FLL - A Gateway to FIRST Robotics

June 22, 2016

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What is FLL?

https://youtu.be/ydLJKFi0vHA

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The Robots We are Talking About

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The Robots We Are Not Talking About

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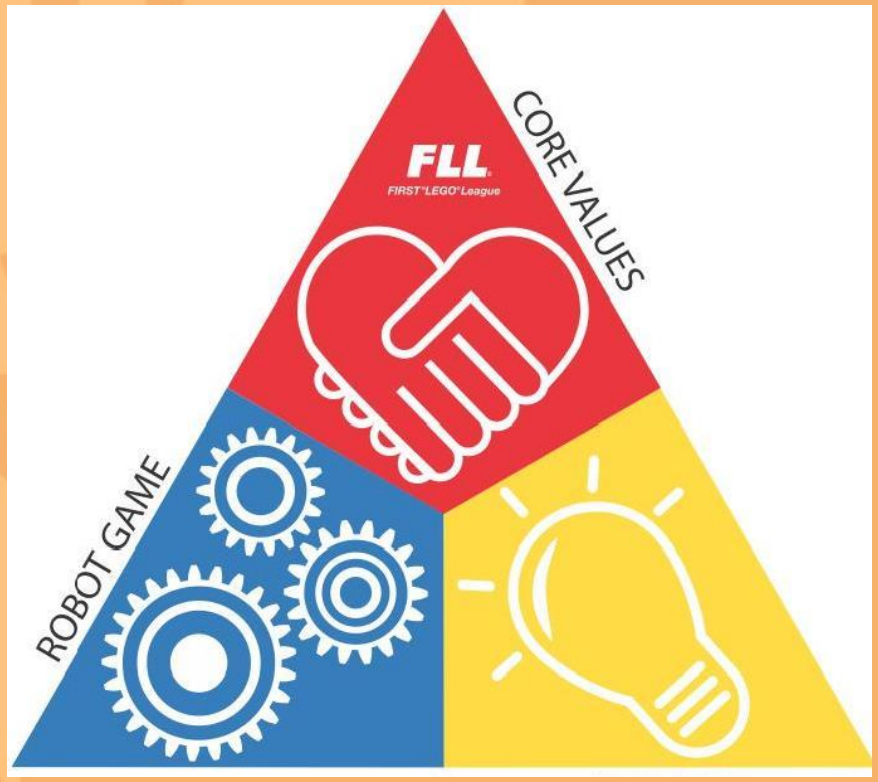
The Three Components of FLL



The Project and Robot Game are what the children do. Core Values are how they do it.

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The Team

- FLL teams have
  - 2 adult coaches
  - 4-10 students in grades 4 to 8
- Teams can be based in schools, organizations, or homes
- Students can only be on one team
- Teams compete in official and unofficial events

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The Challenge

- Each year has a robot game and a project that share a common theme
  - Robot assembled from Lego parts
  - 4’x8’ field layout is new every year
  - Research project proposes solutions to real life problems
- Challenge is announced in late August
  - This year is August 30
  - Detailed manual + highlight video

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The Robot

- Start with Lego EV3 Kit
- Add parts to perform tasks
- Write software
- Robot is completely autonomous

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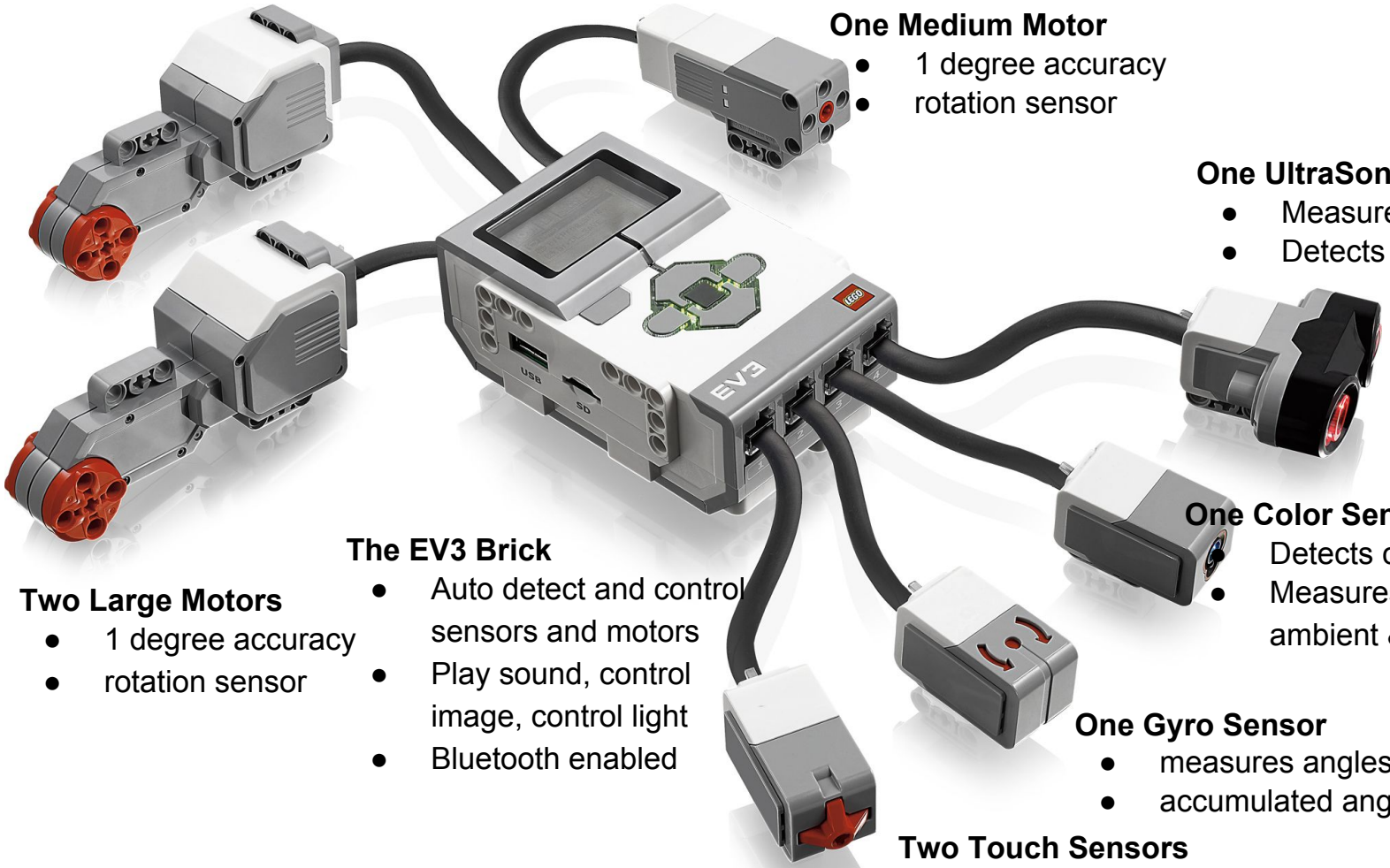
EV3 Brick with Sensors & Motors



One Medium Motor
- 1 degree accuracy
- rotation sensor

One UltraSonic Sensor
- Measures distances
- Detects objects

One Color Sensor
- Detects colors
- Measures light intensity, ambient & reflected light

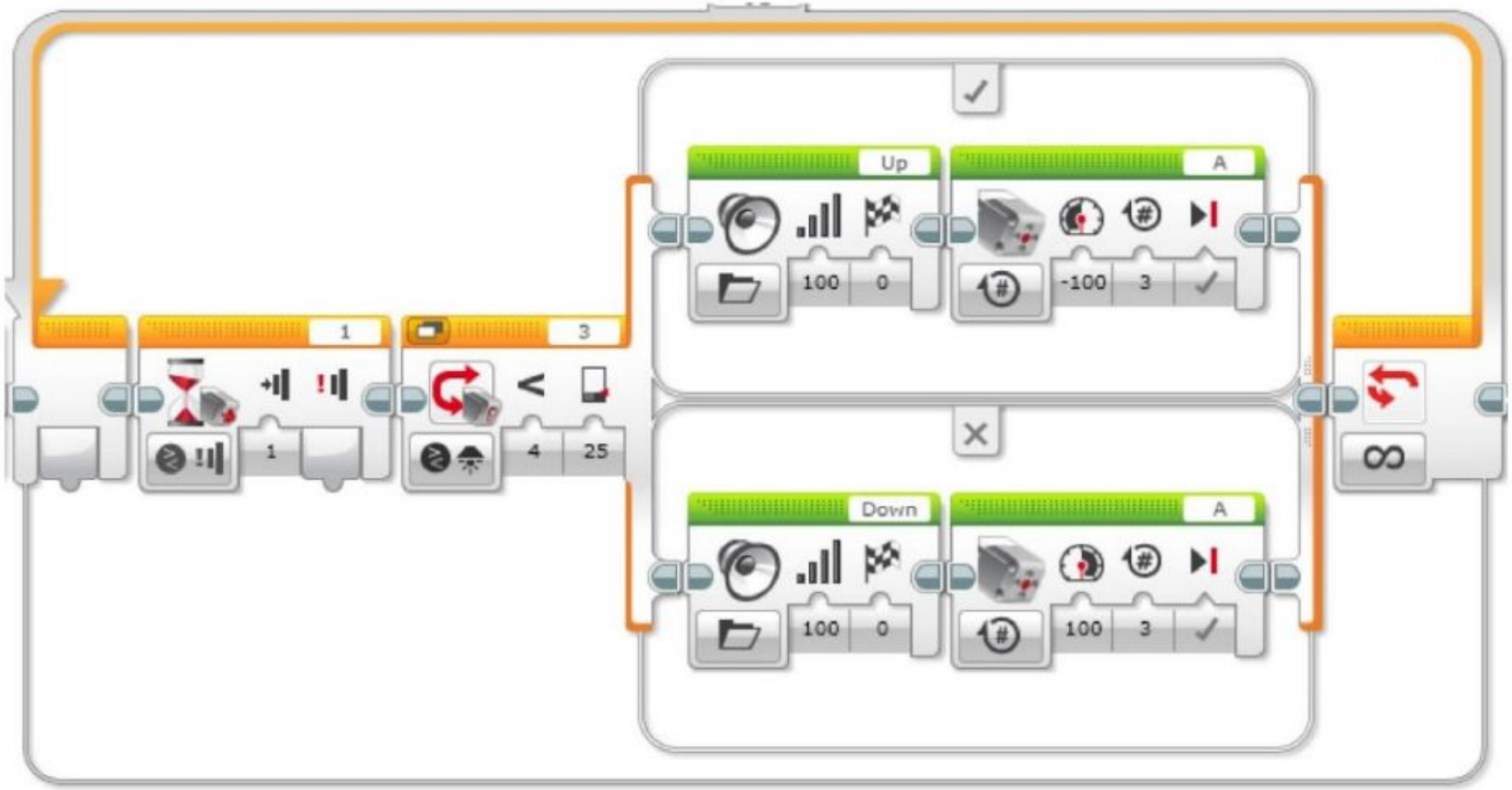
One Gyro Sensor
- measures angles
- accumulated angles

Two Touch Sensors
- 3 modes: pressed, released, and count presses

The EV3 Brick
- Auto detect and control sensors and motors
- Play sound, control image, control light
- Bluetooth enabled

Two Large Motors
- 1 degree accuracy
- rotation sensor

Intuitive Graphical Programming



Example of a loop which uses the touch sensor and color sensor to determine which sound file should be played, and which direction to move the small motor. Notice the use of icons which look like the sensors and motors on previous page, as well as dials and common symbols.

The Challenge

- Related to the theme of the competition
- Research real-world problems
- Develop an innovative solution
- Come up with a creative presentation

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Season schedule

- Start up over the summer
  - Registration is open
  - Closes when slots are filled
  - Typically mid-September
- Challenge announced August 30th
  - Animal Allies
- Build-season is 10 weeks
- 1 to 2 afternoon meetings/week
- Cost depends on number of members, sponsorships

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2015 Trash Trek: Project Video

https://youtu.be/HhSXJ7bvSYQ?list=PLpaPRqT711tiysCIlVqZWBiRBwIAjcYVT

2015 Trash Trek Robot Video

Details are explained in game manual

https://youtu.be/akuN95EyXJk

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2015 Trash Trek: Video of Game

https://youtu.be/kRKiSFzmGSQ

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2015 Trash Trek: The Project

- Real world question, kid created solutions
- Helps to improve public speaking and presentation skills
- Has resulted in patents and civic programs

https://youtu.be/uyO5mD4pPyQ

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Hidden Agenda

Working with robots and developing a real world solution are nice, but the real benefits of being on the team:

- learning how to work together
- positively work through conflicts
- confidence even under scrutiny

Other benefits

- applied engineering concepts
- applied software development concepts
- applied prioritization & time management
- applied fun and achievement

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Finding a team

- There is a small number of existing teams in Newton
  - School based, home based
  - Some will recruit new members, others are full
- Teams change every few years
- The number of teams does not meet the demand
- If you can’t find a team - start one!

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Starting a team

- Finding coaches
- Finding students
- Costs - $500-$1000
- Timeline - registration closes in September
  - often fills up before closing
- Registration process
  - Start on the FIRST website

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Coaching a team

- You too can coach a team!
- Does not require a STEM professional
- Abundance of resources for coaches
  - FIRST web site, google, Youtube
- Other coaches will help - so will we
- Every technical problem has already been solved!
  - And it's all been captured on video

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Team Activities

Team Building

- Icebreakers: Name Bingo, Pasta tower, low bar, name game, human robot...etc.
- Team name, logo, t-shirt design, banners,mascots...etc.
- “Yes, and...” exercises: practice agreeing, supporting, building
- Create decision making process to resolve conflicts

Robot Game

- Build 96” x 48” FLL table (detailed instructions are available online)
- Setup challenge field (August)
- Lego build challenges – vague problem, many solutions, compare approaches
- Programming tutorials - navigate obstacles, push item, pick up, target … etc.

Project

- Practice project – Nature's Fury
- Research, brainstorm, present, document, and repeat
- Watch other team presentations

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Team Member's Responsibilities

- Be positive to learn new subjects
- Be supportive of everyone
- Contribute to the team
- Respect coaches and others
- Do your share of the work and more
- Know your schedule & manage your time
- Make mistakes & share bad ideas (might not be bad)
- HAVE FUN!

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Parent Responsibilities

- Communicate scheduling conflicts
- Be supportive, drive and pick up on time
- Be involved and motivate your child
- Lots of opportunities to help out (treasurer, graphics,
- Administration (T-shirt, fundraising, field trip, snacks, photos, videos, pit management, food, carpool, etc)
- Help with fundraising or to obtain sponsorship

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Coach Responsibilities

- Encourage and structure the process, let the team develop the content
- Ask questions to encourage the team's thinking and problem solving
- Keep kids aware of the schedule
- Help learn skill in basic building and programming
- Help kids find resources for the project
- Read and understand the rules
- Balancing fun versus competition
- Keep parents informed

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Not Coaches Responsibilities

- Build and program the robot
- Do research and design project solutions
- Make important decisions
  - The kids need to make the decisions
- Not a football coach
  - Don’t call the plays
  - Winning isn’t everything

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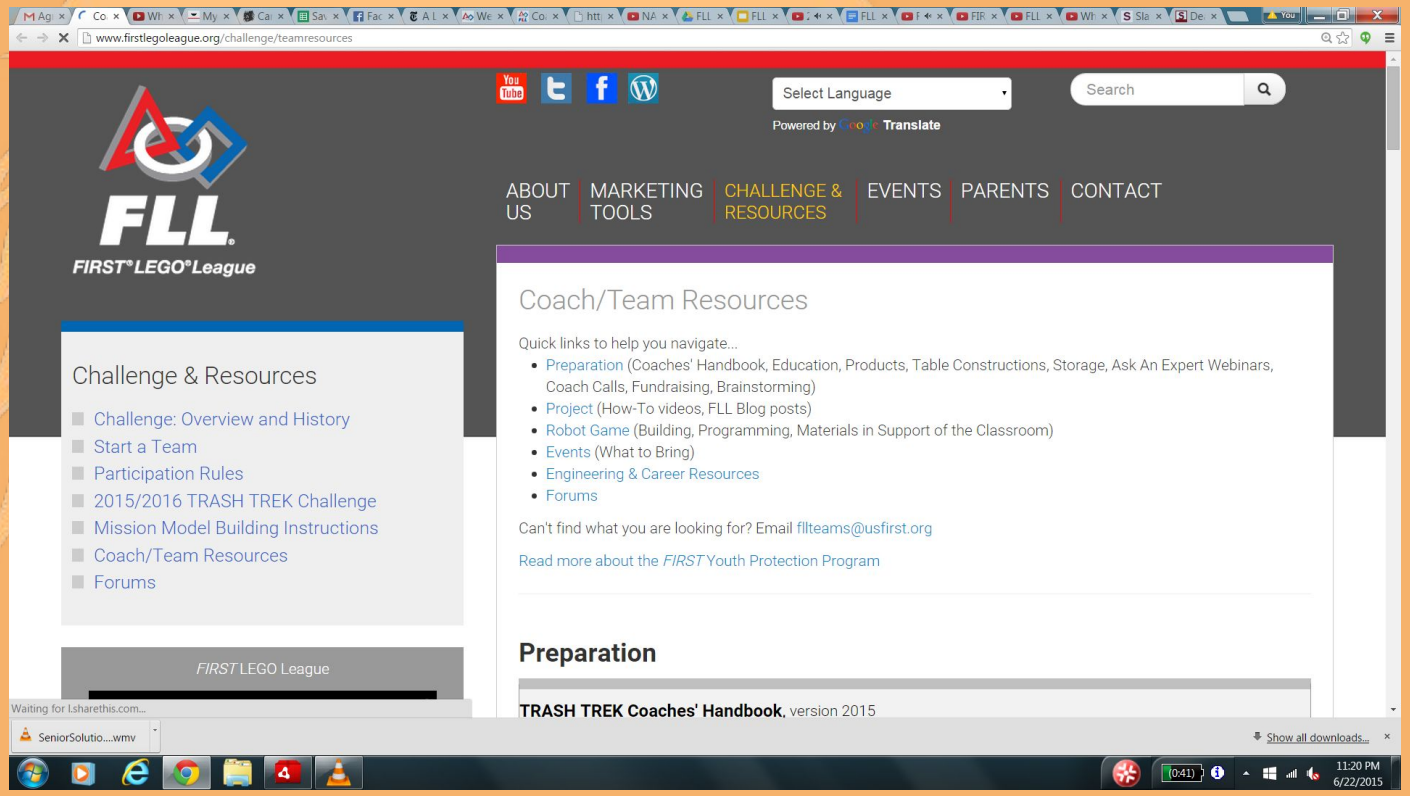
Official FIRST® online resources



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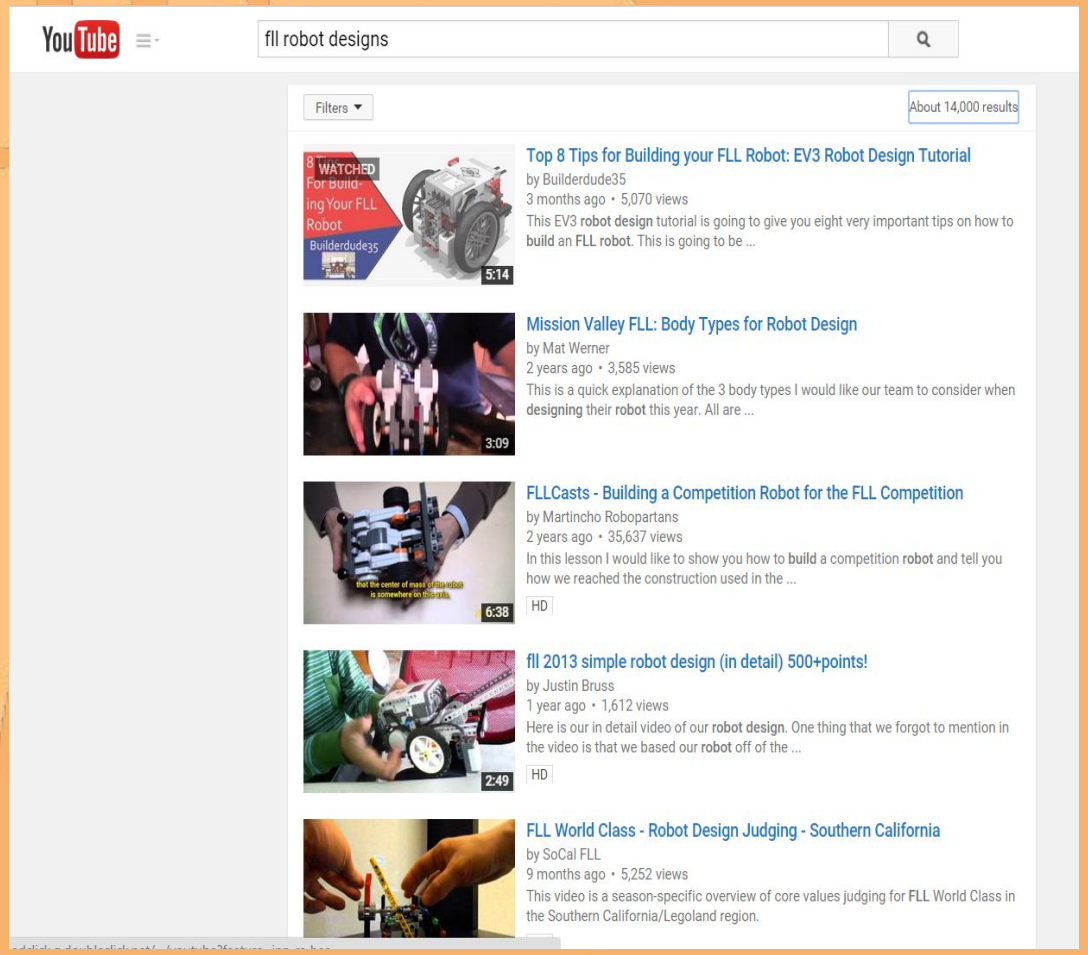
Youtube - FLL robot designs



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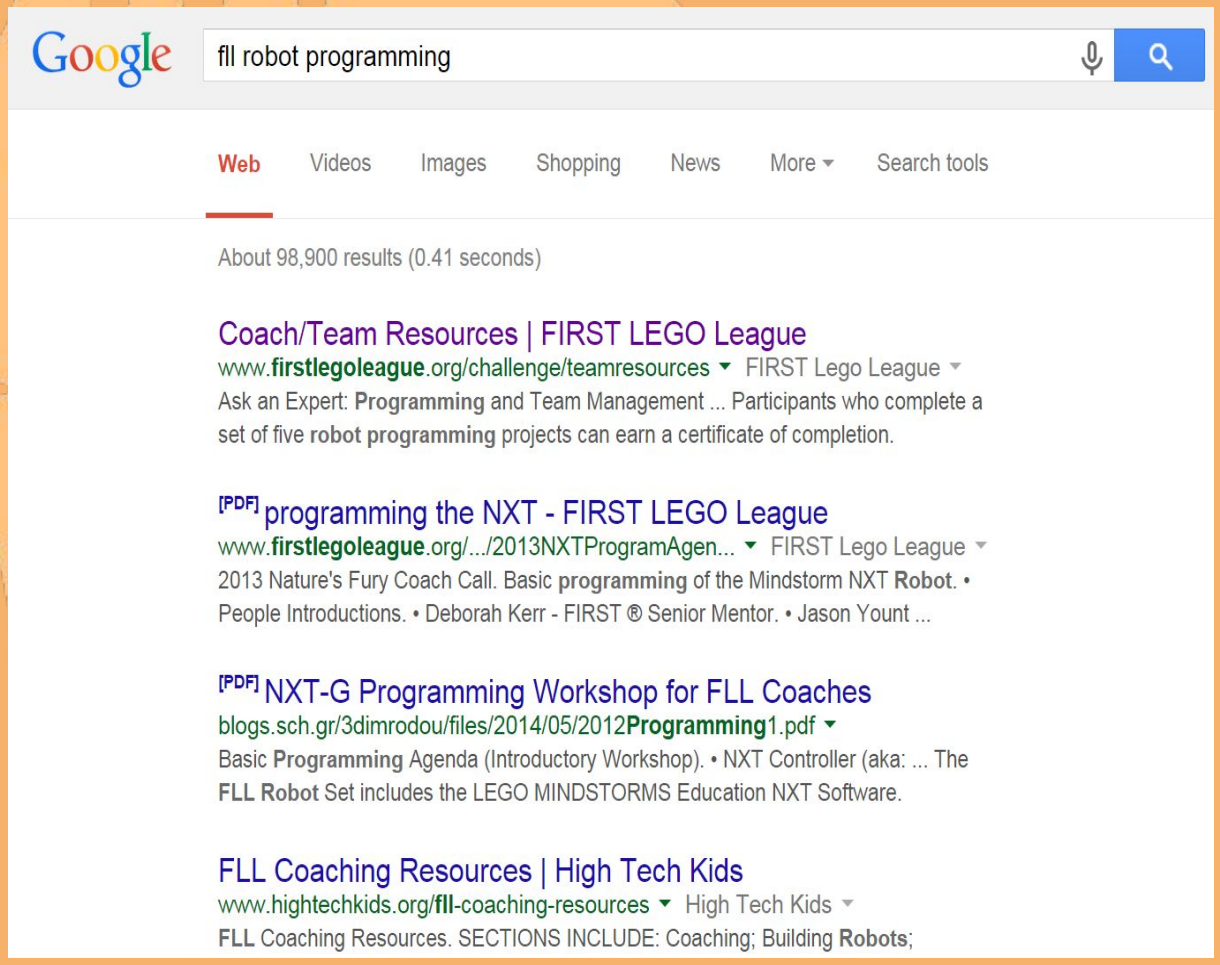
Google - FLL robot programming



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Panel Q&A

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