

Come usare queste lezioni

By Sanjay and Arvind Seshan



LEZIONI PER PRINCIPIANTI

PANORAMICA DEL SITO

- EV3Lessons.com fornisce le basi per l'apprendimento con successo del programma LEGO MINDSTORMS EV3
- Forniamo anche ampie risorse per la robotica a squadre come strumenti di pianificazione, guide rapide, angolo del coach e attività di Team Building
- Chiunque è benvenuto nell'usare e modificare queste lezioni per scopi educativi (non-profit)
 - Comunque, dovete riportare i crediti relativi a EV3Lessons per i materiali e inserire un link al nostro sito se postate del materiale online
 - Se usate del materiale di EV3Lessons in una competizione robotica (per es. FIRST, WRO), dovete citare la sorgente nel vostro materiale del concorso.
 - Se fate parecchio uso del materiale, per favore, prendete in considerazione di fare una donazione al sito per supportare il nostro lavoro.

DESCRIZIONE DELLE LEZIONI

<http://ev3lessons.com/lessons.html>

- **Beginner**: Queste lezioni vi insegnano a muoversi e girare il robot, utilizzare i sensori, e utilizzare i loop e gli interruttori.
- **Intermediate**: Queste lezioni introducono tecniche di programmazione più avanzate come My Blocks, variabili, i fasci paralleli, la calibrazione e i blocchi logici e matematici.
- **Advanced**: Per queste lezioni si presuppone che si sappiano utilizzare tutti i blocchi in ambiente EV3. Le lezioni avanzate insegnano i programmi più sofisticati come i sistemi di menu, seguire un andamento proporzionale, squadratura su linee e le tecniche di rilevamento di stallo.
- **Beyond**: Queste lezioni sono per gli studenti che hanno completato tutte le altre lezioni e interessati a conoscere i sensori di terze parti e con il EV3 con altre piattaforme come il Raspberry Pi.
- Le lezioni per principianti sono progettate per essere imparate in ordine. La lezioni intermedie ed avanzate possono essere eseguite fuori ordine. Le lezioni di solito menzionano specifici pre-requisiti in caso di necessità. Se si stampano le lezioni, assicuratevi di tornare al sito spesso per controllare la data sul fondo della pagina per assicurarsi di avere l'ultima versione della lezione.

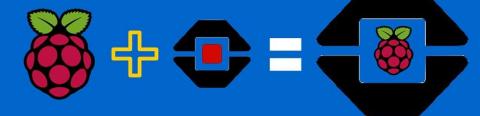
ELENCO

Beginner	Intermediate	Advanced
 <ul style="list-style-type: none">• Come usare le lezioni• Costruire un robot di base• Introduzione al mattoncino e al sw• Andare dritto• Le porte• Pseudocodice• Ruotare (base)• Mostrare testo e grafica• Inserire immagini e suoni• Introduzione al sensore al tocco• Introduzione al sensore di colore• Loop• Interruttori• Importare blocchi Addizionali• Blocco suono• Introduzione al sensore suono• Introduzione al sensore ultrasuono• Seguire una linea (base)• Muovere un oggetto• Esercitazione finale	 <ul style="list-style-type: none">• Seguire un muro con gli ultrasuoni (base)• Tasti del mattoncino come sensori• Dati collegati• My Blocks con input e output• Muoversi usando My Blocks• Ruotare usando My Blocks• Seguire colori con My Blocks• Sensore infrarossi• Tecniche di Debugging• Blocchi di movimento• Tecniche di miglioramento dell'affidabilità• Calibrazione del sensore di colore• Variabili• Operazioni logiche e decisionali• Flussi paralleli (introduzione)	 <ul style="list-style-type: none">• Sincronizzare percorsi paralleli• Arrays (Insiemi)• Controllo Proporzionale• Seguire una linea (proporzionale)• Seguire linea colorata (proporzionale)• Seguire un muro con gli ultrasuoni (proporzionale)• Controllo col sensore ai suoni (proporzionale)• Follower• Accelerazione e decelerazione• Introduzione al Gyro Sensor• Ruotare col Gyro Sensor• Dritto e ruotare col Gyro• Quadratura sulle linee• Rilevazione di stallo• Menu System• Registrazione di dati• Bluetooth• Blocco Random

LEZIONI BONUS

Beyond

- Importare blocchi di terze parti
- PixyCam per MINDSTORMS: Introduzione
- PixyCam per MINDSTORMS: Identificatore di Colore
- PixyCam per MINDSTORMS: Usare I codici di colore
- Mindsensors PSP-Nx Controller: Introduzione
- Mindsensors PSP-Nx Controller: Simon Game
- EV3 Raspberry Pi Communicator
- Controllare le luci con un EV3
- Introduzione a ev3dev
- Raspberry Pi e ev3dev Communicator
- Controllare le luci usando un ev3dev and Raspberry Pi
- NXT Sensore alla luce in EV3



RPi & EV3

New Lesson Series





Linux & EV3

New Lesson Series



STRUTTURA DELLE LEZIONI

- 1. Ogni lezione inizia con un elenco di obiettivi e termina con una sfida**
- 2. Nella maggior parte delle lezioni, forniamo suggerimenti sotto forma di pseudocodice. Gli studenti che hanno bisogno di un suggerimento dovrebbero guardare il Pseudocodice.**
- 3. Forniamo pure una soluzione alla sfida, ma è bene che gli studenti completino la sfida da soli prima di controllare la soluzione**
- 4. Una guida discussione è inclusa dopo la sfida che vi aiuterà a capire gli obiettivi principali**
- 5. Alcune lezioni sono fogli di lavoro per gli studenti. Altri saranno aggiunti nel corso del tempo.**

GUIDA RAPIDA

Hardware	Programmazione	Documentazione & Strategia																
<ul style="list-style-type: none"> Gestione dei cavi 1 Gestione dei cavi 2 Guida alla costruzione di un robot per la FLL Tecniche di schermatura Usare ingranaggi con EV3 Accessori passivi Carabiner LEGO Digital Designer File One Way Gate LEGO Digital Designer File 	<ul style="list-style-type: none"> Un minuto per seguire una linea Usare I sensori: vai fino a... Migliorare l'affidabilità del robot Sensore di Colore: Schermatura e calibrazione Blocchi personalizzati Miti e verità sul Giroscopio La verità sulla rotazione: Girare sul pivot 	<ul style="list-style-type: none"> Usare i commenti per migliorare il codice Taccuino per la costruzione Istruzioni su LEGO CAD & Robot Build Strategia per giochi con robot Foglio di pianificazione delle missioni Imparare come funziona la FLL 																
Piattaforma EV3	Misc.																	
<ul style="list-style-type: none"> Edu vs. Home Edition Software Compatibilità fra EV3 e NXT Aggiornare Software/Firmware Home Ed Aggiornare Software/Firmware Edu Edition 	<ul style="list-style-type: none"> LEGO: I sistemi organizzativi Ruoli e Responsabilità Lista del materiale occorrente per un torneo Dieci idee fuori stagione FLL: Guida di partenza 	 <p>MYTHS & TRUTHS ABOUT THE GYRO By Droids Robotics, 2015</p> <p>"We used to fear the gyro but we did your @EV3Lessons today at practice and now we love it!" - FLL Team</p> <p>There are numerous myths about the Gyro sensor that we would like to discuss. These myths make teams afraid of trying out the sensor.</p> <p>The gyro sensor is an extremely useful sensor, but does take a bit of work to use correctly. That is why we have the Gyro lessons in Advanced on EV3Lessons.com.</p> <table border="1"> <tr> <td>MYTH</td> <td>TRUTH</td> </tr> <tr> <td>The gyro is unreliable for turns.</td> <td> <ul style="list-style-type: none"> The biggest problem with the gyro is drift and lag. Both can be fixed. There are software solutions you can try. There are several examples of solutions on EV3Lessons.com. </td> </tr> <tr> <td>You cannot use software to correct for the gyro's drift. All you can do is unplug and replug the gyro.</td> <td> <ul style="list-style-type: none"> See images below. Where it is on the robot and the height off the ground makes no difference in the readings for FLL. If the sensor is mounted on another part or another type of robot that is balancing or has a twisting motion, other installs will work too. </td> </tr> <tr> <td>Placement matters: The gyro needs to be low to the ground and at the center of the robot.</td> <td> <ul style="list-style-type: none"> Unfortunately, this does not work. </td> </tr> <tr> <td>Using two gyros will cancel out the drift.</td> <td> <ul style="list-style-type: none"> The gyro measures angular velocity (rate) and computes angle from this. The gyro can be successfully used in FLL if you correct for lag and drift. </td> </tr> <tr> <td>The gyro measures angles</td> <td> <ul style="list-style-type: none"> Gyro drift takes as little as 0.1 secs and at most 3 secs and is easily done during table set up time in FLL. </td> </tr> <tr> <td>The gyro cannot be used in FLL reliably</td> <td> <ul style="list-style-type: none"> Gyro accuracy is an issue While the gyro might be a couple of degrees off, other techniques (odometry) can produce similar or worse errors. Build a robot to tolerate these errors. </td> </tr> <tr> <td>It takes 30secs or more to correct for drift.</td> <td>  <p>1: Angular installs 2: Parallel installs 3: Straight up or down 4: Parallel to ground 5: Up-side down, but parallel to ground</p> </td> </tr> </table>	MYTH	TRUTH	The gyro is unreliable for turns.	<ul style="list-style-type: none"> The biggest problem with the gyro is drift and lag. Both can be fixed. There are software solutions you can try. There are several examples of solutions on EV3Lessons.com. 	You cannot use software to correct for the gyro's drift. All you can do is unplug and replug the gyro.	<ul style="list-style-type: none"> See images below. Where it is on the robot and the height off the ground makes no difference in the readings for FLL. If the sensor is mounted on another part or another type of robot that is balancing or has a twisting motion, other installs will work too. 	Placement matters: The gyro needs to be low to the ground and at the center of the robot.	<ul style="list-style-type: none"> Unfortunately, this does not work. 	Using two gyros will cancel out the drift.	<ul style="list-style-type: none"> The gyro measures angular velocity (rate) and computes angle from this. The gyro can be successfully used in FLL if you correct for lag and drift. 	The gyro measures angles	<ul style="list-style-type: none"> Gyro drift takes as little as 0.1 secs and at most 3 secs and is easily done during table set up time in FLL. 	The gyro cannot be used in FLL reliably	<ul style="list-style-type: none"> Gyro accuracy is an issue While the gyro might be a couple of degrees off, other techniques (odometry) can produce similar or worse errors. Build a robot to tolerate these errors. 	It takes 30secs or more to correct for drift.	 <p>1: Angular installs 2: Parallel installs 3: Straight up or down 4: Parallel to ground 5: Up-side down, but parallel to ground</p>
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<http://ev3lessons.com/guides.html>

SFIDE DI ABILITÀ

Challenges

FIX MY CODE
Skills Challenge
By EV3Lessons

LINE FOLLOWING
Skills Challenge
By EV3Lessons

"ON" MODE
Skills Challenge
By EV3Lessons

Fix my Code Series

These challenges test a student's ability to read and understand code written by others. The goal is to identify errors and fix them. We will add challenges for each sensor

[Challenge 4: Touch Sensor: Fix My Code](#)

[Challenge 2: Fix My Code](#)

Line Following

These challenges are to practice writing line followers and find ways to improve them.

[Challenge 1: Line Following](#)

Other Skill Challenges

These are other challenges that we have not categorized yet.

[Challenge 3: On Mode](#)

<http://ev3lessons.com/challenges.html>

RISORSE: L'ANGOLO DEL COACH

Coach's Corner

Maximize Learning, Minimize Cloning

By Asha Seshan
Not the Droids You Are Looking For (Pennsylvania, USA)



In this article, I share my experience coaching a team: the good, the bad, the opinions are mixed. Research has shown that the first place to start is with the topic. It is important to distribute the ideas among people, so that the ideas are shared.

When I was a child, I was always interested in science and technology. I remember my parents taking me to the library every week to borrow books on space exploration, robotics, and engineering. I also enjoyed playing with my brother's toy robots and trying to figure out how they worked. This interest in robotics continued throughout my childhood and adolescence, and eventually led me to pursue a degree in mechanical engineering at college. After graduation, I began working in the field of robotics, specifically in the area of mobile robotics. I have had the opportunity to work on various projects, including developing autonomous mobile robots for research purposes and creating educational robotics programs for schools and museums. I have also taught robotics to children and adults, both in person and online. In addition to my professional work, I am also involved in coaching a local FIRST LEGO League team. Coaching has been a rewarding experience for me, as it allows me to combine my passion for robotics with my desire to help others learn and grow. I believe that everyone has the potential to succeed in robotics, and it is my goal to inspire and support them in their journey.

"Coaching isn't about the coach. It is about the team."

Coach's Corner

Motivating Your Team

By Asha Seshan
Not the Droids You Are Looking For (Pennsylvania, USA)



I have coached a FIRST LEGO League team for six years - large teams and small teams. Each team and each student is motivated differently. For some playing with LEGO is all they want or joined for. So how do you encourage the kids to learn all that FIRST LEGO League has to offer them? Creating a badge system much like our scouting merit badge systems) as prizes for learning new skills. I used a large chart on the side. I created little packets for them to place their patches on as they earned them. I included a photo of this chart in this article.

When I had a large team with mixed interest levels, I used patches (merit badge systems) as prizes for learning new skills. I used a large chart on the side. I created little packets for them to place their patches on as they earned them. I included a photo of this chart in this article.

What skills do they learn? In the picture on the left, I have organized, Determination, Bright Idea!, Oops, Early Bird, and Note taking about. Most of them speak for themselves, but they are worth talking about.

Oops" patch was given when students made a mistake, but learn from the mistake. I wanted the kids on the team to learn was okay to make mistakes in FIRST LEGO League. "Early was given as an encouragement to get their work done ahead Note taking" was given out to encourage the students to when we went on field trips or interviewed someone.

When they received an even large FIRST patch. When the they all celebrated together with a movie and pizza. physical patches that the kids could keep, you can electronic patches from FLL" - time and on "additional skills from FLL" - time e taking, gyro, etc. But this system could work even for patches? I got most of this from A Jantzen.

Coach's Corner

Coaching: What Can You Offer

By Carrie Koepke
The Final Elements and Fantastic LEGO Ladies (Missouri, USA)



When a neighborhood FLL team formed in 2014, my daughter was excited to join. My son watched The Fantastic LEGO Ladies embrace their first season, tugging my sleeve about next year. In 2015, The Final Elements was formed. They followed in the Ladies' footsteps, able to attend the Razorback Invitational in their Rookie year. Both teams are excited to see what the Animal Allies season will bring. I coach The Final Elements and offer occasional support to The Fantastic LEGO Ladies.

It was intimidating to step into an FLL coach role. The closest I have come to an engineering degree was editing my friends' and husband's papers in college. My expertise is in English and Biology. Nonetheless, I am about to walk into year two of coaching my son's FLL team, The Final Elements. Last year was a bit of a shock to the system, but even more shocking was how many coaches I kept meeting who had zero experience. As we chatted about the perplexing oddity, it became clear that our background didn't matter. We arrived with the desire to help these kids reach their goals and our own unique abilities to nurture their dreams.

"We know our Coaches and Mentors don't have all the answers; we learn together." Thank goodness for this Core Value! Walking into our first meeting, the boys and the majority of the other parents (with a variety of engineering backgrounds) already knew more than me. I still have a lot to learn. I have discovered is that this allows the team to take ownership of their knowledge. They carefully explain their robot design and programming work to me, developing their understanding as they do so. They also take my inquiries well. When I ask why they do something, or if it can be done more efficiently, or if it should be done at all, they know I am asking because I don't know. It is an opportunity to take a step back and solidify their thoughts or take a new approach.

Know your strengths and weaknesses. I have coached before . . . in a completely different field. For years I coached children's gymnastics. Those years taught me to be aware of team dynamics, as well as how to focus on one individual while maintaining a connection with others.

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RISORSE: ATTIVITÀ PER I CORE VALUES

NEWSPAPER TOWER Core Values Activity

By Sanjay and Arvind Seshan



Objectives:

- Coming up with creative solutions to a problem (there are many ways to solve this challenge)
- Problem Solving

Before you begin:

2 full sheets of newspaper

HATS OFF! CORE VALUES ACTIVITY

By The Bayou Builders



Objectives:

- Exercise of the brain
- Work together
- List
- Teamwork

Notes for the Coach/Team

ACT IT OUT Core Values Activity

By Sanjay and Arvind Seshan



RECYCLED ART CORE VALUES ACTIVITY

By The Bayou Builders



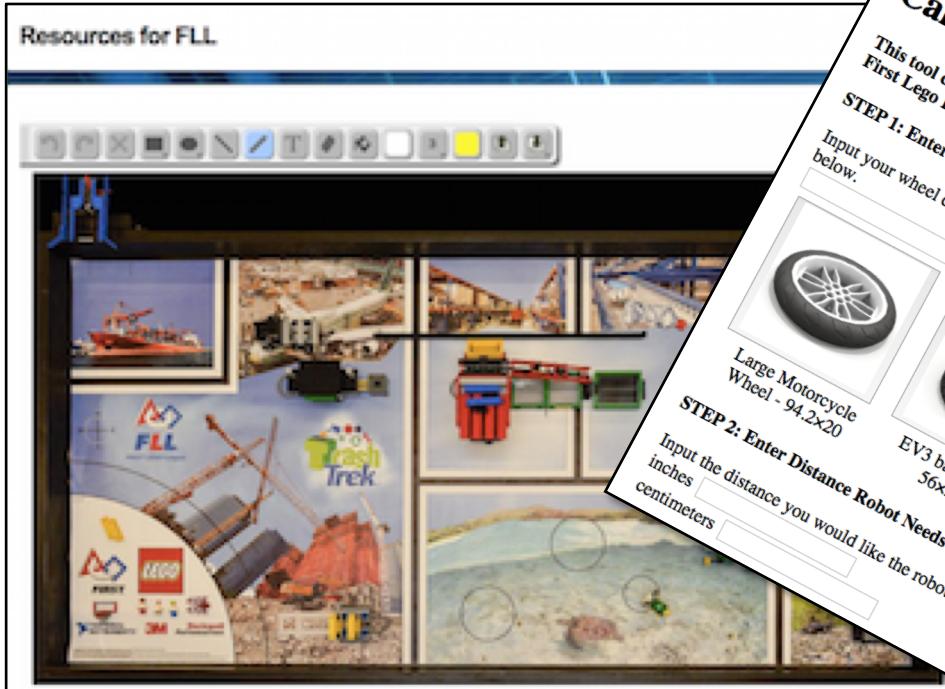
Objectives:

- Working together to develop an action plan
- Choosing from a large set of items in a short amount of time
- Exercise creative thinking
- Explaining the decision making process utilized

Notes for the Coach/Team

recycled. Packaging works

RISORSE: STRUMENTI DI PIANIFICAZIONE E CALCOLO



Wheel Converter: Automatic Distance to Degrees

This tool can be used to easily convert your wheel/tire size information into useful data to be used by your First Lego League team.

STEP 1: Enter Wheel Dimensions

Input your wheel diameter in millimeters *OR* You can click one of the tires commonly used by FLL teams below.

STEP 2: Enter Distance Robot Needs to Move

Input the distance you would like the robot to move in either inches or centimeters:

The app shows a list of common tires used by FLL teams with their dimensions:

- Large Motorcycle Wheel - 94.2x20
- EV3 basic tire - 56x28
- Motorcycle tire - 81.6x15
- Balloon tire - 56x26
- Small tire - 43.2x22

Aggiornato ogni anno

Disponibile su Apple App Store e Google Play

CREDITS

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Altre lezioni sono disponibili al sito www.ev3lessons.com

Tradotto da Giuseppe Comis



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