ROBOTICS LESSON

WITH SMARS

Lesson Plan

Summary

Overview:

In this lesson, students will learn the basics of robotics. During the theory, they will receive a short presentation about the history of robotics and then the class will analyze the functioning of the various components of the SMARS. Simplified operation of the battery, motors, microcontroller, motor driver, and main sensors will be explained.

In the practical part, the class will be divided into small groups (2-3 students) that will assemble the robots.

Subjects:

Simplified operation of the battery, motors, microcontroller, motor driver, and main sensors will be explained. The student should be able to distinguish the main differences between input and output devices, understand the concept of electrical signal, voltage and current.

Duration of Lesson

The theoretical part will take place within 45 minutes, while practice will take another 45 minutes.

Preparation

Before starting the practical part, the teacher will have to make sure that the computers used have Arduino IDE and the required libraries already installed. For this lesson, students will simply have to be clear about the dangers of electricity (short circuits, polarity reversals, etc.).

Arduino IDE: https://www.arduino.cc/en/Main/OldSoftwareReleases

Adafruit Motor Shield: https://learn.adafruit.com/adafruit-motor-shield/library-install

Libraries Support: https://www.arduino.cc/en/Reference/Libraries

Tutorials: https://www.arduino.cc/en/Tutorial/HomePage

Electrical safety: https://goo.gl/XqYEGB

Lesson Plan and Activity

1. Distribute the documentation

2. Begin the presentation (history of robotics, generality on the main peripherals of a robot, SMARS composition analysis and lab safety rules)

3. Time for questions

4. Short questionnaire to check that they understand (15 questions)

5. Correcting the questionnaire

6. Laboratory Start

7. Assembly phase

8. Check proper mounting / wiring

9. Loading the Demo sketch

10. Verifying robot works properly

11. Challenge: Change the code to make the robot stop at the second black line.

Rubric and Assessment

At the end of the lesson, students must have assembled and programmed the robot. For students who have not already done so in class, the homework will be to make the robot stop at the second black line.

Notes, Tips, & Tricks for Printing

In the next lessons, the goal will aim to increase student skills in programming. Once you have reached a good level, you can switch to hardware enhancements through 3D printing. students will have to design peripherals (electromechanical or purely mechanical) in order to reach the goals set by the teacher (eg collecting some cubes and putting them in a black glue tape enclosure).

At the end of the course, you can plan a robot-sumo tournament where each team of students will have to customize its robot with the aim of eliminating the opponent's robot .

Look at the page: https://pinshape.com/users/208532-kevin-t#designs-tab-open from time to time to check for the presence of new peripherals for the robot.

For the screwed version there will be a quadpod module (4-legs instead of the tracks) in the future. If you are interested, we recommend to print the version "Chassis_S.