

ILEO General Competition Rules

ILEO Core Team

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Introduction

Each year, the ILEO core team presents final projects that the students work on during class. These project documents explain the rules, arena layout, and helpful tips. Students present their solution to judges at the ILEO final competition.

The ILEO final competition occurs at the [Rochester Community and Technical College \(RCTC\)](#) campus. Specifically, in the field house space of the [Rochester Regional Sports Center](#) . The word “venue” in this document refers to the RCTC field house. The event date is in the program materials at the start of the season. The date is typically in early December. The competition hosts are [IBM](#), Rochester and the Rochester Public School (RPS) district and RCTC. Many schools and organizations from across southeast Minnesota and beyond join us at the competition.

This document lists the basic rules for all projects and the competition. Most rules appear in other ILEO messages. Now, they are all in one place. The project descriptions are shorter and more clear by separating them.

Some rules are common sense. Others may seem overly formal for clarity. Fairness of the competition is important to us.

Projects may change or disable rules. The document should mention exact rule IDs. Please reach out to the core team if anything is not clear.

This document may change during the season. We try not to make big changes once the season starts. Always check that you are using the latest version. The main copy is the online copy at ILEO Box site (<https://ibm.ent.box.com/ILEO-Project>) in the ‘Tips, tools, and hints’ folder.

Rules

General

Rule	Notes/Why	ID
<p>Students and mentors must understand the full rules of a project and this document. Reach out to the ILEO core team if anything is unclear well before (weeks ahead) the competition to answer any questions, or for a ruling in case other schools/teams have the same questions. Judges and the ILEO core team have the ultimate say in interpreting the rules or handling unexpected situations at the competition.</p>	<p>We expect students to read and understand the rules of the project and the final competition. Students should ask a mentor for help if anything is unclear. Mentors should reach out to the ILEO core team if anything is unclear to them. We also expect mentors to inform students if they are breaking a rule while practicing in class.</p> <p>We try to make rules as clear and unambiguous as we can. Unfortunately, we don't always catch every possible corner case or potential point of confusion. If you feel that you have to interpret a rule, or if you have discovered an unintended "loophole", please contact the ILEO core team well ahead (weeks ahead) of the competition to verify your interpretation. If you fail to do so, the ruling of the judge or core team could disappoint your team. We want to avoid such situations for the students.</p> <p>Sometimes we want you to read between the lines and use that leeway to invent clever solutions. Even in that case we'd like you to also verify your interpretation with the core team.</p>	RULES-01
<p>ILEO has 3 divisions, based on age or skill level of students:</p> <p>Beginner</p> <p>Open to elementary and middle school students. We strongly encourage students who have participated in the program in the past move from beginner to standard.</p> <p>This is not a strict rule. Mentors, use your best judgement, and (if possible) consult with a teacher who knows the students well. In some cases younger students or students with limited experience with engineering concepts may be better served by a second year in the beginner division.</p> <p>Standard</p> <p>Open to elementary and middle school students.</p> <p>Advanced</p> <p>Primarily for high school students. High school students may not join beginner nor standard. Open to other students based on ability.</p> <ul style="list-style-type: none"> Advanced is hard. If your students have not been in the ILEO program before, we do not recommend placing them in the Advanced division unless they are familiar with the LEGO® MINDSTORMS® platform and have solid problem-solving skills. If you are not sure, but the students really want to try, have them do the Advanced challenge projects that lead up to the final project. If they do well there, they will likely be OK with the long-term projects. 	<p>We'd like the competition to be even. The number and size of divisions affects the materials the ILEO core team needs to prepare for the competition. It also affects the complexity and timeliness of scoring for the competition.</p>	DIV-01

Rule	Notes/Why	ID
<p>We expect teachers/mentors/classes to familiarize students with the concepts in the ILEO curriculum documents in the ILEO box folder. Admittedly giving the documents to young students won't work due to the reading level and the amount of reading intended for middle school and high school students.</p> <p>You have flexibility in how to present these materials, especially for younger students. Though typically classes work directly from the documents. We also do not expect you to finish the documents, but you should finish material that covers all sensors, or at least the sensors needed for the final project.</p>	<p>The curriculum has the building blocks students will need in preparing their solutions to the final project, this year and beyond. We also hope to teach the students about engineering as a discipline and career.</p>	CURR-01
<p>Winning/planning in your division isn't the most important thing. Its more important that you learn about STEM, have some fun and work in teams as real engineers do. Teams who place get limited prizes (e.g. no scholarships, etc) and maybe bragging rights for their school. Mentors, please discourage overly competitive behaviors.</p>	<p>The ILEO competition is a way to motivate students to focus and prepare their solutions using what they've learned. Its a learning experience on its own.</p>	WIN-01

Eligible LEGO® robot kits and parts

Rule	Notes/Why	ID
<p>A team's solution to the final project may only use the LEGO® parts from one LEGO Robotics kit. The kits typically in use in the ILEO program:</p> <ul style="list-style-type: none"> • LEGO® MINDSTORMS® NXT Education #9797 (any of the 3 revisions) • LEGO® MINDSTORMS® EV3 Education #45544 • LEGO® Education SPIKE™ Prime #45678 <p>Other variations of these kits, and LEGO robot generations exist. The home/retail versions we generally allow. We may limit certain parts in those kits to avoid giving an unfair advantage. You may add parts to bring retail kits in line with the education kits.</p> <p>For details, see the 'Kit Compatibility Statement.pdf' in the 'Tips, tools, and hints' folder. In it we explain the differences between the kits and what we will and will not allow at the final competition. It will also explain rules for parts swaps allowed between kits. The document is in the ILEO box folder.</p> <p>No other non-LEGO style/brand of robot is eligible for competition in our program.</p>	<p>Students might compete against students with different kits. Minimizing those differences keeps competition fair.</p> <p>Standard kits control costs so the schools.</p> <p>The education version of the kit is the gold standard. Some schools have purchased the retail version of the kits in the past. Such kits are legal at the competition, with the restrictions listed in the document.</p> <p>Mentors, replace lost or broken parts in the kits. Ideally all LEGO robotic kits given to the students are complete as if new at the beginning of the season. Get parts from the LEGO group, other sources, or take them from unused kits. Its often useful to select a "parts" kit you can raid, but you'll quickly run out of certain parts.</p> <p>Mentors may remove easily lost (e.g. small gears), expensive to replace, or distracting (tank treads, rubber bands) parts. Please make those materials available to teams upon request if they have a legitimate need for their project.</p>	KIT-01
<p>Only parts with a LEGO Group part number designed to connect to standard LEGO bricks or LEGO TECHNIC™ parts (including the wire and battery cover) are valid for use. Parts not meant to connect to the robot (bins, lids, sticker sheets, and manuals), are NOT valid for use.</p> <p>Said another way, components in the box which are not LEGO pieces are NOT allowed as part of the team's solution. The intelligent brick, sensors, and wires ARE LEGO parts. If there is any question contact the core team ASAP. You may ask a judge at the competition, but that might be too late to correct any issue.</p>	<p>Creative uses of these parts may be an advantage, disruptive to the competition, or damaging to reusable things in the kit.</p>	PARTS-01
<p>Do not modify or damage parts of the kit in preparing your project for competition, or for other in-class activities.</p>	<p>Avoid damage to reusable parts of kits for use by future students. Avoid advantage given by non-LEGO parts.</p>	DMG-01

Robots

Rule	Notes/Why	ID
<p>All robots/programs must run autonomously. That is, once you start the program, the robot must complete the task on its own without any human intervention. Touching the robot after the program has started ends the run. Certain kinds of interference or project rules might disqualify the run.</p> <p>For example, you may not maintain a Bluetooth or other connection (long stick) to communicate or influence the robot.</p> <p>Guiding the robot through human interaction with a sensor such as the ultrasonic sensor, the light sensor, or the sound sensor after the program has started is not allowed. For example, waving your hand over an upward pointing ultrasonic sensor to cause the robot to turn left.</p>	<p>This makes the project too easy to solve. We want everyone to face the same challenges and make the competition fair. We want to encourage creative builds and programming solutions.</p>	AUTO-01
<p>Start your run using buttons or sensors on the robot. It should be quick to start the program or start the next run. It should be clear to the judge when your run is about to start.</p> <p>Avoid the sound sensor for this purpose due to the background noise level at the competition.</p> <p>Any run started through other means (e.g. from laptop/tablet), the judge will disqualify the run.</p> <p>Mentors, ensure your students are aware of this. Practice the technique before the final competition.</p>	<p>Related to rule AUTO-01 about autonomous robots. Also, we're uncertain about interference that many Bluetooth connections might cause. It also makes it clearer to the judge when to start timing your run.</p> <p>LEGO® software allows students to download and run a program with one button click. Students get used to this convenient interaction (especially with the Bluetooth connections). As such, they might not know how to start a previously downloaded program using controls on the Intelligent Brick. The ILEO curriculum does cover this.</p>	START-01
<p>No person may interfere with other's robots. This includes families, guests, etc that are viewing the competition and have an interest in the results.</p>	<p>Fairness. Action taken against the offending team will be up to the discretion of the judges.</p>	AUTO-02
<p>If a robot interferes with a robot in another arena by accident, the judge may give the affected team(s) another run. For short-term, this depends on the specific project: two robots operating near each other is more common.</p> <p>If the judge believes this was on purpose, the judge may disqualify the run.</p>	<p>To save floor space and materials, we generally place two arenas together. One 4 foot by 8 foot surface typically hosts two teams/arenas at the same time. We try to design projects to prevent/reduce interference between robots. Certain robot designs or malfunctions can still interfere.</p>	AUTO-03
<p>Before a run starts, the robot must fit in the bounds of an 8 1/2 inch by 11 inch (US Letter) piece of paper when viewed from above.</p> <p>The wires that connect motors and sensors may go beyond the boundaries. Tying wires down is difficult and may damage the wires. The wires must still fit in the bounds when you gently press/squish the wires inward toward the robot.</p> <p>If the robot does not fit at the competition, the team must change the robot to fit to attempt a run. This time counts against the available time to perform scored runs with the robot. But really the team must size the robot correctly before arriving at the competition, per PROG-01</p> <p>Once the robot's program starts, the robot may unfold or transform by itself. The robot may then become larger than the stated dimensions (autonomously per AUTO-01).</p>	<p>Some of our projects are too easy to solve with a large or wide robot. Unfolding adds a challenge in build in programming to be fair to students with other solutions.</p>	SIZE-01

Rule	Notes/Why	ID
<p>If a project does not include a wall around the arena (typically made of 2×4s), the robot may leave the arena and return to it during a run. It should not go more than about one foot from the arena.</p> <p>Judges determine if your robot has moved too far from the arena and may disqualify the run. If your solution does this, warn the judge as you arrive at your arena (before you attempt any runs) so they can prepare the ground, ask people to move, etc.</p> <p>If a project has a wall, we do not want robots leaving the arena area enclosed, unless explicitly allowed by the project. No part of the robot may extend or move more than 1/2 inch over the top of the wall when viewed from above.</p> <p>If the robot violates this rule the run will end immediately.</p>	<p>At times during the competition there may be people, judges or other materials around the arena. We'd like to allow creative solutions that leave the arena, but we need to limit chaos and interference that results. A robot out of control or purposely driving away might look the same to a judge.</p> <p>At the competition, we try to conserve materials and floor space. When a project has walls, another arena surface and another team might compete on the other side. We do not want teams competing near each other, or observers, to interfere with the teams' runs.</p> <p>The surface of the competition is generally like a gym floor, but it might be inconsistent when compared to our whiteboard arenas. The competition floor is likely different than the floor you practice with. That could affect the behavior of your robot.</p> <p>Also, our arena surfaces typically have a 1/8 inch drop to the floor. Students should be familiar with that, assuming the class uses our standard arena materials. Your robot will need to traverse that. This could be a problem for robots with a "plow" that scrapes the surface or otherwise has low-hanging parts.</p>	AUTO-04

Arenas and Project Materials

Rule	Notes/Why	ID
<p>The arenas that we use at the final competition are not new. They have faint pencil marks or other minor blemishes from previous competitions. The arena walls are not perfectly smooth. The walls may contain knots or other defects.</p> <p>We do not use arenas with blemishes we expect will interfere with student solutions. Most robots have no problem tolerating these. Students should avoid tight tolerances and build some flexibility in their solutions.</p>	<p>We reuse materials for cost reasons (as we encourage schools to do). Arenas at the competition are not perfect/new. Note that the arenas at the competition are not exactly the same as the ones you use in class. Minor differences are not avoidable in replicating projects from the project documents.</p>	MAT-01
<p>No one may touch or interfere with the arena or arena materials during a run. Examples of interference include (but are not limited to):</p> <ul style="list-style-type: none"> • Blowing on a ping-pong ball to change its trajectory • Using a stick made of LEGO® parts to knock over a peg • Kicking the arena to cause pegs to fall over or ping-pong balls to move <p>Such interference disqualifies the run immediately.</p>	<p>Stopping a ball from rolling, removing an item makes the robot's job easier, or give an unfair scoring advantage to a team.</p>	MAT-02
<p>No one may not damage project materials or arenas on purpose. Do not build or code robots to damage materials. If the judge determines that the robot has damaged a material on purpose they disqualify the run. Examples include but are not limited to:</p> <ul style="list-style-type: none"> • Robot or person crushing a ping-pong ball to stop it from rolling or to fit it in a smaller space. • Moving walls • Changing tape lines 	<p>We need to reuse parts for all teams, and not interrupt the competition flow and finish on time.</p>	DMG-02
<p>No one may add project materials to an arena. Though a robot may autonomously drop compliant parts (see KIT-01 and AUTO-01). Examples include but are not limited to:</p> <ul style="list-style-type: none"> • Adding tape lines or other marks to the arena surface. • Shining a flashlight on the surface 	<p>We need to reuse parts for all teams, and not interrupt the competition flow and finish on time.</p>	MAT-03
<p>"Knocked over" in the context of an item like a PVC peg or domino might not be clear in certain situations. This is easy if the peg is on its side, on the arena surface, or on the floor off of the arena surface. The item could catch on a wall, robot, or other materials in the arena.</p> <p>An object (e.g. PVC peg or domino) is "knocked over" if the item is resting horizontally on a surface, or if the judge determines that the item would come to rest horizontally on a surface if all other objects (including the robot, obstacles, and walls) were not present. For example, a PVC peg leaning on the robot at the end of a run is "knocked over".</p>	<p>Consistency in judging/scoring.</p>	KNOCK-01

Rule	Notes/Why	ID
<p>Objects might still be moving after the team has declared a stop to their run. Judges will not score the run until the objects either stop, or come to some state where the scoring is less ambiguous, at the judge's discretion.</p>	<p>Judges might not be able to catch the state of all the scored objects at exactly the time the students stop the run. We don't have "instant replay". The judge also must pay attention to the trial time and stop the stopwatch.</p> <p>Students, consider the state of objects at the end of a run when creating your strategy. For example, ping-pong balls with too much momentum can easily leave a scoring area before coming to rest.</p>	STOP-01
<p>Locations of objects on the arena are specifically chosen/assigned by the ILEO core team. Some projects under-specify the location to give us more options at the competition or to make the project more challenging. Judges will know and enforce the positions of the objects.</p> <p>No person may move items on the arena from the assigned position before the team starts their run. Once the robot starts, it may move anything on the arena not fastened down (and as not to cause damage as in DMG-02). Scoring rules in the project will tell you what you should or should not move.</p> <p>Some projects may allow students to pick the starting position for the robot. If your chosen/ideal starting position overlaps with an object, you must choose another starting position. You may not move objects to make room for the robot. If you moved any objects before placing your robot the judge will return the objects to their original positions.</p>	<p>Might give teams an advantage. We want teams to be solving similar problems.</p>	MAT-04

Competition requirements

Requirements before you compete. Materials your team must bring.

Rule	Notes/Why	ID
<p><i>Mentors, return signed photo release forms for all students when you sign in at the competition!</i> You may return forms any time up to the start of judging.</p> <p>Rochester Public Schools is a co-sponsor of the final competition: their name appears next to IBM's name on the release form. All students, whether they are from a school in the Rochester Public Schools system or not, must submit a release form signed by a parent or guardian.</p> <p>The local media may be taking photographs or video at the event, sharing the story on TV, online or in print. Regular participants may also do the same. We encourage this to grow awareness of our program to recruit students, mentors, and schools or other groups.</p> <p>If you cannot appear in such materials, do not attend the competition. Other members of your team should present your solution to the judges.</p>	<p>Checking with every student for photo/video permission during the event is not realistic. Those taking photographs/video don't know your preference.</p> <p>Participants confused about the "Rochester Public Education" verbiage on the form did not submit the required forms in the past. We require photo releases for all students.</p>	PHOTO-01
<p>Not a rule, but a best practice. Mentors, consider having a mock competition in one of the regular sessions just before the final competition. Mentors will judge the students as though they are competing in the final competition. Point out any mistakes the students have made or things they might have forgotten about competing at the final competition. Students often get so focused on their solution they forget rules that they read weeks ago.</p> <p>Practice for short term using a timed, 45-minute project. This should help students understand how short 45 minutes really is, experience the pressure, and help them identify any teamwork issues in such a situation.</p> <p>Mentors, ask students that have participated in the past to share their experience with the rest of the class.</p>	<p>Help students prepare for the event.</p>	PRAC-01
<p>Students who feel that their solution isn't good enough might not want to compete. Students can get hung up on results or winning. Please discourage that per WIN-01 and try to get them to compete.</p> <p>If they still choose not compete, please inform the core team as early as possible before the competition. We need to adjust match plans. Encourage students to attend anyway so they can see other student's solutions and see how the competition works.</p>	<p>Attending the competition on its own is instructive. Its hard to explain to students what its all about: they need to experience it for themselves. We hope these students will return next year and be better prepared.</p>	AUDIT-01
<p>Do not transport the arenas or other materials to the competition on a bus. You may get a ticket for unsecured cargo. You might have to make hasty arrangements to legally transport get your materials to the venue or back home.</p>	<p>This has actually happened to a school in the ILEO program.</p>	BUS-01
<p>Participants in the Advanced final project must place their robots in the designated garage area. The garage's location is in the judging area. Do this once you've located your seating area and have unpacked your robot. Your robot must be in the garage when judging starts.</p> <p>After competing, you may take your robot back to your table. You'll need it for the short-term round of the competition.</p>	<p>Some advanced arena layouts are not revealed until the final competition. We don't want teams to adjust their robot build or program once they've seen the final layout.</p> <p>We expect Advanced students to be ready to compete when they arrive. At most they should need to check and tweak sensor values: you must complete this before the start of judging per PROG-01.</p>	GARAGE-01

Rule	Notes/Why	ID
<p>This rule applies to programming robots at the competition:</p> <p>Arriving at the venue, but before competition starts</p> <p>The final version of the project program is ready to go on the robot, preferably before arriving at the venue.</p> <p>We ask that students check light levels and make any necessary last-minute adjustments to their robot/program before the competition begins. Ideally these final tweaks are all that's needed. But invariably, some might be scrambling to complete their work (a lesson in time management).</p> <p>After the competition starts</p> <p>We do not allow programming of robots during the long-term competition. We still refer to this as the "laptops closed" rule, but we mean any device or technique that can change the program.</p> <p>If a team is programming after competition begins, the team may present their solution to the judge as scheduled, but they may not place in the competition results.</p> <p>Advanced students also follow GARAGE-01</p> <p>For the short-term phase of the competition (announced after the long-term judging is complete for all teams):</p> <p>Students might need to change their program, observe its behavior, or write another program to compete again. Stated another way: a student may not change the program during the first phase of the competition, but must be able to change the program for the second phase and have their programming device available.</p>	<p>Almost every year we have a team that does not have the right program on their robot when they compete.</p> <p>Participants that compete later would have an unfair time advantage. Also this last-minute work could make the robot behave worse.</p> <p>In theory, students working on a different program or just for play would be ok. Since we can't tell the difference, we must disallow all programming to enforce this rule.</p>	PROG-01
<p>Teams may not practice on the judging arenas before or during the competition. These are the arenas in the fenced area of the venue where the teams go for their judged runs.</p>	<p>We can't guarantee time on the judging arenas to everyone. Judges and core team might be doing final preparations at this stage of the event, and would need to reset all the arenas before competition begins.</p>	PRAC-02
<p>Due to PRAC-02, IBM will supply a small number of "practice" arenas at the final competition. These arenas primarily allow students to verify their robot can sense tape with the light levels available in the competition venue. They are not guaranteed to have the correct layout as the competition arenas.</p> <p>Be courteous and share with other teams. A lot of teams need to verify their robots work under the conditions at the venue. Do not expect to be able to perform an entire run of your project solution on a practice or competition arena.</p>	<p>As mentioned in PROG-01, we expect student solutions finalized before arriving at the venue. Students should only need to verify that the light settings in their program will function under the conditions at the venue.</p>	PRAC-03
<p>Not a rule, but a best practice/reminder. Have your students make sure that their robots are fully charged on the day of the competition.</p>	<p>Would be unfortunate if a team could not compete to its potential due to a lack of battery power. The batteries take time to charge, and PARTS-01 disallows external charging solutions.</p>	BATT-01
<p>Remind students to be careful with their robots! Past students did drop their robots on the way to the arena for judging. Reassembling damaged robots counts against the team's available competition time. Judges will not pause stop watches while students repair their robots. Also see BREAK-02</p>	<p>Can ruin a student's experience. Picking parts of all the parts is tricky with the number of people around.</p>	BREAK-01

Rule	Notes/Why	ID
Remind your students to watch the power cables! Cables run under all the tables to provide power to devices and kits. These cables connect together in series. Every year someone will trip on a cable and accidentally unplug other tables. If you suddenly lose power, do a quick check to see if your extension cord has become unplugged. Many of the laptops loaned out by IBM have unreliable batteries, so this can be a big problem if it happens during the short-term competition prep time.	Unplugging power is disruptive to the teams. Old devices may lose power and lose student data.	VENUE-01
<p>We ask that you be respectful of the staff and keep the venue as clean as possible. Encourage your students to be courteous. We are going to have a large number of students in the Field House, and we want to keep this a positive experience for everybody.</p> <p>Relatives/guests are welcome to attend and observe the competition, we only ask that they give room to the competing teams and to judges when spectating. A fence separates the competition area from the rest of the venue. We ask that only competing teams (or teams that are about to compete) and their mentors be in the competition area. Relatives may come into the competition area to take photographs, but we ask that they maintain a respectful distance so as not to interfere with the competition.</p>	Ensure a good experience for all attending the competition.	VENUE-02
<p>IBMers: Please consider wearing an IBM shirt at the final competition.</p> <p>Mentors consider the same for any other organizations that support your program.</p>	Show your company pride! Networking. Good for photos.	SHIRT-01
<p>The venue has limited wifi access. It might not with the number of devices present. Use available wifi for competition activities, not gaming, etc.</p> <p>Groups that use the web-based programming app (SPIKE™ Prime) should consider bringing their own reliable wifi hotspot, or switch to an installed app. This will depend on the school/organization information technology policies, and on the devices available to students.</p>	Venue wifi is available, but not robust. Plan ahead if your programming software requires Internet.	WIFI-01

Judging

Rule	Notes/Why	ID
<p>Teams may not reprogram robots in the judging area (e.g. just before or during their runs). To avoid misunderstanding by the judges, do not bring laptops, tablets, phones, or other programming devices to the judging/competition area.</p> <p>Leave devices at your work/seating area with your other belongings if possible. If you're uncomfortable leaving them, keep the device closed/suspended/off and in a bag or pocket so its clear to the judges you are not using the device.</p> <p>Teams may use a device (e.g. phone/camera) to take photos. Judges may request to inspect any device in the judging area. Judges may disqualify a run if there is any doubt in the device's use.</p>	<p>Related to the no programming policy, PROG-01</p> <p>Students may encounter things they didn't expect. The time it takes to change the program, and test the robot will likely take too much time.</p> <p>Remote controlling robots is possible using wireless connections. This violates AUTO-01. Minimizing the possibility that the robot is being remotely controlled helps judges as they are busy with scoring and catching this is difficult.</p> <p>A team once brought their tablet to the arena and the judge observed them interacting with the tablet right before the robot stopped. The team did stop the program via the tablet, which stopped the robot. In their defense, this rule was less clear at the time.</p>	PROG-02
<p>Students must bring their team name slip to the judges. These slips are in the packet at check-in to the competition, or provided by a judge. Mentors must pass these out and remind students to bring them.</p>	<p>The paper contains the team name, time and arena. Judges can confirm they are judging the right team and the scoring records are correct.</p>	SLIP-01
<p>Ways a run can end:</p> <ol style="list-style-type: none"> 1. An end condition defined in the project description. 2. Team ending the run early by touching the robot or asking the judge to stop the run. 3. "immediately" due to a rules violation. 4. "disqualified" due to a rules violation. <p>For 1,2 and 3 the judge records the score for the run. For a disqualified run, the score for the run is not recorded. If a team has no scored runs (i.e. all disqualified), their final score recorded is the worst possible score (e.g. zero) and worst tiebreaker value (e.g. time).</p>	<p>Judging consistency and scoring quality. Give students some control over the time.</p>	RUN-01
<p>Judges have final say on the recorded scores and times. Teams may verify the score recorded by the judge matches expectations. If the judge disagrees, their word is final.</p>	<p>Mistakes and distractions are possible. We do trust our judges to be fair and make as few mistakes as possible.</p> <p>We must resolve these situations quickly to keep the competition moving. Any extended discussion will eat into your competition time, and we can't allow it to delay other team's runs.</p>	SCORE-01
<p>Students must wait for permission from the judge before resetting arenas for the next run. The judge may hold the next run until a judge or student correct any issues.</p> <p>Judges appreciate student help in resetting arenas and collecting items that leave the arena space (e.g. ping pong balls that rolled or bounced out). Follow the project rules while resetting the arena.</p>	<p>The judge needs a few moments to correctly score the run before the arena is reset and the next run can start. Judges will try to do so quickly as that time counts against the student's total time to complete all runs.</p> <p>This speeds up the reset time, possibly giving students more time to perform their runs. We must also ensure the reset is correct for the project rules.</p>	RESET-01

Rule	Notes/Why	ID
During a run, a robot might malfunction or parts may otherwise disconnect. After judges score the run, but before the next run begins, students may reassemble the robot. Time will continue running for timed projects. For non-timed projects, we expect reassembly in a timely manner.	Teams can't be successful on the next run with a broken robot, but we need to balance the time involved to keep the competition as a whole moving.	BREAK-02
<p>Rules ignore LEGO® parts not attached to the body of the robot. For example parts that fall off due to contact with anything on the arena or were loose to begin with. Rules related to interaction/removal of arena obstacles or robot location apply here.</p> <p>These parts do become obstacles your robot might encounter and must deal with. Or you may wish to stop the run early.</p> <p>In a project where you score points for removing items from the arena, you will not get points for clearing those LEGO parts. Only the materials described in the project count for scoring.</p>	<p>Scoring rules should be clear what items add or remove points. We don't want language in a project to imply such LEGO parts affect your score.</p> <p>Though a loose part in the robot's way could affect its behavior, which in turn can affect your score.</p> <p>Sometimes the end position of a robot in a project is significant. Parts that were part of the robot, are no longer part of the robot. Thus they are not considered for robot position.</p>	PARTS-03
<p>Judges can provide students information on their final score, but only the scoring official has complete results on the day of the competition. The scoring officials will not provide this information at the competition.</p> <p>ILEO does not make the full list of results publicly available. After the competition schools may request placement information for their teams.</p>	<p>The scoring officials are busy during the event.</p> <p>Although we want to recognize teams which perform well, we do not want to discourage teams that did not. This is why we do not distribute the full rankings.</p> <p>We collect bracket-based scores live at the event, but the only detail we keep is a photo of the bracket from the competition.</p>	SCORE-02
Projects describe tie-breakers. A judge's coin flip will resolve any remaining ties. The core team will have coins available at the scoring official area.	We need something fair and quick to resolve the situation. We try to balance the simplicity of rules, ease of judging, and ties when we define projects. We can't prevent all ties.	COIN-01

Terms

- **Arena:** This is the environment described by the project document that robots interact with on a run. Students practice on mentor-built arenas in class.
- **Garage:** An area inside the judging area where Advanced teams must place their robot before the competition begins.
- **Intelligent Brick:** This is the LEGO® part you connect motors, sensors and other parts to build a robot.
- **Run:** A judged attempt by a robot to solve the project problem. Projects define clear start and end criteria for a run. Rules in this document describe other situations that stop a run. Most projects allow your team to attempt multiple runs. How the scores from each run affect your final score varies.
- **Surface:** A whiteboard or other surfaces that contains one or more arenas. At the competition, we may use one surface to host multiple teams. This conserves materials and floor space. But this means that another team may be competing near you, where they might not in class. Typically, one surface is one arena in class.

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Prepared by the ILEO core team, IBM

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