Robotika dan Sistem Cerdas

Webots Hacking

Diajukan untuk memenuhi UAS pada mata kuliah
Robotika dan Sistem Cerdas

Oleh :

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PROGRAM STUDI S1 TEKNIK KOMPUTER

FAKULTAS TEKNIK ELEKTRO

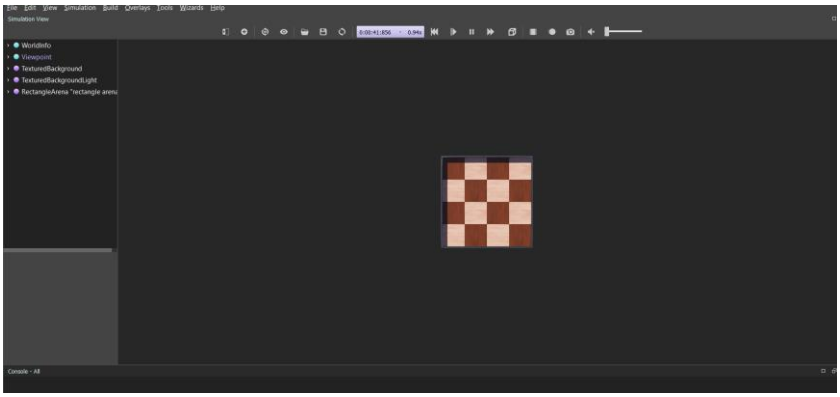
UNIVERSITAS TELKOM

BANDUNG

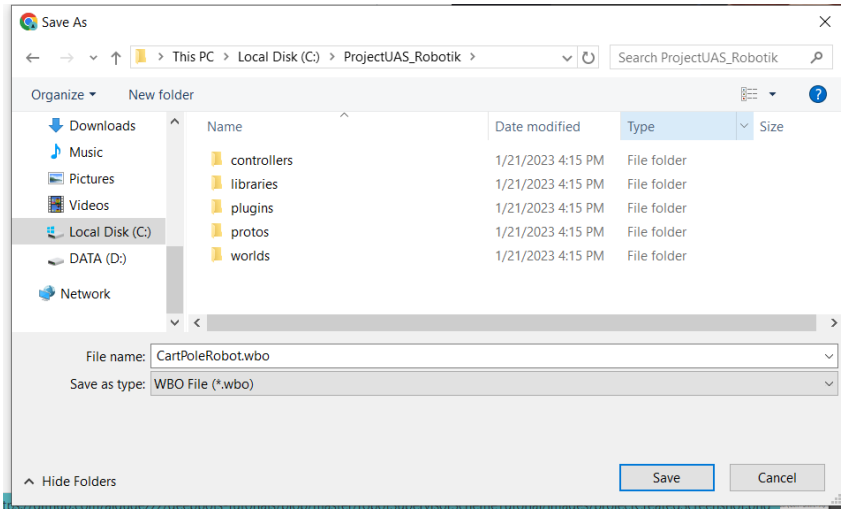
2023

Deepbots-CartPole Beginner Tutorial

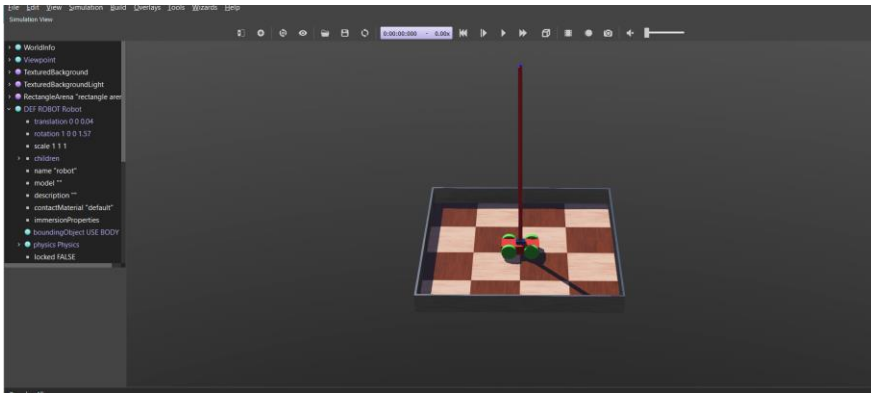
Menambahkan new Project Directory



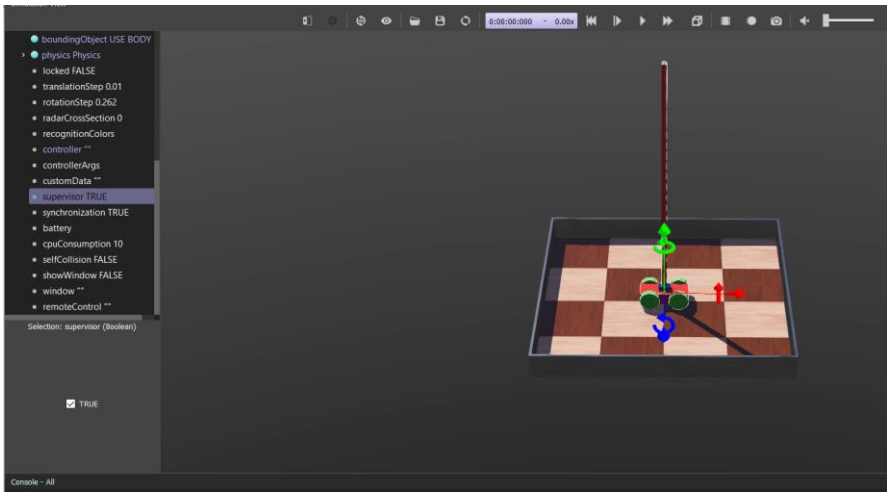
Klik link pada tutorial project, dan unduh content nya lalu simpan file tersebut.



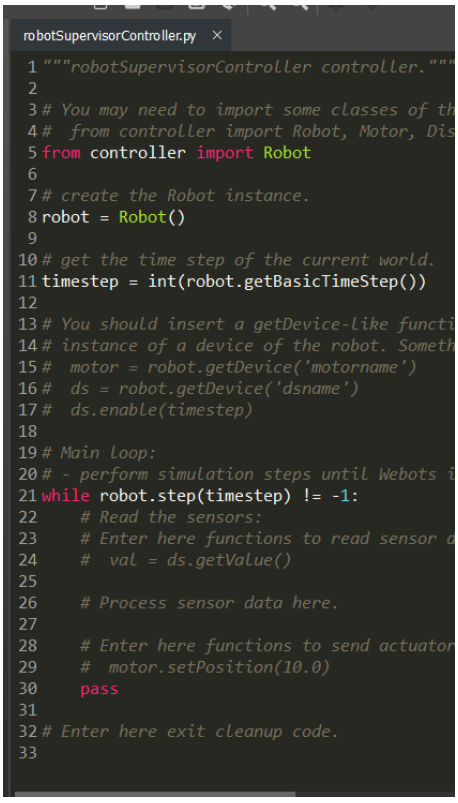
Setelah itu import file untuk menampilkan robot seperti ini



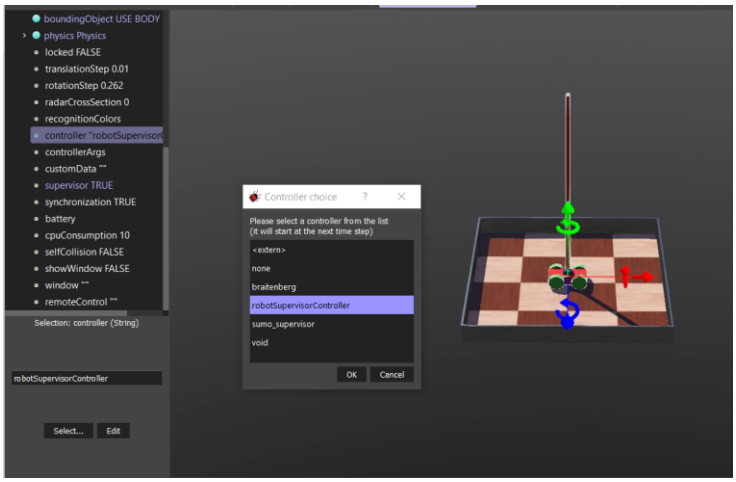
Lalu supervisor nya diubah menjadi TRUE.



Tambahkan controller baru



Lalu tambahkan controller robotsupervisorController



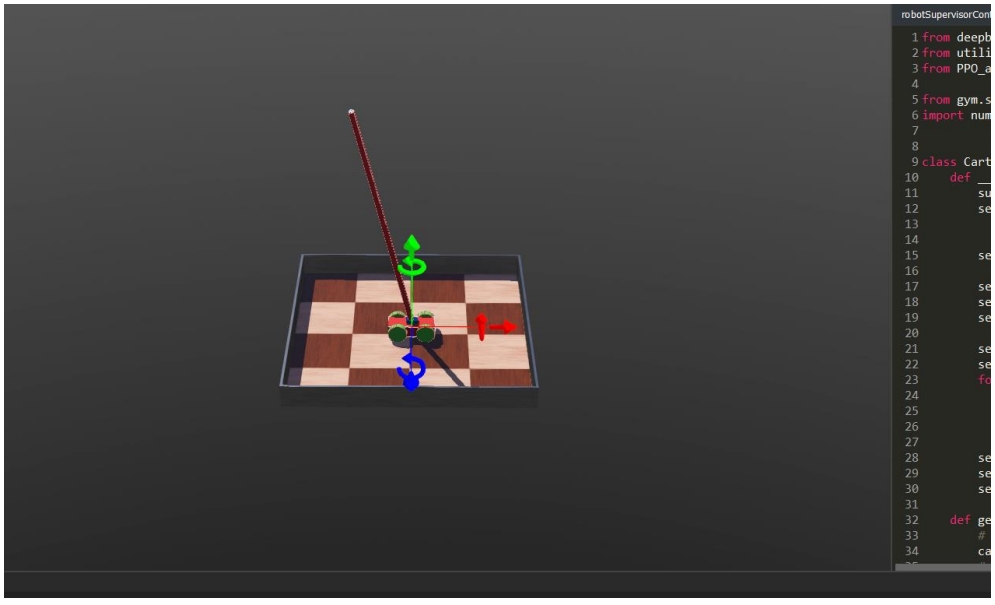
Selanjut save file yang sudah di download dengan tempat folder yang sama.

Name	Date modified	Type	Size
PPO_agent.py	1/21/2023 4:26 PM	Python File	8 KB
robotSupervisorController.py	1/21/2023 4:22 PM	Python File	1 KB
utilities.py	1/21/2023 4:36 PM	Python File	2 KB

Lalu Copy and paste code ke halaman yang tadi.

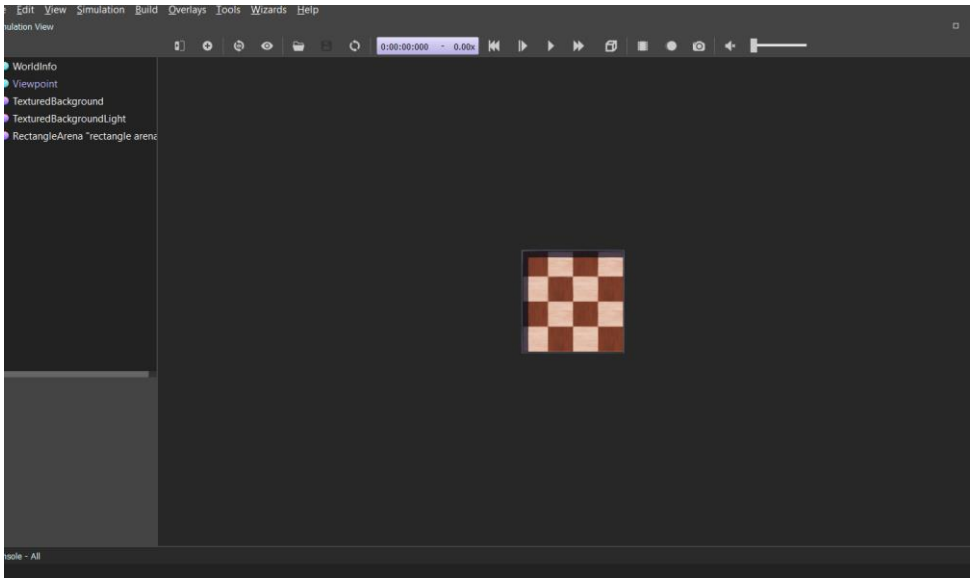
```
from deepbots.supervisor.controllers.robo
from utilities import normalizeToRange, p
from PPO_agent import PPOAgent, Transitio

from gym.spaces import Box, Discrete
import numpy as np


class CartpoleRobot(RobotSupervisor):
    def __init__(self):
        super().__init__()
        self.observation_space = Box(low=
                                     high
                                     dtyp
        self.action_space = Discrete(2)

        self.robot = self.getSelf()  # Gr
        self.positionSensor = self.getDev
        self.positionSensor.enable(self.t

        self.poleEndpoint = self.getFromD
        self.wheels = []
        for wheelName in ['wheel1', 'whee
            wheel = self.getDevice(wheelN
            wheel.setPosition(float('inf'
            wheel.setVelocity(0.0)  # Zer
            self.wheels.append(wheel)
        self.stepsPerEpisode = 200  # Max
        self.episodeScore = 0  # Score ac
        self.episodeScoreList = []  # A l

    def get_observations(self):
        # Position on x axis
        cartPosition = normalizeToRange(s
```

Robot telah berhasil bergerak.

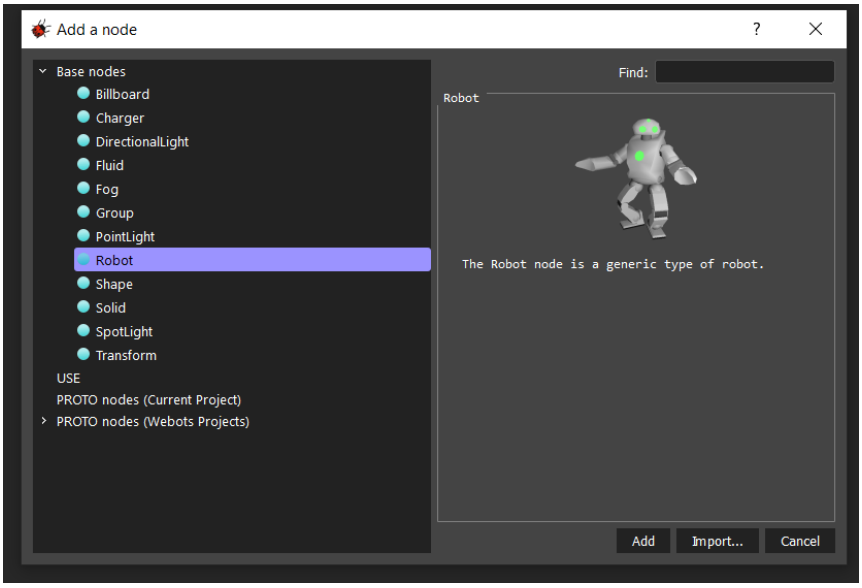


CartPole Emitter-Receiver Scheme Tutorial

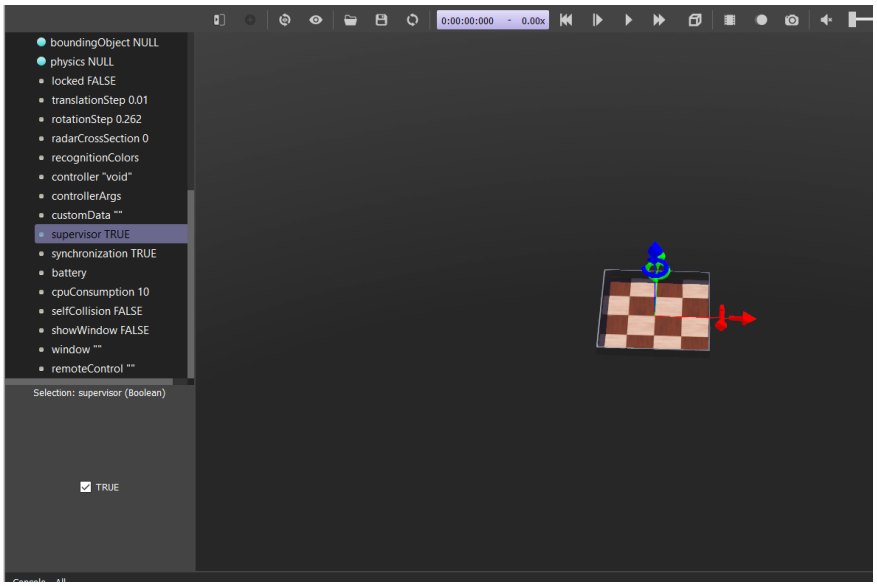
Membuat Project baru pada tab wizard, Create New Project



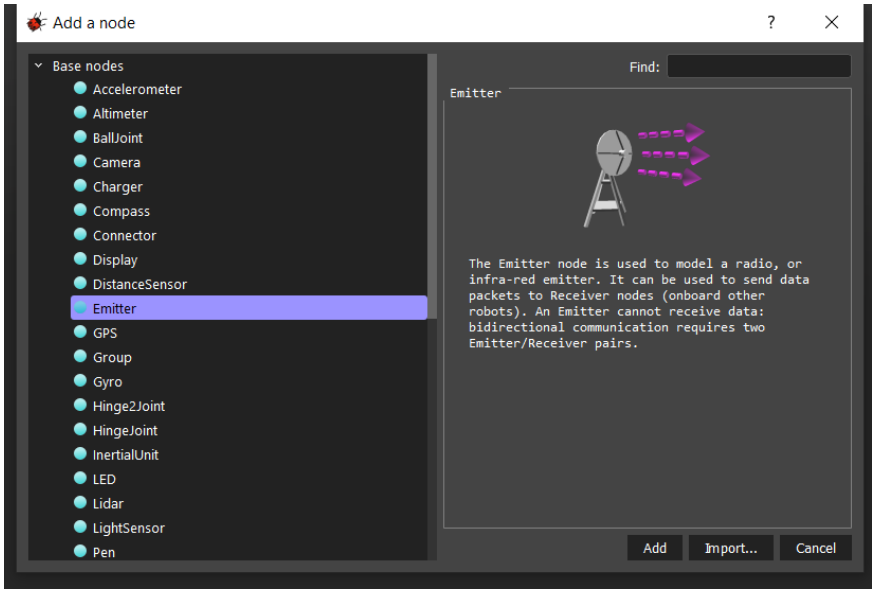
Pilih Sub Base Nodes, laluu import Robot



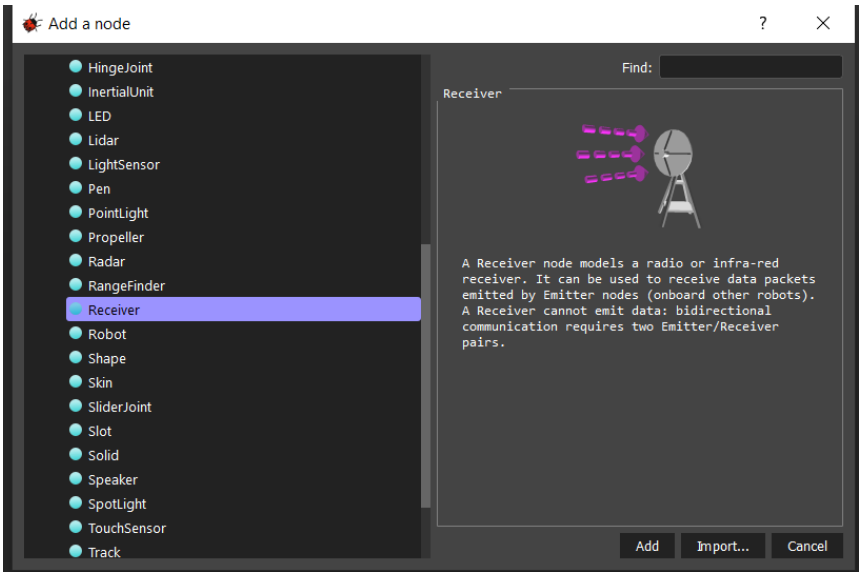
Lalu pilih Supervisor yang awal nya FALSE, menjadi TRUE.



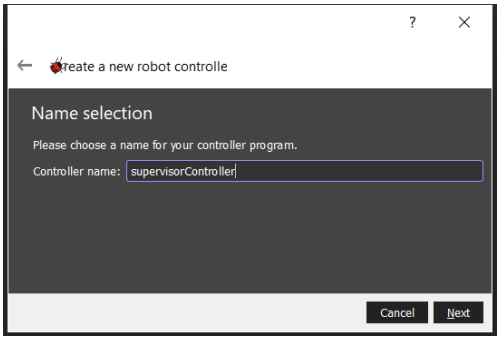
Lalu Pilih Base nodes untuk menambahkan Emitter



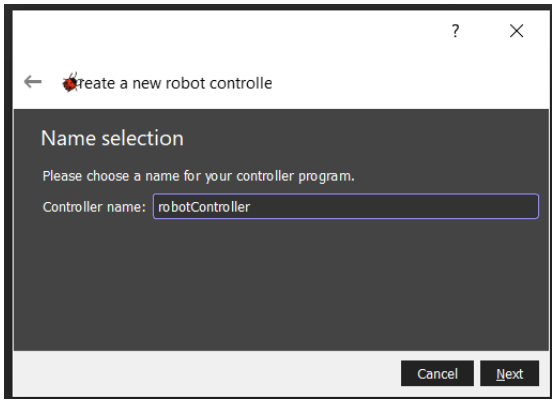
Lalu lanjut ke step berikutnya, menambahkan Receiver lalu klik save



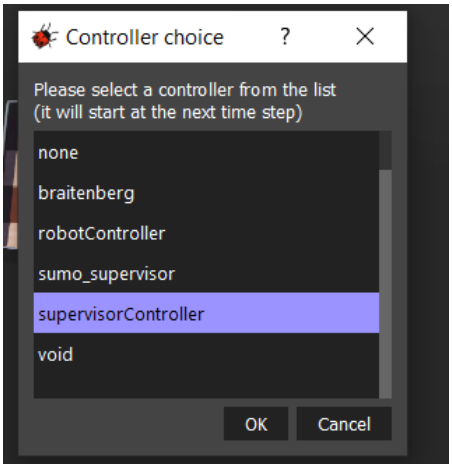
Selanjutnya menambahkan Controllers



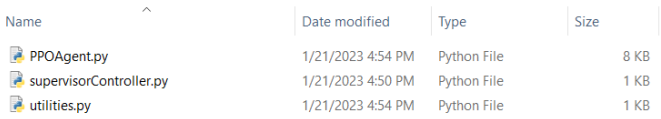
Lalu merubah controller name menjadi robotController



Asosiasikan controller yang telah anda buat dengan field controller, lalu pilih SupervisorController dan Klik save

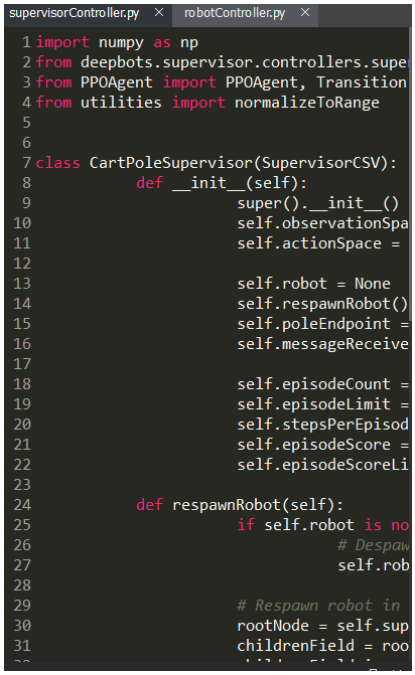


Simpan file yang telah di unduh dengan folder yang sama, dan folder berbeda pada project sebelum nya



Name	Date modified	Type	Size
PPOAgent.py	1/21/2023 4:54 PM	Python File	8 KB
supervisorController.py	1/21/2023 4:50 PM	Python File	1 KB
utilities.py	1/21/2023 4:54 PM	Python File	1 KB

Selanjutnya menambahkan code pada robotcontroller. Code bisa di unduh dari tutorial yang telah disediakan, lalu copy and paste pada laman tersebut dan save.



supervisorController.py | robotController.py

```
1 import numpy as np
2 from deepbots.supervisor.controllers.supe
3 from PPOAgent import PPOAgent, Transition
4 from utilities import normalizeToRange
5
6
7 class CartPoleSupervisor(SupervisorCSV):
8           def __init__(self):
9                   super().__init__()
10                  self.observationSpa
11                  self.actionSpace =
12
13                  self.robot = None
14                  self.respawnRobot()
15                  self.poleEndpoint =
16                  self.messageReceive
17
18                  self.episodeCount =
19                  self.episodeLimit =
20                  self.stepsPerEpisod
21                  self.episodeScore =
22                  self.episodeScoreLi
23
24          def respawnRobot(self):
25                  if self.robot is no
26                          # Despaw
27                          self.rob
28
29                  # Respawn robot in
30                  rootNode = self.sup
31                  childrenField = roo
```

supervisorController.py | robotController.py

```
from deepbots.robots.controllers.robot_emi

class CartpoleRobot(RobotEmitterReceiverCS
        def __init__(self):
                super().__init__()
                self.positionSensor
                self.positionSensor.
                self.wheel1 = self.r
                self.wheel1.setPosit
                self.wheel1.setVeloc
                self.wheel2 = self.r
                self.wheel2.setPosit
                self.wheel2.setVeloc
                self.wheel3 = self.r
                self.wheel3.setPosit
                self.wheel3.setVeloc
                self.wheel4 = self.r
                self.wheel4.setPosit
                self.wheel4.setVeloc

        def create_message(self):
                # Read the sensor va
                message = [str(self.
                return message

        def use_message_data(self, mess
                action = int(message

                if action == 0:
                        motorSpee
```

Setelah itu klik run pada webots untuk menjalankan sistem tersebut.