

*Disclaimer: This article was written in 2022 with our best kNnowledge via online reading and experience. To get the most latest information, you need to visit the individual organizer website given in the 2nd row of the following table.*

|                              | <b>Robocup</b>  | <b>F.I.R.S.T</b>   | <b>VEX Robotics</b>   | <b>W.R.O.</b>   | <b>RoboFest</b>   |
|------------------------------|---|--|---|---|---|
| <b>General Overview</b>      |   |  |   |   |   |
| <b>History</b>               | 1997 : Robocup<br>2000 : RobocupJunior  | 1992   | 2007  | 2004  | 2000  |
| <b>Organizer</b>             | Robocup Federation -<br>www.robocup.org<br>junior.robocup.org   | FIRST   For Inspiration and<br>Recognition of Science and<br>TechNology<br>FRC/FTC:<br>www.firstinspires.org<br>FLL:<br>www.firstinspires.org/robotic<br>s/edu | Robotics Education and<br>Competition Foundation -<br>www.vexrobotics.com                 | World Robot Olympiad<br>Committee<br>- wro-association.org                                | Lawrence TechNological<br>Univeristy - www.ltu.edu  |
| <b>Levels</b>                | National, and World<br>competitions.<br>From Age 10 to Research.  | Local, regional, national, and<br>world competitions.<br>For Elementary school to<br>High School   | Regional, National, and<br>world competitions.<br>For Elementary school to<br>High School | Regional, National, and<br>world competitions.<br>For Elementary school to<br>High School | National, and World<br>competitions.<br>For Elementary school to<br>High School   |
| <b>Popularity<br/>in USA</b> | Low.  | High   | High  | Low   | Low   |
|                              | But highly esteemed in<br>Europe, South East Asia,<br>Australia, and Baltic States.   | also popular   | also popular  | limited   | very limited  |
| <b>Cost</b>                  | Low-cost and affordable<br>competition.<br>Field is 100% or mostly<br>reusable year after year with<br>affordable modification. | VERY HIGH. About 10K every<br>year, but with 50K+ for the<br>first year.<br>High cost due to investment<br>in new arena, and<br>proprietary mechanical         | similar to FIRST.   | Higher, but less expensive<br>than FIRST game.  | Low-cost and affordable<br>competition.<br>Field is 100% or mostly<br>reusable.<br>Field is 100% or mostly<br>reusable year after year with |

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|---------------------------------|---|--|--|--|---|
| <b>Grades/<br/>Leagues</b>      | Junior Leagues: pre-college (age 10+)<br>Major Leagues: College and Research Level .      | JrFLL - Gr. K to 4<br>FLL - Gr. 4 to 8<br>FTC - Gr. 7-12<br>FRC - Gr. 9-12       | VEX IQ - Gr. 4 to 8.<br>VEX EDR - Gr. 7 to 12.<br>VEX U - College level          | Beginner - 6 to 10<br>Elementary - up to 12.<br>Junior - 13 to 15<br>Senior - 16 to 19<br>FootBall - 10 to 19 Advanced | Junior - Gr. 5 to 8.<br>Senior - Gr. 9 to 12<br>Collegiate - only for Vision Centric Challenge. |
| <b>Subleagues</b>               | Soccer - Light and Heavy weight<br>Rescue Leagues<br>Robot On-Stage                       | None   | VEX IQ - Gr. 4 to 8.<br>VEX EDR - Gr. 7 to 12.<br>VEX U - College level          | None   | many- see <a href="http://www.robofest.net/">www.robofest.net/</a>                              |
| <b>Simulation</b>               | YES   | NO   | NO   | NO   | NO  |
| <b>World Event</b>              | Any country   | within USA :<br>- Houston, TX<br>- Detroit, MI                                   | Louisville Kentucky since April 2014   | Any country.   | Any country. Mostly in Asia.  |
| <b>Atmosphere</b>               | very Subdue.<br>Mentors are Not allowed to communicate with team members during           | Sport like.<br>Mentors,and teams are closely working together during competition | Sport like.<br>Mentors,and teams are closely working together during competition | unkNown.   | unkNown.  |
| <b>Most challenging aspects</b> | Excellent Software development skills.<br>Computer Vision kNnowledge is a MUST in most HS | Excellent Mechanical Building Skillls.   | Excellent Mechanical Building Skillls  | a large variety  | a large variety   |
| <b>Local</b>                    | Locals: 1 day event<br>World: 4 days with 5th day as Technical Symposium                  | locals: 1 day event world event: 3 days  | unclear..  | unkNown.   | unkNown.  |
| <b>team size</b>                | all (pre-college) : 2 to 4. For College: Various  | JrFLL - 2 to 6<br>FLL - 2 to 10<br>FTC - 2 to 15<br>FRC - 6 to 100               | No limit.  | Majority : 2 to 4  | 1 for the individual game category. But 2 to 7 for others.                                      |

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|------------------------------|--|---|---|---|---|
|                              | Heavily focus on technical aspect, engineering practice.   | Simulates how a corporation work - from marketing, engineering, to  | like FIRST.   | Heavily focus on technical aspect, engineering practice.  | Heavily focus on technical aspect, engineering practice.                |
| <b>Season</b>                | National: Early Spring. World : Early Summer.  | Regionals vary from October through April.<br>World event: last week of April                                   | Regionals : year-round<br>World : Usually in April        | Late Fall   | Regional : Dec World : May  |
| <b>World size</b>            | over 400+ teams from about 50 nations. (including all College leagues)                           | approx. 600 teams from about 30 nations (including all leagues)   | over 1000 teams from 30+ nations. (including all leagues) | Catching up like RoboCup  | unclear..   |
| <b>Awards</b>                | about 6 -10 awards for each league   | Many, depending on the division. They are trying to maximize the chance that almost every team get some awards. | like FIRST.   | unclear.  | unclear.  |
| <b>About the Game itself</b> |  |   |   |   |   |
| <b>Controller?</b>           | Up to each team.   | Must be a standard kit<br>Must use a single proprietary   | Must be from VEX  | 2 Categories - Must be LEGO<br>2 Categories - at team's choice                                      | Up to each team.  |
| <b>Mechanical</b>            | Can use any hardware.<br>Continuous improvement in the mechanical requirement from year to year. | much higher investment in building materials due to big yearly regulatory changes.                              | Must be from VEX  | 2 categories - must be LEGO but with various programming languages<br>2 categories - similar to RCJ | Continuous improvement in the mechanical requirement from year to year. |
| <b>Electronic</b>            | Can be heavily in Electronic.<br>Enhancement is required from one year to next.                  | Not so much.  | No. Plug and Play Vex components only.                    | 2 categories (LEGO) - None<br>2 categories - up to the team.  | Not so much.  |

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| <b>Robot Size</b>          | RCJ: smaller than 1'x 1'x 1'<br>College Leagues: Any size up to Humanoid                                    | FRC: About 4' x 4' x 4'+H<br>Others: smaller than 1'x 1'x 1'   | similar to FIRST.   | 2 categories (LEGO) - small<br>2 categories - up to the teams                 | usually small about 1'x 1'x 1'.   |
| <b>Automation</b>          | 100% autonomy. Emphasize on algorithms improvement in AI development. Requires excellent programming skill. | <b>Mainly Tele-op (remote control).</b><br>Provide clear sample to follow in order to encourage students to run the robot in the few seconds of Auto mode. | Similar to FRC. While VEX allows to run either tele-op or auto mode, large majority runs in tele-op.                              | 2 categories (LEGO) - full autonomy<br>2 categories - up to the teams         | Heavily in automation.  |
| <b>Attainable</b>          | Very challenging. Less attainable by Novice.  | Can be very challenging, but more attainable by Novice in simpler level.   | similar to FIRST.   | Can be very challenging, but much more attainable by Novice in simpler level. | Can be very challenging, but much more attainable by Novice in simpler level. |
| <b>Time limit</b>          | varies from 2 to 15 minutes. Completely Auto mode.  | Total 2.5 minutes.<br>- 15 seconds for Auto mode.<br>- 2 min + 15 sec for Teleop mode (i.e. Human control)   | Total 2 minutes.<br>- 45 seconds for Auto mode. (only for EDR and VEX U)<br>- 1 min + 15 sec for Teleop mode (i.e. Human control) | unclear.  | Large varieties   |
| <b>Tech. Symposium</b>     | World event: 5th day is for Technical Symposium where researchers from the globe presentation and talk.     | No   | No  | No  | No  |
| <b>Secret challenge</b>    | Yes in world event  | No   | No  | No  | Yes in both regional and world event  |
| <b>Independent Project</b> | Yes under OnStage League  | No   | No  | Yes   | No  |

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| <b>Field appearance</b> | Not colorful  | Appealing..  | Appealing..   | depends on the game. But mostly colorful.   | similar to RCJ   |
|                         | Dynamic Field<br>Completely based on robot's self- awareness.   | Static Field.<br>For the lower level - Mostly based on dead-reckoning method.  | similar to FIRST.   | 2 categories (LEGO) - static field with a few variation for upper grades<br>2 categories - up to the                                | similar to RCJ   |
| <b>Game Theme</b>       | Small Regulatory changes every year.  | Large Regulatory changes every year  | similar to FIRST.   | LEGO categories - Similar year to year but with field items randomly placed (somewhat similar to RCJ in that aspect)                | Field Competition - Junior & Senior Exhibition - Junior & Senior                                 |
| <b>Unique feature</b>   | All: 100% autonomy is required. "Heavily" in software algorithms toward AI development.<br>Electronic design can be very demanding especially in Soccer | JrFLL and FLL: Require research. FTC and FRC: "Heavily" in mechanical design. Minimal automNomy.   | similar to FIRST.   | 2 Categories - Field Competition (with LEGO and full autonomy)<br>2 Categories - Engineering projects (majority with full autonomy) | All: Mostly autonomy.<br>Consists of wide range of competition fields/style.                     |
| <b>Strength</b>         | Allow teams to delve deeper into AI development.  | Since large regulatory changes, a lot of effort must be spent on rebuilding the robot; especially in FRC.<br>Great for those interested in | similar to FIRST.   | A large variety to choose.<br>More attainable for Novice.<br>Also allow teams to delve deeper into strong programming skill.        | A large variety to choose.<br>Even free Theme in Mathematics and Science subjects.               |
| <b>Software Skills</b>  | HIGHLY demanding  | FLL: Once kNowing how to perform deadreckoning with encoder, the growth is limited in programming area                                     | Limited to LEGO platform, but allowing various programming software - this allows more room to enhance programming skills | Some leagues require higher programming skill, such as the Advanced Vision Centric game.  | similar to FIRST. However, it does offer an autonomy option (although most choose tele-op mode). |

## Storming Robots chooses Robocup Junior

### Why?

Storming Robots focuses in computational thinking and learning in computing algorithms required in artificial intelligence realm. In order to maximize the learning in algorithmic software development, and automation in robotics, as well as exploration of various platform, the RobocupJunior (RCJ) stands out as one of the best choices.

While RCJ does Not win the popularity among grade schools in USA, it stands out to be apart from most other games in the states. Robot Challenge itself involves dynamic changes in variables under their running environment. Besides, there is No restriction on a hardware or software manufacturer. RCJ sits at the pre-college level of the RoboCup global initiative. RoboCup is a International reNowned A.I intensive game. It stresses the learning in automation gearing towards artificial intelligence. RCJ delves deeply into computer science and algorithmic programming.

At the International Tournament, besides competing against top teams from across the globe, they will have the opportunity to interface with hundreds of research scientists and engineers from around the Int'l, and watch their amazing robotics apparatus in action.

[Also see our Criteria table](#)