



FIRST[®]
ROBOTICS
COMPETITION

PRESENTED BY  **BOEING**

2022
VIRTUAL
KIT
CATALOG

FIRST[®]  **FORWARDSM**
PRESENTED BY Qualcomm



The *FIRST*® Robotics Competition 2022 **VIRTUAL KIT CATALOG**

Brought to you by



At Xilinx, we think it's important to celebrate the technical heroes of tomorrow and salute you as you embark on this year's journey! **Learn more about our robotic journey at xilinx.com/krs**



WELCOME

TO THE 2022 **FIRST® ROBOTICS COMPETITION SEASON**

This Voucher Catalog is a reference for your team. Inside, you'll find additional items and value available to your team via the Kit of Parts system. Each page represents a specific voucher and its particular instructions and details. Don't miss out on any of these opportunities.

Questions about the Kit of Parts can be sent to:
frcparts@firstinspires.org



We are extremely grateful for the generosity and support that our FIRST® Suppliers provide!

More information about the Kit of Parts can be found at our website:

<https://www.firstinspires.org/robotics/frc/kit-of-parts>

Supplier**Redeemed**

Altium ☐

Armabot ☐

Autodesk ☐

Automation Direct ☐

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Digi-Key Electronics ☐

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MathWorks ☐

Next Gen Robots ☐

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Siemens ☐

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SOLIDWORKS ☐

Tableau ☐

Vulcan Spring ☐

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VOUCHER CHECKLIST

Altium®

Organization Name

Altium

Voucher Detail

One-year Altium Designer
student license

Expiration Date

12/30/2022

Access Code(s)

N/A

Website

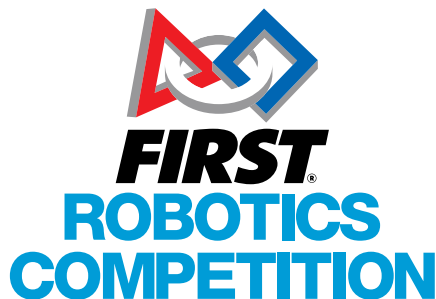
www.altium.com/frc

Altium is excited to support *FIRST*®, committed to providing every designer and engineer with tools to enable you to turn your ideas into products in the easiest and most productive way.

- Altium Designer consists of all the tools required to produce a PCB from concept to manufacturing.
- A PCB development platform supplying both the electrical and mechanical view.
- Integrated access to over a hundred suppliers makes it easy to select the best parts for your design.

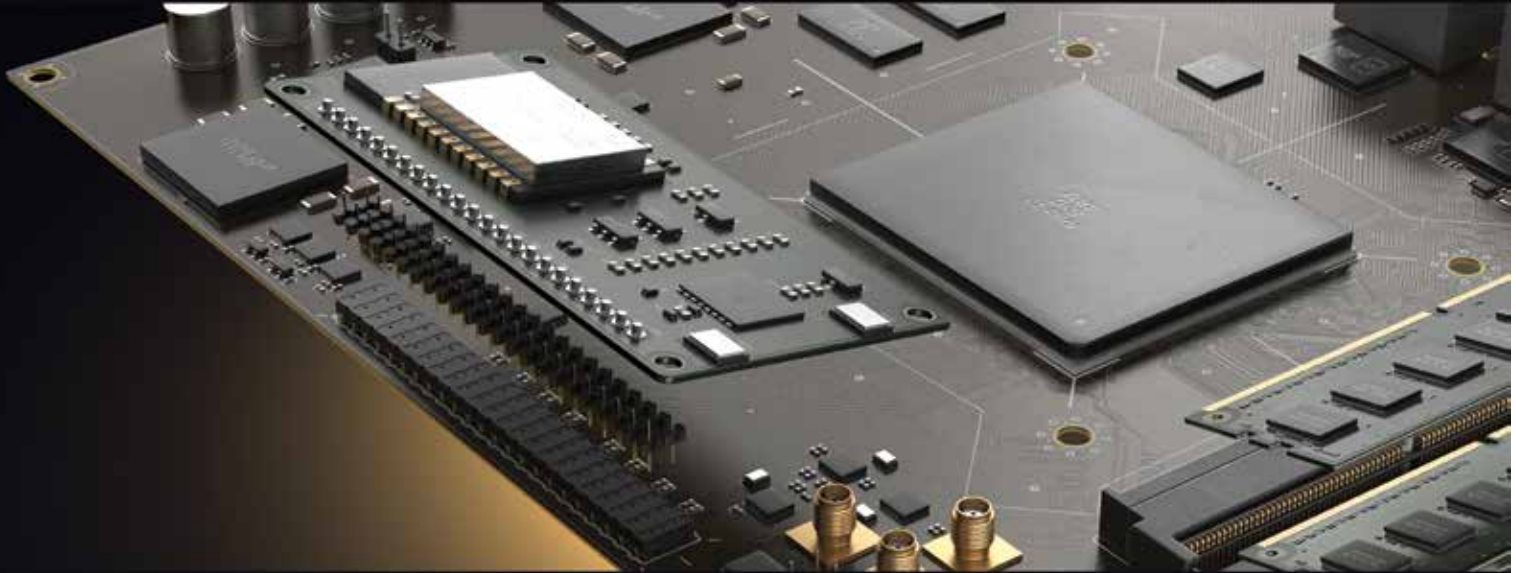
To access one-year student license, fill out the form www.altium.com/frc

Special Instructions: One to five student licenses to be shared per high school team





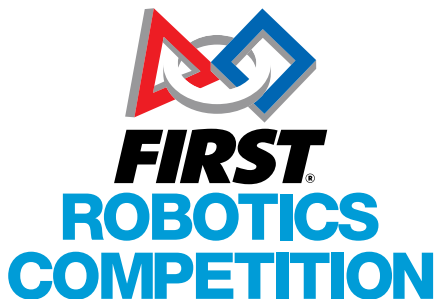
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ARMABOT



Organization Name

Voucher Value

Expiration Date

Shipping

Access Code(s)

Website

Armabot

One (1) RS7 encoder

04/30/2022

Team Responsibility

Visit Team Registration Account

(Lead Mentor 1 or 2)

www.armabot.com

1. Go to www.armabot.com
2. Select 1 or more RS7 encoders (first unit free with this voucher)
3. Enter your valid code from the *FIRST*® Team Registration System
4. Enter shipping and billing information
5. Place order and wait for arrival (3-5 days in continental USA)
6. Installation instructions at www.armabot.com
7. Technology tutorial for encoder implementation at www.armabot.com

Valid for purchase of one RS7 encoder individually or a multiple product order that includes one RS7 encoder. Limit one per *FIRST*® Robotics Competition Team. Must be registered for the 2022 robotics season. Voucher not transferable to other people or teams.

QUICK INTEGRATION

Technology Tutorial

CAN bus PID tuning via Talon SRX controller.

EASY INSTALL

Worm-Drive Clamp

Secure and simple attachment.

COOL RUNNING

Vented Design

Doesn't interfere with motor air flow.

STRAIN RELIEF

Secure Wiring

Integrated feature for cable tie.

CUSTOM DESIGNED MOUNT

775pro Motor Encoder

Successful use at 2016 & 2017 Championships.





Organization Name

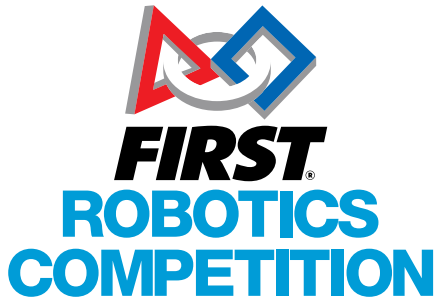
Voucher Detail

Website

Autodesk

3D Design Software Access

www.autodesk.com/first



www.autodesk.com/first Your destination for robotics CAD datasets, robotics simulation, robotics design tutorials, and access to Autodesk software.

Autodesk Fusion 360 – This 3D CAD/CAM tool for PC and Mac enables robot designs, assemblies, photorealistic renderings, fabrication, and team collaboration.

Autodesk Inventor – With this professional software, teams can produce 3D models that help with the design and visualization of the robot.

Synthesis: An Autodesk Technology – Test your CAD designs for driver practice, robot code emulation, strategy, and more with this robotics simulator.

Autodesk EAGLE – Bring your next spark of an idea to life with powerful PCB design software made for every engineer.

Autodesk Tinkercad – Use Tinkercad Circuits environment to program and simulate an Arduino board for use on your robot.

Autodesk 3ds Max – With modeling, rendering, and animation capabilities, 3ds Max is an ideal solution for the VRC Game Design Animation Challenge.

A young woman with long dark hair and black-rimmed glasses is focused on working on a robot. She is wearing a grey sweatshirt. The robot is a complex assembly of metal, wires, and components. She is using a pair of pliers to work on a wire. The background is slightly blurred, showing a workshop or lab environment.

Create winning designs

Autodesk is excited to provide open access to our design software, digital fields, and robot part models.

Put your designs to work with our competition simulation software – created specifically for *FIRST*® teams – and get the robot you want on the field faster.

Get started at www.autodesk.com/first





Organization Name

Voucher Description

Expiration Date

Shipping

Access Code(s)

More Info

Automation Direct

\$50.00

08/31/2022

Team Responsibility (see below for details)

Visit Team Registration Account

(Lead Mentor 1 or 2)

www.AutomationDirect.com

Use your \$50 voucher toward any items available at www.AutomationDirect.com

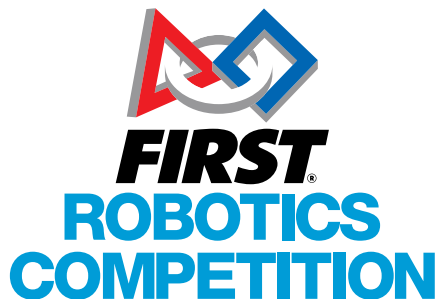
IMPORTANT INSTRUCTIONS - We cannot apply the discount AFTER you place an order!

1. Obtain your voucher code at the Mentor Dashboard at www.firstinspires.org
2. Login, OR create a New Account here: www.automationdirect.com/new-user
3. Then visit www.automationdirect.com/Voucher to enter the voucher code. This will enable a one-time \$50 credit for your account.

Some Restrictions Apply:

1. Orders **must** be placed online. No 'call-in' orders. Stock items ordered by 6:00pm EST will ship via 2-day service.
2. Orders **must** ship to a US or Canadian address. Credit card billing address must also be US or Canadian.
3. The voucher cannot be used towards shipping fees. Orders under \$49 are shipped via 2-day service to US addresses for a flat rate of \$10 (a credit card will be required to pay for shipping). Orders to Canada will incur brokerage fees. Larger orders may qualify for FREE two-day shipping. See website for details: <https://www.automationdirect.com/static/specs/adpolicy.pdf>

This voucher cannot be used to pay sales tax. A credit card (or PayPal) will be required to pay any applicable taxes. If your team/organization is tax exempt, you can submit appropriate documentation online during checkout.



These items are popular with *FIRST*® teams:

Miniature Pneumatic Devices



go2adc.com/fittings

Pneumatic Cylinders



go2adc.com/cylinders

Belts & Pulleys



go2adc.com/tbp

Ferrules, Terminals, and Crimp Tools



go2adc.com/zfwire

Push connect fittings



go2adc.com/ptcfittings

Ethernet Cables
(and crossovers!)



go2adc.com/cat5e

Wire Ties



go2adc.com/sapiselco

Sensors and Encoders



go2adc.com/sensenco



AUTOMATIONDIRECT.com

1-800-633-0405 | www.AutomationDirect.com



Clippard

Organization Name

Voucher Value

Offer Expires

Shipping

Access code

Website

Clippard

\$20.00

12/31/2022

Team Responsibility

FIRST2022

clippard.com

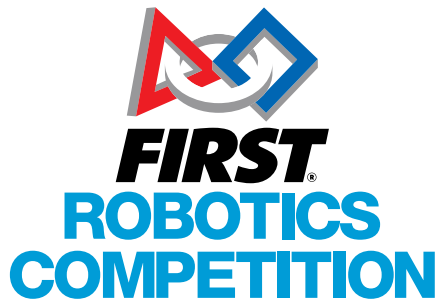
Congratulations on the many successes you have achieved to earn your team a position in the 2022 *FIRST*® Robotics Competition!

As long-time supporters of the *FIRST*® organization, and the new generation of pneumatic enthusiasts, Clippard is happy to provide you with a complimentary **AIR VOLUME TANK (#AVT-PP-35)** found in your kit of parts.

In addition, we are proud to provide you with an additional **\$20.00 of FREE Clippard products** for your design needs. Simply visit clippard.com to select your products, and use the promotional code above at check out.

PLEASE NOTE: YOU MUST CREATE AN ACCOUNT AND BE LOGGED IN FOR THE VOUCHER TO BE VALIDATED.

If you need technical assistance, don't hesitate to contact us at 1-877-245-6247.



Clippard



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**PRECISION FLOW CONTROL
PRODUCTS & SOLUTIONS**

www.clippard.com



Organization Name

Digi-Key Electronics

Voucher Value

\$50

Expiration Date

09/30/2022

Shipping

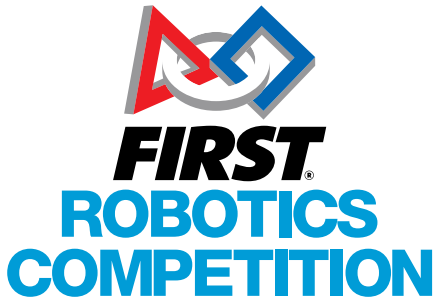
Included (excludes Marketplace products)

Access Code(s)

See Team Registration System

Website

www.digikey.com/first



Digi-Key is proud to provide you with \$50 of components.

- Visit www.digikey.com/first to redeem your team's voucher.
- The \$50 voucher will not display on the total of your order, but will be subtracted from your order during processing.
- This Product Donation Voucher valued at \$50 is good for the purchase of components only at www.digikey.com

Taxes not included. This voucher is good for a one time use. Any amount not utilized in your initial transaction will be forfeited.

\$50

VOUCHER & FREE SHIPPING!*

Digi-Key has the product portfolio, service, tools, resources, and know-how to support students, coaches, and mentors on *FIRST*® teams.



**REDEEM YOUR VOUCHER IN
3 EASY STEPS!**

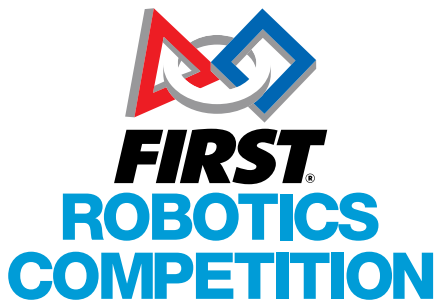
- Visit digikey.com/first
- Enter your team info
- Shop at digikey.com

VISIT US ONLINE TO ACCESS OVER 2.2 MILLION
PRODUCTS IN STOCK, RESOURCES, AND MORE AT:

DIGIKEY.COM



*Free Shipping offer does not apply to Marketplace products.



Organization Name

Voucher Value

Expiration Date

Shipping

Access Code(s)

Website

DriveWorks Ltd.

**(1) 1 year license of DriveWorks Solo
Design Automation Software**

12/31/2022

Included

Visit Team Registration Account
(Lead Mentor 1 or 2)

<https://www.driveworks.co.uk/education/first/>

FIRST® teams can request a license of DriveWorks Solo Design Automation Software for a period of one (1) year.

DriveWorks Solo allows engineers and students to quickly and easily create and configure variations of your SOLIDWORKS models directly inside of SOLIDWORKS.

DriveWorks Solo is a powerful SOLIDWORKS Automation Tool. It allows teams to automate their SOLIDWORKS parts, assemblies and detailed drawings.

- Control Dimensions, features, custom properties, advanced feature parameters, instances and file formats.
- Dynamically replace components.
- Create a library of components using intelligent file reuse.

Key benefits of DriveWorks Solo

- Capture and re-use your design knowledge
- Incorporate design rules to reduce errors and rework, and improve product quality
- Automate repetitive tasks to reduce design time
- Liberate students and mentors to focus on quality variations of robot design.

How does our FIRST® Robotics Competition Team request a license of DriveWorks Solo?

Please visit <https://www.driveworks.co.uk/education/first/> to submit your request for a license of DriveWorks Solo.

Once on the website, you will be asked to complete and submit a "Request a License" form. Upon completion of this form, we will review for completion, process and once approved you will receive detailed instructions on how to download and install the software.

Valid for one (1) license of DriveWorks Solo requested by the Team Leader. License includes access to FREE online learning resources which include DriveWorks Solo Online Training webinars, How to Videos, Help Files and other learning resources. Product support and assistance provided to Team Leader by DriveWorks Ltd. via email to first@driveworks.co.uk. Must be registered for the 2022 Robotics Season. License is non-transferable to another team.

Questions?

Contact us at first@driveworks.co.uk



DriveWorks
Configure & Automate



Powerful Design Automation for **SOLIDWORKS®**

FIRST® Robotics Competition Teams can get a
free 12 month license of DriveWorks Solo

Automate repetitive SOLIDWORKS tasks & free up
students & mentors to focus on quality robot design.



Follow us on Instagram @driveworksconfigurator

www.driveworks.co.uk/education/first





Organization Name

Voucher Value

Expiration Date

Shipping

Access Code(s)

Website

Mastercam

Mastercam Educational Suite

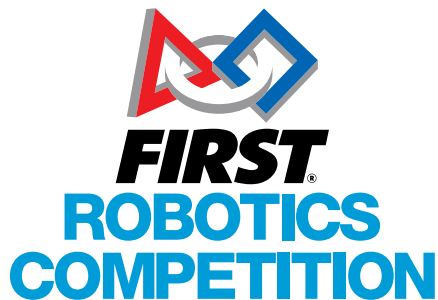
10/31/2022

Included

Visit Team Registration Account

(Lead Mentor 1 or 2)

www.mastercam.com/community/competitions/first-robotics/



Mastercam Educational Suite: one free license of the current version of the Mastercam Educational Suite. The Mastercam Educational Suite includes Mill, Lathe, Wire, Router, Design, Art, and Mastercam For SOLIDWORKS.

Please go to www.mastercam.com/community/competitions/first-robotics/

Please fill out the required information on the registration page. Once we receive your request, an email will be sent with your activation code and instructions on downloading Mastercam.



1257 Y.628 Z-5.1475 A-48.0715 B
.803 Y.6251 Z-5.1103 A-48.5782
1348 Y.6222 Z-5.0731 A-49.0828
192 Y.6193 Z-5.0350 A-49.5848 B
135 Y.6165 Z-4.9985 A-50.0835 B
177 Y.6138 Z-4.9611 A-50.5784 B
118 Y.611 Z-4.9236 A-51.0688 B
159 Y.6084 Z-4.8861 A-51.5539 B28.4544 F686.13
199 Y.6058 Z-4.8486 A-52.0331 B27.3917 F710.23
38 Y.6033 Z-4.811 A-52.5057 B26.2988 F734.35
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7 Y.5917 Z-4.622 A-54.741 B20.5597 Y.5917 Z-4.622 A-54.741
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11 Y.3616 Z-4.0000 A-94.4920 B0.0000 A-94.4920 B0.0000
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Organization Name

MathWorks

Voucher Value

MathWorks Resources for *FIRST*® Teams

Expiration Date

08/31/2022

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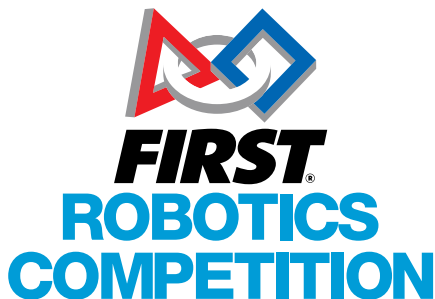
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Website

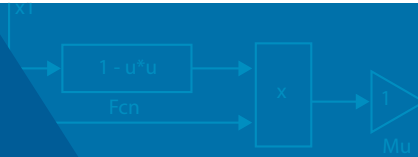
mathworks.com/first-robotics

MATLAB and Simulink allow students/participants to simulate robots, develop control and navigation algorithms, and optimize their mechanical designs. Please visit our website to request access to MathWorks software as well as find other resources available to *FIRST*® teams:

- Software license to over 50 products, including:
 - o MATLAB, Simulink, Stateflow, Simscape, MATLAB Coder, Robotics System Toolbox, Navigation Toolbox, Control System Toolbox, Signal Processing Toolbox, Computer Vision Toolbox, Sensor Fusion and Tracking Toolbox and more
- Links to free, 2-hour online courses to get started with MATLAB and Simulink
- Tutorials, videos, and examples for students participating in robotics competitions



```
if sym = 1,  
    if sym = 3,  
        ia = sym;  
        l = sym + 3*(s-1);  
        j = 2:n;  
        alfa(j) = alfa(j) + 1;  
        l = l - del;  
    else  
        alfa = 2/3;  
    end  
end  
length(alfa);
```



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Organization Name

Voucher Detail

Expiration Date

Shipping

Access Code(s)

Website

Next Gen Robots

1 CIM Cooler 180 or 775 Cooler 360

05/31/2022

Team Responsibility

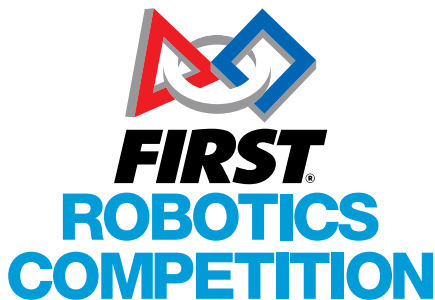
Visit Team Registration Account

(Lead Mentor 1 or 2)

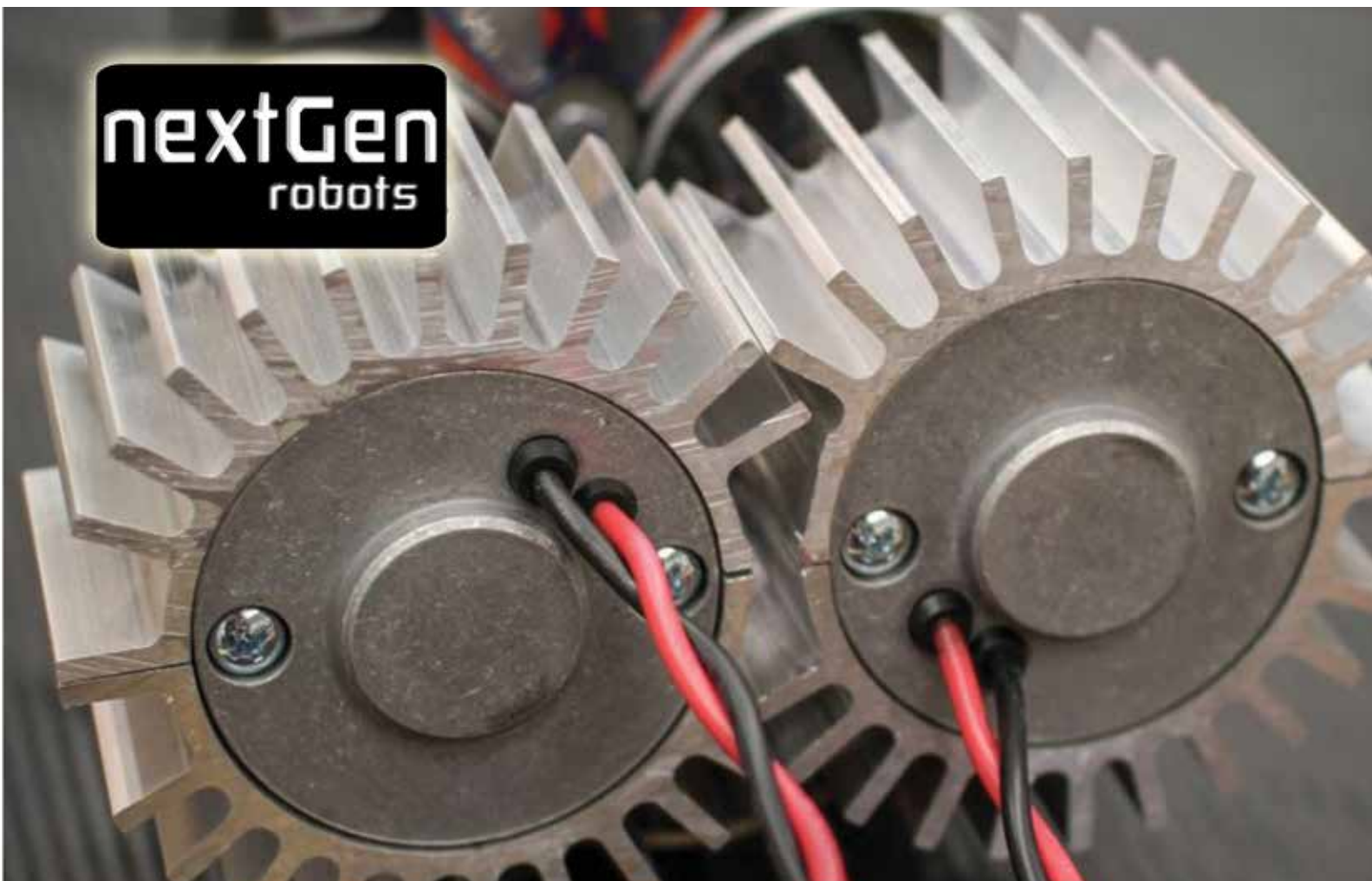
www.nextgenrobots.com

Attention *FIRST*® Robotics Competition Teams:

1. Be sure to email sales@nextgenrobots.com with your Lead Mentor Name, *FIRST* Robotics Competition Team Number, and PDV Code found on the *FIRST* Robotics Competition Team Registration System so that we can make sure that your code is active!
2. Once confirmed, enter the team's assigned code from step 1 into "Coupon code" on your order and the discount will appear during checkout. Do not "Checkout as guest".
3. This coupon can be redeemed for one CIM Cooler 180 (an \$8.00 value) or one 775 Cooler 360 (an \$8.00 value) but products can be purchased in any combination and multiple amounts of the CIM Cooler or the 775 Cooler. After applying the coupon code during checkout, the total will be less \$8.00. Before submitting the order make sure the discount has been applied to the total. If the discount is not showing, try clicking "view cart" and reapply the code.



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Organization Name

NI

Voucher Value

NI LabVIEW Software

Expiration Date

01/31/2023

Shipping

Included

Access Code(s)

Visit Team Registration Account

(Lead Mentor 1 or 2)

Website

<http://www.ni.com/frc>

This license also provides access to more than a dozen LabVIEW add-ons, NI Multisim for SPICE simulations, and NI Ultiboard for PCB design.

1. Access Your Team's Serial Number

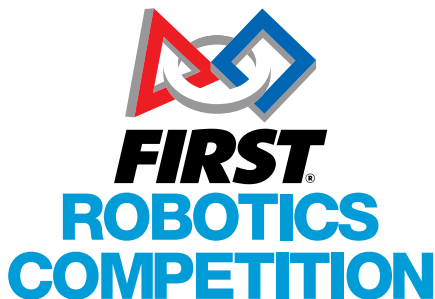
Have your Lead Mentor 1 or 2 log in to your team's account at www.firstinspires.org to access your serial number by clicking on "Passwords/Voucher Codes."

2. Download Software

Get NI LabVIEW for *FIRST* Robotics Competition via the *FIRST* Robotics Competition Resource Hub at www.ni.com/frc

3. Learn and Earn

Learn LabVIEW with free online training and earn skills badges at www.ni.com/frc



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Organization Name

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Expiration Date

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Access Code(s)

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OneIPM

OneIPM Project/Task Management for Onshape

11/30/2022

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(Lead Mentor 1 or 2)

www.oneipm.com/first

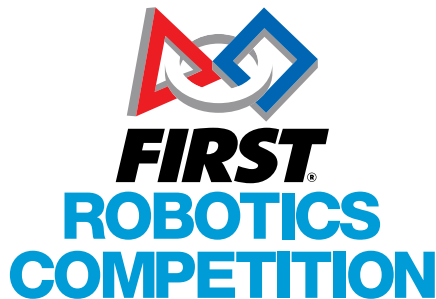
OneIPM is pleased to provide complimentary use of our cloud-based Project/Task Management and Product Structure Explorer solution for all FIRST® teams.

OneIPM is an Onshape add-in that provides innovative visuals of your Onshape documents and assemblies, helping teams better understand design intent, while also managing all your project related tasks with complete associativity to your CAD documents.

To access OneIPM:

- Create an account in Onshape at onshape.com
- Subscribe to the free trial of OneIPM in the Onshape app store at appstore.onshape.com
- Extend your free trial of OneIPM for the entire season at oneipm.com/first/

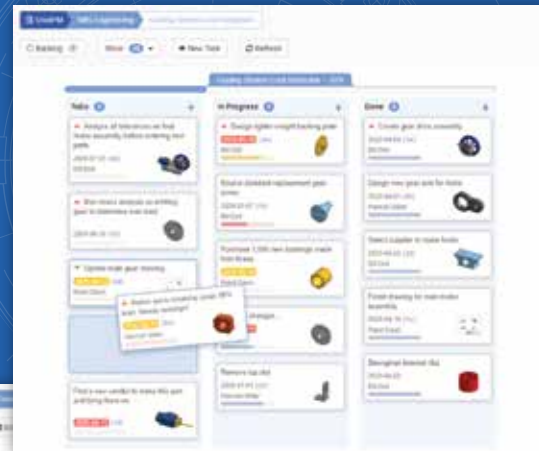
For detailed information and step-by-step instruction, please visit: oneipm.com/first/ Best wishes for a great season!



OneIPM

Integrated Project Management

- Manage all your projects and tasks *within* Onshape
- *Link* tasks directly to documents, parts, assemblies, drawings...
- Visualize product structure with OneIPM's innovative *tree and node* views
- Gain insight into design intent using part *version history* viewer





Organization Name

Onshape, A PTC Business

Voucher Detail

Onshape CAD Software

Expiration Date

09/01/2022

Shipping

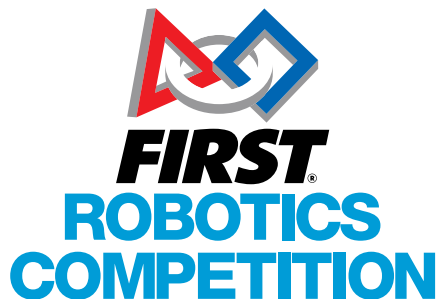
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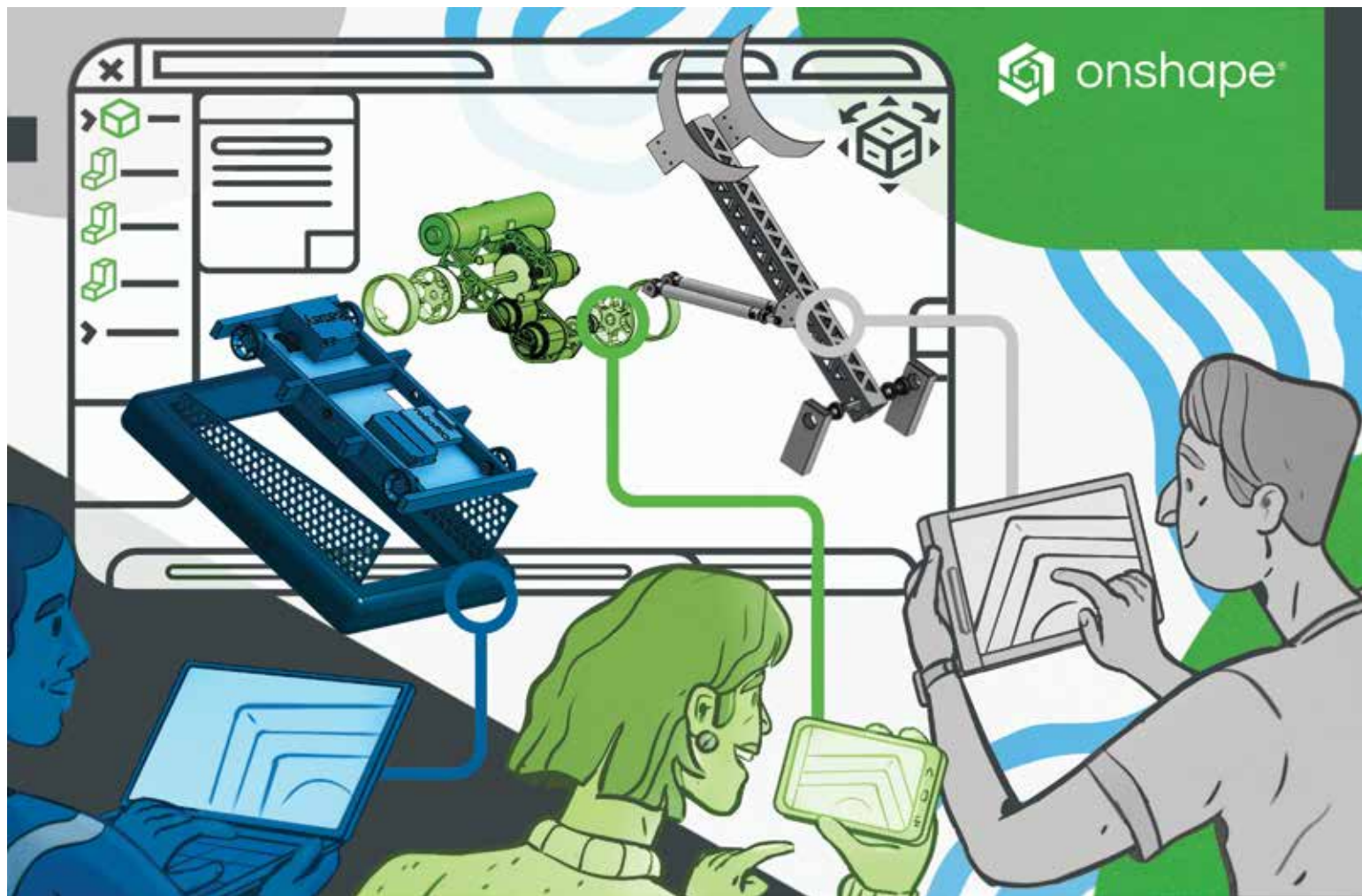
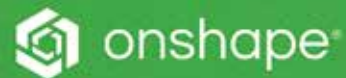
<https://www.onshape.com/edu/frc>



Free access to the Onshape Education Plan and full access to the Learning Center.

*Visit the FIRST Onshape webpage for information and resources:
<https://www.onshape.com/edu/frc>*

Email comments or questions: FIRST@ptc.com





Organization Name

PTC

Voucher Detail

PTC CAD and Collaboration Software

Expiration Date

09/01/2022

Shipping

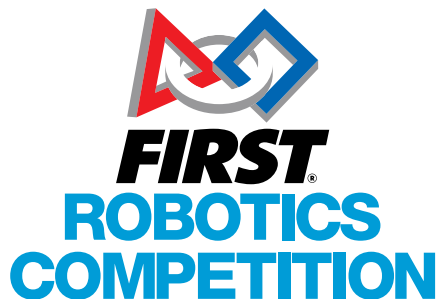
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Access Code

N/A

Website

ptc.com/en/academic-program/student/first



Access to the following PTC Software:

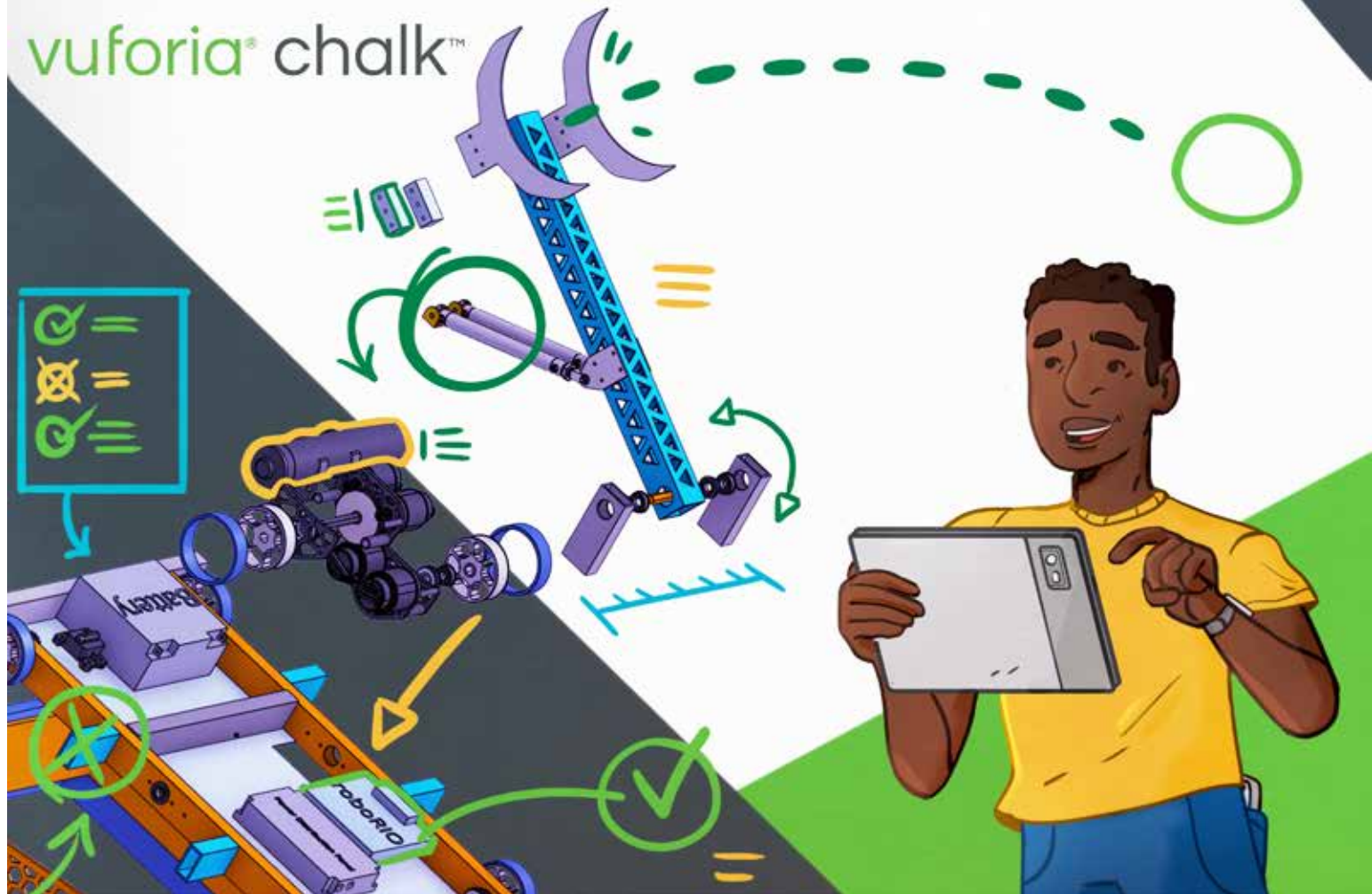
- ***Vuforia Chalk*** – Application to facilitate AR remote assistance between team members
- ***Onshape*** – Cloud-based 3D CAD software
- ***Creo*** – 3D CAD software
- ***Mathcad*** – Software for engineering calculations

Visit the FIRST PTC webpage for more information:

<https://www.ptc.com/en/academic-program/student/first>

Send comments or questions to FIRST@ptc.com

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Organization Name

REV Robotics

Voucher Value

\$50.00

Offer Expires

06/30/2022

Shipping

Team Responsibility

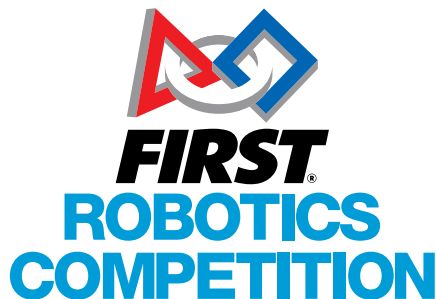
Access code

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(Lead Mentor 1 or 2)

Website

www.revrobotics.com



Receive \$50 towards any product on www.revrobotics.com

Enter the code you receive as a “gift certificate” at checkout.

More instructions will be posted to **<http://www.revrobotics.com/frc-voucher/>**



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Custom robot parts-
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Expiration Date

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RoboPromo

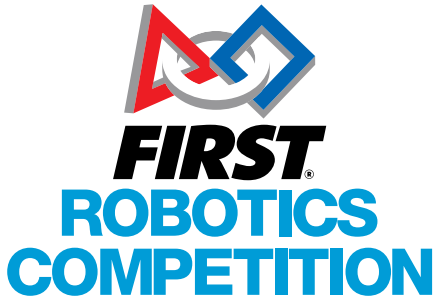
FIRST® Iron-On Bumper Logos (set of 8)

05/01/22

Team Responsibility

LOG022

www.robopromo.com



Instructions:

- Go to **www.robopromo.com** and enter access code **LOG022** at checkout (include team number) to receive (1) pack of (8) iron-on logos: 3.75" x 5"
- *Available to FIRST® Robotics Competition Teams only.*
- *Available 01/08/22 (one order per team)*



SIEMENS

Organization Name

Siemens

Voucher Detail

Siemens software, training, tutorials, and certification exam for Solid Edge and NX applications

Expiration Date

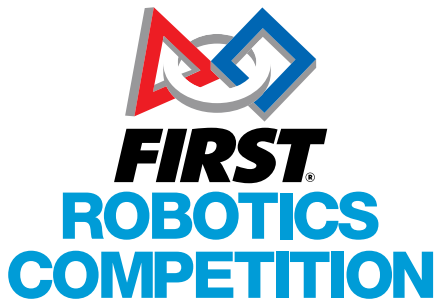
09/30/22

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Websites

**www.siemens.com/FIRSTRobotics
www.siemens.com/plm/solidedgecertification**



To access your free license of Solid Edge 3D CAD, Solid Edge Simulation, and PADS Professional software visit **www.siemens.com/firstrobotics**, and download your software in minutes.

You'll also find a library of tutorials that will help you to accelerate your design phase, as well as an opportunity to take the Solid Edge certification exam free of charge.

Siemens also invites all *FIRST*® teams who are using SIEMENS software to apply for funding. Criteria for funding is detailed on our *FIRST* resource page, and made available on a first-come, first served basis. **www.siemens.com/firstrobotics**

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Download Siemens Solid Edge®
Software for students today! Solid
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Organization Name

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SolidProfessor

One Free Individual Annual Membership

11/30/2022

n/a

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(Lead Mentor 1 or 2)

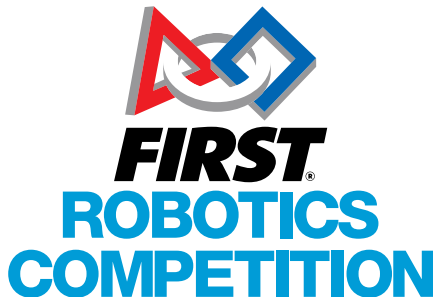
<https://www.solidprofessor.com/first-robotics-competition-sponsorship/>

With this voucher, your team will receive one free individual annual membership to SolidProfessor (\$490 value).

This membership will give you access to online CAD and CAM courses that will help your team become more effective design engineers. Each course includes bite-sized video lessons, practice exercises, and short quizzes that will make learning CAD and CAM easier than ever! Plus, when students successfully complete a course, they can show off their new skills by earning a Technical Certificate.

To access your free membership:

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1-Year SolidProfessor Membership

**Voucher available for
FIRST® teams in the 2022
Virtual Kit of Parts.
Access online CAD
training today!**





Organization Name

3DS SOLIDWORKS

Voucher Detail

SOLIDWORKS 3D Design Software Suite

Expiration Date

07/31/23

Shipping

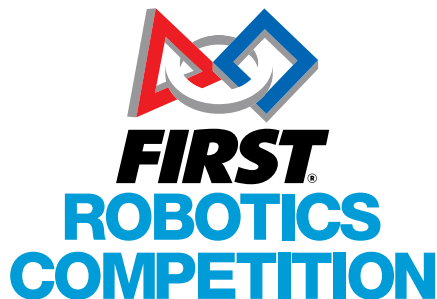
Included

Access Code

N/A

Website

WWW.SOLIDWORKS.COM/FIRST



Dassault Systèmes SolidWorks Corporation wants to help you develop the engineers and innovators of tomorrow. That is why we are pleased to sponsor your FIRST® team.

Student teams now have the choice of using our SOLIDWORKS desktop product, which includes over twelve powerful design, and engineering products. OR the **3DEXPERIENCE** platform, a cloud-based portfolio of integrated tools and apps. Teams can apply for both sponsorships separately if they choose.

To request SOLIDWORKS Desktop visit: solidworks.com/studentchallenges

To request 3DEXPERIENCE Platform visit: edu.3ds.com/challenges





Organization Name

Voucher Detail

Expiration Date

Shipping

Access Code(s)

Website

Tableau

One copy of Tableau Desktop

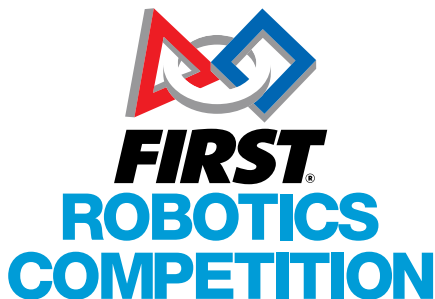
08/31/22

Included

Visit Team Registration Account

(Lead Mentor 1 or 2)

www.tableau.com/first-robotics



Complimentary access to Tableau Desktop data analysis and visualization, and Tableau Prep for data preparation.

Visualize your data. Quickly answer questions. Play better defense, pick alliance partners, analyze robot performance, target your fundraising, and reduce inventory waste.

- Use the product code found in your Lead Mentors' 1 and 2 *FIRST*® registration accounts for five activations per team.
- Don't forget to check out Tableau's free online resources (<https://www.tableau.com/first-robotics>) created specifically for *FIRST*® Robotics Competition students.

These access codes are for educational use only. Please do not share your key with anyone outside your team.

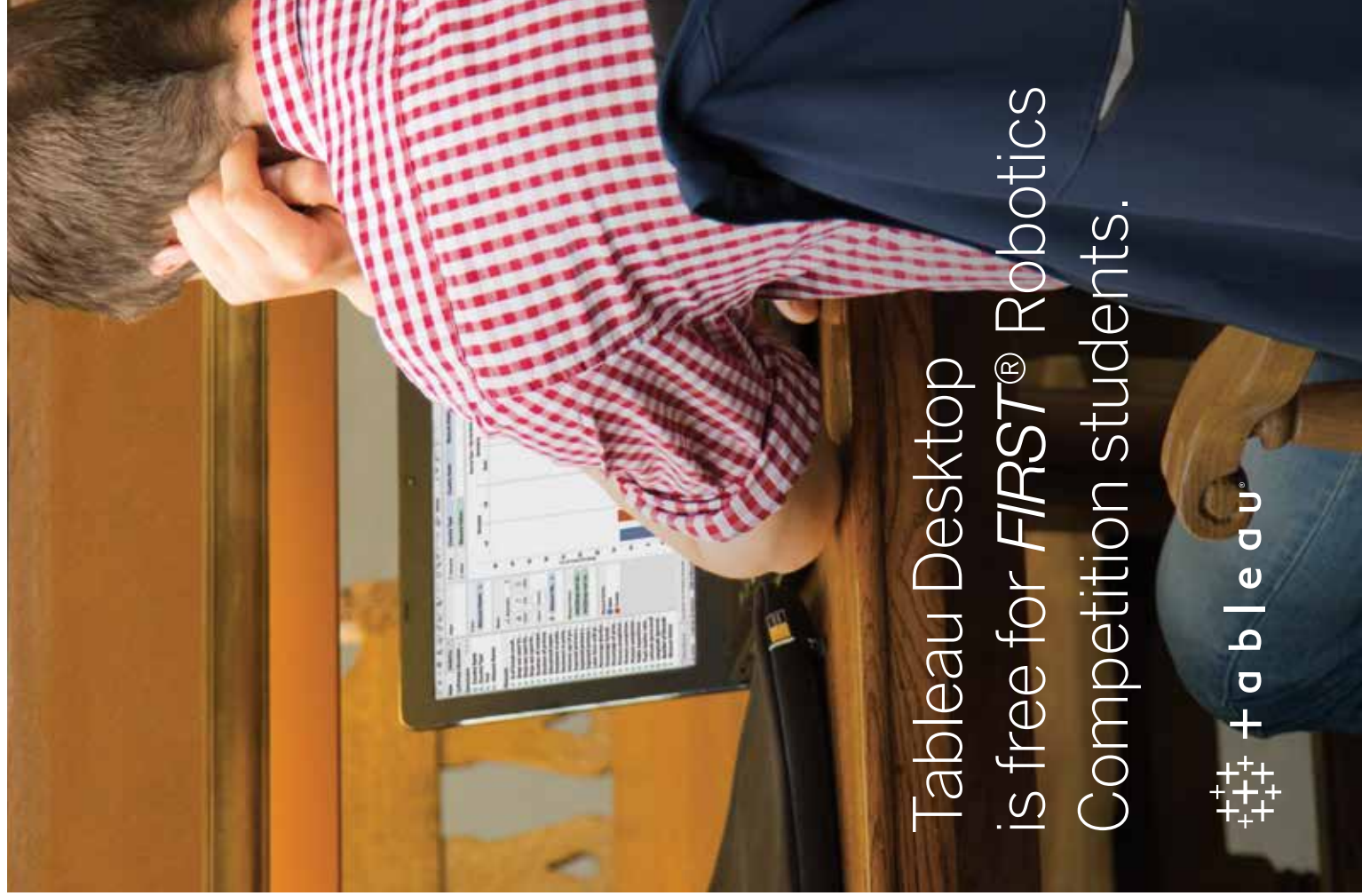


Tableau Desktop
is free for *FIRST*® Robotics
Competition students.

+++ + a b l e a u ®



Organization Name

Voucher Value

Expiration Date

Shipping

Access Code(s)

Website

Vulcan Spring & Manufacturing Co.

Six Free Springs

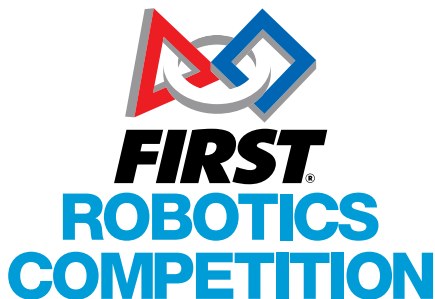
12/31/22

Included (U.S. and Canada)

Visit Team Registration Account

(Lead Mentor 1 or 2)

<https://www.vulcancares.com>



We are offering six constant force springs to each team participating in the competition. Mix and Match any springs from our constant force stock offering. The offer also includes free shipping within the USA and Canada! Orders are limited to 1 per team per year.



Beyond the Spring™ ▶▶▶

Sharing Spring
Solutions with
FIRST® Robotics
Competition
Since 2007

Phone: 215-721-1721 | 501 Schoolhouse Road, Telford, PA 18969



WOLFRAM
COMPUTATION MEETS KNOWLEDGE

Organization Name

Voucher Detail

Expiration Date

Shipping

Access Code(s)

Website

Wolfram Research

A year of complimentary access to Wolfram|One, Wolfram SystemModeler, and Wolfram|Alpha Pro

06/01/2022

Included

See below for details

www.wolfram.com/firstrobotics/



FIRST
ROBOTICS
COMPETITION

To claim your software, visit www.wolfram.com/firstrobotics

Students: Please use the screencast code “**FRCSTU53SYSW1PR2022**” and complete the team name and coach name fields in the form.

Coaches: Please use “**FRCOACH54SYSW1PR2022**” as the screencast code in the form.

Wolfram resources for *FIRST*® Robotics Competition are non-transferable and may only be used by registered participants of *FIRST*® Robotics Competition. This offer expires on June 1, 2022.





NOTES



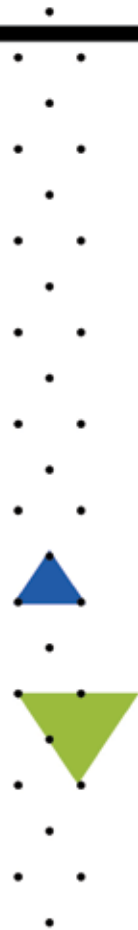


NOTES





NOTES



***FIRST*®** is a global robotics community
that prepares young people for the future.



firstinspires.org





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