SCHOOL OF MECHANICAL AND MANUFACTURING ENGINEERING

MTRN4110 21T2 Robot Design

Phase A Tutorial – Introduction to Webots

By Ming Xuan Chua

Released 3/6/2021

Aims

This tutorial aims to introduce Webots and the E-puck robot as the platform for the assignments in this course.

At the completion of this tutorial, you should be able to:

1. Understand the key characteristics of the E-puck;
2. Modify the world file and add sensors to the E-puck;
3. Develop a controller to read from sensors and control motors of the E-puck.

This document outlines the schedule of the tutorial session.

1. Explain Assignment Phase A Descriptions

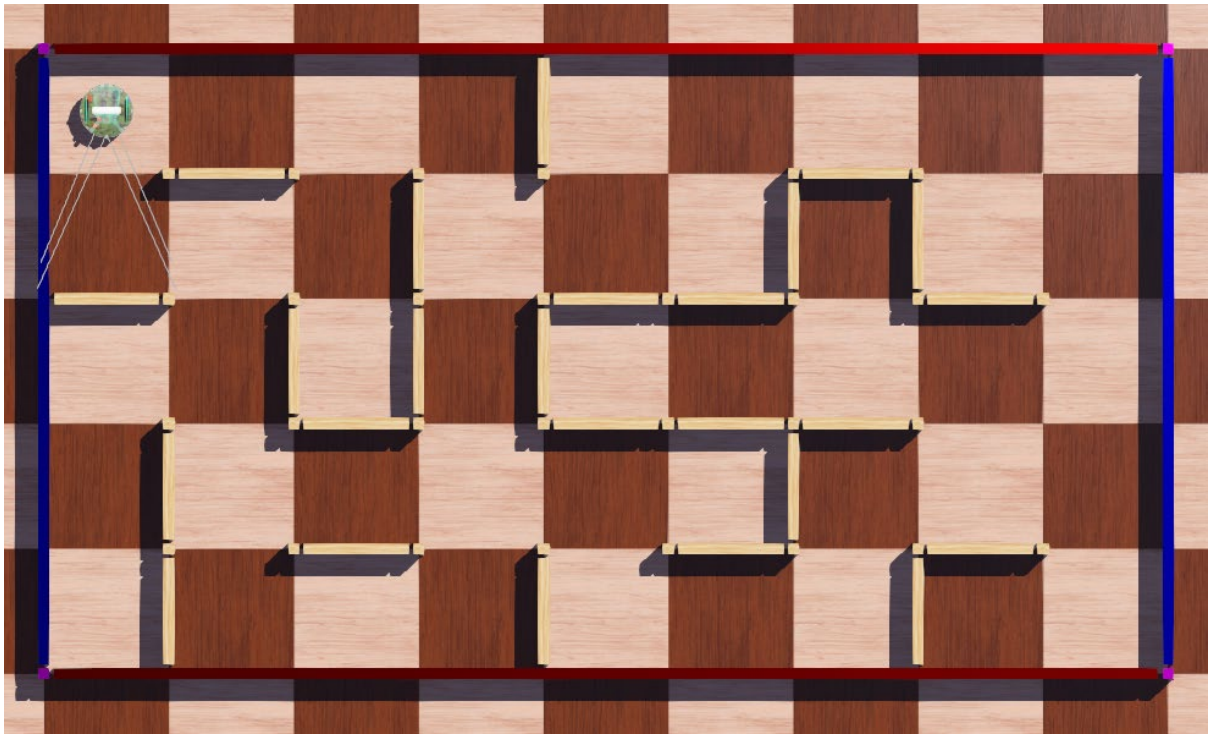
At the beginning of the tutorial, we will go through the assignment specs for Phase A.

2. Introduce the E-puck

In the second part, we will look at the specifications of the E-puck, including the robot's on-board sensors and some characteristics of the robot that are relevant to Phase A.

3. Modify the world file and the E-puck model

For Phase A, we have provided a world file that consists of a maze and an e-puck robot, as shown in the picture below.



In this part, we will introduce methods to modify some elements of the world file, such as the walls' position and the robot's location and orientation. This will be useful for developing your own test cases for your program.

4. Develop a controller to read from sensors and control the motors

In this part, we will first discuss how to add extra sensors to the E-puck. Then, we will go through some tutorials on developing a controller for E-puck that drives the motor and read from an IMU. We will build the controller during the tutorial.

References

E-puck: Webots documentation: GCTronic' e-puck (cyberbotics.com)

Webots Tutorial 1: Webots documentation: Tutorial 1: Your First Simulation in Webots (30 Minutes) (cyberbotics.com)

Webots Controller Tutorial: Webots documentation: Tutorial 4: More about Controllers (30 Minutes) (cyberbotics.com)

Webots Motor Node: Webots documentation: Motor (cyberbotics.com)

Webots Inertial Unit Node: Webots documentation: InertialUnit (cyberbotics.com)