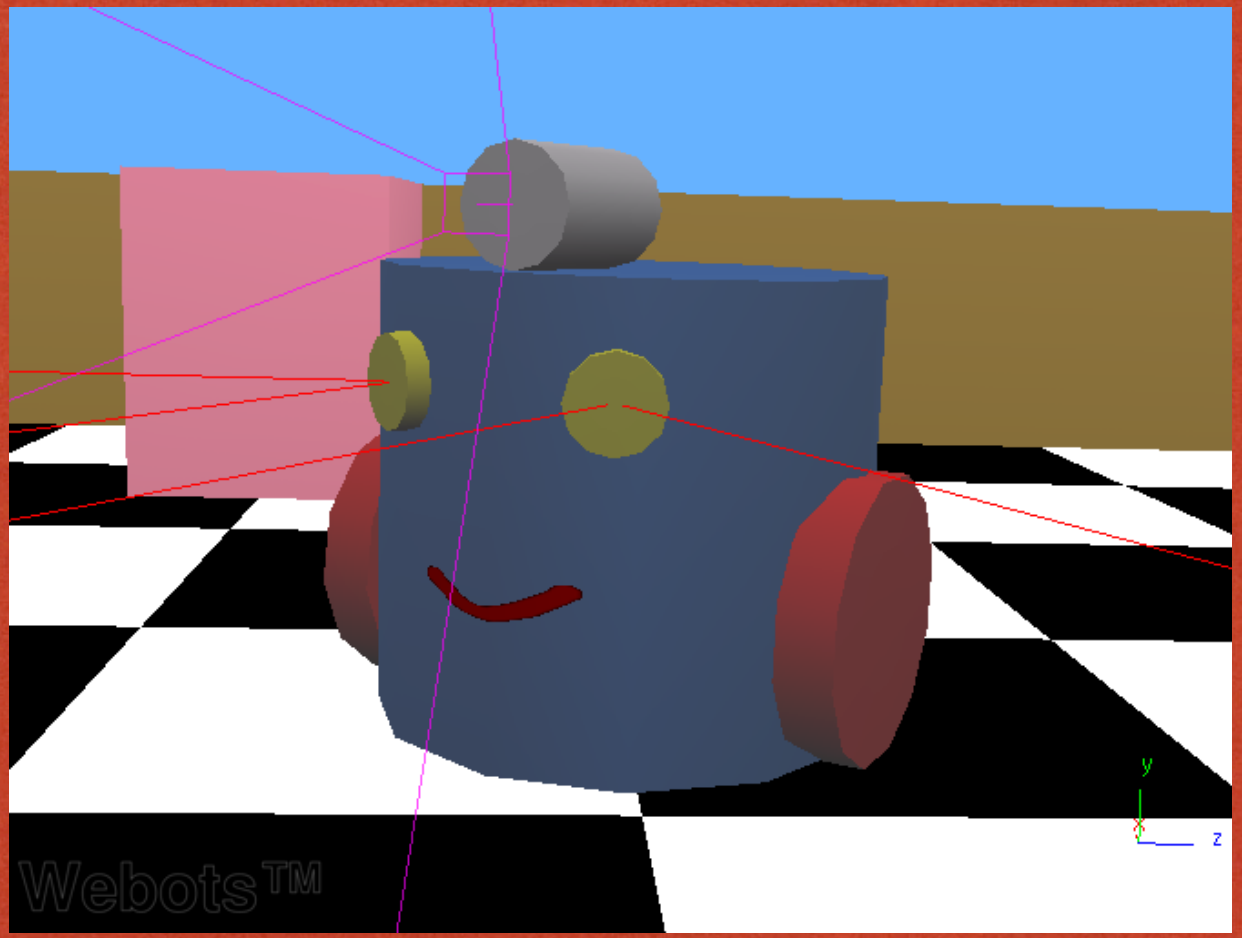
Robotics



Katherine Chan
Masud Karim
Steven's Institute of Technology
Mentor: Dr. Yu Dong Yao
Harlem Children Society

Introduction

- **Wireless technology and robotics engineering**
  - Wireless Fidelity (Wi-Fi) — a wireless connection without wires linked to any computer network. It can also be transmitted through radio waves.
  - Robotics — a mechanical and functional figure formed by sensors, actuators and power source(s). It can be functioned or programmed to be automatic or manual.

Goals

- To understand Webots and how to program it.
- To simulate the robot's environment.
- To build and activate the robot.
- To avoid obstacles using IR sensors and camera(s).
- To incorporate physics.

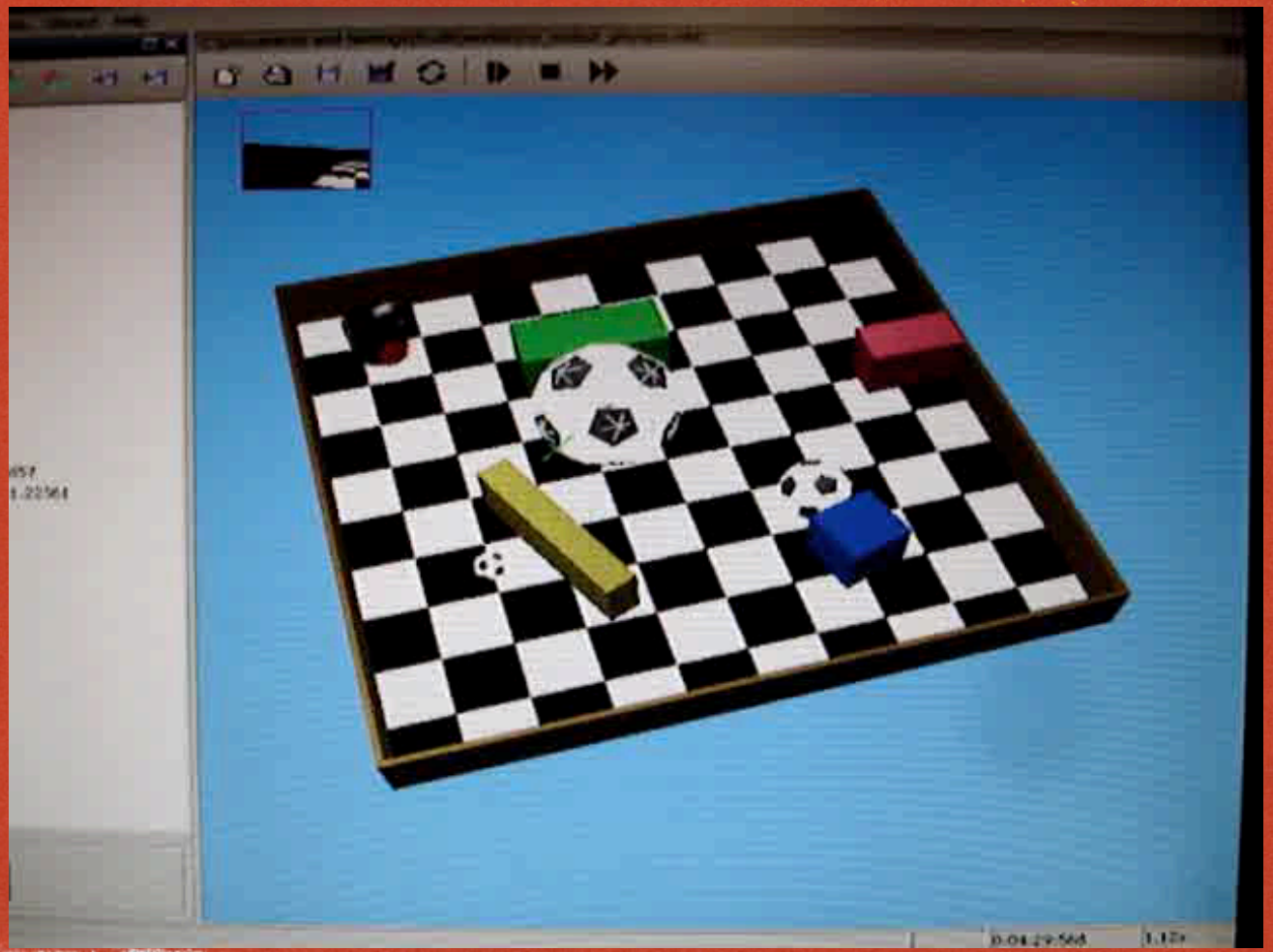
Introduction: Webots & e-puck

- **Webots and E-Puck**
  - Webots is a program that simulates mobile robots. It is a 3-D program in which the robots are programmed to react based on the commands that are programmed in.
  - E-Puck is a tiny robot that is also in the Webots program, and are also sold. In the program, it is used similar to the Webots that are created, except this robot has been pre-made.

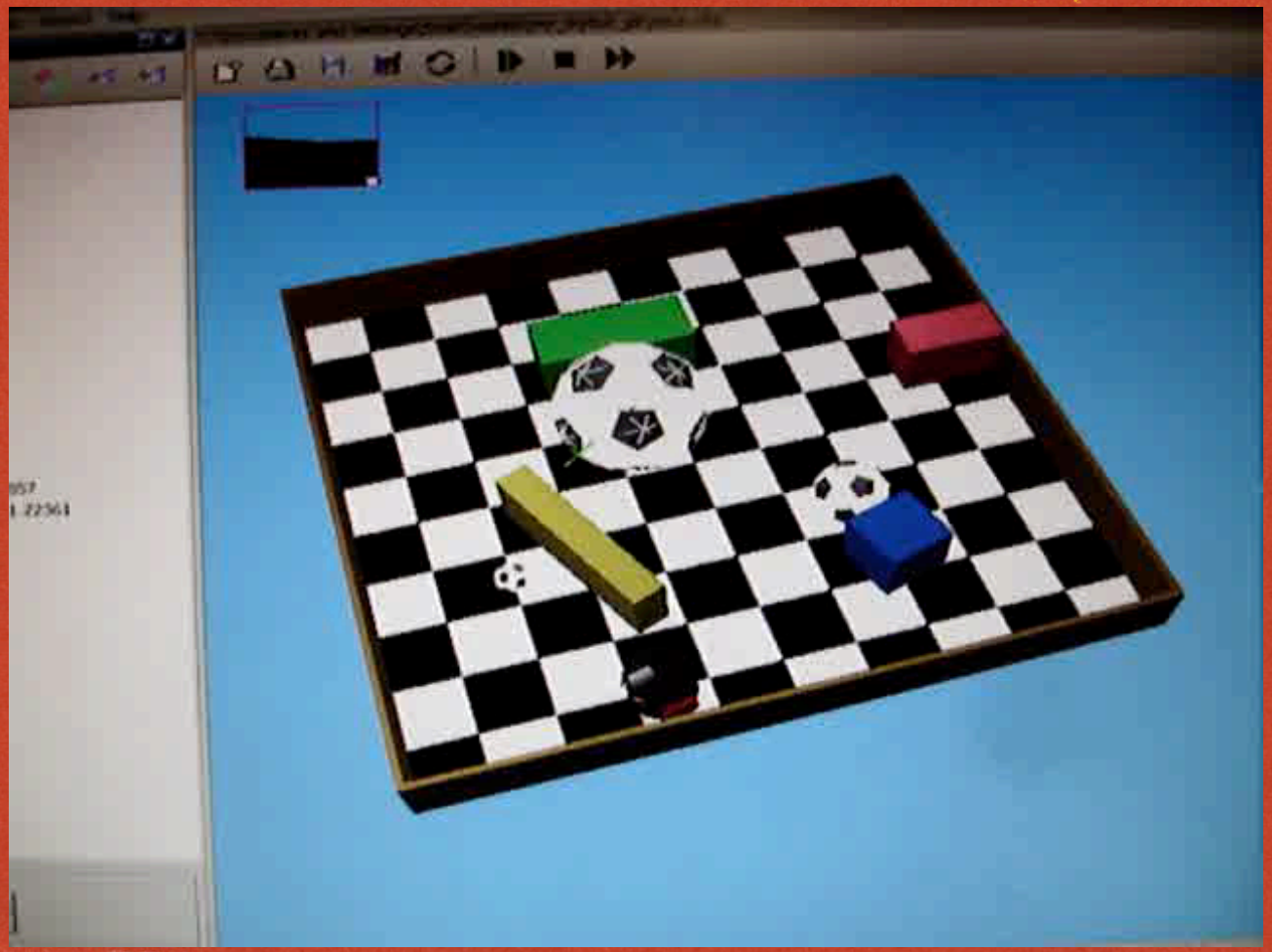
Webots

- A computer program that is used to simulate robots through applied nodes.
- NODES:
  - Nodes are subjects that dictate the simulation piece by piece.
  - Nodes can be dismembered and altered to ameliorate the characteristics (i.e, geometry, physics, appearance, etc.) and overall efficiency of the pertaining object
  - Major nodes include sensors (i.e. infrared), differential wheels, elevation grids, point light nodes, and shape nodes (i.e. boxes, cylinders, spheres, etc.
- AUTOMATONS:
  - These (in addition to keyboard shortcuts such as S, X, D, and C) chart the movement of robots such as the e-puck
- Lastly, the simulation can be played by clicking the “play button”

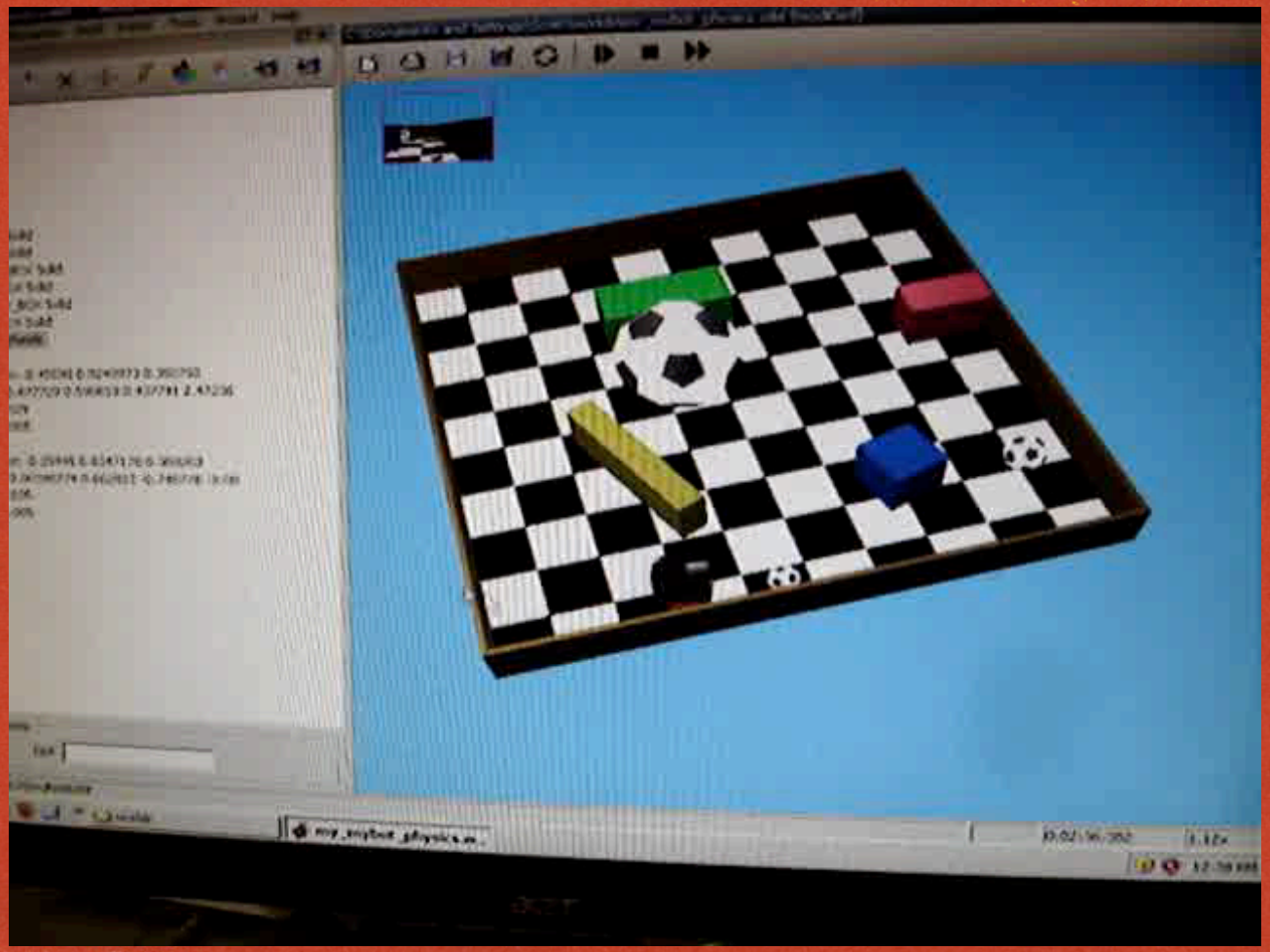
Webots



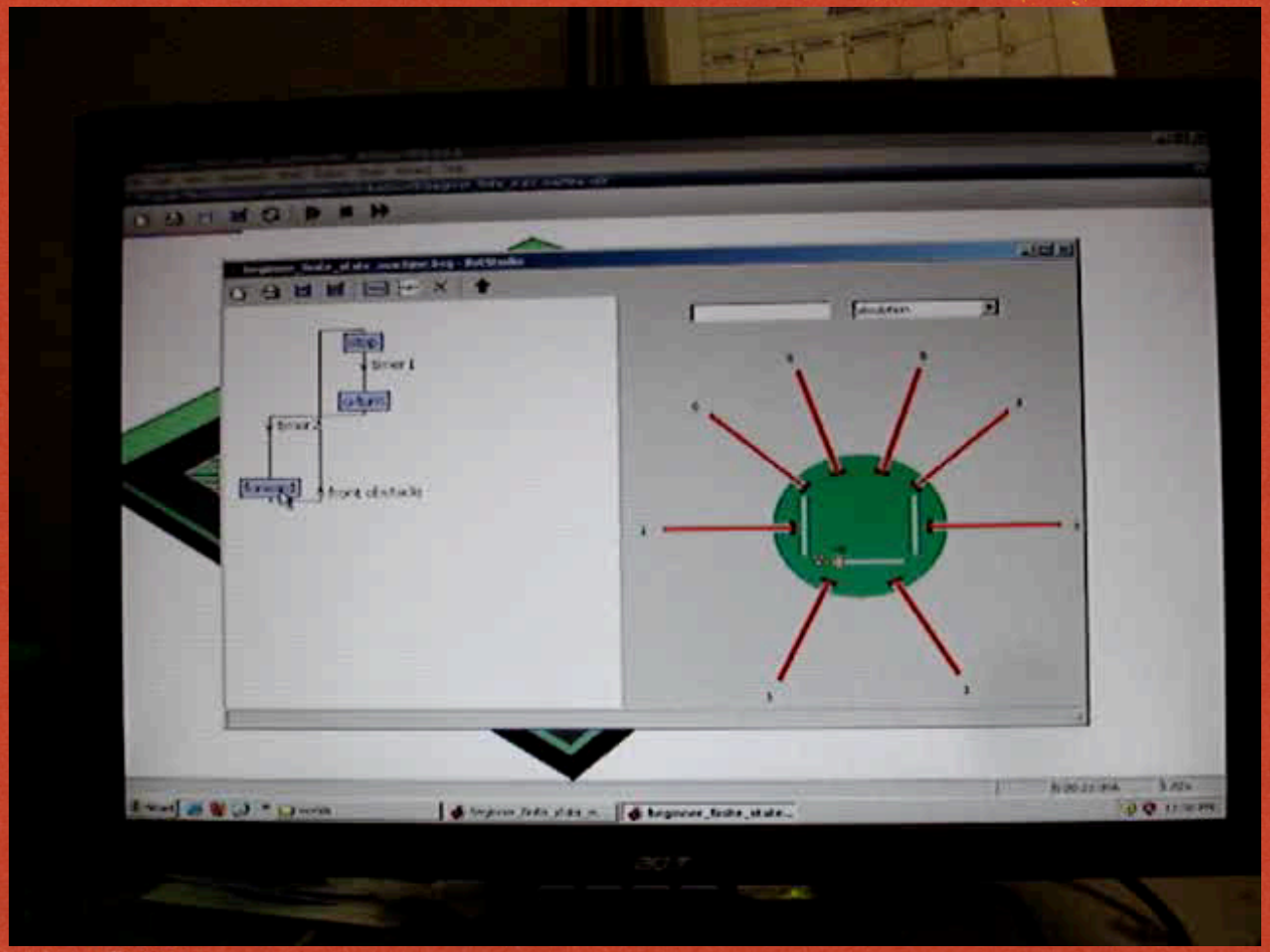
Webots



Webots



E-Puck



Results

- We completed the prelimary simulation of a “MyBot” robot (a simple differential wheels robot) and we analyzed its function through sensors, geometry, physics, environments, etc.
- We further dissected certain files to observe and mimic functions, nodes, automatons, and any other crucial adjustments.
- We analyzed the impact of making adjustments to the motor speed, automatons, phsysics, geometry, appearance, sensors, and the environment itself

Future

- We will experiment with the e-Puck both physically and on the Webots program.
- To emulate the proposed e-puck in its proposed environment on Webots.
- Depending on how many e-pucks we are provided, we aspire to ultimately create:
  - Robotic vacuum cleaner (one e-puck)
  - Smart office desk (1+ e-pucks)
  - Movable feast (1+ e-pucks)
  - Mouse catcher (one e-puck)

References

- http://www.cyberbotics.com/products/webots/index.html
- http://www.cyberbotics.com/cdrom/common/doc/webots/guide/chapter7.html
- http://www.e-puck.org/index.php?option=com_content&task=view&id=5&Itemid=27
- Dr. Yu Dong Yao — http://personal.stevens.edu/~yyao/
- http://www.cyberbotics.com/products/robots/e-puck.html
- http://wifinotes.com/wireless-networks.html

Thanks to...

- Dr. Sat Bhattacharya
- Dr. Yu-Dong Yao — mentor
- Steven's Institute for Technology
- Gouri, Jonathan, Dante — students
- Harlem Children Society & Staff

&& Thank you all for listening!