## BUBUFEST 2017

## **RoboHit Game Judge Training**



Go to

<u>www.robofest.net</u> and click on Get Involved → Game.

Print scoresheets from: RoboHitScoreSheet.pdf

Rule Updates and FAQs can be found at: RoboHit\_Final\_1.7.1.pdf



March 2, 2017

This presentation is for all Site Hosts, Judges, volunteers, coaches, mentors, and team members

### Agenda

- A. Review Game Rules
- B. Judge Roles
- C. Site Setup
- D. Work Time
- E. Impound Procedures
- F. Placing the Trash Objects
- G. Placing and Starting the Robot
- H. Judging Tips
- I. Ending the Round
- J. Scorekeeping
- K. Practice Scoring with videos

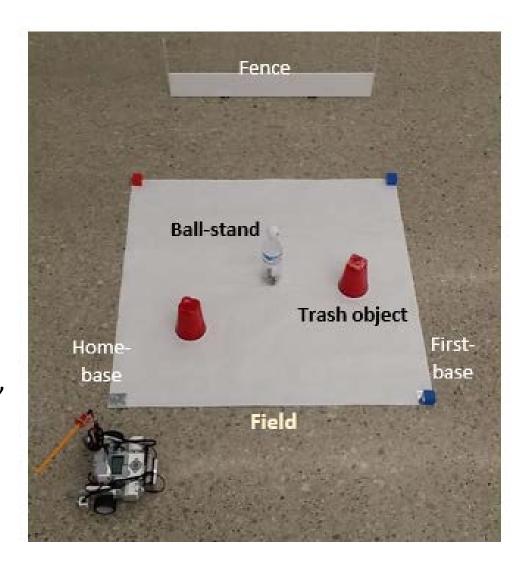


- Based on Official Rules (v1.7.1) published on Jan 27,
   2017
- View the Judging Score Sheet online by going to <u>robofest.net</u> → Get Involved → Game



A robot is to perform the following tasks:

- (1) locate a ball stand and hit the ping-pong ball on top of it using a standard pencil as a bat (moved by at least one actuator),
- (2) search for two trash objects and remove them completely from the field,
- (3) locate bases and remove bases completely from the field.





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### RoboHit Rules

#### **How Points are Earned**

- Points are earned depending on where the ball is hit.
  - A home-run (highest points) will be scored if the ball flies over the fence or hits either pole.
- Points are earned for each base visited by the robot
  - A visit is defined by a block being completely removed from the field.
- Points are earned if the robot locates one or both of the 2 trash objects and removes them completely from the field.
- Points are earned if the robot returns back to Home-base, stops, and rests.
- All the tasks should be done completely autonomously within 2 minutes without any external help.



#### **Violations and Reset Option**

If any of the following violations occur, then judges will announce a violation, stop the run, and ask team if they want to reset the whole field. If team declines the reset, the run will end and the score will be calculated.

- 1. Human contact/touch with the official playing field materials
- 2. Human contact/touch with the robot at any point after the start
- 3. The robot (including the bat) touches the fence
- 4. The robot completely leaves the field (the distance between the edge of the robot and the field becomes greater than approximately 5 cm (not taking connector wires into account)

  Note: the 5 cm distance is measured by the judge's discretion;

  the boundary will not be marked



#### **Detailed Rules for Reset**

- 1. When the field is reset, all the points earned from the previous attempt are lost (cleared).
- 2. The complete reset will be done by a Judge while the 2-minute countdown timer continues to run. Judges must reset as quickly as possible. No partial reset is allowed.
- 3. The player may ask for a complete reset to be done or to stop the run (with no reset) at any time even if there is no violation.
- 4. Only one complete reset is allowed for a run with a penalty defined on the scoring sheet.

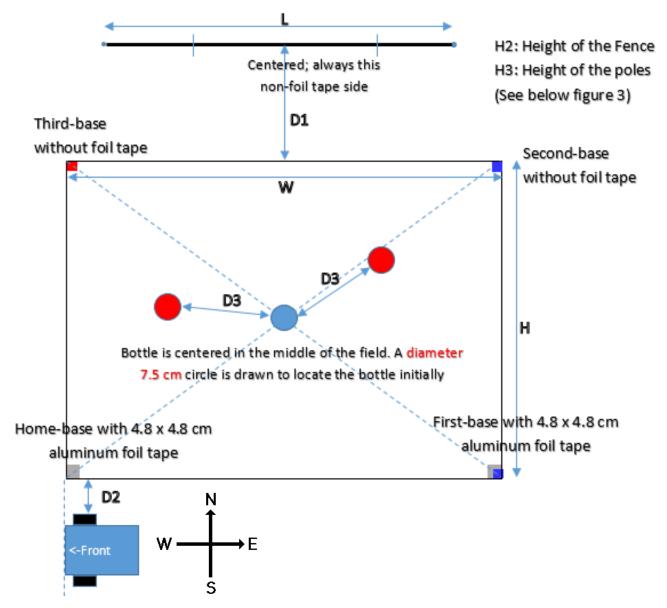
#### **Game Rules**

- 1. The robot may attempt/complete the three tasks (hit the ball, visit bases and remove trash objects) in any order with the final task then being to stop at Homebase at which point the timer will stop.
- 2. The ball can be moved off the bottle without being hit by the bat, however the maximum score for the Pingpong ball without being hit by the bat is 7. (See section 1 of the score sheet)
- 3. Unknown factors will be unveiled according to "Table 1- Field Dimensions/Unveil Time" on slide 12.
- 4. A 30 minute work-time will be given to adjust the robot after the unveiling.

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### **RoboHit Rules**

Game Playing Field (example for Sr. Division with Rectangle Field)



#### **Fence with 2 Poles**







Table 1: Field Dimensions/Unveil Times

	Min	Max	Unveiled when?	Note		
	value	value				
L	50cm	100cm				
W	70cm	120cm		To be used for both rounds		
Н	70cm	120cm	At the beginning of competition day			
H2	12cm	30cm				
Н3	15cm	18cm				
D1	35cm	60cm	Unveiled before work-			
			time for each round			
D2	5cm	5cm	Fixed	Fixed		
D3	10cm	Unknown	Unknown; different each	May need to sense		
			round	objects		



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### **RoboHit Rules**

#### Table 2. Field Component Properties/Color and Unveil Times

Floor color	Unveiled at the beginning of competition day. If floor color is bright, dark
	paper or vinyl will be placed under the Field.
Field Material	White paper or vinyl; can be taped to the floor
Fence	Supports will be placed & taped on the back side of the fence.
Poles	Drinking straws. Diameter is 6 ~ 9mm. Color unknown. Taped at the edge of
	the fence
Home- & First- base	4.8 x 4.8cm aluminum foil tape; shiny silver. 3M HVAC tape
Bottle without the	500ml (16.9 FL Oz) bottle. The height without the cap is about 20cm. Bottle
cap	diameter is approximately 7cm. Unveiled at the beginning. The teams may
	measure the height after check-in.
Ping-pong ball	Standard size 40mm; color is unknown.
	https://www.amazon.com/gp/product/B00M9VXF50
Trash objects	Possible examples: plastic cup, empty soft drink can, etc. Height: 11~14cm.
	Diameter: 6.5~10.5cm, Weight: 12~15g. Unveiled at the beginning of the
	day. Actual locations can be anywhere as long as D3 is maintained and will
	be announced <b>after</b> all the robots are impounded.
Base objects	The cube is made of six 2x4 LEGO® bricks. 3.2 x 3.2 x 3.2cm. Weight is 13g.
<i>2</i>	Color is unknown
Robot orientation	West, North, East, or South – Unveiled before work-time for each round

#### **Robot Specifications (For both Junior and Senior Division)**

- 1. Robot may expand to hit the ball. However, it must fit within a 35 x 35 x 35cm box before expanding; after expansion, the max size must be less than 54 x 54 x 54cm including the pencil. (54 = 35+19)
- 2. Weight limitation: none
- 3. A standard wooden pencil must be attached to the bot for use as a bat. Hexagonal or round shape pencils are allowed. Triangular, carpenter, or flexible pencils are not allowed. Diameter is between 6~7mm. Max length is 19cm. Any part of the pencil surface including the eraser needs to hit the ball to constitute a "legally hit" ball.
- 4. Any number of sensors/sensor types (unless it is harmful to humans)
- 5. Any number/type of motors/servo motors (multiplexor is OK to use)
- 6. Any material/robot kit may be used to construct the robot including tape, glue, bolts and nuts, rubber bands, etc.
  - 7. A Robofest team ID tag on top of the robot is required.
- 8. A label identifying the **front** side of the robot is required.

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### RoboHit Rules

#### Table 3 - Difference between Junior and Senior Divisions

	Junior (5 ~ 8 <sup>th</sup>	Senior (9 ~ 12 <sup>th</sup>
	grades)	grades)
Field shape	Square	Rectangle
D1 value	Less than or equal to	Greater or equal to
	that of Sr.	that of Jr.
Number of	One	No limit
controllers		



D1=Distance between the field and the fence.

#### Rules to Play Two Rounds and Determine Winners

- Playing field configuration may be different for each round.
- When unknown factors are unveiled, teams will be provided hardcopy of unveiled information or the information will be projected on the screen.
- 3. Teams will be given 30 minutes (work-time) after unknown factors are unveiled to work on their robots. During this time, all people except contestants and authorized staff/volunteers will be evacuated from the pit/room
- 4. All teams must submit their robot to the impound area when 30 minute work-time has expired.

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5. During the impounding process, judges will inspect robots. (size of the robot before and after expanding, Team ID, and label indicating the front side)

#### Rules to Play Two Rounds and Determine Winners

- 6. After impounding, the judges will setup official playing fields with trash objects. Jig for trash object placement will be provided.
- 7. Teams will compete in a pre-determined order decided by the site host.
- 8. A maximum of two contestants per team are allowed at the playing field during the run.
- 9. The judge will place a jig just off the field for robot positioning. It will be removed after team has positioned their robot correctly.
- 10. Contestants must move away at least 1m from the field edge after starting the robot. Timer stops only when the robot stops at Home Base at the end of the run.
- 11. Judges mark the score for the Ping-pong ball during the run. Final scoring for bases and trash objects is done after the run is over.
- [12. Bottle (ball stand) location is checked after the run is over.

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#### Rules to Play Two Rounds and Determine Winners

- 13. A team member must sign/initial the score sheet to confirm the team's score.
- 14. Entered scores shall be displayed to teams to validate data entry.
- 15. Winners in each age division will be decided by the **average** Final Score of the 2 rounds. Tie breakers will be: (1) best Score of two rounds, (2) highest time left from best score, (3) rerun, if needed.

#### Table 4 - Example of breaking Ties:

Team	Round 1	R1 time	Round 2	R2 time	Avg.	(1) Best	(2) Time left	Rank	
Name	Score	left	Score	left	Score	score	best score	Natik	
Team A	80	20	100	15	90	100	15	1	
Team B	100	10	80	0	90	100	10	2	
Team C	90	20	90	20	90	90	20	3	

#### **Ball Stand Original Location**

• A 7.5cm diameter circle is drawn with pencil on the field to locate the bottle initially as shown:







**Initial Setup** 



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### RoboHit Rules

#### **Ball Stand Original Location**

 If any part of the bottle is outside of the circle (see below), Judge will declare the bottle has NOT remained

on original location.



**Obvious out** 

#### **Ball Stand Original Location**

To help with judging a Lego cube can be used





The bottle remains inside circle

The bottle does not remain inside circle

Notice that the side of the bottle is wider than the bottom of the bottle, so the edge of the cube must touch the side of the bottle AND the circle for the bottle to be considered "in".



#### Important Reminders to be Announced Before Each Round

- Proctors are watching for Pit Violations including:
  - Coaches or Parents in the pit area during work-time.
  - Verbal/electronic communication between team and coach/parent during work-time.
  - Team member leaves the pit unsupervised before their robot is impounded.
  - Team alters its own robot in the impound area after impound.
  - Team handles or interferes with another team's computer or robot, either in the pit or impound area.
  - Destruction of property.
  - Use of inappropriate words and/or behavior toward team members, other teams, audience, judges or staff.



#### Important Reminders to be Announced Before Each Round

- Any violations can result in deduction of points or disqualification at the judge's discretion.
- If anyone sees any suspicious activities, please notify the nearest volunteer immediately.
- Spectators are welcome to take pictures or video, but please make sure your flash is off.



#### **Special Notes**

- Though every effort is made to be consistent and precise in all of the dimensions of the playing field and parts, Robofest assumes a tolerance of ±3mm, unless stated otherwise.
- If there are multiple playing fields at the competition sites, the Chief Game Judge will check consistency between the playing fields.
- Judges & contestants should maintain at least a 1m distance from the field.
- Final decisions are at the discretion of the Chief Game Judge.



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## RoboHit – Rules

#### Game Score Sheet (1/2)

	Judging	Items	Location/ Or Count	Point Value (per count)	Score Earned / Lost
			Home-run (over the fence or hits a pole)	30	
	Ping-pong ball	Legally hit by pencil	Touched the fence without first hitting the floor	15	
			Bounces over fence	13	
#1			Outside the field	10	
			On the field	8	
			Outside the field	7	
		NOT hit by pencil	On the field (off the bottle)	5	
			On the bottle	0	Max. 30
#2	Number of Bases visited. The LEGO blocks must be removed completely from the field*		0 1 2 3	10	Max. 30

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## RoboHit –Rules

### Game Score Sheet (2/2)

(*) No specific order required			Total Score Time left in seconds		
#7	A Reset was done (Reset penalty)	0 (no)	1 (yes)	-5	Мах. 0
#6	The robot remained intact throughout the run.	0 (no)	1 (yes)	5	Max. 5
#5	The robot came back to Home-base, stopped, and rested at the end of the run. Any part of the robot must be on or over the Home-base aluminum foil plate.	0 (no)	1 (yes)	10	Max. 10
#4	Bottle (ball-stand) remained on original location. (The bottle is completely inside the circle on the mat)	0 (no)	1 (yes)	5	<b>M</b> ax. 5
#3	Number of trash objects removed completely from the field*	0	1 2	10	Max. 20



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#### RoboHit – Rules

#### **Frequently Asked Questions**

- Is it a Home-run, if the ball flies over the fence poles but still between the 2 poles? Yes.
- Does the robot have to be at the original 35cm size at the end of the run? No.
- Can the ball be moved/carried/touched by anything other than the pencil? Yes, but lower points will be awarded. See Score Sheet.
- Can a team repair robot and/or change program during the reset?
   Yes.
- Will the 5cm mark outside the Field mat be visible? No
- How many points if the ball hits the wall and bounces back onto the Field? 15
- Can gears, springs, and/or rubber bands be used to assist the
  actuator in moving the pencil? Yes, any materials may be used to
  construct your robot.

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#### **Frequently Asked Questions**

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- How long does the robot need to rest before the timer stops (Is there a countdown?) The timer will stop when the robot stops at home base. If the robot then moves again (other than a small adjustment), the team will get "0" points for #5 ("stopped and rested") on the scoresheet and the time left will be recorded as "0"
- Can players/coaches request that the edge of the field be taped down, or is it solely up to the Site Host? Players/coaches may ask the Site Host if he/she deems it necessary to use tape, however, the Site Host may grant or deny the request to tape down the fields at their own competition.
- Does the pencil have to swing to legally hit the ball? No, any part
  of the pencil surface including the eraser needs to hit the ball.
  The pencil does not have to move relative to the robot.

#### **Frequently Asked Questions**

- Is the robot allowed to carry/ have prolonged contact with the pingpong ball, using the pencil/bat? Yes, however, it will not be considered a legal hit and will be scored accordingly
- Can the ball be moved by substances other than the pencil/bat, such as liquid/water, or gas? Yes, but again, it will not be considered a legal hit and will be scored accordingly
- Can the bottle be moved outside of the 7.5cm circle, but then moved back inside before time expires? Yes, scoring is done at the end of the run for all items except the ping pong ball
- Can the ball be punctured, broken, or physically altered in any way?
   No
- Can more than one pencil be used to move the ball? A Legal Hit is scored when one pencil contacts the ball like a bat hits a baseball (either with a swing or by the forward motion of the robot).



## RoboHit - 2017 Game

## **Judge Roles**

Judges' decisions are final!



**Chief Judge** 





2 Judges per Game field







Qualify for Michigan and World Championships



## Site Setup

- Site Hosts will receive Playing Field Initial Setup document with dimensions for each division
- If multiple fields are used (8+ teams), Site Host should set up all playing fields in the same direction, numbering each field clearly with enough distance for teams to stand 1m away from the field
- Practice fields should also be set up before teams arrive
- Confidential items (site host setup documents/measurement jigs) should be kept secure
- Impound Table Team Placemats Assign impound proctor to watch table at all times
- Pit Area Team Signs on tables Assign proctors to watch during work time and during rounds





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## Site Setup



RoboHit™ - Robofest® 2017 Game Playing Field Initial Setup

Junior Division

#### Site Host Copy - Confidential, do not show this to teams

Values of field matarials provided by Robofest.

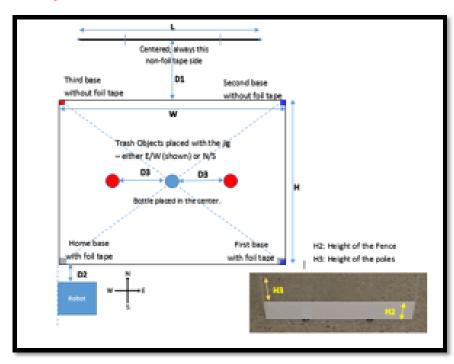
- W = 92cm.
- H = 92cm.
- L = 58cm.
- H2 = 22cm

Values to setup on all fields before teams arrive for practice; Keep them throughout the day.

H3 = 16cm.

Note 1: Teams may measure L, W, H, H2 and H3 values during the worktime.

Note 2: D2 is constant at 5cm – Use Jig provided to set robot IN RELATION TO THE GAME MAT





## Site Setup

#### Round 1:

Announced/Unveiled prior to Work Time. Setup D1/Mark with tape during the beginning of Work Time to allow time for teams to practice. No template provided, please measure carefully.

- D1 = 40cm
- Starting Orientation = E

DO NOT ANNOUNCE. Using the jig provided, setup after impounding all the robots

D3 = 15cm Orientation = N/S

#### Round 2:

Announced/Unveiled prior to Work Time. Setup D1/Mark with tape during the beginning of Work Time to allow time for teams to practice. No template provided, please measure carefully.

- D1 = 39cm
- Starting Orientation = N

DO NOT ANNOUNCE. Using the jig provided, setup after impounding all the robots

D3 = 11cm Orientation = E/W



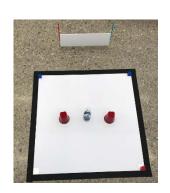
Example

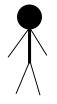
## Recommended Setup

#### Timer\*

2 Judges / Competition Field



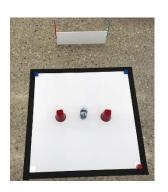






2 Judges / Competition Field







Chief judge works closely with scorekeeper to review score.
The Chief Judge is ultimately responsible for final scores.





should be blocked and supervised at all times; *Charging* is not allowed



Chief Judge



Score Keeper with Laptop/Excel



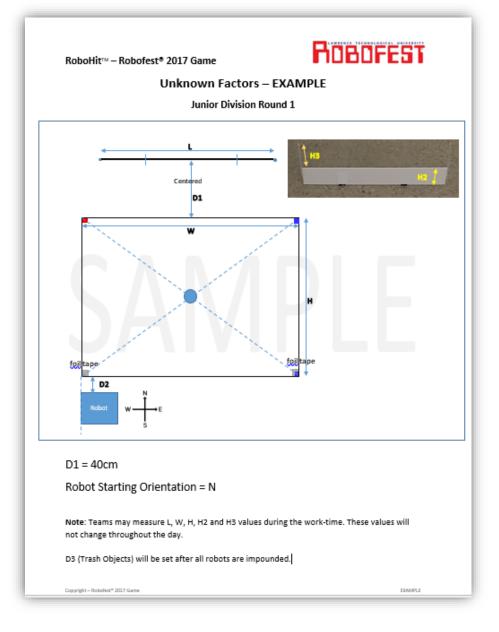
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(\*) Centralized or Smartphone App.

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## Work Time 1/3

 At the start of the work time, teams are given an "Unknown Factors" data sheet with unveiled dimension of D1 and **Robot Starting** Orientation (included in Site Host materials)





## Work Time 2/3

- Emcee will make announcements when 10 Minutes and 5 Minutes remain until the end of the Work Time.
- If any non-game related communication is necessary during the 30 minute work time, Coaches/Parents may speak with team members away from the Pit Area under the supervision of a judge or proctor. No additional time will be granted for teams who have been interrupted in this manner.
- Proctor Responsibilities List and Violation Report are available for Site Hosts to use.



## Work Time 2/3

#### Proctor's Responsibilities:

Watch for the Following Violations in the Pit Area:

- Team member leaves the pit area unsupervised during work time.\*
- Coaches/Parents/Spectator entering the pit area during the work time or game rounds.\*
- Competitors communicating with (includes verbal, hand gestures, Cell Phone, Text, email) coaches/parents/ spectators during the work time.
- Coaches/Parents/Spectators communicating with competitors during the work time.
- Use of a cellular/mobile phone or a medium of wire/wireless communication in the Pit area. - Phones must be returned to the spectator area under supervision of staff.
- Destruction or modification of competition fields, materials or robots of other teams.
- Use of dangerous items or behaviors that may create or cause interference with the competition.
- Inappropriate words and/or behavior toward other team members, other teams, audience, judges or staff.
- Any other situation which judges might consider as interference or violation of the spirit
  of the competition.

\*If emergency communication is necessary or competitors need to the work time, they may request to do so under supervision by tour additional work time will be granted.

#### Monitor Robot Impound Area:

- Once robots have been impounded, teams must not enter the have been called for the round of competition.\*
- No modifications can be made to their robot between impour round of competition.\*
- · Any handling of another team's robot is strictly prohibited.\*

If a violation occurs, place a Yellow colored sticker on the Team Sigr or impound table) and report the violation to the Chief Proctor usin The team ID will be displayed on the screen.

Proctor Vio	ation Report:
Team Numl	er:Time remaining
	During Impound
Round #:	During Break
Define Viola	tion:
	Team handled or interfered with another team's robot, laptop, competition or personal materials (either in pit or impound area) AUTOMATIC IMMEDIATE DISQUALIFICATION  Team member left the Pit Area unsupervised during work time Coach/Parent entered the Pit Area during the work time or game rounds  Team communicated with Coach/Parent Spectator (verbally, hand gestures, cellular device/email)
	during work time
	Team entered impound area after robot was impounded
	Use of inappropriate words and/or behavior toward other team members, other teams, audience, judges or staff.
	Other:
Proctor:	Turned in to:
If a violation	occurs, place a Yellow colored sticker on the Team Sign (either on the team table or impound

table) and report the violation to the Chief Proctor using the form provided.

The team ID will be displayed on the screen.



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## Impound Procedure 1/3

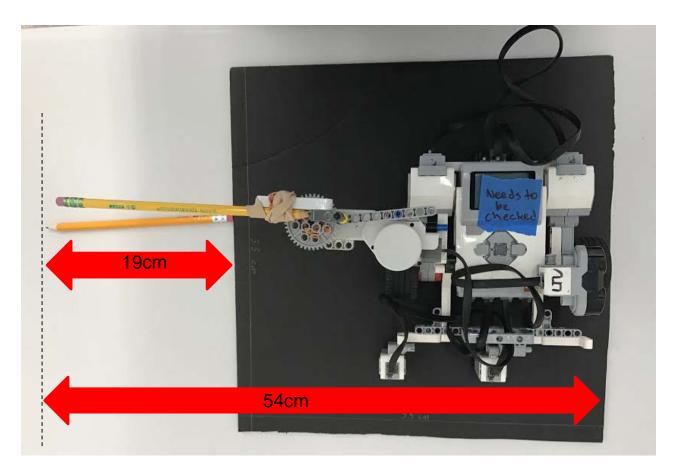
- Each Team will have a designated "Place Mat with Team ID" on a table set up away from the Pit and Spectator Areas to secure the robots between the end of the Work Time and the End of the Game Round.
- 5 to 10 minutes are given based on # of teams at the site.
- Impound Tables should be blocked and supervised at all times.
- Only one member of the team should present their Robot to the impound area. All other team members should remain at the Team Table.
- Robot will be checked for legal parts (one standard pencil, number of controllers for Jr. Teams)
- Robot will be checked for the "TEAM #" and "FRONT" label.





## Impound Procedure 2/3

 Robot (L x W x H) will be measured using a 35x35 cm board to check before expanded and a 35x35 cm board PLUS a standard 19cm pencil to check size after expansion.







## Impound Procedure 3/3

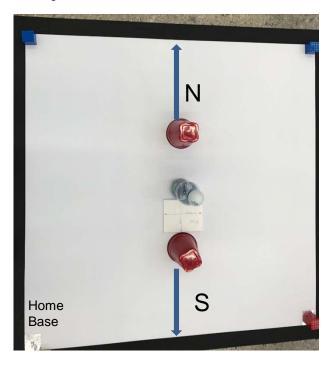
- If robot passes inspection, it is placed on the "Team Placemat" on the Impound Table. If not passed, teams may come back before the end of impounding time.
- If teams are ready to impound their Robot early (before the end of the Work Time), they can present the robot to the Impound Table when ready.
- Teams may NOT be allowed to charge their robots during impound.
- Robots not impounded at the end of announced impounding period are automatically disqualified for the round.
- Participants are not to touch/remove robots from the impound table for any reason once the robot has been impounded.





## Placing the Trash Objects

- After all robots are impounded, the trash objects are to be placed on the game field
- Jigs will be provided by Robofest. Object orientation will also be indicated (for example North/South) on the Playing Field Initial Setup Document sent to Site Hosts

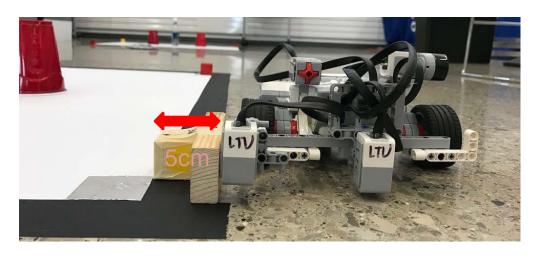






## Placing and Starting the Robot

- Jigs will be provided by Robofest. 1 jig will be used for both rounds per division.
- 5cm Tape may also be used for the robot placement.
- Robot starting orientation (North, South, East, West) for each round will be indicated on the **Playing Field Initial Setup** document sent to the Site Host and the Unknown Factors projected on the screen and provided to the teams







## **Judging Tips**

- Make sure Score Sheet has correct team information
- Check violations carefully during the run
- Judges must reset the playing fields as quickly as possible during the run since time will not stop during resets.
- Enter the Time Remaining carefully (near the end of the run, one judge should watch the timer while the second watches for the robot to reach home base)
- If the robot does not stop at home base, the "time remaining" is recorded as "0"
- Chief judge at individual Sites has the authority to interpret any and all questions that may arise during the competitions



## **Ending the Round**

- Record time remaining and score for the round
- Get initials from a team player. Coaches must instruct students to check score carefully before signing. This is part of the educational process
- One Judge must also initial the scoresheet
- Give the score sheet to Chief Judge
- After checking, Chief Judge will give the score sheet to score keeper



## Scorekeeper Instructions

- An Excel file will be provided to the Site Host to record scores
- Scorekeeper should carefully enter score AND time remaining for each round
- Entered scores of a round shall be projected on the screen to validate data entry after each round. Do not display additional columns

4	Α	В	С	D	E	F	G	Н	1	J	K	L	М
1	Robof	est 2017		Qualifier:									
2	RoboH	it											
3	Sr. Gan	ne		Final score is d	determined by average of the two rounds								
4				Tie breakers:	(1) best score o	f two rounds							
5					(2) highest time	e left from best	score						
6					(3) rerun				DO NO	OT DISPLAY THES	E COLUMN:	S	
7													
8	Team ID	Team Name	R1 Score	R1 Time Left	R2 Score	R2 Time Left		Avg. Score	Best Score	Time for Best Score	Rank	Trophy?	Advance?
9	120-1	Team 1			400				400	4.5			
	120 1	reami	80	20	100	15		90	100	15	1		
10	999-5	Team 2	100		80	0		90	100	15	2		
						0					2		
11	999-5	Team 2	100	10 20	80 90	0 20		90	100	10	2 3 5		
11 12	999-5 1121-2	Team 2 Team 3	100 90	10 20	80 90 40	0 20		90 90	100 90	10 20	2 3 5		

# Judge Training Videos from Warm-up Competition

Judge Training Video Playlist:

https://www.youtube.com/playlist?list=PLoaa287K8J2x7lU5a1UBT74gooPNjTFHc

Go to <a href="https://www.robofest.net">www.robofest.net</a> → Get Involved → Game (under Judging Section)



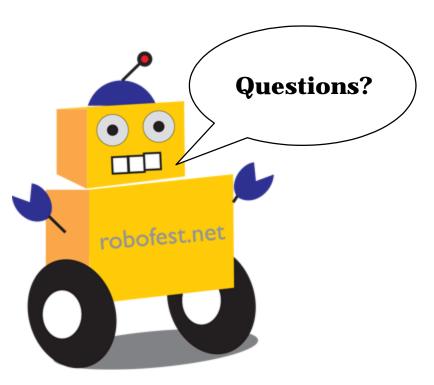




## Little Robots, Big Missions

Go to
<a href="https://www.robofest.net">www.robofest.net</a> and
<a href="https://www.robofest.net">click on Get Involved</a>
<a href="https://www.robofest.net">→ Game</a>

This PowerPoint file and related materials are available under Judging section





Contact: robofest@LTU.edu