

Los Altos Robotics

www.LosAltosRobotics.org

VEX IQ

Parent Orientation Meeting

August 23, 2016

Please sign in

Quick Survey

Expectations and outcomes for this meeting

- How did you find out about tonight's meeting?
- Who is undecided about joining VEX IQ?
- Who is a rookie who has decided to join but needs more information?
- Who is looking for a team to join?
- Who is looking for team members?
- Is there anyone here from outside the Los Altos area?

Agenda

- Introduction to VEX, REC Foundation and VEX IQ
- Los Altos Robotics Organization
- How to Participate, Program Details
- Remote Control vs. Programmed Robots
- Robot Programming Software
- VEX IQ Challenge / Sample Robot
- Questions & Answers
- Post-meeting: Q&A for potential coaches, managers, and team organizers

REC Foundation's STEM Pipeline

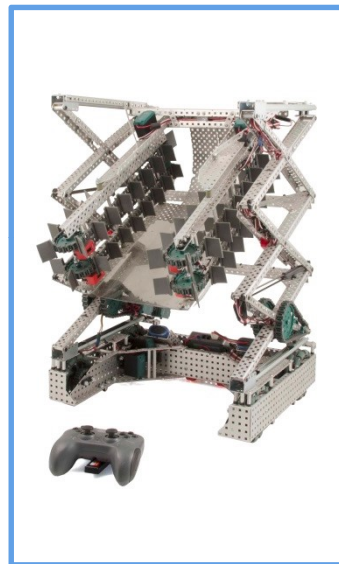
A Comprehensive Learning Platform from K to College



Elementary



Middle School



High School



Post Secondary



Workforce

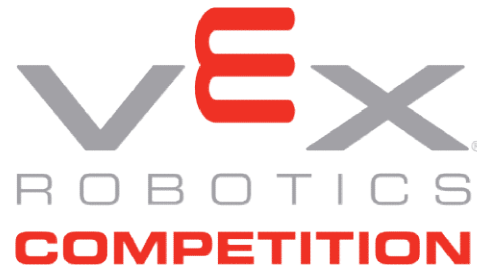
REC Foundation

Robotics Education & Competition Foundation seeks to increase student interest and involvement in STEM by engaging them in hands-on, sustainable and affordable curriculum-based robotics engineering programs worldwide.



Inspiring students, one robot at a time.

www.RoboticsEducation.org



Elementary & Middle School Students

- Teamwork Matches
- Individual Skills Challenges
- Snap-together assembly
- Free programming software
- Free curriculum
- STEM Research Project Challenge

Middle School & High School Students

- Local, state, regional, national and world competitions
- Driver controlled and autonomous Skills Challenges
- Free curriculum
- Scholarships
- Online Challenges

College & University Students

- VEX U teams build 1 competition robot
- Higher level and longer autonomous period of play
- Gain desired industry skills, like programming, CAD and technical writing

What is VEX IQ?

Teams of 4-8 students, ages 8-14

- Build, control, and program a **VEX IQ Robot** to solve challenges on a 4' x 8' field in time trial competition
- Participate in tournaments and work together in **Teamwork Matches** and show off their skills in **Skills Challenges**
- Complete an **Engineering Notebook** to document their design work and qualify for awards
- Optional: Complete and share a STEM Research Project related to robotics

How does the VEX IQ Program Work?

- Challenge details were announced in May
 - Most teams participate during September - February
- Teams design, construct, program, and test solutions using a VEX IQ robot kit
- Scrimmages and Tournaments are October – February
- Teams compete with peers in high-energy events with an emphasis on teamwork and good sportsmanship
 - Robot Challenges: Teamwork Alliance, Robot Skills, Programming Skills
 - Judging of Engineering Notebooks and team interviews
 - Presentation and Judging of STEM Research Projects

What is Los Altos Robotics?

- Los Altos Robotics is a 501(c)(3) Non Profit Corporation
 - A group of volunteers dedicated to inspiring kids exploring technology
- We organize and host **VEX IQ Events at Blach Middle School**
 - **VEX IQ Practice Scrimmage** on Sunday, November 6, 2016
 - **VEX IQ Qualifier Tournament** on Saturday, December 3, 2016
- We previously hosted annual FIRST LEGO League (FLL) events (1999 to 2015)
 - Practice Scrimmages, Project Share-a-thons, Qualifying Tournaments
- We promote and organize **Botball** teams, a robotics activity for grades 7-12
- We support High School **FIRST Robotics** (FRC) teams in Los Altos area high schools
- Contacts: Michael Schuh (michael@boardsailor.com)

Los Altos Robotics 2016-2017 Calendar

- Apr 22 VEX IQ Challenge Crossover Unveiled
- May – Sep Teams register and order materials
- May 17 Los Altos VEX IQ Parent Orientation
- Aug 16 LAR Board Meeting
- Aug 23 Los Altos VEX IQ Parent Orientation
- **Sep 13 Registration opens for Los Altos VEX IQ Events**
- **Sun, Nov 6 Los Altos VEX IQ Scrimmage**
- **Sat, Dec 3 Los Altos VEX IQ Qualifying Tournament**
- End of Feb Northern California Championship Tournaments
- Mid May VEX IQ World Championship Tournaments
(in Kentucky)

How to Participate in VEX IQ

How are Teams Organized?

- Parents or schools organize teams
 - Online at www.robotevents.com
- Teams may be formed from: friends, schools, churches, youth organizations
- Los Altos Robotics hosts VEX IQ events, but does not register teams or individual players

What Parents can do to Organize a Team

- **Volunteer to be a coach or team manager**
- Check with your child's friends to gauge interest level
- Teams generally work best with children at the same grade level
- Talk to teachers
- See www.LosAltosRobotics.com for possible *"I need a team"* list
- **Send email to TigerBots mailing list**

VEX IQ Team Requirements and Steps

- Students in elementary and middle school (recommended for ages 8-14)
 - Teams typically have 4-10 members, but there is no limit
- At least one adult coach
- Team meeting site that can accommodate a 4' x 8' field
- Register team online (www.robotevents.com/robot-competitions/vex-iq-challenge)
 - Cost is \$100 for the first team from an organization (\$50 for each additional team)
- Register for events at www.robotevents.com
 - Teams may participate in one or more events during the season
 - Events are added and updated online throughout the season
 - Tournament Fees range from \$20-\$100 per team (typical \$50)
 - Teams can also Join or form a League
- Get Equipment (www.vexrobotics.com/vexiq/products)
 - VEX IQ robot kit (\$300 - \$400)
 - Game Field (\$100 - \$200)
 - Game Elements (\$30 - \$100)
- Join TigerBots email list (TigerBots-subscribe@yahoogle.com)

Questions to Ask When Forming a Team

- **Whose idea was this?**
 - Parent or child?
- **What kind of experience do you want for your child?**
 - Great vacation or the job you love?
- **How many other activities do the kids have? How important is VEX IQ?**
 - If doing well is important to the kids, they will need to spend more time
- **What previous construction or robotics experience do the kids have?**
 - Follow directions vs. building own creations?
- **Who will be our team volunteer?**
 - We need volunteers to help put on the events (e.g. venue setup, scorekeepers, and timekeepers) **Each team must provide a volunteer!**

Frequently Asked Questions

- **What are typical meeting times?**
 - The coach sets meeting times with input from the team. Often there is a shorter meeting on a weekday and a longer meeting on the weekend.
- **What is the time commitment for the children and parents?**
 - Players: 4-6 hours per week (about the level of a recreational soccer team)
 - Coaches: Player meetings plus prep time
- **I don't know anything about robotics or programming. How can I help?**
 - A good coach mostly provides organization and direction, not technical help.
 - You can also be a team manager, assistant coach, or tournament volunteer.
- **The recommended age range is 8-14, can my younger child participate?**
 - Some younger children are excited initially, but may end up mostly playing with the kit parts.
 - Do they like math, chess, or puzzles; or want to build or program games?
 - Can they stay reasonably focused in a team setting?

How Much does it Cost?

Item	Team Cost	Player Cost (team of 6)
Team Registration	\$100	\$17
VEX IQ Robot Kit*	\$300 - \$400	\$50 - \$67
Extra robot parts+	\$0 - \$100	\$0 - \$17
Field Perimeter Kit*	\$100 - \$200	\$17 - \$33
Challenge Game Elements	\$100	\$17
Scrimmage Fee	\$20	\$3
Qualifier Tournament Fee	\$50	\$8
2 nd Qualifier Tournament Fee+	\$0 or \$50	\$8
Championship Tournament Fee+	\$0 or \$100	\$17
TOTAL	\$670 - \$1120	\$136 - \$186

*non-recurring costs (schools can apply for a robot kit grant)

+optional

Purchase items from www.vexrobotics.com or elsewhere

Resources for Coaches

Helpful resources and links are available online

- www.roboticseducation.org/vex-iq-challenge/viq-teams
 - How to Start and Organize a Team document
 - Registration Instructions for New Teams
 - VEX IQ Challenge League Play document
 - free VEX IQ Curriculum
 - Online Challenges
 - Design Award Rubric
 - Robot Programming Software
 - Team Design Notebook Example
 - VEX IQ Product and General Discussion Forums

VEX IQ Challenge Current Game

- www.roboticseducation.org/vex-iq-challenge/viq-current-game
- STEM Research Project

Local Resources

- Los Altos Robotics
 - www.LosAltosRobotics.org
 - www.facebook.com/losaltosrobotic
- TigerBots email list
 - Used for communication from Los Altos Robotics
 - Used as a forum for local teams to ask and answer questions
 - To join, send a brief description of your interest to TigerBots-subscribe@yahoogroups.com
 - Details and archives online at LosAltosRobotics.org/TigerBots
- REC Foundation Office
 - Includes a small store with VEX IQ materials
 - 2390 Almaden Road, Ste. 40, San Jose
 - (408) 841-9389

Remote Control vs. Programmed Robots

- VEX IQ includes both Remote Control Challenges and Autonomous Programming Challenges



```
when run
touch_led turn on
wait until touch_led is touch?
touch_led turn off
print "LED Touched"
```

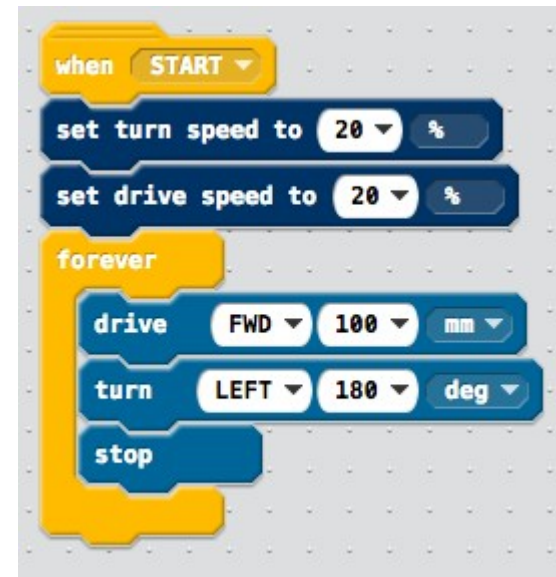
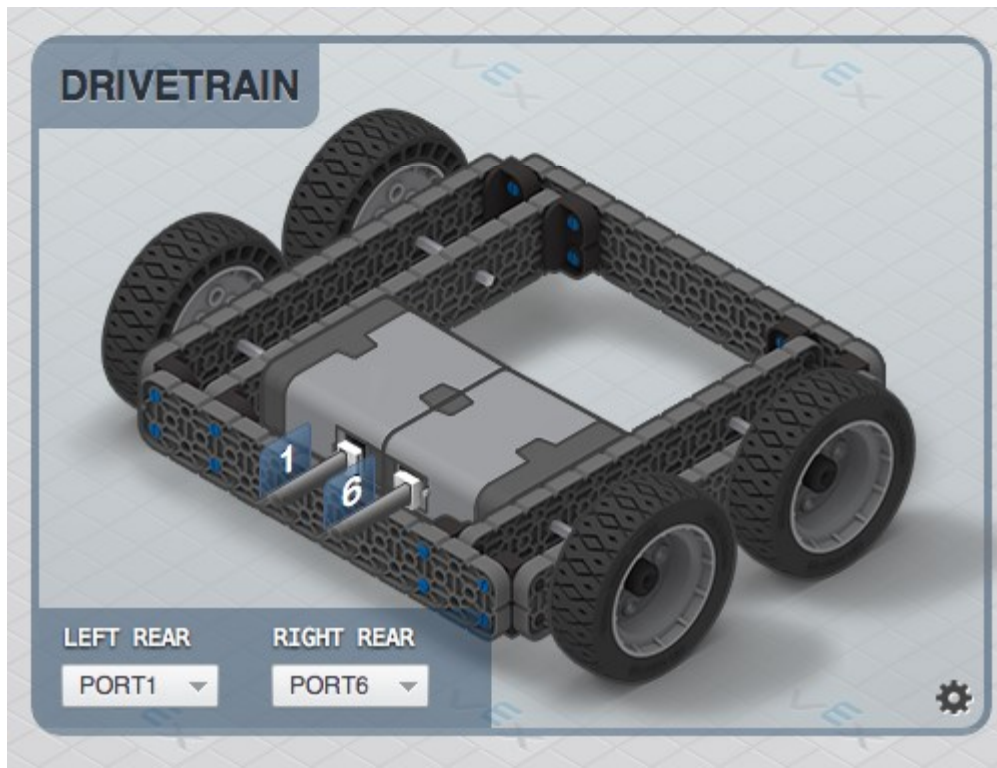
```
1 # VEX IQ Python-Project
2 import sys
3 import vexiq
4
5 # Connect a Touch LED into Port 1
6 touch_led = vexiq.TouchLed(1)
7
8 # Turn the LED on and wait for it to be touched
9 touch_led.on()
10 sys.wait_for(touch_led.is_touch)
11 touch_led.off()
12 print "LED touched"
```

Robot Control and Programming Software

- Built-in Remote Control Program
- Modkit
 - www.modkit.com/vex
- Robot C
 - www.robotc.net
- Python / Blockly
 - www.robotmesh.com/python

Modkit for VEX IQ

- Graphical Block Style Programming



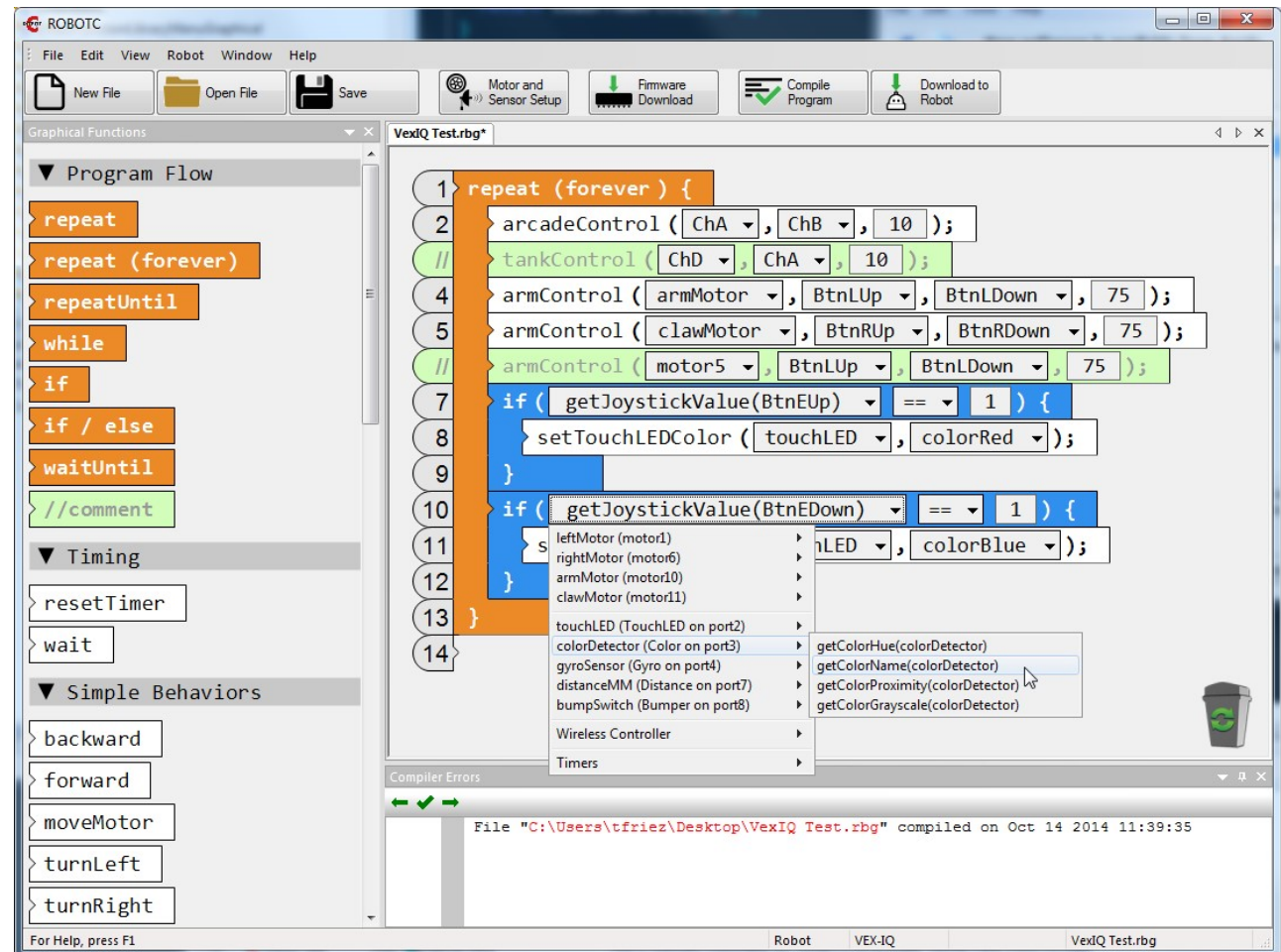
Robot C for VEX IQ

- Graphical Programming
- C Programming
- Virtual World



Robot C Graphical Programming

- A Block Style Graphical Programming Language
- Transition to C Language Programming



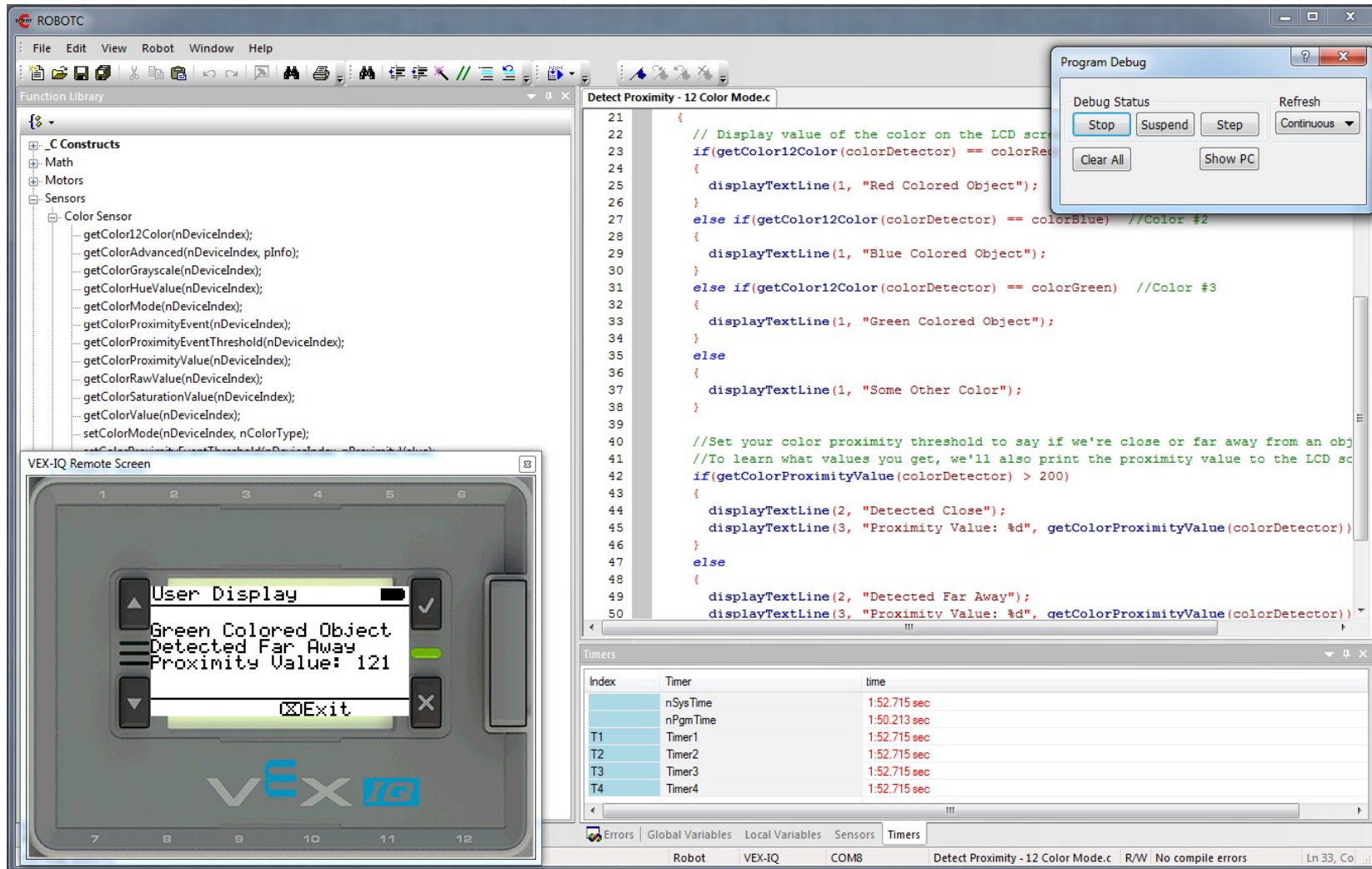
The screenshot shows the Robot C software interface. On the left, a 'Graphical Functions' panel lists various programming blocks under categories like Program Flow, Timing, and Simple Behaviors. The main workspace displays a C program named 'VexIQ Test.rbg' with line numbers 1 through 14. The code is a translation of the block-based logic, featuring a 'repeat (forever)' loop, motor control functions like 'arcadeControl' and 'armControl', and conditional logic using 'if' statements to check joystick values and control LEDs. A dropdown menu is open over the code, showing a list of available sensor and actuator functions such as 'getColorHue', 'gyroSensor', and 'touchLED'. At the bottom, a 'Compiler Errors' window shows a successful compilation message: 'File "C:\Users\tfriez\Desktop\VexIQ Test.rbg" compiled on Oct 14 2014 11:39:35'.

```

1 repeat (forever) {
2   arcadeControl ( ChA , ChB , 10 );
3   // tankControl ( ChD , ChA , 10 );
4   armControl ( armMotor , BtnLUp , BtnLDown , 75 );
5   armControl ( clawMotor , BtnRUp , BtnRDown , 75 );
6   // armControl ( motor5 , BtnLUp , BtnLDown , 75 );
7   if ( getJoystickValue(BtnEUp) == 1 ) {
8     setTouchLEDColor ( touchLED , colorRed );
9   }
10  if ( getJoystickValue(BtnEDown) == 1 ) {
11    leftMotor (motor1)
12    rightMotor (motor6)
13    armMotor (motor10)
14    clawMotor (motor11)
15    touchLED (TouchLED on port2)
16    colorDetector (Color on port3)
17    gyroSensor (Gyro on port4)
18    distanceMM (Distance on port7)
19    bumpSwitch (Bumper on port8)
20    Wireless Controller
21    Timers
22  }
23 }

```

Robot C Language Programming



The screenshot displays the ROBOTC IDE with the following components:

- Function Library:** Lists various functions for a Color Sensor, including `getColor12Color`, `getColorAdvanced`, `getColorGrayscale`, `getColorHueValue`, `getColorMode`, `getColorProximityEvent`, `getColorProximityEventThreshold`, `getColorProximityValue`, `getColorRawValue`, `getColorSaturationValue`, `getColorValue`, and `setColorMode`.
- Code Editor:** Shows the source code for `Detect Proximity - 12 Color Mode.c`. The code uses `getColor12Color` to detect colors (Red, Blue, Green) and `getColorProximityValue` to determine if an object is close or far away. It uses `displayTextLine` to output results to the LCD screen.
- Program Debug Window:** Displays the current debug status with buttons for Stop, Suspend, Step, Continuous, Clear All, and Show PC.
- VEX-IQ Remote Screen:** Shows the output on the robot's LCD screen:

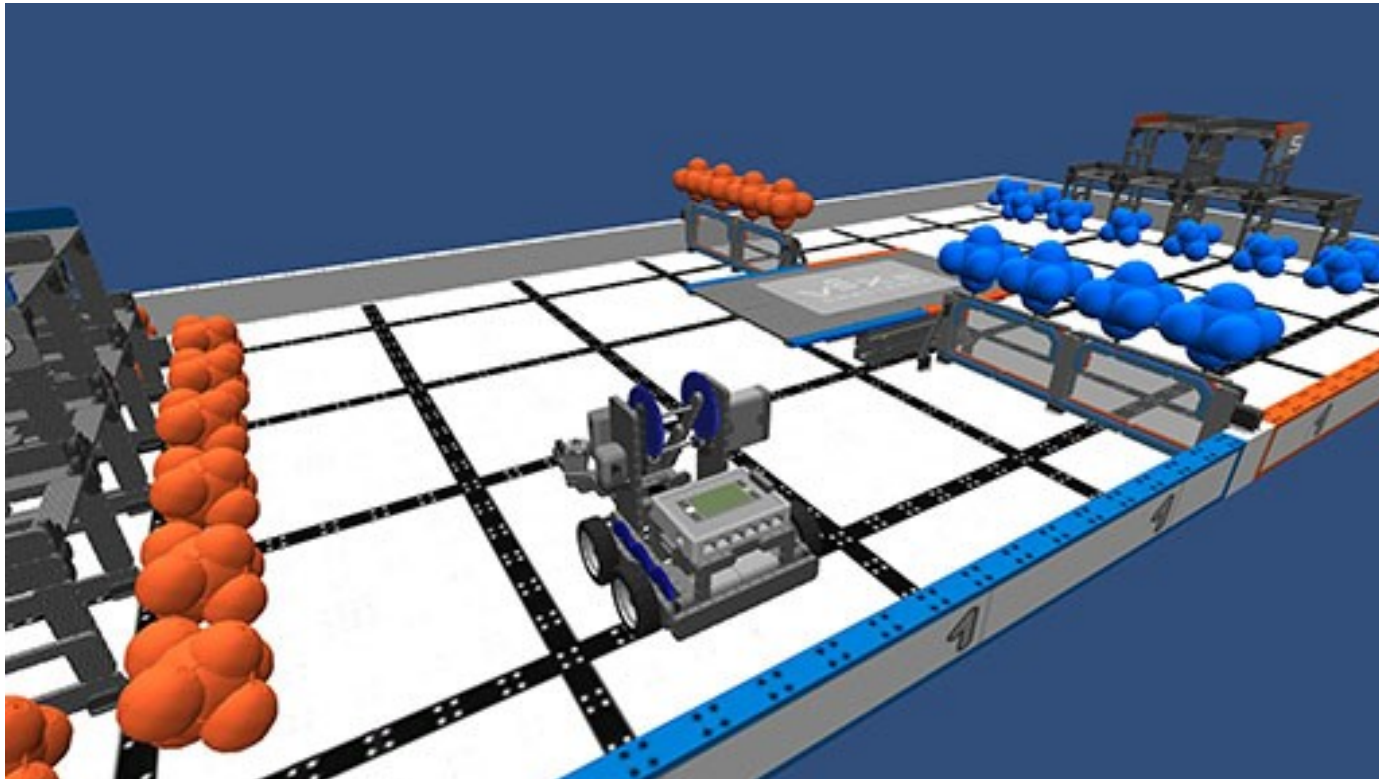

```

      User Display
      Green Colored Object
      Detected Far Away
      Proximity Value: 121
      Exit
      
```
- Timers Window:** Shows a table of system and user timers.

Index	Timer	time
	nSysTime	1:52.715 sec
	nPgmTime	1:50.213 sec
T1	Timer1	1:52.715 sec
T2	Timer2	1:52.715 sec
T3	Timer3	1:52.715 sec
T4	Timer4	1:52.715 sec

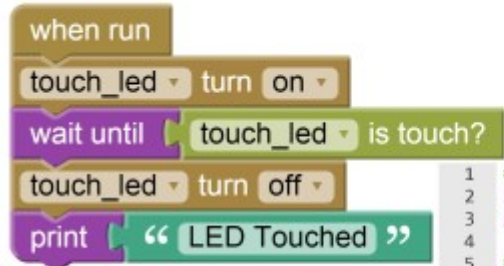
Robot C Virtual World

- Allows programming and testing simulated robots



Python / Blockly for VEX IQ

- Graphical Block Style Programming
- Python Programming
- Remote Control Customization Wizard
- Transition from Blockly or Wizard to Python



```


1 # VEX IQ Python-Project
2 import sys
3 import vexiq
4
5 # Connect a Touch LED into Port 1
6 touch_led = vexiq.TouchLed(1)
7
8 # Turn the LED on and wait for it to be touched
9 touch_led.on()
10 sys.wait_for(touch_led.is_touch)
11 touch_led.off()
12 print "LED touched"
    
```

Robot MESH My Projects > Editing coil > JOYSTICK_CONTROL

Save Build Port Refresh Stop

Description Joystick Wizard Generated Code

Joystick Wizard



Axis deadband:

axisA Arcade Dri... Left motor: motor_1 | Add action...

axisB Add action...

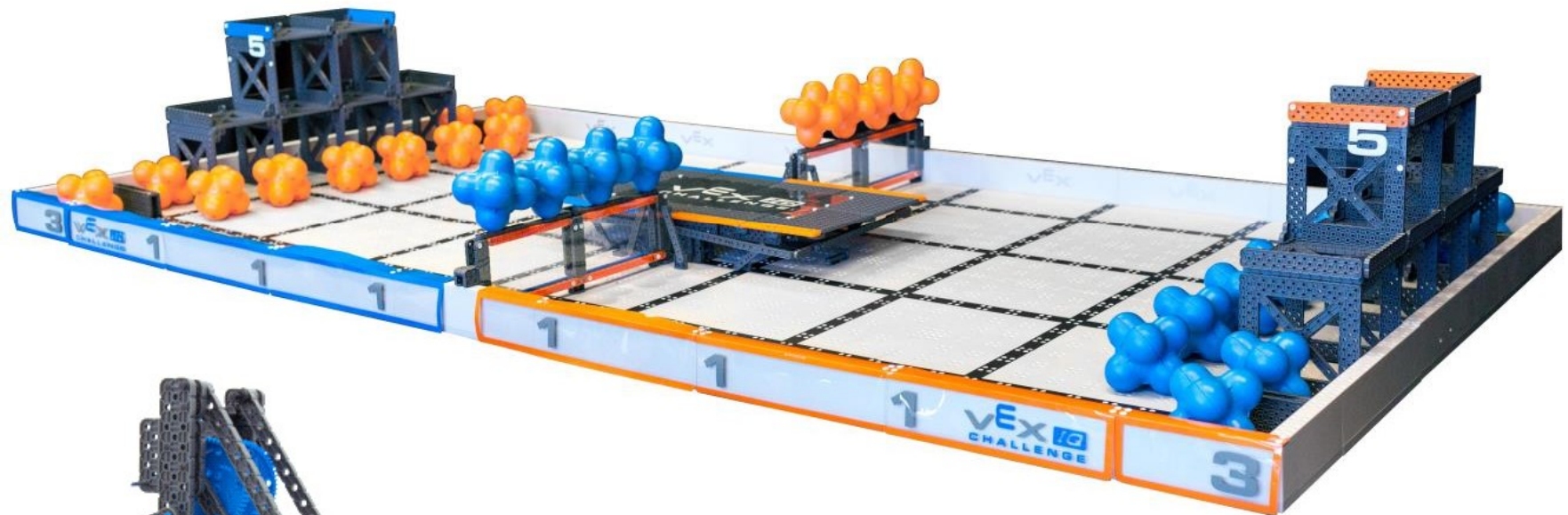
axisC Arcade Dri... Left motor: motor_1 | Add action...

axisD Add action...

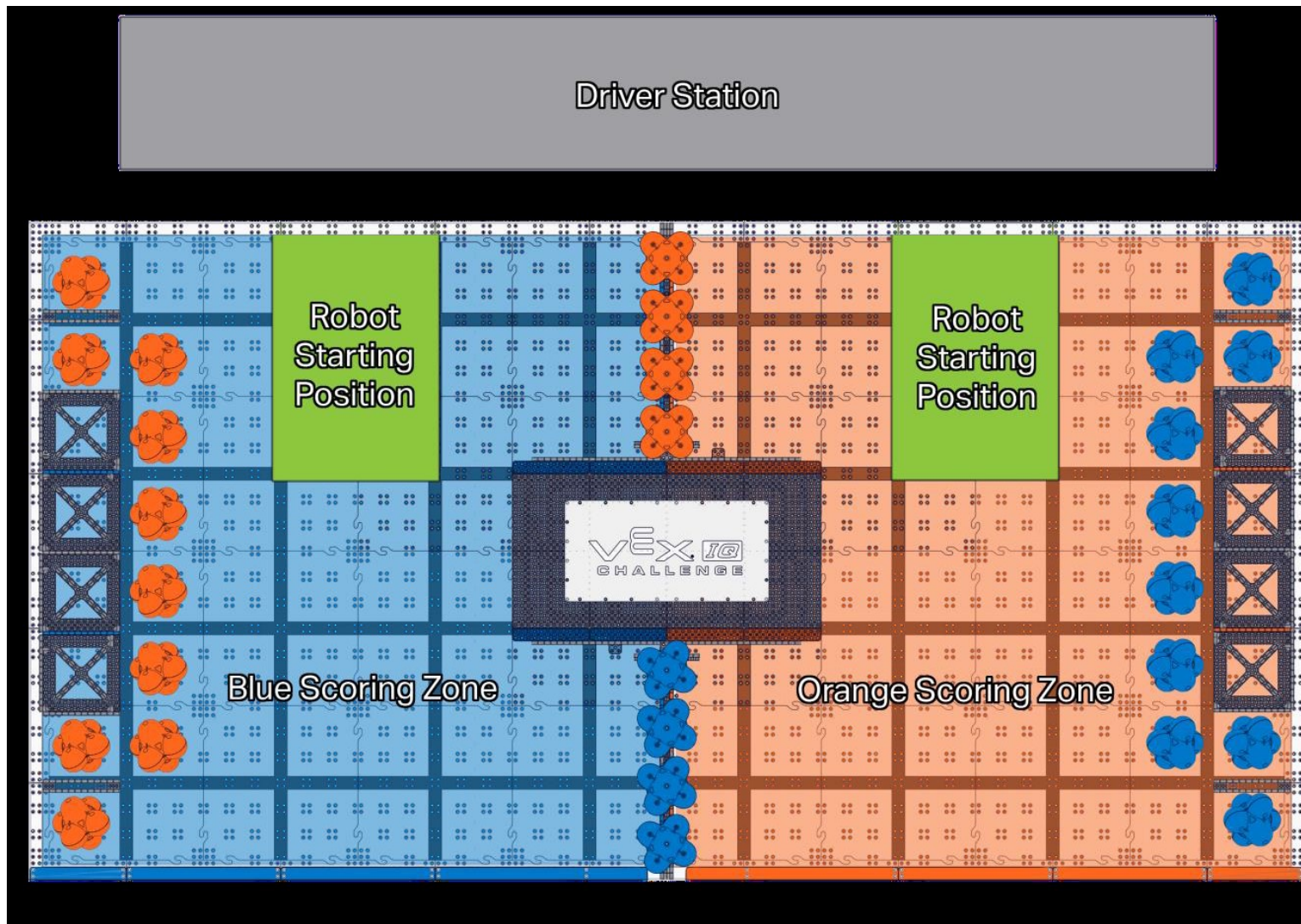
bEup Forward Motor: motor_2 | Power | Add action...

bEdown Reverse Motor: motor_2 | Power | Add action...

VEX IQ Challenge Crossover Game and Sample Robot

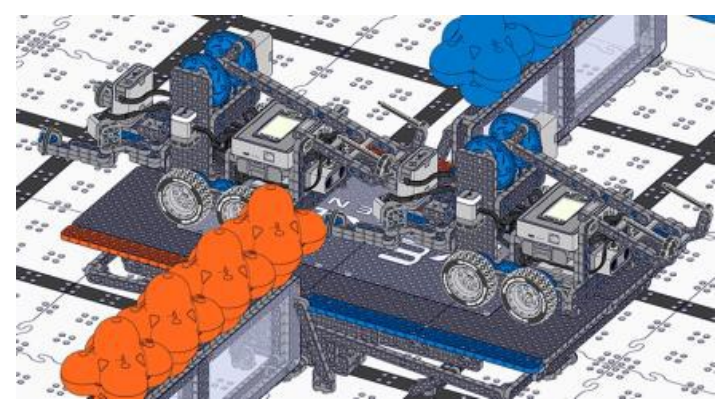
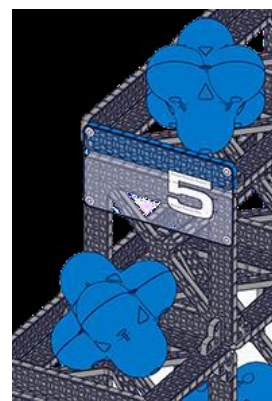
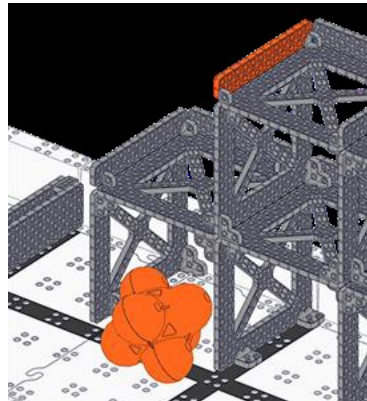
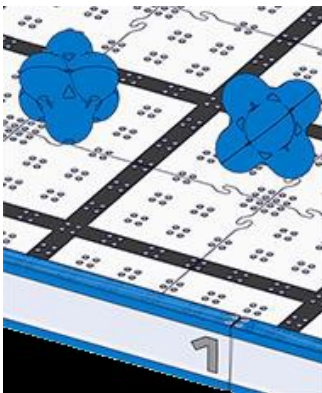


Crossover Field Set-Up



Crossover Challenge Scoring

- Hexball in Scoring Zone = 1 point
- Hexball in Low Goal = 3 points
- Hexball in Elevated Goal = 5 points
- 1 Robot Parked on Bridge = 5 points
- 2 Robots Parked on Bridge = 15 points
- All Robots Balanced on Bridge = 25 points



Questions & Answers

Los Altos Robotics thanks

FRC Team 971
Spartan Robotics

For providing our meeting venue tonight!