# 9th Annual ROBOFEST® 2008 Rules

1-20-08 v1.1 **Official Version**

## Table of Contents



## Attachments:



## Attached Forms (and web links):

- **Consent, Release and Media Authorization Form:** http://www.robofest.net/ConsentMediaReleaseForm.pdf
- **Age Division Waiver Request Form:** http://www.robofest.net/2008/ageWaiverForm.pdf *or* http://www.robofest.net/2008/ageWaiverForm.doc
- **Robofest Video Submission Form** http://www.robofest.net/2008/RobofestVideoSubForm.doc *or* http://www.robofest.net/2008/RobofestVideoSubForm.pdf
- **Digital Video Competition Submission Form** http://www.robofest.net/2008/videoEditingSubForm.doc *or* http://www.robofest.net/2008/videoEditingSubForm.pdf
- **Robofest Theme Digital Music Competition Submission Form** http://www.robofest.net/2008/musicSubForm.doc *or* http://www.robofest.net/2008/musicSubForm.pdf

# Part 1 – Robofest 2008 General Rules

Robofest® is an annual robotics competition to increase young students' interest, engagement, understanding and use of science, technology, engineering, and mathematics (STEM) through autonomous robotics. Robofest is an open competition, allowing teams to use any type of robotics platform and any programming language for the various competition categories shown in the table 1.

| Competition Categories | Age Divisions | Team Size | Plat-form | Unknown Problems | Oral exam* | Reg. fee** | Note |
|---|---|---|---|---|---|---|---|
| **Game** | Junior (5-9th) and Senior (9-12th) | Max. 7 | Any | Partly unknown | Yes | $55 | A team of students competes to accomplish robotics missions using two fully autonomous robots. This year's challenge is "RoboSavers". |
| **Exhibition** | Junior (5-9th) and Senior (9-12th) | Max. 7 | Any | No | Yes | $55 | Each team has complete freedom to show off any creative autonomous robotics project. |
| **RoboSumo** | Junior (5-9th) | Max. 4 | Any | Yes | No | $45 | Limited qualifying sites. 30" ring, max weight 2.2 lb (1 kg) |
| | Senior (9-12th) | Max. 4 | Any | Yes | No | $45 | Limited qualifying sites. 48" ring, max weight 4.4 lb (2 kg) |
| **RoboFashion Show** | Junior (5-9th) | Max. 7 | Any | Dimension unknown | No | $55 | Two robots are recommended. Limited qualifying sites |
| **VEX Pentathlon** | Senior (9-12th) | Max. 7 | VEX | Partly unknown | No | $55 | Skeeball, 1600 Meter Dash, Tug of War, Slam Dunk, and Bottle bowling. Hosted by Cranbrook Schools |
| **VEX Bridge Battle** | Senior (9-12th) | Max. 7 | VEX | No | No | $55 | Associate Event; Hosted by Cranbrook Schools |
| **Collegiate Robofest – Mini Urban Challenge** | Senior (9-12th)<br>College | Max. 3 | Vision based L2Bot | Dimension unknown | No | $45 (***) | Talented high school students who are interested in computer science can participate. |

(*) Answer a Question (**) Site Check-in fee not included; International sites may use different fees
(***) does not include the laptop robot platform, L2Bot.

Table 1. Robofest 2008 Competition Categories

Detailed rules about each competition category can be found in later Parts. Special Video Editing & Production and Team Photo competitions are explained in section 10.

### 1. General Team Registration Rules

- Team registration is processed on the web at http://www.robofest.net (Team Registration Link). The registration fee shown in the table is for one team. Please note that no refunds will be given. There may be a $20 check-in fee at the qualifying competition site, which will be used solely by the qualifying competition organizer. Each site web page under check-in fee section specifies whether the site requires the check-in fee or not. All contest sites are open to the general public and admission is free.
- A team must have an adult "coach".
- A coach may have several teams; each team can register at only one qualifying competition site. The Robofest registration system can accommodate only one competition site selection per coach ID. Therefore, if a coach has other teams, and they wish to compete at a different qualifying competition site, the Coach must setup another coach ID and use that ID to register other teams for another site.

- A coach may have different Age Division teams, but each team must select a single Age Division and a Competition Category.
- Though not recommended in general, a team member may join multiple teams, if team coach approves.
- Any organization, such as a school, home school, civic organization, club, etc. can form a team.

**2. Registration process (Five Steps)**

Step 1. **Coach Registration** will begin on the web at www.robofest.net in December 2007. After the registration, a coach ID and password will be sent to the coach's email address in less than 2 minutes from admin@robofest.org. You must confirm the coach registration by clicking a link in the email confirmation sent to you; otherwise the coach registration has not been completed. If you do not receive the confirmation email, contact **Robofest.t@gmail.com or 248-204-3569** to resolve the problem. (This may be due to either the system/network has been down or you put the incorrect email address in the coach registration form.) Please also check your spam folder, before contacting us. Veteran Robofest (2003, 2004, 2005, 2006, or 2007) coaches can use their prior coach ID and password. If you forgot your password, click on the "Forgot Password" link. If you forgot your coach ID number, please contact **Robofest.t@gmail.com or 248-204-3569**.

Step 2. **Team Registration** will begin after the top level official Robofest 2008 rules are finalized and posted on the web on January 21, 2008. Using the coach ID and password, the coach can now create teams *after selecting one qualifying site*. During this step, the coach must accept the Robofest 2008 Coach's Pledge as shown in Appendix 1. All the team member names, grades, and gender must be entered (student contact information is not made public). Each team must provide at least one volunteer who will help with qualifying competition site setup or cleanup. The volunteer's name and email address needs to be entered. For exhibition teams, a short exhibition description must be entered in this step. It must include the theme of the exhibition, functionalities of the robots, the number and types of sensors and motors used, and any other information that describes the exhibition.

Step 3. **Registration Fee Payment**: After creating all of your teams, pay the registration fee online using a major credit card through PayPal. You will receive a payment confirmation email from PayPal, which can be used as a receipt. Or, you may choose the option to send a check to LTU Robofest, 21000 West 10 Mile Rd., Southfield, MI 48075, USA. Make the check payable to LTU Robofest. Your team registration will be complete once LTU receives the check. The registration of a site will be closed when the number of teams who have completed Step 3 is equal to the max capacity for each division and competition category of the hosting site.

Step 4. **Team Photo Uploading**: Take a team photo and upload it to the coach account on the web. The requirements for the photos are: (1) standard **landscape** "jpg" file (width: height ratio should be 4:3) (2) size should be less than 350KB – if not, the file will be automatically resized (3) must show all the team members listed (4) adult coach and volunteers may be in the picture (5) must show the identifiable team ID and team name (Write down or print the number on a paper and hold it when taking the photo ***or*** edit the photo file to add text). The team ID number is decided in the **Step 2** above. If no photo is uploaded before the update deadline, certificates for the team will not have team and robot photos. The photo must be uploaded within ***3*** weeks after the team registration. There will be a special prize for Best Team Photo.

Step 5. **Robot Photo Uploading**: When the missions are completed or two weeks before your qualifying competition date, take a photo showing the team robots. Upload the photo using the coach web account. The robot photo requirements are the same as (1), (2), and (5) in step 4 listed above. At this step, coaches must be sure to update any information on the web. The update deadline will be ***10*** days before the competition date for each qualifying site. It is a hard deadline, as time is needed to print and ship all the participant certificates to each site.

**3. Team Coaches**

- Coaches must not do the direct work for the team's robots, but they must teach or provide necessary training for the team to solve the challenge problems. Robofest provides some technical workshops; there are some books on robotics. There are many websites providing technical information; some multimedia curriculum are available to purchase. Coaches are encouraged to contact local IEEE

chapters (Robofest medal sponsor), local ACM chapters, local engineers societies, local engineers associations, local Robotics Clubs, or Universities to find volunteer technical mentors.

- The coach is responsible for registering, entering, and updating his/her team information. (This includes team data, uploading team and robot photographs by the update deadline to insure that the Robofest organizer can print the personalized certificate.) The team coach is responsible for facilitating and overseeing team members. The coach must have a valid email address and must check the email account periodically. Email is the primary and official communication method between the team and the Robofest organizer. If a coach's email address is changed, it is the coach's responsibility to update the Robofest registration system by logging into the coach's Robofest account and making the change. To confirm an email address change, the system will send the coach a confirmation email. The coach will need to click on a link in the confirmation email message.
- Any teacher, school administrator, parent, college student, professor, tech specialist, or scientist/engineer is eligible to be a coach. Coaches must be adults without any criminal record.
- Robofest 2008 has multiple qualifying competition sites. A coach must register teams for only one qualifying site. It is allowed, however, for a coach to get another coach ID for another qualifying site to register teams on a different date.
- We recommend for coaches to recruit technical mentors or assistant coaches if necessary. The coach is responsible for entering on the web up to 5 volunteer names and their roles.
- Each coach must provide at least one volunteer for helping with either setup or cleanup at the hosting site. Each hosting site will send detailed information to the volunteers.
- The coach is responsible for entering/updating the team data. Please note that personalized certificates will be printed based on the information and the photos on the website. The Robofest organizer will not reprint certificates for free due to incorrect information on the web. (Please see the last section about Reordering Certificates and Trophies)
- From 2008, Robofest introduces web-based assessment as an experiment for some teams. Each coach is supposed to help with Robofest administration to gather data and analysis regarding students' learning in STEM subjects.
- Robofest has been attracting lots of media attention. Coaches must collect Consent & Media Release Forms (PDF file) not only for team students but also for coach him/herself and team volunteers. These must be submitted to the hosting site during check-in.
- Another important role of the coach is to find sponsors for their team(s). Team sponsors are individuals, groups, companies or other organizations that donate cash, products, or in-kind services to the team. The Robofest website will list up to four sponsors per team on the web. A Certificate of Appreciation will also be given to the sponsor on the day of the qualifying Robofest competition.
- Before and after Robofest, please contact newspapers, radio, and TV stations to recognize your teams' efforts and achievements. Let Dr. Chung (chung@LTU.edu) know if your teams were introduced on any media.

**4. Student Team Members**

- Junior Division participants must be $5^{th}$-$9^{th}$ grade students in April 2008, and Senior Division participants must be $9^{th}$-$12^{th}$ grade students in April 2008.
- Any exceptions, the coach must submit "Age Division Waiver Request Form" to Robofest administration for approval. The general rule is that playing up is fine as long as the student has exceptional talent in both construction of the robot and computer programming and has maturity to work with other team members. Playing down is discouraged in general. The reason to request playing down must be specified on the form. For either playing up or playing down, coaches should obtain consent from entire team and their parents.

**5. Team Volunteers**

The team cannot work without the help of various volunteers for jobs such as mentoring, financial sponsoring, transportation, constructing playing fields, preparing food, taking pictures, or video taping, etc. The Robofest website will list up to five volunteers per team and a certificate of appreciation will be given to each team volunteer on the Robofest qualifying competition day. As mentioned in section 3, each team must provide at

least one volunteer for the setup or cleanup of the hosting site. This will be a good opportunity for teams to preview the site and playing field setups.

**6. Common Sense Rules for Education**

Construction of the robot body as well as all programming for the student competition should be solely done by students only. Parents, teachers, mentors, or coaches may not directly assemble the robots or directly write the program code for the team at any time during the preparation period or during the contest. Any direct participation is a violation of the rules. The offending team will become ineligible for any awards.

Only team members with name badges are allowed in the pit (team table) area after the unveiling of the unknown problem. No adults are allowed to be in the pit area after the unveiling. If a team coach must enter the area, they must receive permission from one of the judging proctors. Only coaches with badges will be allowed into the area with permission. It is strongly suggested, for security purposes, that the coach have assistants to watch the team table area, especially when the team is competing. There will be judges/proctors in the competition area. If any adult wants to give help to his/her team for any reason, the adult must get permission from the judges/proctors. The use of cell phones in the pit area by student is prohibited. WI-FI in the pit area must be turned off.

**7. Team's Responsibility on Robofest Day**

- All the teams must observe the check-in time set by the host organizer for each site.
- Things to bring to Robofest venue
  - ❑ A laptop (or PC) computer for each team. (To solve the unknown part or adjust lighting condition, each team must bring a computer. It is not recommended that teams share computers)
  - ❑ *Only for exhibition teams*: poster boards to introduce the exhibition description and all the necessary materials for the exhibition.
  - ❑ A power strip and power cable.
  - ❑ Lego Mindstorms RCX robot teams only: Cardboard box to cover your robot and IR tower
  - ❑ Extra batteries
  - ❑ Robot(s) and spare parts
  - ❑ Signed Consent & Media Release forms for team members and coach
  - ❑ $20 check-in fee, if your qualifying site charges a check-in fee. Check out your site home page.

- Teams must use the team table assigned by the organizer. Please do not change team tables. If you change, judges and the organizer *cannot* find your team.
- Read the competition rules carefully.
- *Lego RCX robot teams only*: whenever new programs are downloaded, both your robot and the IR tower MUST be covered by a box. If not, you may damage other robots and/or your program may be corrupted. Do not forget to bring an IR opaque cardboard garage to house your robots and IR tower.
- See also attached "Typical Qualifying Robofest Competition Schedule"
- General Rules During the Robofest Competition:
  - ✓ No food or drink are allowed inside the contest area
  - ✓ Taking pictures with flash is not allowed inside the competition area
  - ✓ Do not make unnecessary noise which might disturb other teams in the pit area

**8. Rules for Video Submission Site**

If there is no qualifying site near the team location or for special circumstances, the teams may register on-line for the Video Submission site. Video submission teams are required to pay the same registration fee. The coach must submit the signed Robofest Video Submission Form when sending the video to: LTU Robofest, 21000 West 10 Mile Rd., Southfield, MI 48075, USA. It must be postmarked by the deadline, Sat. April 12, 2008. The video itself can be made by adults. The following is the suggested video contents:

- Start with the team and team member introduction, around 5 seconds for each member.
- Introduce features of the robots, around 5 seconds for each robot.
- Select one question from the list of sample questions attached, and answer within 45 seconds.

- Demonstrate the games or exhibitions; the video should not be edited, once the demo started.
- Rolling credit and/or acknowledgement (recommended).
- Acceptable video media: VHS, CD with a video file, Video CD, or DVD

Adults may help produce the video. If students were involved in the video production work, it should be acknowledged in the rolling credit.

**9. Judging and Prizes**

About 25% of the total number of teams at each qualifying site will win big trophies that will be presented during the award ceremony. Detailed Judging rules are explained in each competition category later in this document. Every officially registered team member will receive a framed certificate of achievement and IEEE sponsored medal during the award ceremony of the qualifying competition. All teams must stay for the closing ceremony.

**10. Special Competitions for 2008**

**10.1 Team Video Editing and Production Competition**

Teams will videotape and submit a digitally edited video journal of their team preparing to compete at Robofest 2008. Allowed maximum length is 15 minutes including rolling credits, acknowledgement, and video editing software used. Submit DVD or CD with a video file, to LTU Robofest, 21000 West 10 Mile Rd., Southfield, MI 48075, USA. It must include signed "Digital Video Editing and Production Competition Submission Form" attached. It must be postmarked by May 17th after the World Robofest Championship. No pre-registration is needed. There is no registration fee. Winners will be notified by email and Robofest eNewsletter. Please note that adults should not be directly involved in the video production.

Selection criteria will be how well the video presents the Robofest competition and the team's design solutions & performance. Additional criteria would be team spirit, unity, harmony, uniqueness, sound, narration, editing techniques, etc. In addition, all the registered team student members should be shown in the video.

**10.2 Robofest Digital Theme Music Composition Competition**

In order to celebrate the 10th anniversary of Robofest in 2009, we would like add a special digital music composition competition. Students can submit their own original digital music in MP3 format (See the submission form). The music composition must be original work produced by the students and contain no copyrighted material. At the time of the submission the coach will sign the copyright over to Robofest for use in future promotions such as the background music for Robofest 10th anniversary videos. The team and students will receive credit for the composition whenever it is used. Techno dance style is recommended. The music should express fun, harmony, excitement, progress, joy of mastering technology, etc.

**10.3 Team Photo Competition**

Best team photos will be selected from the uploaded official team photos. Every team is automatically entered once their team photos are uploaded. Selected team photos will be posted on the web and presented on a big screen during the World Robofest before announcing the winners.

Selection criteria include showing team spirit, unity, harmony, and uniqueness. In addition, we are checking if all the registered team student members are in the photo. Please be aware that the time of posting photo will be an important criterion for the selection. It will be deducted, if the team photo was uploaded **3** weeks after the team was registered.

**11. The World Robofest 2008 Championship**

The Robofest 2008 Qualifying Competitions will take place at several regional and international locations. There is a video submission site for teams who are not close to a competition location as discussed in section 8. Top teams from each qualifying competition site will qualify to move on to compete in the World Robofest 2008 Championship at Lawrence Technological University on Saturday, April 26, 2008, which will be the kick-off event to celebrate Lawrence Tech's 75th anniversary. The total number of teams advancing from each qualifying site will be dependent on the number of teams registered at the site. Team check-in fee will be $40.

Lawrence Technological University is *tentatively* planning to invite total 30 game competition teams, 25 exhibition teams, 25 RoboSumo teams, 10 VEX teams (including Bridge Battle), and 10 RoboFashion Show teams and 10 Mini Urban Challenge teams for the World Robofest 2008 Championship. Number of Jr. and Sr. teams for each category will be determined after the registration is closed.

Competition category rules found later in this document specify the details on how teams will be ranked during each competition. The total number of teams advancing from each qualifying site/competition category will be decided in proportion to the number of teams registered at the site. The exact number of teams qualifying for Worlds will be determined by Robofest Administration after registration closes.

Team Members of the top Senior Division teams at the World Robofest Championship in Game, Exhibition, RoboSumo, and Mini Urban Challenge will receive $2,000 LTU annual renewable scholarships as well as other prizes donated by Robofest 2008 sponsors.

**12. Reordering Certificates and Trophies**

Robofest is pleased to announce a new systematic service: we have decided to provide certificate re-printing services with minimum charge. Also, winner teams can order multiple trophies with individual names on a fee basis.

# Part 2 – Robofest 2008 Game Competition Rules

The Robofest competition is quite unique because the shape and dimension of the playing field is unknown; the brightness of the competition area is also unknown. The condition of the playing field changes during competition, and some parts of the competition problem such as the locations of the objects to find are unknown until the day of competition.

The name of the challenge for the 2008 competition is “RoboSavers”. Although Robofest allows up to 7 members, we recommend 4 or 5 members per team to better engage students. Both Junior and Senior game competitions use the same challenge theme, but Senior Division Mission is more difficult than that of Junior Division. We recommend a high-level programming language such as C or Java for the Senior Division teams.

Robofest teams do not compete in a predetermined order. For each round, whenever the team is ready to compete after solving the unknown problem, they line up with their official competition score sheet, which can be found in the team envelope given at the team check-in (no computers are allowed while waiting in line). As teams start their first round of game competition, they give a brief, oral, public presentation.

For game competition divisions, teams to advance to World Robofest are determined based on the following scores:

| | |
|---|---|
| Average two performance scores | 90% |
| Team public presentation and answer a question scores | 10% |

**Details about the game rules on the web at:**
**http://www.robofest.net/2008/roboSavers.pdf** (This rule may be revised or refined during the season)

Flash animations as well as streaming video for the game are available on the web at http://www.robofest.net

# Part 3 – Robofest 2008 Exhibition Competition Rules

The robotics exhibition is a great way for students to show off their imagination and creativity. Each team has complete freedom to create autonomous robotics projects such as robot pets, robot artists, dancing robots, storytelling with robots, robots for scientific experiments, and practical robotics applications. Teams are composed of one to seven members. In general, two students are recommended per robot. Computer controlled robots may be of any size and can use any material as long as it is safe for team members as well as spectators. Even though human controlled remote is not allowed, wireless host computer control is allowed.

On the day of Robofest, each exhibition team will be given a table on which to demonstrate the robots. After the opening ceremony, exhibition teams have **4** minutes to explain and demonstrate their robotics project to the public on the stage using a microphone. They will also answer a question chosen at random. Judges will visit the team table to ask additional questions anytime before the final judging. "Silent Judges" will visit team throughout the day to check presentation methods and attitude for spectators. These Judges will not identify their roles.

Teams must bring all the necessary materials for the exhibition. For example, if the exhibition needs background music, the team must bring a CD or audiocassette tape. The sound system in the hosting site will be available to play your audiotape or CD. Teams are requested to bring poster boards to describe their projects.

We highly recommend each exhibition team publish video clip on a video sharing site such as SchoolTube (www.SchoolTube.com) or YouTube.com. Judges will use this to preview the team projects. The exhibition team coach can update the video information and the URL using his Robofest account.

Awards and advancing to World Robofest are determined based on the following data:

| | |
|---|---|
| Public demonstration performance (reliability) | 25% |
| Originality (creativity and imagination) | 25% |
| Official team presentation and answer of question | 10% |
| Presentation methods and attitude for spectators; Information on the team poster; Information on the Internet such as SchoolTube or YouTube video | 10% |
| Source code and robot inspection | 10% |
| Complexity and number of functions | 5% |
| Usefulness / Practicality | 5% |
| Entrepreneur ideas and mindset | 5% |
| New technologies used & other factors | 5% |

# Part 4 – RoboSumo Rules

Two autonomous robots attempt to push each other out of a ring. The engineering challenges are for the robot to find its opponent and to push it out of the flat arena. A robot should also avoid leaving the arena, by means of a sensor that detects the edge. There are Junior and Senior age divisions. Detailed rules can be found at

http://www.robofest.net/2008/robosumo (This rule may be revised or refined during the season)

# Part 5 – RoboFashion Show Rules

Robotics in education creates an innovative and simulating classroom environment, in which students have fun, are excited, and are motivated to learn math, science, and technology.

In this competition, a team of robots will use the whole stage to show off their costume, walk (driving), and performing dancing motions to music.

The RoboFashion Show category has been created in order to get young people interested in math and science at a younger age.

Detailed rules and judging rules can be downloaded from the web at **http://www.robofest.net/2008/RoboFashionShow.pdf** (This rule may be revised or refined during the season)

# Part 6 – Robofest 2008 VEX Pentathlon Rules

The objective of VEX Pentathlon is to design and program VEX robots that will work autonomously to sense and search for light and objects, navigate different paths, manipulate objects and pull loads.

VEX Pentathlon has the following 5 game categories.

- **Skeeball**: to launch from a distance balls into the buckets for points.
- **1600 Meter Dash**: Robot runs 4 laps counter-clockwise around an oval track
- **Tug of War**: This event would pit one robot against another in a tug of war.
- **Slam Dunk**: To deliver softballs into 24" goal
- **Bottle bowling**: The robot pushes pre-arranged bottles off of a field

Detailed rules can be downloaded from the web at
**http://www.robofest.net/2007/vex5thlon.pdf** and rule clarifications:
**http://www.robofest.net/2007/vexUpdate.html**

(This rule may be revised or refined during the season)

This competition is organized by Cranbrook Schools, Michigan


(http://schools.cranbrook.edu)

# Part 7 – Collegiate –“Mini Urban Challenge” using Vision-based Robots

The Defense Advanced Research Projects Agency (DARPA) is the central research and development organization for the US Department of Defense (DoD). They organized the famous **DARPA  Urban Challenge 2007** where Teams competed to build an autonomous vehicle able to complete a 60-mile long real-world urban course safely in less than 6 hours.

Robofest is inspired by the ambitious DARPA challenge and we are simulating a small indoor competition environment solely based on an onboard vision system. The contestants are to use(This rule may be revised or refined during the season)

a common robotic platform called L2Bot and then they have to implement a vision guidance software system to allow the robot to maneuver a given course.

There will be high school and college divisions. Detailed rules can be downloaded from the web at

**http://www.robofest.net/2008/miniUrbanMissions.pdf** (This rule may be revised or refined during the season)

# Part 8 – Associate Challenge: VEX Bridge Battle

This competition is co-organized by Cranbrook Schools, Michigan (http://schools.cranbrook.edu)


Qualifier(practice) rounds will be held on Friday April 25, 2008 from 5pm at Lawrence Technological University. Final matches will be held during the World Robofest Championship on April 26, 2008.

Bridge Battle rules by IFI (Innovations First, Incorporated) can be found at http://www.vexlabs.com/vex-robotics-bridge-battle.shtml (This rule may be revised or refined during the season)

**Appendix 1:**

# Robofest 2008 Coach's Pledge

As a Robofest coach, I have read and agree to abide by the Robofest 2008 rules (http://www.robofest.net/2008/robofest08rules.pdf) as they exist now and as they may be set forth during the Robofest season.

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, primarily via emails. I am responsible for reading the information and I will relay them to all the people affiliated with my team. If any changes in my email account, I will notify Robofest administrators as well as I will update my coach profile.

As a Robofest Coach, I understand that the young students come first. Robofest is about the students learning the 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.

The acceptance of this code signifies my intent to uphold and maintain the Robofest spirit.

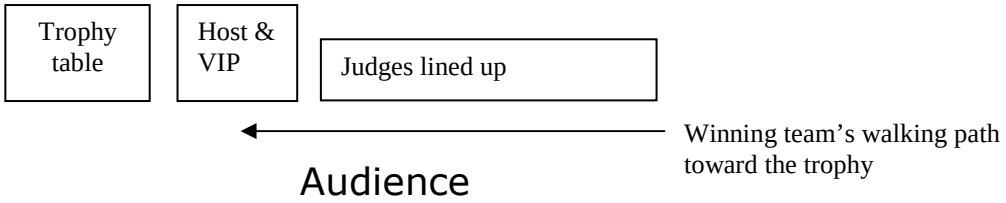
*This will be signed when coaches register sites on-line.*

## Appendix 2:

# Typical Qualifying Robofest Competition Schedule

(Assumption: 20 game competition teams, 5 exhibition (or Fashion Show) teams, and 2 official playing fields. There is no official lunch time, but food concession stand can be open)

| | |
|---|---|
| **08:00 am** | **Doors Open and Check-In begins.** Find your team table after check-in. Practice fields & official playing fields open for practice. Setup exhibitions. |
| **9:00am** | **Opening Ceremonies** |
| | National Anthem |
| | Opening Remarks |
| | Introduction of Judges |
| | Explanation of Robofest rules and unveiling of unknown problem |
| **9:20am** | **Official presentation and demonstration of exhibitions** (6 min x 5 = 30 min) |
| **9:50am - Noon** | Exhibition judges will visit exhibition team tables for interviews |
| **9:50am – 11:20am** | **First Round of Game Competition Begins**: First come first serve basis. **The emcee will assign a game track to the team first.** Then emcee will visit each track for oral presentation. Each team member must introduce her/his name, grade, and role using a microphone to Judges & the public for 5 seconds per member. In addition, then they will have 10 seconds to introduce their robot design. The emcee will ask a question selected at random. The team needs to answer it within 45 seconds. Students may use pencil, paper, calculator to calculate, if the question is math related. Team discussion time is included in the 45 seconds. Estimated average match time will be nine minutes in length, which includes move-in, introduction, answer a question, game competition, and move-out. (10 x 9 min = 90 min). |
| **11:20am** | **Last call for First Round: teams who have not yet competed will be called. If they are not ready, they will lose the chance.** |
| **11:25am** | **Second Round of Competition Begins**: First come first serve basis. No presentations – the only exception will be teams who did not compete in the first round. (10 x 5min =50min) Each match will be five minutes in length, which includes move-in, game competition, and move-out. |
| **12:15pm** | **Last call for Second Round: teams who have not yet competed will be called. If they are not ready, they will lose the chance.** |
| **12:20pm** | **Recognition of Coaches, Teams, & Team Members:** Coaches and team volunteers are given a bag of framed certificates and medals (*) in advance. Ask the audience to give them applause. Students are called to come down and stand in front of their coach. Coaches present Medals (*) and Certificates in parallel. Ask students to face audience and sit down. Take a group photo with everyone. Music is recommended at this time. |
| **12:35pm** | **Awards and Closing Ceremony:** Judges should line up and congratulate winning teams. See figure below. Also, announce the teams to advance to World Robofest. |
| **12:45pm** | **Recognition of Volunteers**<br>**Volunteer Group Photo / Cleanup** |



## Appendix 3:

# List of Sample Questions to answer during Oral Presentation (Oral Exam)

**General Questions**

- Assume a motor has an embedded rotation sensor. It gives 360 counts per a whole rotation. How do we calculate the traveled distance for 720 rotation counts if a robot has same size wheels of which radius is 5cm and directly connected to the motor?
- A motor has a gear with 16 teeth. A second follower gear with 8 teeth is attached to the driver gear with 16 teeth. How much faster the follower gear will be? How about the power of the 2nd gear?
- How do we make a robot to go straight exactly one meter?
- How do we make a robot to spin exactly 360 degrees?
- How do we program a robot to go forward exactly a specified distance such as 1 foot (or meter)?
- Assume a robot moves 20cm for a rotation of two identical wheels connected to motors. How many rotations are needed to program the robot to move forward 1 meter?
- A robot has two identical wheels connected to motors. If the diameter of the wheels is 5 cm, then what is the distance of the robot to move for a rotation?
- Explain ways your team used to structure, organize, and document your programs
- How can you implement the line-following algorithm to make your robot stop at the end of the line?
- Assume there is an unknown length black line. Show ideas to detect the end of the line in your line following algorithm
- Explain pros and cons for icon-based GUI programming languages such as NXTG, RCX code, or RoboLab
- What are six fundamental components of autonomous robots?
- What is localization problem in robotics?
- What is acceleration? (*)
- What is torque? (*)
- Explain disadvantages of using timers for the duration of motors.
- What have you learned about robot programming?
- What have you learned about choosing the design for your robot?
- What is the purpose of working as a team? Give an example of your team working together.
- What programming language did you use? What are some features and advantages of this language?
- What sensors does your robot use? What is the purpose of each sensor?
- Describe your robot's gearing mechanisms and gear ratio. Why did you choose that ratio?
- What was the most difficult problem to solve? How did you solve or overcome it?
- Are you using any new technology that other teams might not be using?
- Are you using any creative ideas or strategies that other teams might not be using?
- Are you using any robot parts/components that other teams might not be using?
- Did you have any conflicts between team members in designing the robots? If so, describe a conflict and tell how your team resolved it.
- Explain the difference between remote- controlled robots and autonomous robots. Give examples of real-life applications of remote-controlled robots and autonomous robots.
- What problems can occur when robots do not have sensors?

- Why is friction needed? Why is friction bad? Give examples. (*)
- What are some ways to improve the reliability of your robots? Give examples of methods that you used.
- Are there any tasks that your robot cannot do yet?
- How would you improve your robots if you had more time and resources?
- Explain what you would have done differently.
- How did you debug your program code?
- How did you make your programs more readable and understandable to others? Why is this necessary?
- What factors must be considered in building and programming a robot to climb down a steep ramp?
- What would you do if you want to make the robot go faster?
- What factors must be considered in building a robot to push heavy objects?
- Give an example of any science concept you applied in designing or programming your robot.
- Give an example of any math concept you applied in designing or programming your robot.
- What factors must be considered in building a robot to lift heavy objects?
- How did you trouble-shoot your robot?
- Who gave the most valuable technical help to your team and what was it?
- **…**

**Game Competition team only**

- Explain how your robot detects the ball
- Explain how your robot follows the black line.
- Explain how your robot detects the wall.
- Explain how your robot detects the edge of the table to avoid falling off.
- Explain any unique features of your robot and programs.
- Strategies for two robots to cooperate together
- Strategies for two robots not to collide each other.
- **…**

**(*) Sr. division only questions.**

To all Robofest coaches: please suggest your own oral exam questions to chung@LTU.edu