Robotics and Programming 1

Dates: September 11- October 23, 2013 (7 weeks)

Instructor: Digital Kidz

Objective: Using Lego Mindstorms and VEX, this robotics program introduces students to the world of robotics and programming using software based on the industry-standard C Language. Students will write, test, and troubleshoot programs in RobotC to control direction, speed, movement, sensing, variables, and functions. Students test their programs on virtual robots in high-end simulation environments, such as Ice World, Cave World, and Underwater World. The game like environment makes programming fun. Students compete in challenges such as Sumo-Bot and Mine Removal Challenges and obstacle courses.

Skills Learned:

- Learn the role of the programmer and how the robot sees the world.
- Learn to control robot's direction and speed autonomously.
- Learn how robots use feedback from sensors to interpret the world around them.
- Write, test, and troubleshoot programs using RobotC.
- Robot movement, robot sensing, variables, control structures, and functions.
- Test programs in simulation environments.

Preliminary Course Outline

Week	Theme/Topic
1.	Programming Overview • Understanding the components of a robot and the the role of the programmer and the machine. • Understanding RobotC syntax. • Build the base robot.

2. Sumo-Bot Challenge
   - Learn what each line of code does while introducing students to moving motors.
   - Program robots to accurately move forward, backward and turn.
   - Compete in a Sumo-Bot Challenge to push as many cans as possible out of a ring.

3. Follow the Wall Challenge
   - Configure the touch sensor and build a new program from scratch.
   - Using feedback from the touch sensor program the robot to detect the wall and turn in the correct place no matter how far away from the wall it started.

4. The Speed of Sound
   - Write a program that uses feedback from the Ultrasonic sensor to control the robots speed as it approaches an object.
   - Assign values to control the power level of the robot's motors.
   - Experiment with variables to optimize the robots deceleration speed.

5. Table Bot Challenge
   - Configure and program the light sensor.
   - In the Table Bot Challenge students program the robot to move forward until it detects the edge of a surface, using the light sensor.

6. Clap On, Clap Off
   - Configure and program the sound sensor to control the robot's behavior.
   - Calculate a sensor threshold value.
   - Write a program that makes the robot go and stop using sound.
   - Use a Loop in a program to repeat behaviors.

7. The Mine Removal Challenge

- Students learn how Bluetooth works and how to program a remote control unit.
- Combine autonomous and remote control programming.
- Our robot's task is to safely remove and transport mines to a designated disposal area.

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