

# 20<sup>th</sup> LAWRENCE TECHNOLOGICAL UNIVERSITY **ROBOFEST** 2019

## Kick-off Info Meeting



V1.0 10/01/2018 – International Kickoff

This PowerPoint file can be found at [robofest.net](http://robofest.net) under the “What’s New” Section and the **Get Involved→2019 Main Page**

# Welcome to Robofest 2019

## *Little robots, Big Missions*

- Dr. CJ Chung, Prof. of Computer Science, Founder and Director
- Dr. Chris Cartwright, Associate Prof. of Mathematics
- Dr. Joe DeRose
- Dr. Fred Brauchler
- Dr. John Miller
- Prof. Gordon Stein
- Prof. Keith Bozin
- Prof. Maurice Tedder
- Prof. Jon Ruzsala
- ...
- Elmer Santos, Assistant Director
- Shannan Palonis, Coordinator
- Pam Sparks, Coordinator
- Marilyn Weisman, MCS Department
- Teri Dubois, Associate Coordinator
- Don Dubois
- David Carbery
- Nicholas Paul
- Devson Butani
- Daniel Oliver
- Charles Faulkner
- Mark Kocherovsky
- Zhen Liu
- Joe Jeon
- Nimit Changani
- Candace Byrnes
- Judith Williams

# Robofest 2019 Kick-off Informational Meeting Agenda

***I. Overview***

*II. Schedule*

*III. 2019 Registration and How to Advance*

*IV. Open Competition Categories*

*V. Rules for Each Main Competition Category*

*VI. Q & A*

# Robofest Mission Statement

Robofest's mission is to

- Generate excitement & interest among young people for Science, Computer Science, Technology, Engineering, and Mathematics (STEM)
- develop soft skills such as teamwork, leadership, creativity, communication and problem solving
- Prepare them to excel in higher education and technological careers

# Features of Robofest

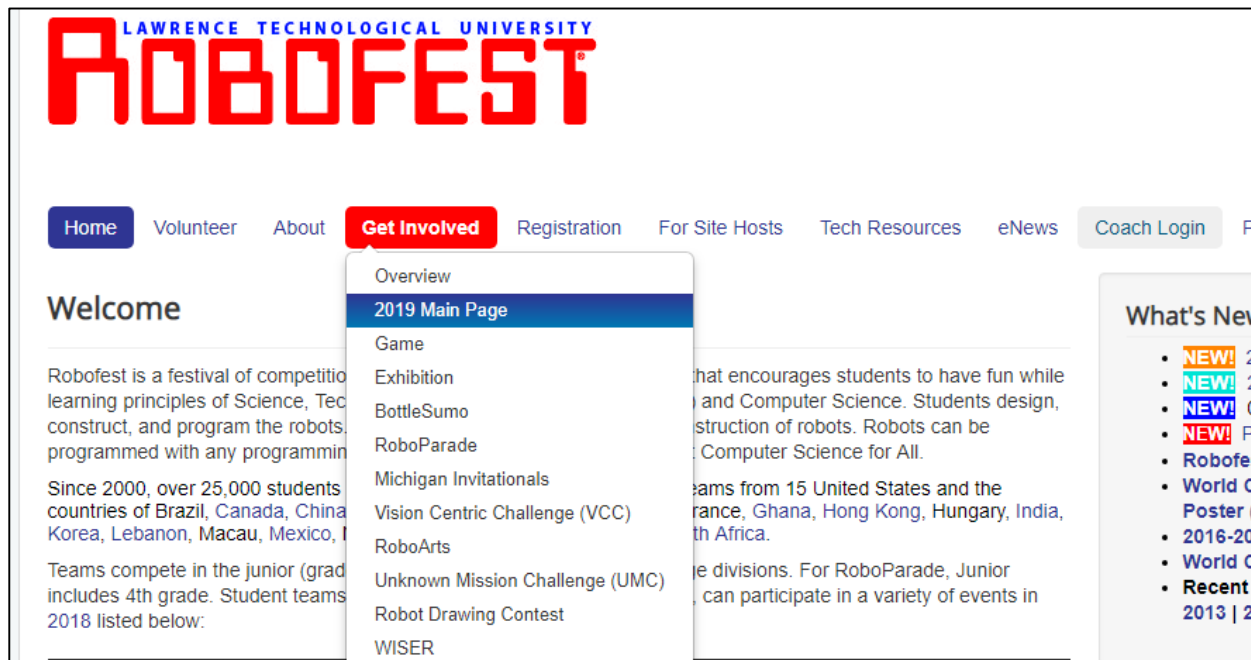
- Autonomous – **Sensors required**
- Challenging - dynamic playing fields, unknown factors, and **no** direct adult help allowed
- Any robotics kit / system
- Affordable (reuse old kits; Registration fee: \$50)
- Pre and Post Assessments (on-line)
- Qualifying Competitions, MI Invitationals & World Championship
- Age Divisions for most categories:
  - Jr. Division: 5<sup>th</sup> – 8<sup>th</sup> (in spring 2019)
  - Sr. Division: 9<sup>th</sup> – 12<sup>th</sup> (in spring 2019)
- Variety of competition categories for more opportunities in STEM learning

# 2019 Season Opportunities

- Main Qualifying Competitions
  - Game
  - Exhibition
- Open Competition Categories
  - RoboParade
  - BottleSumo
  - Vision Centric Challenge (Vcc)
  - Unknown Mission Challenge (UMC)
  - RoboArts

# 2019 General Rules

- Official General Rules Document and other important forms can be found on the robofest.net website under the **Get Involved** → **2019 Main Page**



- Coaches are responsible to communicate rules updates to contestants

# Online Surveys for Math and Science

- All surveys are anonymous
- Pre-survey: Instructions will be emailed to coaches when teams are registered.
- Post-survey: After the qualifiers, instructions will be emailed to coaches in April.



# LTU Scholarship Opportunity

- Opportunity available for distinguished Robofest team members who attend Lawrence Technological University.
- Earn a \$3,000 renewable scholarship, a total of \$12,000 over 4 years of college.
- Submit your application, along with a 400-word essay regarding your Robofest experience, your career goals, and a letter of recommendation from one of your Robofest adult coaches or mentors.
- Deadline date: April 1st. The application can be found in the Admissions area on the [LTU.edu](http://www.ltu.edu) website or directly at: <https://www.ltu.edu/cm/attach/44851ee6-dffc-48f0-8c4e-cb0c0ea8bace/robofestscholarshipform-1.pdf>
- Robofest can assist with a letter of recommendation if requested.

# Volunteer Opportunity

- Advanced/Experienced Robofest participants of any age as well as adults can volunteer to mentor Robofest teams
- Service Hours can be earned:
  - President’s Volunteer Service Award
  - National Honor Society
  - Boy Scouts/Girl Scouts
  - Church or School
  - Etc...
- Robofest will screen and coordinate teams with volunteers. Contact Elmer Santos [esantos@ltu.edu](mailto:esantos@ltu.edu)

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# 2019 Main Season Schedule

- **October 1:** International Rules published
- **October 26:** Official US Rules announced & published on the website
- **November 30:** US Team registration opens
- **January 12, 2019:** finalization of Rules; watch for eNews announcement. Join eNews list at [robofest.net](http://robofest.net)
- **January ~ February:** On-site technical workshops and Webinars – Registration open for competing teams.
- **February 16:** Warm-up at LTU (Judge Training)

# 2019 Main Season Schedule

- **March ~ April 21**: US and International Qualifiers; post assessment sent
- **April 22**: US and International Video Qualifier deadline
- **April 22**: Video Submission deadline for Screening of Winning US Exhibition teams
- **April TBD**: Michigan Invitationals at LTU
- **May 16, 17, 18**: World Robofest Championship at LTU

# 2019 Workshops – Tentative

- Game:
  - EV3 Workshops at LTU: Jan 12, 19, 26 and Feb 2
  - EV3 Webinars: Jan 22 and Feb 2 (to be recorded)
  - Robot Mesh for VEX IQ Workshop at LTU: Feb 9
  - RobotC Workshop at LTU: Jan 26 and Feb 9
- Exhibition:
  - EV3 Workshop at LTU: Feb 23
- Vcc:
  - L2Bot Workshop at LTU: Mar 3

# 2019 Workshops – Tentative

- On campus workshops are only for teams who have registered and paid for a qualifier. (*Pre-registration available*)
- Students can register for multiple workshops
- Complete list at [www.robofest.net](http://www.robofest.net), click on “coach login”  
➔ “Available workshops”

# Michigan Invitionals

- To be Scheduled during April, 2019
  - Lawrence Tech University, Southfield, MI
  - Computer Science Robotics Lab – J234
  - Small events (10 – 12 teams)
- 
- More information covered later in the presentation





# World Robofest Championship

- Lawrence Tech University Campus, Southfield, MI
- Thursday May 16:
  - Jr. BottleSumo Group 1
- Friday May 17:
  - RoboParade
  - UMC
  - Jr. BottleSumo Group 2
  - and Sr. BottleSumo
- Saturday May 18:
  - Game and Exhibition Championships
  - RoboArts
  - Vcc
  - Jr. BottleSumo Final Round



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# Becoming a Team Coach

- Any teacher, school administrator, parent (not necessarily from a school), tech specialist, or scientist/engineer is eligible to be a coach.
- Coaches must be adults without criminal record.
- Please note: email is the primary and official communication method between Robofest and coaches.
- Coaches must agree to *and* abide by the 2019 Coach's Pledge.

# Coach's Pledge

*As a coach, I am responsible for communicating and enforcing the Robofest rules to team members, team volunteers, and others affiliated with my team. I understand that any rule updates, guidelines, additional information, and announcements will be communicated to me, officially via emails. I am responsible for reading the information and I will relay it to all the people affiliated with my team. If any changes are made to my email account, I will notify Robofest administrators as well as update my coach profile.*

# Coach's Pledge - Continued

*As a Robofest coach, I understand that the students come first. Robofest is about the students learning computer technologies, science, engineering, and mathematics. Everything my team does starts and ends with the principle: the students do all of the work. My team members will do the designing and building of the robot, problem solving and programming. Adults can help them find the answers, but cannot give them the answers or make the decisions in detail.*

*I intend to uphold and maintain the Robofest spirit.*

# Roles of Team Coach

- Recruit team volunteers, including technical mentors and assistant coaches, if needed
- Find sponsors
- Facilitate team meetings
- Enter/update the team data and upload team & robot photos
- Collect Consent & Release forms to submit at event
- Request Students complete pre & post assessment
- New Coach Presentation available on line: [robofest.net](http://robofest.net)
  - ➔ Get Involved ➔ Overview

# Steps to Register a Team

1. Read [2019 General Rules](#)  
([robofest.net/Get involved/2019 Main Page](http://robofest.net/Get%20involved/2019%20Main%20Page))
2. *if you are a returning coach, skip to 5*
3. Go to [robofest.net](http://robofest.net), click on Coach Login, and submit New Coach Registration form
4. Confirm the registration at your email account – If you do not receive a confirmation email, please contact [robofest@ltu.edu](mailto:robofest@ltu.edu)

# Steps to Register a Team

5. Log on to the coach account at [robofest.net](http://robofest.net)
6. Select a competition site and a category per team
7. Register team(s)
8. Pay registration fee online using PayPal (or send a check)
9. Upload team photo; update team info as necessary



# Team Registration Deadline

- Site will be frozen to updates **10 days before** the qualifier competition date (some sites may be longer to allow for cross country/international shipping)
- Coaches are notified of Freeze Date multiple times via email and on the Site's web page
- If a division at a site does **not** have **5** teams or more, the division may be canceled
- Teams registered in the division at the site may be moved to another available site (Michigan); or teams can compete via Video Qualifier

# Age Division Waiver Requests

- Coaches submit the Age Division Waiver Request on-line when registering team members if the team member is outside the age for the division
- Robofest office will review the application
- Robofest will respond to the coach via email with approval or disapproval
- Usually, playing up from Jr. to Sr. is permitted

# Registration FAQ

- Can a coach register multiple teams at a single site: **Yes**
- Can a coach use one coach ID to register teams in multiple sites? **Yes**
- Can a student be a member of multiple teams at one site?
  - Yes, but not the same category
  - For example, a student can participate in Game as well as BottleSumo

# Registration FAQ

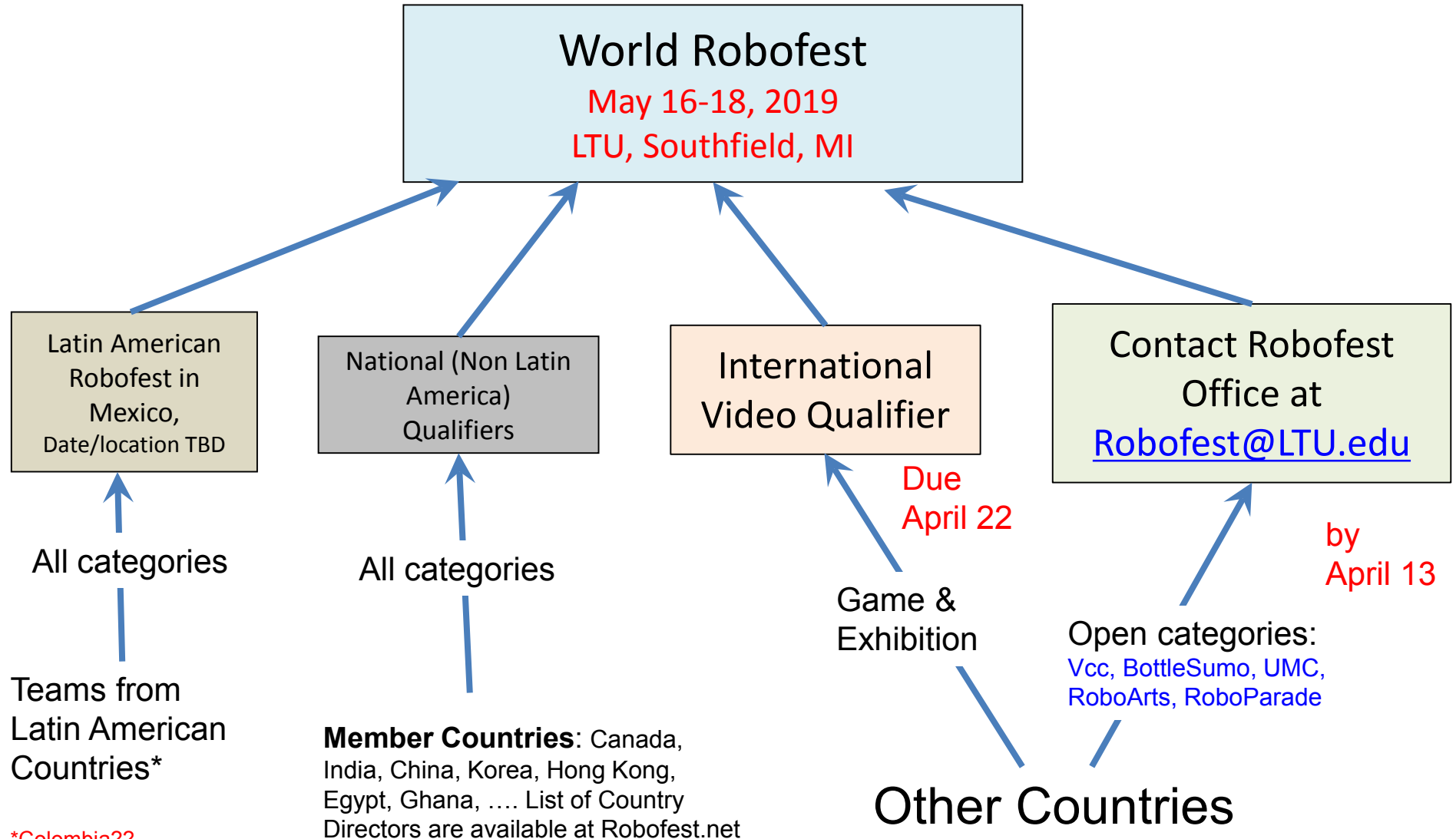
- Can a team register at multiple qualifying sites?
  - Game Teams in Michigan who would like a second chance to qualify for World Championship can register for Michigan Invitationals (create a new team number, new registration fee)
  - Exhibition Teams in Michigan as well as Game and Exhibition Teams in other US states who would like a second chance to qualify for World Championship can register for Video Qualifier (new team number, new registration fee)

# Advancing to World Championship

# Advancing to World Championship International Teams

- International Game, Exhibition and Open Category teams in Member countries will compete at Member Country Qualifiers.
- Qualified teams will be advanced to the World Championship through the Director.
- International Game and Exhibition teams in other countries may compete via International Video Qualifier Submission
- International Open Category teams in other countries can register directly for the events.

# How to participate in World Robofest – International (non-USA) Teams



\*Colombia??

# Advancing to World Championship Non-Michigan Teams

- All Game and Exhibition trophy winners of the US Non-Michigan Qualifying competitions will compete in a “Virtual Regional” for an invitation to the World Championship
- Winning Game scores will be submitted by site hosts (teams do nothing)
- Winning Exhibition teams must prepare a video of their exhibition presentation/demonstration and the coach must upload a link to the video to the team’s registration site by Monday, **April 22**



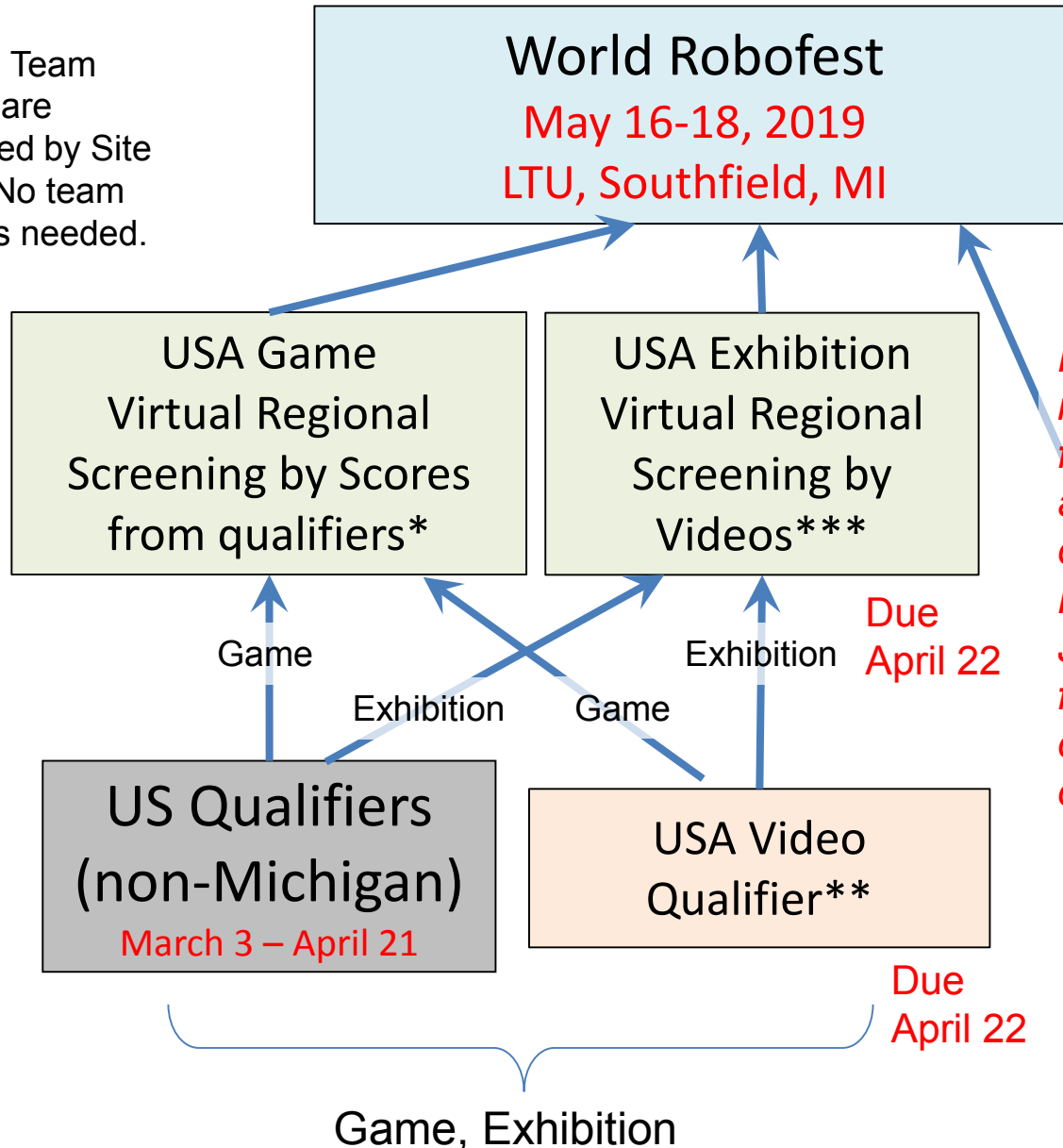
# Advancing to World Championship Non-Michigan Teams

- The total number of Game and Exhibition teams advancing from the Virtual Regional to the World Championship will be decided on the team's scores.
- **Game and Exhibition** Teams who did not win a trophy at a US Non-Michigan Qualifying competitions who would like a second chance to qualify for World Championship can register to compete again through Video Qualifier (new team number, new registration fee, Deadline **4/22**)
- Game and Exhibition Teams earning an invitation to World Championships will be notified by Robofest World Headquarters Friday **4/26**.

# How to participate in World Robofest – USA Teams

\* Game Team Scores are submitted by Site Hosts. No team action is needed.

\*\*\* Exhibition Teams must record video and post link on team page at Robofest.net



*Registration is first come, first served and will be opened in March, 2019. Join eNews for notification of exact date of opening.*

\*\*Teams are permitted to re-compete through USA Video qualifier, if not satisfied with qualifying results. Must re-register with a new team ID.

Open categories:  
Vcc, BottleSumo,  
UMC, RoboArts,  
RoboParade

# Advancing to World Championship

## Michigan Game Teams

- All Trophy-Winning **Game** teams from each Michigan Qualifying competition will automatically advance to the Robofest World Championship
- **Game** teams who do not win a trophy from Michigan Qualifying competitions who would like a second chance to qualify for World Championship will be eligible to register to compete again at one of several **Michigan Invitational** Events to be scheduled during the month of April 2019 at Lawrence Technological University.

# Advancing to World Championship

## Michigan Game Teams

- Registration for Invitationals will open later in the season
- Teams must register with a new team number and pay a new registration fee to be eligible to compete. Teams will receive a Michigan Invitational Certificate and Medal of participation.
- The total number of Game teams advancing from the Michigan Invitationals to the World Championship will be decided on the team's scores.

# Advancing to World Championship

## Michigan Exhibition Teams

- Trophy Winning **Exhibition** teams from the Michigan Qualifiers will compete in the “Virtual Regional”
- Teams must prepare a video of their exhibition presentation/demonstration and upload a link by **4/22**
- Non-Winning Teams in who would like a second chance to qualify for World Championship can register to compete again through Video Qualifier (new team number, new registration fee, Deadline **4/22**)
- Exhibition Teams earning an invitation to World Championships will be notified by **4/26**

# How to participate in World Robofest – USA Michigan Teams<sup>+</sup>

+ Michigan teams may also compete via USA Video Qualifier

**World Robofest**  
May 16-18, 2019  
LTU, Southfield, MI

\*\*\* Exhibition Teams must record video and post link on team page at Robofest.net

**Michigan Invitational Qualifiers**  
April

**USA Exhibition Virtual Regional Screening by Videos\*\*\***  
Due April 22

*Registration is first come, first served and will be opened in March, 2019. Join eNews for notification of exact date of opening.*

Trophy Winning Game Teams

Game

Exhibition

**Michigan Qualifiers**  
March 3 – April 14

Open categories: Vcc, BottleSumo, UMC, RoboArts, RoboParade

Game, Exhibition

# Trophies and Certificates

- Coaches can order Duplicate Trophies
  - For teams who place at any event
  - Exact duplicate of the trophy awarded
- Coaches can order “Winners Certificates”
  - For teams who place at Championship Events
  - Indicates the Participant’s Name, Team Number, Event and award
  - Fee: \$1.00 per certificate plus shipping and handling
- Order forms and pricing information will be available on [robofest.net](http://robofest.net)

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# 2019 Open Competition Categories

- Open competitions - do not require a qualifying competition except in some countries
- Some US sites host open categories – no advancing, lower registration fee possible
- All Competitions will be held during World Championship, May 16, 17 and 18, 2019
- World Championship Open Category Registration will open in March 2019.
- First come, first served. Space is limited. Register and pay registration fee early!

# 2019 Open Competition Categories

- Registration fee per team at World Championship events: \$50
- Fee covers participation medals, certificates, winner's trophies, Dinner on Friday, May 17, etc.

# RoboParade

- Robots are decorated like parade floats and follow a line and a robot in front of it on the parade route
- Jr. Division - expanded to include 4<sup>th</sup> Grade
- Perfect for beginners
- Max team members: 5
- 2019 WC Event Theme: “The Past, Present and Future of Transportation”
- Rules: [robofest.net](http://robofest.net) → Get Involved → RoboParade

ROBOParade

# BottleSumo

- Be the first robot to intentionally push a bottle off the table OR be the last robot remaining on the table.
- Jr. Division – Only LEGO NXT, LEGO EV3, and VEX IQ
- Sr. Classic Division for LEGO NXT, LEGO EV3, and VEX IQ
- Sr. Unlimited Division for any robot platform
- Max team members: 3
- Rules: [robofest.net](http://robofest.net) → Get Involved → BottleSumo

**BOTTLESUMO**

# Vision Centric Challenge (Vcc)

- Vision based robot navigation challenge
- Senior (Advanced High School Students) and College Divisions
- Advanced competition
- Max team members: 3 for Senior, 2 for College
- 2019 Challenge: “**S-SLAM (Simple - Simultaneous Localization and Mapping)**”
- Rules: [robofest.net](http://robofest.net) → Get Involved → Vcc

The logo for the Vision Centric Challenge (Vcc) is displayed in a large, bold, green font. The letters 'V', 'c', and 'c' are all lowercase and have a slightly rounded, modern appearance.

# Unknown Mission Challenge (UMC)

- Missions are completely unknown until day of challenge
- Jr. and Sr. Divisions
- Lego NXT, Lego EV3 or Vex IQ only
- All robot components must be un-assembled at the beginning of the competition
- Max team members: 3
- Rules: [robofest.net](http://robofest.net) → Get Involved → UMC

The logo for the Unknown Mission Challenge (UMC) is displayed in a large, bold, blue font. The letters are stylized with thick strokes and rounded corners, giving it a modern and industrial appearance.

# RoboArts

- Similar to Exhibition, but projects are specifically focused on the visual and performing arts
- Jr. and Sr. Divisions
- Max team members: 5
- Rules: [robofest.net](http://robofest.net) → Get Involved → RoboArts

ROBOArts

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# Qualifying Competitions

Competition Category	Age Division	Team Size	Robot	Unknown factors
Game	Jr. & Sr.	Max 5	Any	Yes
Exhibition	Jr. & Sr.	Max 5	Any	Lighting Condition

**Team Registration Fee: \$50**

**(fee includes participation medals, certificates, and winners trophies)**

# 2019 Qualifying Sites for Game/Exhibition

- Complete list at [robofest.net](http://robofest.net) → Registration
- United States: MI, CA, FL, HI, IL, MN, MO, **NM**, OH, OR, TX, US Video Qualifier, IN, MA, WA, ...
- International: Canada, China, Egypt, Ghana, Hong Kong, India, Korea, Lebanon, Macau, Mexico, Morocco, Nigeria, South Africa, and International Video Qualifier from France and Italy...
- *Still accepting site host applications - Email application to [robofest@ltu.edu](mailto:robofest@ltu.edu)*

# Video Qualifier Submission: US & International Teams

- US and Canada Game and Exhibition teams **who do not have a Robofest Qualifier in close proximity** may register for On-Line Video Submission:
  - **USA\_Video\_Qualifier**
- International Game and Exhibition teams **who do not have a National Robofest Director** may register for On-Line Video Submission:
  - **International\_Video\_Qualifier**
- Game teams: contact [robofest@ltu.edu](mailto:robofest@ltu.edu) prior to the submission to get unknown factors

# Video Qualifier Submission: US & International Teams

- When submitting a video, the coach must include the a link to the team's video on the team's registration page (emails not accepted)
- All videos/submission forms must be *received* by Monday **April 22, 2019** 11:59pm Eastern Time

# Recognition of Video Submission Teams

- Medals and Certificates will be mailed to each coach
- Winners will be decided by Judges appointed by Robofest office
- Winner's trophies will be presented at World Championship or shipped to the coach if the team does not attend



# Team Photo Contest

- Upload team photograph within 3 weeks after the team registration *and* at least 10 days prior to the competition.
- Selection criteria: Upload date (earlier is better), team spirit, unity, harmony, uniqueness, etc.
- Winners will be announced during the World Robofest Championship.

# Exhibition

# Exhibition

- Complete freedom to show off any type of creative intelligent robotics project - Robotics Science Fair
- No Recommended Theme for 2019
- Must employ sensors
- Human to Robot, Robot to Robot interaction strongly encouraged.
- Program controlled remote is allowed, if the program of remote controller is programmed by students.
- Space for project is limited to **64** square feet including a 6ft or 8ft table.



# Exhibition

- 4 minutes are given for an official presentation including demonstration. Team is responsible for keeping the time.
- Teams should not ask Judges to be a part of the official demonstration.
- Prior to Qualifiers, Sharing online videos (such as YouTube) is highly recommended – Upload to team registration page
- Example Projects - Visit [robofest.net](http://robofest.net) and click on Prior Years, then Prior Year Exhibitions.

# Exhibition

## Judging

- View the Exhibition **Judging Rubric** online by going to [robofest.net](http://robofest.net) → Get Involved → Exhibition
- The application of math and science theories which are appropriate to the team members' age level is a strong plus for judging. Not appropriate to the age level is OK, but it may not give any advantages for the judging.
- One member team is allowed, but will get lowest score for teamwork criteria.
- Site Hosts may utilize Judging App to streamline judging and reduce errors.

# Exhibition

## Judging Rubric (1 of 2)

<b>5: <u>Strongly Agree</u></b>	excellent, outstanding, advanced, exemplary, or amazing
<b>4: <u>Agree</u></b>	good, accomplished, or proficient
<b>3: <u>Neutral</u></b>	average, intermediate level, or acceptable
<b>2: <u>Somewhat Disagree</u></b>	attempted but needs work
<b>1: <u>Disagree</u></b>	little attempted or needs lots of help

1 ~ 5

Judging Category	Sub Categories	Weight	Score
1. STEM learning	This project truly demonstrates applications of science, engineering, and math.	8%	
	Students have an age appropriate understanding of the science, engineering and math concepts they applied.	8%	
2. Project idea and originality	The project idea was very original and showed impressive creative thinking and problem solving skills.	12%	
3. Project demo performance (robot)	The official public robot demo was free from problems and very impressive.	12%	
4. Project presentation	Project presentation was clear, well organized, and delivered effectively within the allowed time.	8%	
	Information on the team poster, brochure and signage was clear, well designed, and able to be understood even by robotic novices. Project remained within allowed size parameters.	4%	

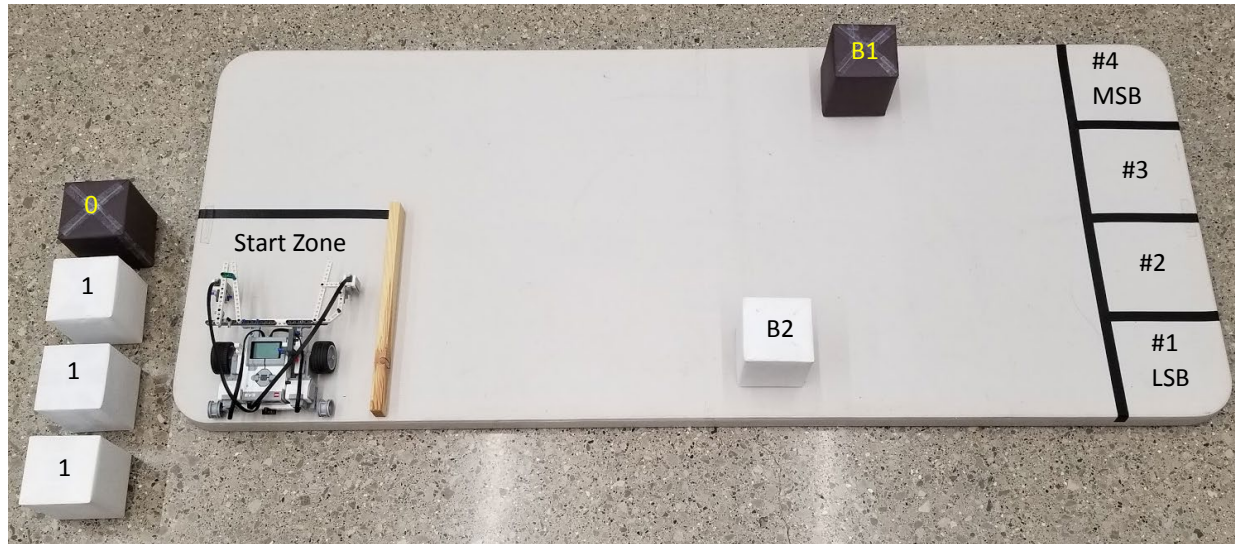
# Exhibition

## Judging Rubric (2 of 2)

5. Teamwork	Specific member roles were clearly introduced. Work division was well balanced. Team members were respectful toward each other.	5%	
	Teamwork and team spirit were evident. <i>Note: If the team only has one member, the score should be 1.</i>	3%	
6. Robot design	The robot mechanical design was creative, effective, user-friendly, and sturdy.	8%	
7. Project complexity	The project is complex with multiple features/functions, sensors, and components.	7%	
8. Practicality	The project shows potential as a useful and practical application of robotics technology.	7%	
9. Programming	Students were able to explain their programming code. Programs are well structured and commented.	8%	
10. Team independence	I believe the project was mostly designed, developed, and programmed by students, not by adult coaches, parents, or mentors. The students were able to clearly and confidently explain each part of their project.	10%	

**GAME**

# 2019 Game BinaryBlocks



# 2019 Game – BinaryBlocks

## Mission

- Develop an autonomous robot that:
  - Arranges white and black blocks to represent a 4-bit binary number of a target decimal number.
  - Stacks additional blocks on top of the first same color block from the left.
  - Completes all the tasks autonomously within 2 minutes without any external help.
- Points are earned based on final location of the Blocks and the robot.
- At the World Championship, additional unknown task(s) will be added.

# 2019 Game - BinaryBlocks

## Documents and Videos Available

View Official Game Rules, Judging Score Sheet, Sample Unknown Factors, Site Host Procedures and more online by going to [robofest.net](http://robofest.net) → Get Involved → Game

Go to [robofest.net](http://robofest.net) and click on Game link to watch Example video with different scores



# 2019 Game - BinaryBlocks

## Unveiling Unknown Factors and 30 minute work time

- General unknown factors such as lighting condition, table (exact size, color, and texture), Block (exact size, weight, paper color and texture), etc. are unveiled when teams check-in at **the team pit.**
- Other unknown factors as well as “Game-Ending-Mission” will be unveiled just before the 30 minute work-time for each round.
- During the work-time, teams are to adjust the robot, change the code, and add programs for the Game-Ending-Mission.
- All people except contestants and authorized staff/volunteers will be evacuated from the pit/room during the work-time.
- Robots are impounded at the end of the 30 minutes and remain until all robots have completed the round.

# 2019 Game - BinaryBlocks

## Starting a Round

- **How to start a Game and Deliver Blocks**
  - The entire robot must be inside the Start Zone.
  - If the robot will push or carry a block, both the robot and block must be completely inside the Start Zone.
  - A human player may load a block on the robot or on the table surface.
  - When the robot returns back to the Start Zone and the robot completely passes the outside edge of the Start Zone line and not touching the floor, a human player may touch, pick-up, select different program, and re-orient (turn) the robot.
  - The robot does not need to self-stop.

# 2019 Game - BinaryBlocks

## Stopping a Round

- **How to end a Game**

- Unveiled just before the 30 minute work-time for each round.
- An example of the Game-Ending-Mission is for the robot to **stop** at the Start Zone line - any part of the robot must be on or over the black line.
- Game competition time will be recorded only when all the other missions as well as this Game-Ending-Mission are perfectly completed.
- World Championship Game-Ending-Mission will be more challenging than that of qualifying competitions.

# 2019 Game - BinaryBlocks

## Pick Up Violations

- **Violations that require a contestant to pick-up the robot: Pick-up penalty**
  - A human player touches the robot intentionally or unintentionally when the robot is not inside the Start Zone.
  - If a human player touches any field material (except Start Zone Blocks) intentionally or unintentionally.
  - If additional blocks are placed on the table by the human player outside the Start Zone.
  - If a block is placed in the Start Zone, when the robot is not inside the Start Zone.

# 2019 Game - BinaryBlocks

## Violations-Pick Up

- If one of the above violations occurs, the judges will announce “violation”, and give the team the option to either:
  - Restart inside Start Zone (with **pick-up** penalty).
    - At that time, the team may request one time full-reset (**full-reset** penalty) **OR**
    - Continue as is **OR**
    - Declare **end of the run.**

# 2019 Game - BinaryBlocks

## Violations-Pick Up

- **Robot drops off the table: Pick-up penalty or No Penalty**
  - If the team picks it up to restart, then a “pick-up” penalty will be applied.
  - There will be no penalty when the robot drops off the table and the team declares the end of the Game.
  - There is no double penalty if the robot drops off the table and is picked up.

# 2019 Game - BinaryBlocks

## Violations-Full Reset

- **Full-reset penalty**
  - The team may request a complete full-reset any time.
  - If the full-reset is requested when the robot is inside Start Zone, only full-reset penalty will be applied.
  - If the robot is picked up and full-reset is requested, then both pick-up and full-reset penalties are applied.

# 2019 Game - BinaryBlocks

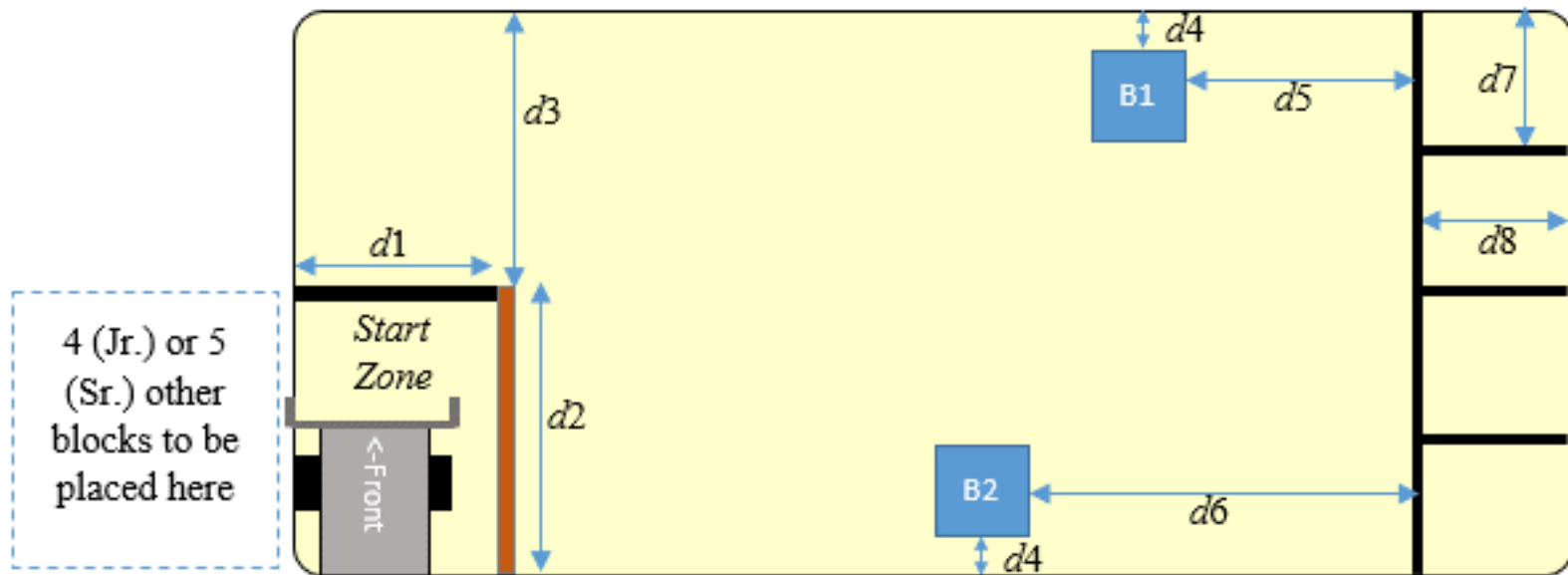
## Violations-Full Reset

- Only one complete full-reset of the playing field is allowed for a run
  - Full-reset is done only by Judges while the 2-minute countdown timer continues to run. Judges shall reset as quickly as possible.
  - A full-reset penalty is assessed as defined on the scoring sheet.
  - A partial reset (for example resetting one block) is NOT allowed.
- When the field is full-reset, all the points earned from the previous attempt are lost (cleared).
- A team may repair their robot and/or select a different program during the full-reset. The 2-minute countdown timer continues to run.



# 2019 Game - BinaryBlocks

## Playing Field Diagram



# 2019 Game - BinaryBlocks

## Field Dimensions/Unveil Times

	Min. value	Max. value	Unveiled when?	Note
<i>d1</i>	35cm	35cm	Known factor	Inside of the wall (wood block)
<i>d2</i>	35cm	35cm	Known factor. Fixed to 35cm	Edge to edge distance
<i>d3</i>	(Table width) – <i>d2</i>			Around 40 cm
<i>d4</i>	3cm	5cm	Unveiled after impounding	
<i>d5</i>	35cm	50cm	Jr: Unveiled before work-time for each round.	
<i>d6</i>	35cm	90cm	Sr: Unveiled after impounding	
<i>d7</i>	(Table width – 1.9*3) / 4			Around 17.3cm
<i>d8</i>	19 cm		Known factor	

# 2019 Game - BinaryBlocks

## Field Component Properties/Color and Unveil Times

<b>6ft plastic folding tables</b>	The playing field is a 30"x72" (actual size is about 75 x 182cm) plastic folding table that can be purchased at discount stores like Lowes. The recommended brand is "LifeTime". The four corners of the table are rounded with a radius of 4cm ~ 7cm. The thickness of the table is about 4.5cm. The surface is light in color such as white, gray, or almond; however, the exact size, color, brightness, and edge shape of the table is unknown until the competition day. Fold-In-Half plastic tables can be used if the center seam is covered with (masking) tape similar to the table color. The color of the tape would also be an unknown factor in that case. Pieces of plywood cut similarly to the folding tables can also be used if plastic folding tables are not available. The table is placed on floor. To mark the location of blocks, tapes, labels, or markers may be used. The exact color and size of those markers are unknown factors.
<b>Floor color under tables</b>	Unveiled at the beginning of competition day. Possibly not homogeneous. However, all the colors should be noticeably darker than the table color.
<b>Blocks</b>	Unopened tissue paper boxes wrapped in black or white paper. Exact color of the paper is unknown till the competition day. Size of a box is about 11cm x 11cm x 13cm (height). We allow $\pm 1$ cm of tolerance since the size of tissue box will vary by vendors and countries. Weight is 145g ~ 185g. Please note that the actual box type to be used is an unknown factor. B1 and B2 block in Figure 1(a) can be either white or black.
<b>Wall</b>	The wall is made of a 1.9cm (wide) x 3.7cm (tall) x 35cm (long) pine wood bar attached to the table with VELCRO or Dual-lock.
<b>Binary Bit Slots &amp; Start Zone line</b>	Standard black electrical tape. Width is $\frac{3}{4}$ " or 1.9cm.

# 2019 Game - BinaryBlocks

## Robot Specifications (Junior and Senior Division)

- A Robofest team ID tag and **team name** on top of the robot is required.
- At the start, the robot's maximum width and length are each 35cm. However, after the round starts, the robot may autonomously expand its length and width dimension up to **50cm**. There is no height limitation.
- Weight limitation: none .
- Any number of sensors/sensor types (unless it is harmful to humans).

# 2019 Game - BinaryBlocks

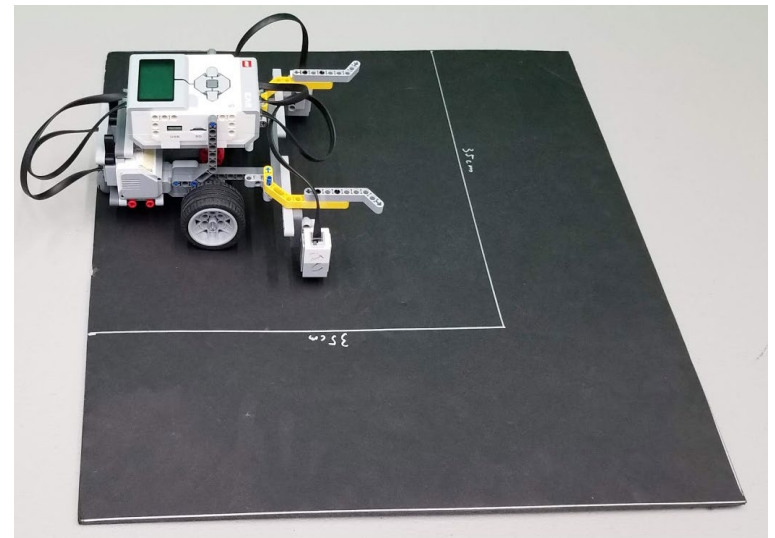
## Robot Specifications (Junior and Senior Division)

- Any number/type of motors/servo motors (multiplexor is OK to use).
- Any material/robot kit may be used to construct your robot including tape, glue, nuts and bolts, rubber bands, etc.
- The robot or part of the robot may not use the game elements. For example, do not use a black or white covered tissue box as part of the robot.

# 2019 Game - BinaryBlocks

## Robot Specifications (Junior and Senior Division)

- During impounding, width and length will be checked.
- During the checking, all the wheels must touch the floor.
- Robot connector wires are allowed to extend beyond the maximum dimensions, but if wires are used for anything other than an electrical connection, they must be within the maximum dimension limits.



# 2019 Game - BinaryBlocks

## Difference between Junior and Senior Divisions

	Junior (5 <sup>th</sup> ~ 8 <sup>th</sup> grades)	Senior (9 <sup>th</sup> ~ 12 <sup>th</sup> grades)
Game-Ending-Mission	Easier	Harder
Colors of B1 and B2	Unveiled before work-time	Unknown. Unveiled after impounding
# of blocks to stack on another	2	3
<i>d5, d6</i>	Unveiled before work-time	Unknown. Unveiled after impounding
Number of on-board computer controllers	One	No limit

# 2019 Game - BinaryBlocks

## Rules to Play Two Rounds and Determine Winners

- Only contestants are allowed to access the pit area, team tables, practice fields, and official game fields throughout the competition day, including during the setup time before the opening ceremony, during work time and breaks (adult coaches, mentors, or other volunteers may assist with transporting team materials if necessary, escorted by proctors).
- Playing field Block locations will be different for each round.
- When unknown factors/tasks are unveiled, teams will be provided a hard-copy of unveiled information or the information will be projected on a large screen.
- Teams will be given a 30-minute work-time after unknown factors/tasks are unveiled to work on their robots. During this time, all people except contestants and authorized staff/volunteers will be **dismissed** from the pit/room.



# 2019 Game - BinaryBlocks

## Rules to Play Two Rounds and Determine Winners

- All teams must submit their robot to the impound area when the 30-minute work-time has expired. Robots may be taken to be impounded early. Only one team member should deliver the robot to the impound table. Penalty may be applied if not impounded in time.
- During the impounding process, judges will inspect the robots. (Size of the robot before & after expanding, Team ID, team name, and label indicating the front side, number of computer controllers, etc.).
- No power will be supplied at the impound table and the entire robot must be impounded, including rechargeable batteries.
- After impounding, the judges will set up official playing fields with blocks.

# 2019 Game - BinaryBlocks

## Rules to Play Two Rounds and Determine Winners

- Teams will compete in a pre-determined order decided by the site host.
- During the Game Rounds, all team members must remain in the team spectator area— no pit access allowed.
- When a team is called to compete, a maximum of two contestants per team are allowed to retrieve the robot from the impound area and be present at the playing field during the run.
- Contestants must stay near the Start Zone. They should not follow the robot. They can approach the robot only when they decide to pick it up.

# 2019 Game - BinaryBlocks

## Rules to Play Two Rounds and Determine Winners

- Final scoring is done after the run is over.
- A team member must sign the score sheet to confirm the team's score.
- Score shall be displayed to teams to validate data entry.
- Winners in each age division will be decided by the **average** total score of the 2 rounds. Tie breakers will be: (1) best score of two rounds, (2) highest time left from best score, (3) rerun, if needed.

Team Name	Round 1 score	R1 time left	Round 2 score	R2 time left	Avg. Score	(1) Best score	(2) Time left best score	Rank
Team A	80		100	15	90	100	15	<b>1</b>
Team B	100	10	80		90	100	10	<b>2</b>
Team C	90		90		90	90		<b>3</b>

# 2019 Game - BinaryBlocks

## Reminders of General Rules, Additional Rules and Restrictions on Competition Day

- Proctors are watching for the following Violations:
  - Coaches or Parents in the pit area during practice or work-time (except for initial transport of materials).
  - Coaches or Parents accessing the practice or official game tables at any time.
  - Verbal/electronic communication between the team and coach/parent while the team is setting up and practicing in the pit area and during work-time.
  - Team members leave the pit unsupervised during work time before their robot is impounded.
  - Any team member alters his/her own robot after impounding
  - Team handles or interferes with another team's computer or robot, either in the pit or in the impound area.



# 2019 Game - BinaryBlocks

## Special Notes

- Though every effort is made to be consistent and precise in all of the dimensions of the playing field and parts, Robofest assumes a tolerance of  $\pm 5$  mm, unless stated otherwise.
- If there are multiple playing fields at the competition sites, the Chief Game Judge will check consistency between the playing fields. However, there is no guarantee to make them all identical.
- Judges should maintain at least 1 meter distance from the field when the robot is in action.
- Final decisions are at the discretion of the Chief Game Judge.

# 2019 Game - BinaryBlocks

## Score Sheet (1 of 2)

Judging Items (to be checked when the Game is ended)		Check / Count		Point Value (per count)	Score Earned / Lost
Bit Slot #4 (MSB)	Correct color block completely in*	0 (no)	1 (yes)	15	} <i>Max.</i>  <i>Max. 15</i>
	Correct color block partially in*	0	1	8	
	Incorrect block is completely or partially in*	0	1	4	
Bit Slot #3	Correct color block completely in*	0	1	15	} <i>Max.</i>  <i>Max. 15</i>
	Correct color block partially in*	0	1	8	
	Incorrect block is completely or partially in*	0	1	4	
Bit Slot #2	Correct color block completely in*	0	1	15	} <i>Max.</i>  <i>Max. 15</i>
	Correct color block partially in*	0	1	8	
	Incorrect block is completely or partially in*	0	1	4	
Bit Slot #1 (LSB)	Correct color block completely in*	0	1	15	} <i>Max.</i>  <i>Max. 15</i>
	Correct color block partially in*	0	1	8	
	Incorrect block is completely or partially in*	0	1	4	





# Example Scoring



**Case 1:**  
Perfect score  
 $15+15+15+15+$   
 $12*2+3+13 = 100$



**Case 2:**  
 $8+15+15+15+$   
 $9*2+3+13 = 87$   
  
Base Block is not  
completely in the  
slot #4

# 2019 Game - BinaryBlocks

## Game Field Kits – Available for Purchase

- Robofest office J-233 in Dec ~ Feb.
  - \$10.00
  - Plus Shipping and Handling
  - Kits may be picked up in the Robofest Office J233
  - The kits consists of 6 (Jr.) or 7 (Sr.) Blocks, Wood Block (Wall) with VELCRO or Dual-Lock tape, roll of electrical tape.
- To order: Email [spalonis@ltu.edu](mailto:spalonis@ltu.edu) (best way) OR call 248-204-3568.
- Robofest Office will ship official Game kits to each Site Host (as listed in site host Letter of Agreement).

# 2019 Game - BinaryBlocks

## FAQ

- A. Block height size is different from width and length. Can a block be placed or stacked on its side, not the tall way? **Yes.**
- B. Can the robot bring B1 and B2 blocks to the Start Zone and then player can load on/to the robot? **Yes. Then the block become the same as the block at the Start Zone.**
- C. Can teams modify the robot and add additional structure when the robot is at the START Zone? **Yes, within the 2-minute time limit.**
- D. If the above (C) is allowed, should the additional structure be impounded too? **Yes.**

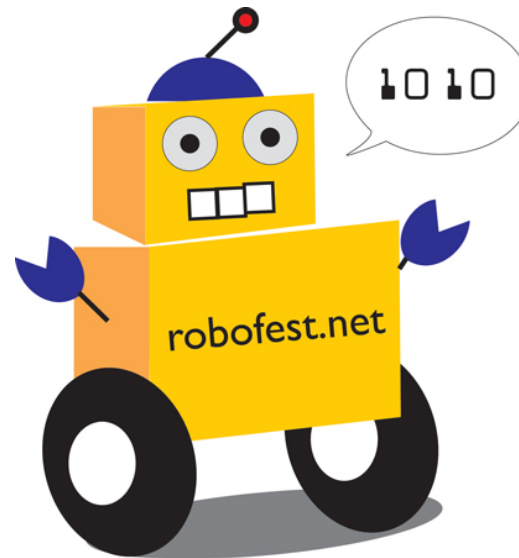
# 2019 Game - BinaryBlocks

## FAQ

- E. Can dead Mindstorms controllers be added to add weight for traction or a counter balance? **Yes, but you should not connect to any sensors or motors.**

# Questions?

Thank you!



Send questions, comments, corrections, and suggestions to  
[robofest@LTU.edu](mailto:robofest@LTU.edu)

join the Robofest eNews list at [robofest.net](http://robofest.net)!