Robotics Teaching Resources

<http://www.education.rec.ri.cmu.edu/fire/competitions/ftc/>

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| Competitions - FIRST Tech Challenge (FTC) For questions relating to the FTC competition, please post at the [FTC Forums](http://www.education.rec.ri.cmu.edu/redirect/redirect.php?url=http://www.robotc.net/forums/viewforum.php?f=52)  Learn to use our forums - [Click Here](http://www.education.rec.ri.cmu.edu/fire/media/forum_howto/forum_howto.html)    The Robotics Academy is eager to support teams competing in this year's FTC Challenge.  You will find links below to training materials that will enable you to master the TETRIX Robotic Platform: |  |

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| What is on this page?  * [Engineering Process/Planning your Project](http://www.education.rec.ri.cmu.edu/fire/competitions/ftc/#engineering-process) * [If you are brand new to TETRIX, click here!](http://www.education.rec.ri.cmu.edu/fire/competitions/ftc/#tetrix-startup) * [Training Webinars](http://www.education.rec.ri.cmu.edu/fire/competitions/ftc/#webinars) * [Learn to Program using ROBOTC](http://www.education.rec.ri.cmu.edu/fire/competitions/ftc/#robotc-programming) * [ROBOTC Support](http://www.education.rec.ri.cmu.edu/fire/competitions/ftc/#robotc-programming) * [Learn to Program using LabVIEW](http://www.education.rec.ri.cmu.edu/fire/competitions/ftc/#labview-programming) |

<http://www.legomindstormsev3.com/ev3-programming/robotc-lego-mindstorms-ev3-c-programming-language.ev3>

robotc programming – lots of sample code

NXT building instructions

<http://robomatter.com/Shop-By-Product-Type/Curriculum/High-School/TETRIX/ROBOTC-Curriculum-For-TETRIX-And-LEGO-Mindstorms-Classroom-License?cPath=74_123_124>

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Overview](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/home/ROBOTC_TETRIX_Curriculum.html) * **Fundamentals**   + Safety     - Safety is an Attitude       * [Safety is an Attitude](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/safety/PDFs/Safety_is_an_attitude.html)       * [General Lab Safety](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/safety/PDFs/General_Safety.html)       * [Safety Checklist](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/safety/PDFs/Safety_Checklist.html)     - Safety Tests (with answer keys)       * [Robotics Lab Inspection Sheet](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/safety/PDFs/Safety_Activity_Inspection.html)   + Project Management     - [Keeping an Engineering Journal](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/projectmanagement/documents/Engineering_Journal.html)     - [Engineering Process Reference](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/projectmanagement/documents/What_is_Engineering_Process.html)     - [Engineering Definitions](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/projectmanagement/documents/Engineering_Definitions.html)     - Project Planning Documents       * [Team Building](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/projectmanagement/documents/Team_Building.html)       * [Understanding the Problem](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/projectmanagement/documents/understanding_the_Problem.html)       * [Brainstorming](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/projectmanagement/documents/Brainstorming.html)       * [Planning your Time](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/projectmanagement/documents/Planning_Your_Time.html)       * [Design reviews](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/projectmanagement/documents/Design_Reviews.html)       * [Organizational Matrix Ideas](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/projectmanagement/documents/Organizational_Matrix_Ideas.html)       * [Recording Progress](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/projectmanagement/documents/Recording_Progress.html)       * [Gantt Chart](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/projectmanagement/documents/Gantt_Charts.html)       * [PERT Chart](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/projectmanagement/documents/PERT_Charts.html)       * [Preparing for a Competition](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/projectmanagement/documents/Preparing_for_a_Competition.html)   + Assessment Rubrics     - [Writing Criteria](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/assessmentrubrics/documents/Writing_Rubrics.html)     - [Presentations Rubric](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/assessmentrubrics/documents/Presentations_Rubrics.html)     - [Work Habits](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/assessmentrubrics/documents/Work_Habits_Rubrics.html)     - [Workplace Competencies](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/assessmentrubrics/documents/Workplace_Competencies_Rubrics.html)     - [Proposal Assessment](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/assessmentrubrics/documents/Proposal_Writing_Rubrics.html)     - [Engineering Journals](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/assessmentrubrics/documents/Engineering_Journal_Rubrics.html)     - [Robotics Explorations](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/assessmentrubrics/documents/Design_Rubrics.html)     - [Internal Design Reviews](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/assessmentrubrics/documents/Internal_Design_Review_Rubrics.html)     - [External Design Reviews](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/assessmentrubrics/documents/External_Design_Review_Rubrics.html)   + Introduction to Programming     - [Thinking about programming](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/Fundamentals_Thinking.html)       * [Behaviors](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_behaviors.html)       * [Flowcharts & Pseudocode](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_pseudo_flow.html)     - [ROBOTC Syntax](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/Fundamentals_ROBOTC.html)       * [Whitespace](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_white_space.html)       * [Comments](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_comment.html)       * [Reserved Words](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_res_words.html) * **Setup**   + NXT Setup     - [Printable REM Building Instructions](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/setup/buildshows/rem_print.html)     - [Running a Program](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_running_a_program.html) * **Movement:**   + [Moving Forward](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/movement/moving_forward/documents/Movement_Movingforward.html)   + [Speed and Direction](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/movement/speed_and_direction/documents/Movement_Speeddirection.html)   + [Improved Movement](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/movement/improved_movement/documents/Movement_Improvedmovement.html)     - [PID Speed Control](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_PID.html)     - [Motor Synchronization](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_synching.html) * **Sensing**   + [Wall Detection (Touch)](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/sensing/walltouch/documents/Sensing_walltouch.html)     - [Printable Touch+Light Instructions](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/setup/buildshows/touch_light_print.html)     - [Sense Plan Act](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_spa.html)     - [While Loops](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_while_loop.html)     - [Boolean Logic](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_boolean_algebra.html)   + [Wall Detection (Ultrasonic)](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/sensing/wallsonar/documents/Sensing_wallsonar.html)     - [Thresholds](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_thresholds.html)     - [Printable Ultrasonic Instructions](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/setup/buildshows/ultrasonic_print.html)     - [Random Number](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_random.html)   + Forward for Distance     - [Encoders](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/sensing/forwardfordistance/documents/encoders_helper.html)   + [Forward Until Dark](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/sensing/forwarduntildark/documents/Sensing_Forwarduntildark.html)     - [Printable Touch+Light Instructions](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/setup/buildshows/touch_light_print.html)     - [Thresholds](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_thresholds.html)     - [Random Numbers](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_random.html)   + [Line Tracking](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/sensing/linetrack/documents/Sensing_LineTracking.html)     - [Printable Touch+Light Instructions](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/setup/buildshows/touch_light_print.html)     - [If-Else Statement](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_if_else.html)     - [Switch-Case Statement](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_switch_case.html)     - [Timers](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_timers.html)   + [Volume and Speed](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/sensing/volumespeed/documents/Sensing_SpeedBasedVolume.html)     - [Printable Sound Instructions](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/setup/buildshows/sound_print.html) * **Variables**   + [Automatic Thresholds](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/variablesfunctions/auto_threshold/documents/NXT_VF_AutomaticThresholds.html)     - [Variables & Data Types](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_variables.html)     - [Thresholds](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_thresholds.html)     - [Printable Touch+Light Instructions](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/setup/buildshows/touch_light_print.html)     - [Display Text](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/variablesfunctions/documents/display_text_helper.html)   + [Line Counting](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/variablesfunctions/line_counter/documents/NXT_VF_LineCounter.html)     - [Printable Touch+Light Instructions](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/setup/buildshows/touch_light_print.html)   + [Patterns of Behavior](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/variablesfunctions/behaviors_functions/documents/NXT_VF_PatternsOfBehavior.html)     - [Functions](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_functions.html)     - [Global Variables](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_global_variables.html)   + Debugging     - [Display Text](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/variablesfunctions/documents/display_text_helper.html) * **Remote Control**    + Remote Control Basics     - [Install Joystick Controller](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/remotecontrol/documents/install_joystick_controller.html)   + Using Bluetooth     - [Install Bluetooth Adapter](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/remotecontrol/documents/install_bt_controller.html) | Building Instructions:   * **Slideshow**    + [REM robot](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/index/prodindex.htm)   + [Touch + Light Attachment](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/index/prodindex.htm)   + [Side Button Attachment](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/index/prodindex.htm) * **Printable Instructions**   + [LEGO Encoder Attachment](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/setup/buildshows/lego_encoder_print.html)   + [REM robot](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/setup/buildshows/rem_print.html)   + [REM Touch+Light Attachment](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/setup/buildshows/touch_light_print.html)   + [REM Ultrasonic Attachment](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/setup/buildshows/ultrasonic_print.html)   + [REM Sound Attachment](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/setup/buildshows/sound_print.html)   + [REM Gripper Attachment](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/setup/buildshows/gripper_print.html)   **Challenges:**   * **Movement:**   + Labyrinth     - [Design Specification](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/movement/documents/Movement_designspecifications.html)  * + - [Solution Video](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/index/prodindex.htm" \l "46) * **Sensing**   + Obstacle Course     - [Design Specification](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/sensing/documents/Sensing_designspecifications.html)  * + - [Solution Video](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/index/prodindex.htm" \l "47) * **Variables**   + Warehouse     - [Design Specification](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/variablesfunctions/documents/warehouse_designspecifications.html)  * + - [Solution Video](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/index/prodindex.htm" \l "48) * Remote Control   + Programming Challenge     - [Soccer Challenge](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/remotecontrol/documents/remote_control_soccer_challenge.html)  * + - [Solution Video](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/index/prodindex.htm" \l "soccersolution)   **Mini-Challenges:**   * [Auto Attendance Challenge](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/minichallenges/auto_attendance.html) * [Bull Ring Challenge](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/minichallenges/bull_in_the_ring.html) * [Can Bot Challenge](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/minichallenges/can_bot.html) * [Firefly Challenge (Level 1)](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/minichallenges/firefly_bot_lv1.html) * [Firefly Challenge (Level 2)](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/minichallenges/firefly_bot_lv2.html) * [Horseshoe Challenge](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/minichallenges/horseshoe.html) * [Line Painter Challenge](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/minichallenges/line_painter_bot.html) * [Line Runner Challenge (Level 1)](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/minichallenges/line_runner_lv1.html) * [Line Runner Challenge (Level 2)](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/minichallenges/line_runner_lv2.html) * [Minefield Challenge (Level 1)](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/minichallenges/minefield_lv1.html) * [Minefield Challenge (Level 2)](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/minichallenges/minefield_lv2.html) * [Minesweeper Challenge](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/minichallenges/minesweeper.html) * [MouseBot Challenge](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/minichallenges/mouse_bot.html) * [PipeBot Challenge (Level 1)](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/minichallenges/pipebot1.html) * [PipeBot Challenge (Level 2)](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/minichallenges/pipebot2.html) * [Robo-Slalom Challenge](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/minichallenges/robo_slalom.html) * [Robo 500 Challenge (Level 1)](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/minichallenges/robo_500_lv1.html) * [Robo 500 Challenge (Level 2)](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/minichallenges/robo_500_lv2.html) * [Robo 500 Challenge (Level 3)](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/minichallenges/robo_500_lv3.html) * [Robo 500 Challenge (Level 4)](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/minichallenges/robo_500_lv4.html) * [Robocci Challenge (Level 1)](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/minichallenges/robocci_lv1.html) * [Robocci Challenge (Level 2)](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/minichallenges/robocci_lv2.html) * [RoboMower Challenge (Level 1)](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/minichallenges/robo_mower_lv1.html) * [RoboMower Challenge (Level 2)](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/minichallenges/robo_mower_lv2.html) * [Sumo-Bot Challenge](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/minichallenges/sumo.html) * [Table Bot Challenge (Level 1)](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/minichallenges/table_bot_lv1.html) * [Table Bot Challenge (Level 2)](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/minichallenges/table_bot_lv2.html)   **Engineering Mini-Challenges:**   * [Driving Straight](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/tetrix_movement/documents/driving_straight.html) * [Remote Control Basics](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/remotecontrol/documents/remote_control_lab.html) * [Remote Control Buttons](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/remotecontrol/documents/remote_control_buttons_lab.html) * [Remote Control Turn Button](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/remotecontrol/documents/remote_control_challenge.html) * [Synching Motors](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/movement/documents/synching_motors_lab.html) * [Turning](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/tetrix_movement/documents/turning.html) * [Turning with Encoder](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/tetrix_sensing/documents/turning_w_encoder.html) * [Using Servos](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/tetrix_movement/documents/servo_engineering_lab.html) * [Wait States Power Level](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/tetrix_movement/documents/wait_states_power.html)   **Quizzes:**   * **Fundamentals**   + Safety     - [Safety Attitude](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/safety/PDFs/Safety_is_an_attitude.html)     - [General Safety](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/safety/PDFs/General_Safety.html)     - [Safety Checklist](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/safety/PDFs/Safety_Checklist.html)   + Introduction to Programming     - [Thinking about programming](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/thinking_quiz.html)     - [ROBOTC Programming](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/fundamentals/robotc_quiz.html) * **Setup**   + [Downloading Firmware to the robot](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/setup/documents/firmware_quiz.html)   + [Downloading a Sample program to the robot](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/setup/documents/downloading_quiz.html) * **Movement:**   + [Moving Forward](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/movement/moving_forward/documents/quiz.html)   + [Speed and Direction](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/movement/speed_and_direction/documents/quiz.html)   + [Improved Movement](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/movement/improved_movement/documents/quiz.html) * **Sensing**   + [Wall Detection (Touch)](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/sensing/walltouch/documents/quiz.html)   + [Wall Detection (Sonar)](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/sensing/wallsonar/documents/quiz.html)   + [Forward Until Dark](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/sensing/forwarduntildark/documents/quiz.html)   + [Line Tracking](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/sensing/linetrack/documents/quiz.html)   + [Volume and Speed](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/sensing/volumespeed/documents/quiz.html) * **Variables**   + [Automatic Thresholds](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/variablesfunctions/auto_threshold/documents/quiz.html)   + [Line Counting](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/variablesfunctions/line_counter/documents/quiz.html)   + [Patterns of Behavior](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/variablesfunctions/behaviors_functions/documents/quiz.html)   **Reference Pages:**   * [Behaviors](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_behaviors.html) * [Boolean Logic](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_boolean_algebra.html) * [Comments](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_comment.html) * [Display Text](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/variablesfunctions/documents/display_text_helper.html) * [Encoders](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/sensing/forwardfordistance/documents/encoders_helper.html) * [Flowcharts & Pseudocode](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_pseudo_flow.html) * [Functions](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_functions.html) * [Global Variables](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_global_variables.html) * [If-Else Statement](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_if_else.html) * [Install Bluetooth Adapter](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/remotecontrol/documents/install_bt_controller.html) * [Install Joystick Controller](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/remotecontrol/documents/install_joystick_controller.html) * [Motor Synchronization](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_synching.html) * [PID Speed Control](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_pid.html) * [Random Numbers](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_random.html) * [Reserved Words](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_res_words.html) * [Running a Program](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_running_a_program.html) * [Sense Plan Act](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_spa.html) * [Switch-Case Statement](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_switch_case.html) * [Thresholds](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_thresholds.html) * [Timers](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_timers.html) * [Variables and Data Types](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_variables.html) * [While Loops](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_while_loop.html) * [Whitespace](http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/reference/hp_white_space.html) |

<http://www.education.rec.ri.cmu.edu/previews/robot_c_products/teaching_rc_lego_v2_preview/movement/improved_movement/documents/Movement_Improvedmovement.pdf>

Improved Movement Principles of PID