

|                         | <b>F.I.R.S.T</b>   | <b>Robocup</b>  | <b>RoboFest</b>   | <b>VEX Robotics</b>   |
|-------------------------|--|---|---|---|
| History                 | 1992   | 1997 : Robocup<br>2000 : RobocupJunior  | 2000  | 2007  |
| Regionals               | Local, regional, national, and world competitions  | National, and World competitions  | National, and World competitions  | Regional, National, and world competitions                              |
| Popularity in USA       | Highest  | Low   | Low   | Somewhat  |
| Main Organizer          | FIRST Commite -<br><a href="http://www.firstinspires.org/">http://www.firstinspires.org/</a> | Under Robocup -<br><a href="http://www.robocup.org">www.robocup.org</a><br><a href="http://www.robocupjunior.org">www.robocupjunior.org</a>   | Lawrence Technological Univeristy - <a href="http://www.ltu.edu">www.ltu.edu</a>                | W.R.O. Committee  |
| Grades / Ages / Leagues | JrFLL - Gr. K to 4<br>FLL - Gr. 4 to 8<br>FTC - Gr. 7-12<br>FRC - Gr. 9-12                   | Regional: Age 9-18.<br>International: Age 12+<br>Major Leagues: College and Research Level .<br>Junior Leagues :<br>Soccer - Light-weight and Heavy-weight)<br>Rescue Maze<br>Rescue Line<br>Robot On-Stage | Junior - Gr. 5 to 8.<br>Senior - Gr. 9 to 12<br>Collegiate - only for Vision Centric Challenge. | VEX IQ - Gr. 4 to 8.<br>VEX EDR - Gr. 7 to 12.<br>VEX U - College level |
| Awards                  | from 13 to 25 awards, depending on the division  | about 6 to 9 awards for each league   | unclear.  | from 25 to 35 awards, depending on the division                         |
| Venue for World Event   | within USA :<br>- Houston, TX<br>- Detroit, MI   | Any country   | In  | Louisville Kentucky since April 2014                                    |

|                        |   |   |  |   |
|------------------------|---|---|--|---|
| Atmosphere             | Sport like.<br>Mentors, and teams are closely working together during competition | very Subdue.<br>ONLY team members are isolated from others who are not in competition including mentors.  |  |   |
| Duration               | locals: 1 days event<br>world event: 3 days                                       | locals: 1 day event<br>world event: 4 days<br>5th day is for Technical Symposium where researchers from global will give presentation and talk. | locals: 1 day event<br>world event: 3 days                 | locals: 1 day event<br>world event: 4 days  |
| Team size              | JrFLL - 2 to 6<br>FLL - 2 to 10<br>FTC - 2 to 15<br>FRC - 6 to 100                | all : 2 to 4 or 5 for pre-college.  | 1 for the individual game category. But 2 to 7 for others. | no known restriction, but usually 3 to 4 for lower level game. Have seen over 10. |
| Season Schedule        | Regionals vary from October through April.<br>World event: last week of April     | National, and World competitions  | Regional : Dec<br>World : May                              | Regionals : year-round<br>World : Usually in April                                |
| Participants in Worlds | approx. 600 teams from about 30 nations (including all leagues)                   | over 500 teams from about 50 nations. (including all leagues)   |  | over 1000 teams from 30+ nations. (including all leagues)                         |
| Awards                 | Many  |   |  |   |

|                                       |  |   |   |   |
|---------------------------------------|--|---|---|---|
| Cost                                  | Considerably higher due to investment in new arena, and mechanical requirement. it can be very costly in materials and time in order to adapt new rules. The registration cost is also higher. | Very low cost in field. Field is 100% or mostly reusable year after year.   | Very low cost in field. Field is 100% or mostly reusable year after year.         | Somewhat higher. Far less expensive than FIRST game.                              |
|                                       | JrFLL and FLL : Require scientific research.<br>FTC and FRC: heavily in mechanical design.<br>Team work is very important.   | Low-cost and affordable competition.<br>Heavily focusing on software algorithms gearing toward AI development.<br>Team work is important. | Low-cost and affordable competition; Focusing on robotics engineering.            | Medium -cost and still affordable competition; Focusing on robotics engineering.  |
| Technical Area                        |  |   |   |   |
| Controller & other electronic devices | From a standard kit<br>Must use a single proprietary Hardware/Software platform  | Any   | Any   | Must be from VEX  |
| Requirement on hardware               | Very different requirement on the Mechanical requirement from year to year.  | Continuous improvement in the mechanical requirement from year to year.   | Continuous improvement in the mechanical requirement from year to year.           | Proprietary   |
| Requirement on software               | Provide clear sample to follow to assist on the Auto mode.   | Heavily emphasize on algorithms improvement year after year.  | same as RCJ   | Proprietary   |
|                                       | Can be very challenging, but more attainable by novice in simpler level.   | Very challenging. Less attainable by novice.  | Can be very challenging, but at least more attainable by novice in simpler level. | Can be very challenging, but at least more attainable by novice in simpler level. |
|                                       | Heavily in Mechanical.   | Heavily in software automation. Can be Mechanical and Electronic Centric as well.   | Heavily in software automation. Can be Mechanical and Electronic Centric as well. | Like FIRST, but has extended automation.  |

|                            |  |  |  |   |
|----------------------------|--|--|--|---|
| Time limit in Game         | Total 2.5 minutes.<br>- 15 seconds for Auto mode.<br>- 2 min + 15 sec for Teleop mode (i.e. Human control) | Completely Auto mode.  | Large varieties  | 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) |
| Consist of unknown mission | no   | yes in world event   | yes in both regional and world event   | yes in world event  |
| Self-designed Project      | no   | yes (OnStage)  | no   | no  |
| Field Challenge            | Static Field.<br>Mostly based on dead-reckoning method.<br>Colorful, very appealing field.                 | Dynamic Field<br>Completely based on robot's self-awareness.<br>Plain looking field. | same as RCJ  | Main field mostly remain the same, with additional materials year after year.   |
|                            | 2.5 minutes  | from 2 to 8 minutes. However, for soccer, it may be longer.                          | 2 minutes  |   |
| Game Theme                 | Theme changes every year   | Theme remains mostly the similar from year to year.                                  | Theme remains mostly the similar from year to year.  | Theme changes every year  |
|                            | Robot Game & Project change every year.  | Theme remains mostly the similar from year to year.                                  | Game - Junior & Senior (Regulatory changes every year)<br>Exhibition - Junior & Senior (Free Theme in Mathematics and Science subjects)<br>Advanced Vision Centric Robot Challenge |   |

## Computer Science Exams and Competitions

|                                  |   |   |
|----------------------------------|---|---|
| USACO                            | <a href="http://www.usaco.org">www.usaco.org</a>  | USA Computing Olympiad holds around four training exams per year and top finishing students are invited to further improve their skills at a summer camp, and may participate in the world Olympiad.  |
| American Computer Science League | <a href="http://www.acsl.org/">http://www.acsl.org/</a>                                 | Contests are available for students in elementary school through high school.   |
| Hackathons                       | <a href="https://www.hackalist.org/">https://www.hackalist.org/</a>                     | A hackathon is a great way to improve your computer skills through competition and collaborative computer programming. While many hackathons are traditionally meant for college students, there are likely local events near you that will allow high schoolers to attend. |
| Google Code-In                   | <a href="https://codein.withgoogle.com/about/">https://codein.withgoogle.com/about/</a> | Open for students ages 13-17, this contest is great for individuals beginners to computer science. The competition is designed to introduce students to open source software development.   |

## What we choose :

Robotics      RobocupJunior      (based on: Distance,A.I. Focus, Affordability, Sustainability, students' own work)  
ZeroRobotics

Computer Science      USACO

## General Criteria for entering competitions :

For 1st time participants to RCJ:

- 1 For 1st time participants, they must perform well in Robotics Projects Track - I & II - Analytics and recommended by instructors in order to enter competition group.
- 2 Demonstrate the maturity of applying himself/herself. The student needs to have the maturity to stay on task without adult supervision for minimum 2 hours. If an individual constantly requires adult supervision and not mature enough to assert his/her own analysis, he/she will not be a good candidate.
- 3 Must demonstrate the willingness to make commitment. This means one must demonstrate this capacity throughout his/her meetings at SR.
- 3 Should not participate in another demanding robotic competition within the same season.
- 4 Passion to learn and challenge in this subject matter, not because of external influence.
- 5 The child should have the right temperament, willingness to work with others. Such as dealing with disagreement, handling mistakes, etc. If the child tends to be very abrasive and be over-bossy, he/she will not be a good candidate.
- 6 Love robotic programming and/or building.
- 7 Must demonstrate the willingness to make commitment. This means one must demonstrate this capacity throughout his/her meetings at SR.

[Also see our Criteria table](#)