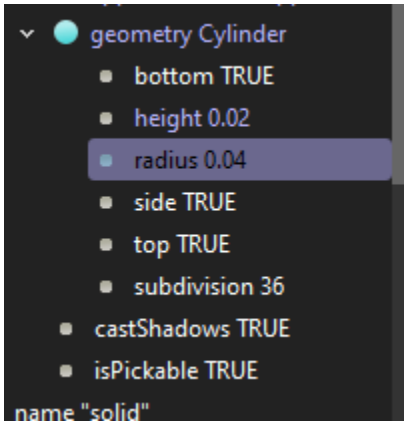
16. Lalu add cylinder pada geometry shape



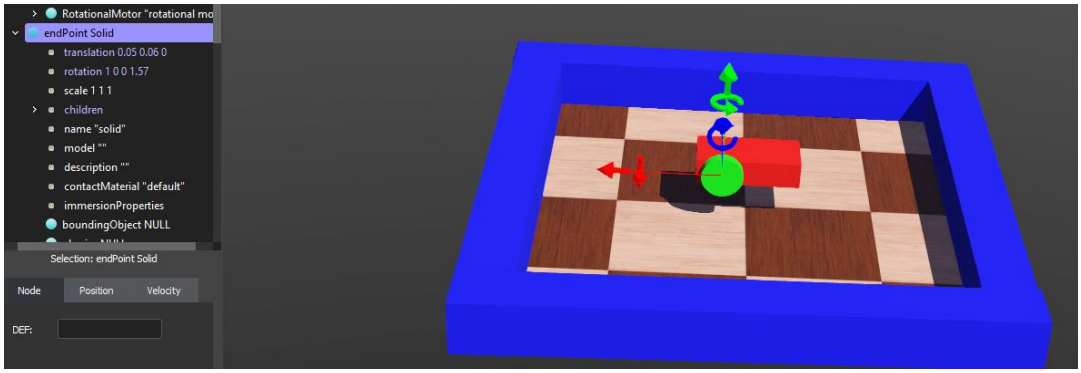
17. Set color = green, roughness = 1, metalness = 0



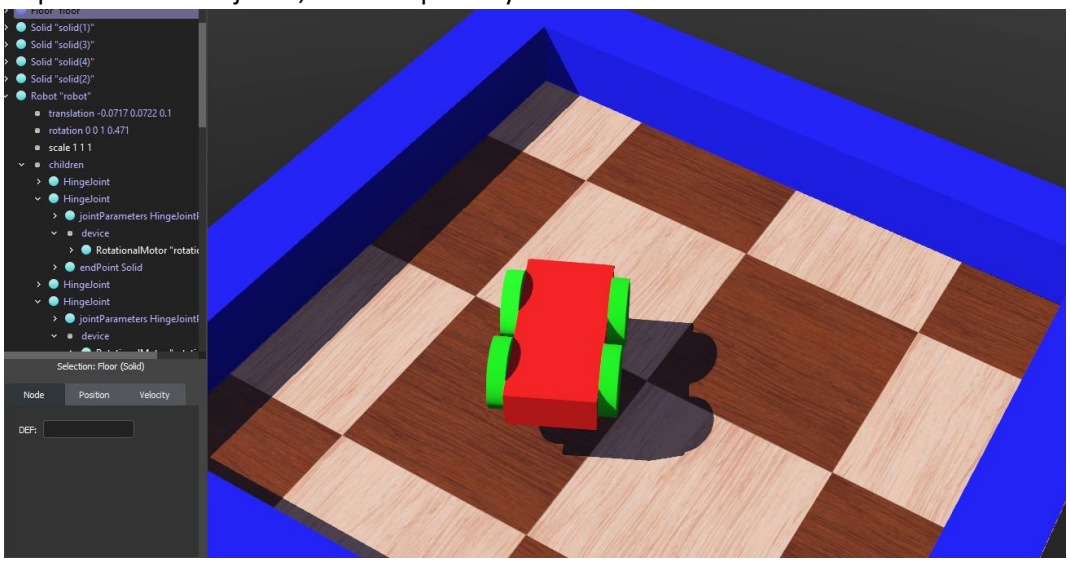
18. Set radius = 0.04, height = 0.02



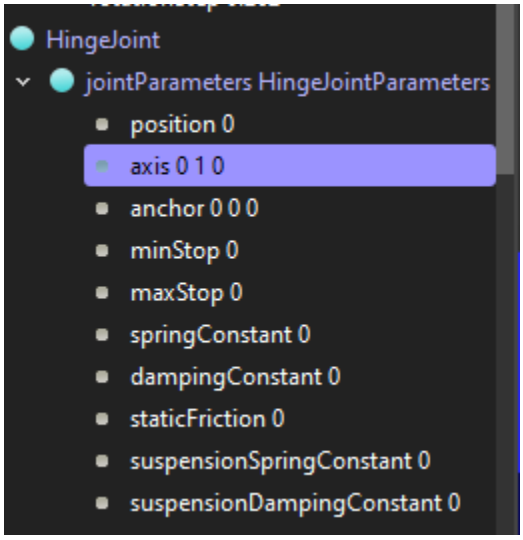
19. Set translation = 0.05 0.06 0 dan rotation = 1 0 0 1.57



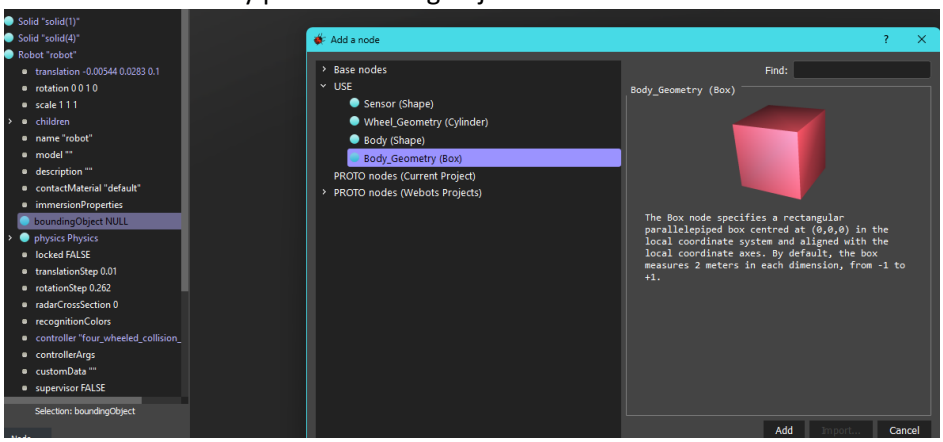
20. Duplikasi roda menjadi 4, dan atur posisinya



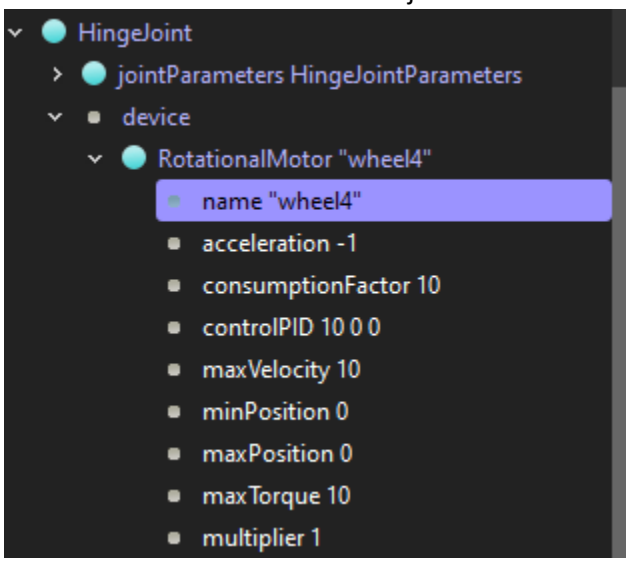
21. set seluruh axis = 0 1 0



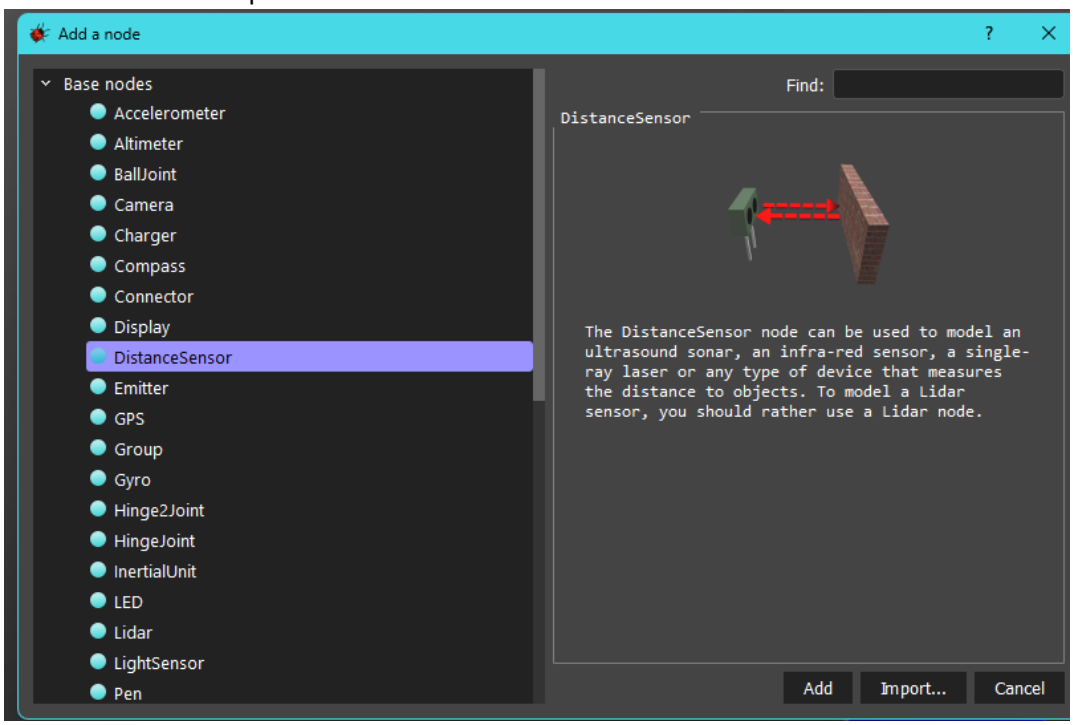
22. Add WheelGeometry pada bounding object



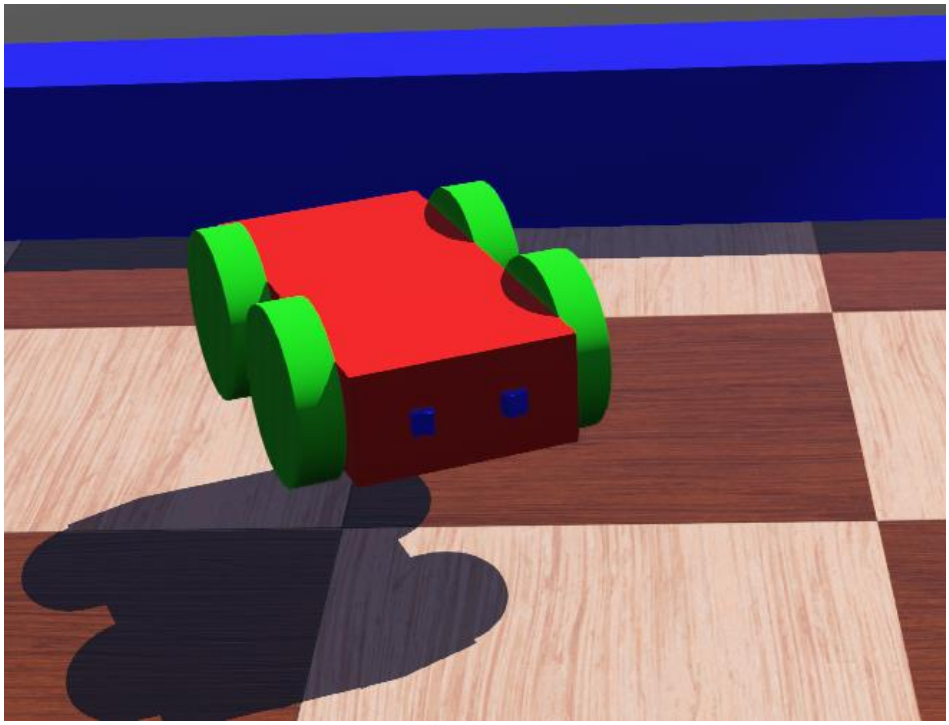
23. Ubah nama RotationalMotor menjadi wheel1 – 4



24. Add DistanceSensor pada children robot



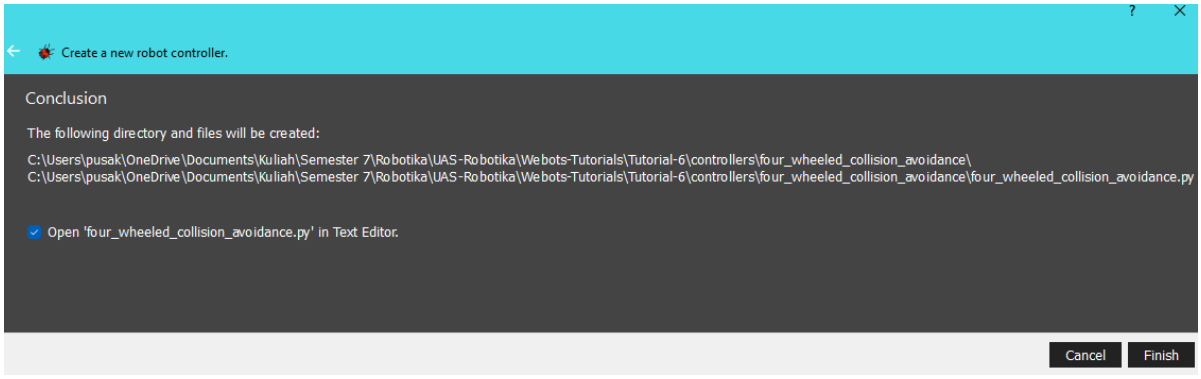
25. Duplikasi distance sensor

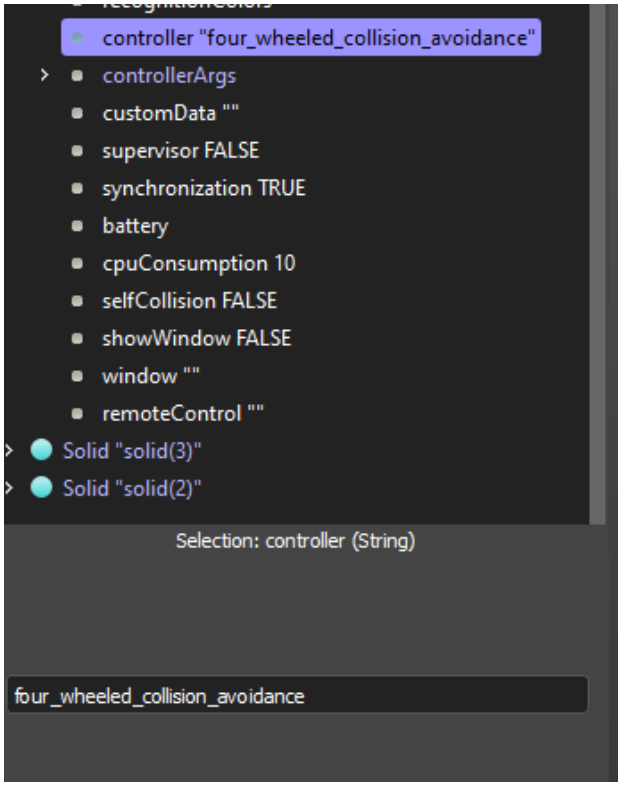


26. Add controller

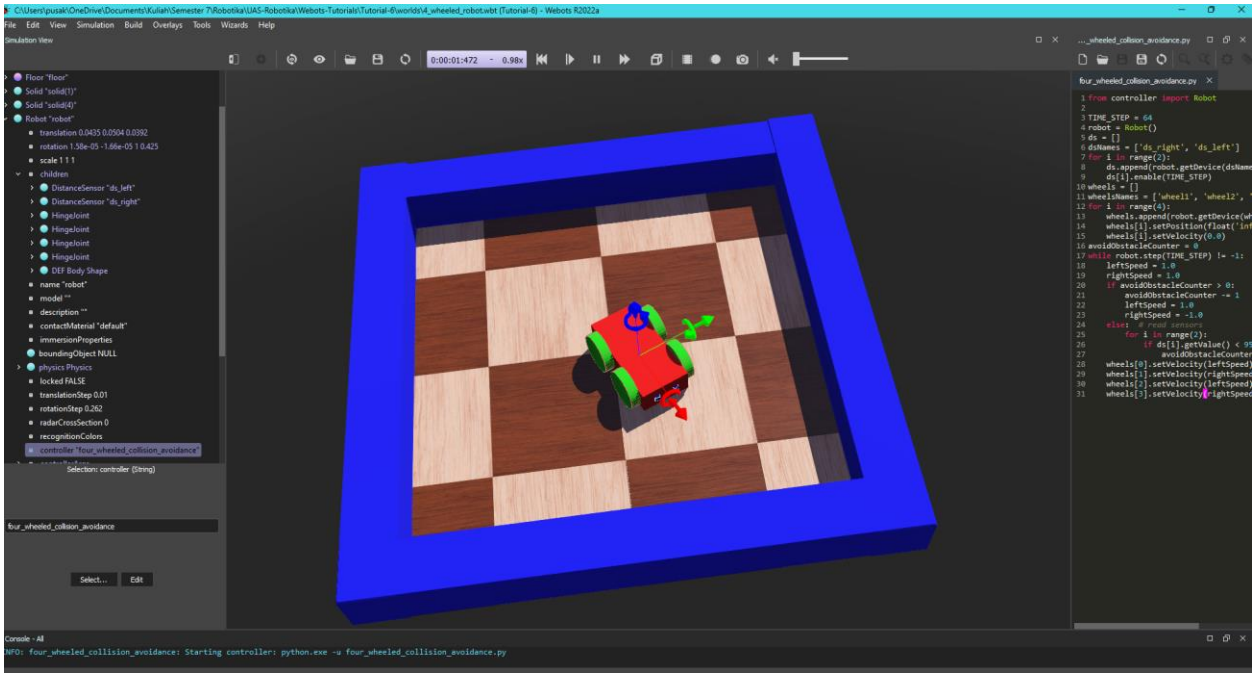
```
from controller import Robot

TIME_STEP = 64
robot = Robot()
ds = []
dsNames = ['ds_right', 'ds_left']
for i in range(2):
    ds.append(robot.getDevice(dsNames[i]))
    ds[i].enable(TIME_STEP)
wheels = []
wheelsNames = ['wheel1', 'wheel2', 'wheel3', 'wheel4']
for i in range(4):
    wheels.append(robot.getDevice(wheelsNames[i]))
    wheels[i].setPosition(float('inf'))
    wheels[i].setVelocity(0.0)
avoidObstacleCounter = 0
while robot.step(TIME_STEP) != -1:
    leftSpeed = 1.0
    rightSpeed = 1.0
    if avoidObstacleCounter > 0:
        avoidObstacleCounter -= 1
        leftSpeed = 1.0
        rightSpeed = -1.0
    else:  # read sensors
```

```
    for i in range(2):
        if ds[i].getValue() < 950.0:
            avoidObstacleCounter = 100
wheels[0].setVelocity(leftSpeed)
wheels[1].setVelocity(rightSpeed)
wheels[2].setVelocity(leftSpeed)
wheels[3].setVelocity(rightSpeed)
```





27. Save project dan jalankan.


File Edit View Simulation Build Overlays Tools Wizards Help
Floor "floor"
Solid "solid(1)"
Solid "solid(4)"
Robot "robot"
translation 0.0435 0.0504 0.0392
rotation 1.58e-05 -1.68e-05 1 0.425
scale 1 1 1
children
DistanceSensor "ds_left"
DistanceSensor "ds_right"
HingeJoint
HingeJoint
HingeJoint
HingeJoint
DEF Body Shape
name "robot"
model ""
description ""
contactMaterial "default"
immersionProperties
boundingObject NULL
physics Physics
locked FALSE
translationStep 0.01
rotationStep 0.262
radarCrossSection 0
recognitionColors
controller "four_wheeled_collision_avoidance"
Selection: controller (String)
four_wheeled_collision_avoidance
Select...
Edit
four_wheeled_collision_avoidance.py
from controller import Robot
TIME_STEP = 64
robot = Robot()
ds = []
dsNames = ['ds_right', 'ds_left']
for i in range(2):
ds.append(robot.getDevice(dsName
ds[i].enable(TIME_STEP)
wheels = []
wheelsNames = ['wheel1', 'wheel2',
for i in range(4):
wheels.append(robot.getDevice(wh
wheels[i].setPosition(float('inf
wheels[i].setVelocity(0.0)
avoidObstacleCounter = 0
while robot.step(TIME_STEP) != -1:
leftSpeed = 1.0
rightSpeed = 1.0
if avoidObstacleCounter > 0:
avoidObstacleCounter -= 1
leftSpeed = 1.0
rightSpeed = -1.0
else: # read sensors
for i in range(2):
if ds[i].getValue() < 9
avoidObstacleCounter
wheels[0].setVelocity(leftSpeed)
wheels[1].setVelocity(rightSpeed
wheels[2].setVelocity(leftSpeed)
wheels[3].setVelocity(rightSpeed
Console - All
INFO: four_wheeled_collision_avoidance: Starting controller: python.exe -u four_wheeled_collision_avoidance.py