

LAWRENCE TECHNOLOGICAL UNIVERSITY  
**ROBOFEST**

2022

**GAME**

# OceanBots Judge Training

Rule Updates and FAQs can be found at:  
Get Involved → Game page on the website

[2022 Game Rules](#) FINAL VERSION

[2022 Game Score Sheet](#) - Official Version

[www.robofest.net](http://www.robofest.net)

[robofest@ltu.edu](mailto:robofest@ltu.edu)

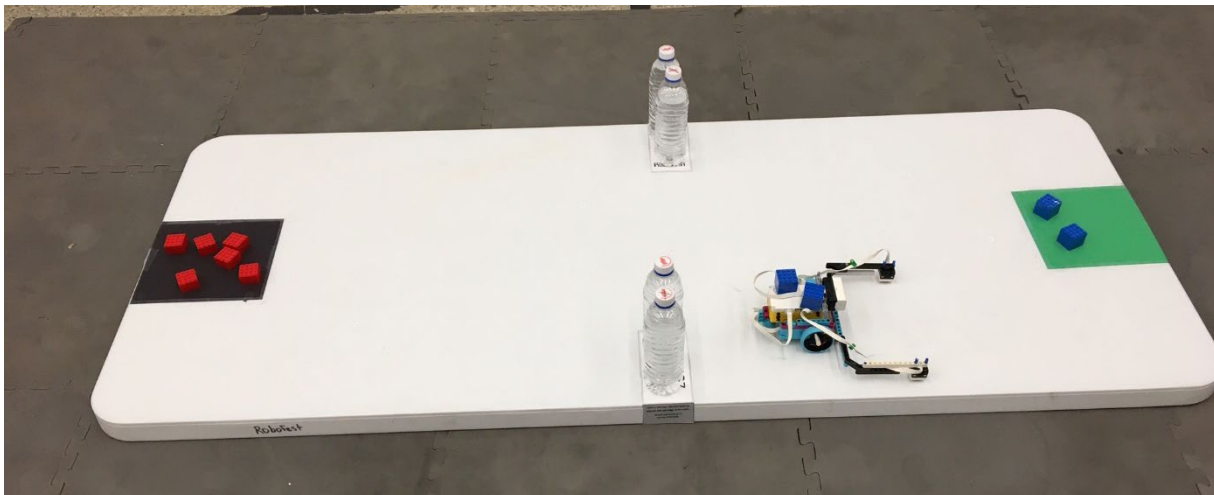
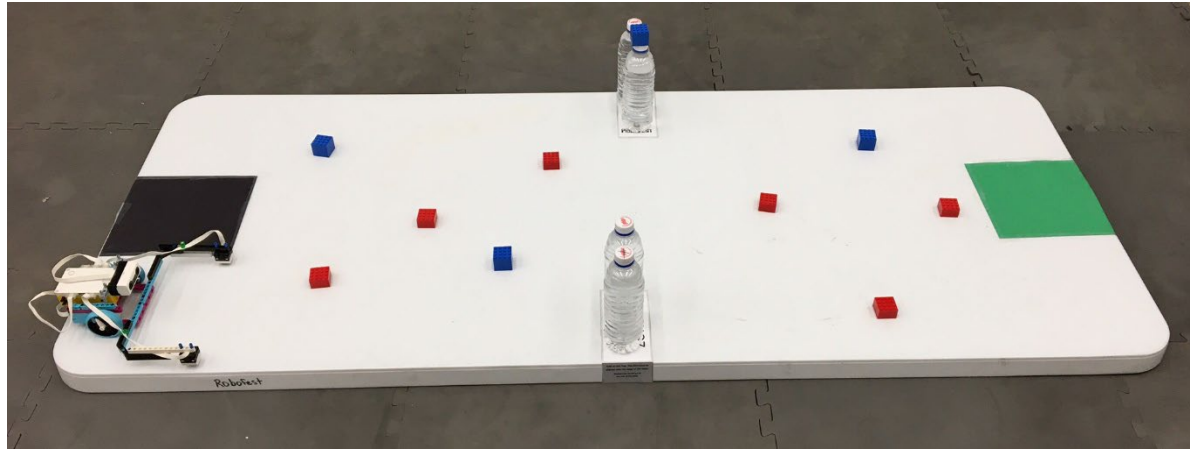
248-204-3568

Room J233 Taubman Complex, LTU  
21000 West 10 Mile Road, Southfield, MI 48075, USA

# Agenda

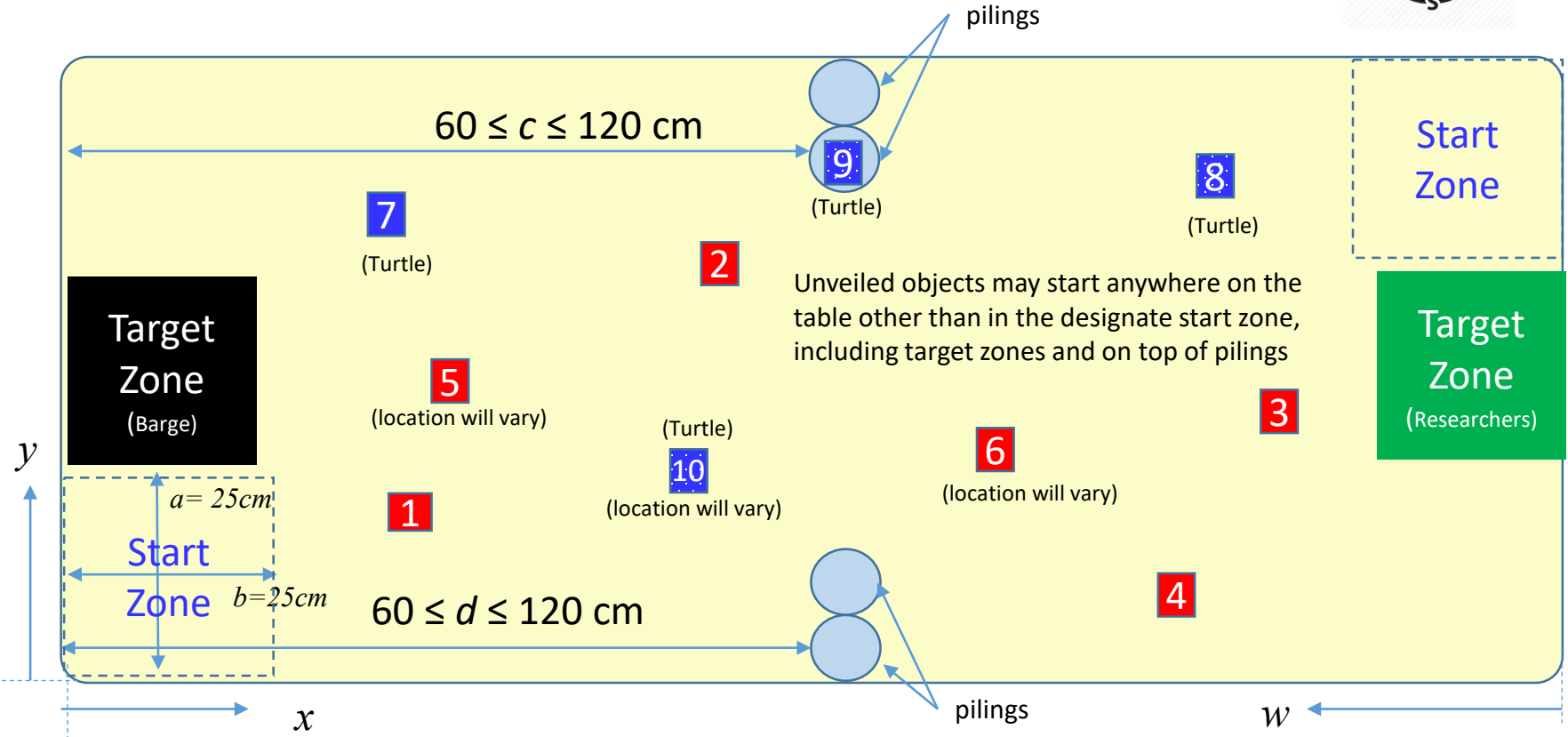
- Review Game Mission
- Field set up and placing the objects
- Unknown Factors and 30 minute work time
- Starting and Ending the Round
- Violations- Pick Up Penalties and Full Reset
- Scoring
- General Rules and Restrictions
- FAQ

# Game Synopsis



- Move 2 Turtles (blue blocks) and 6 Trash objects (red blocks) from the table into their respective targets AND bring 2 Turtles onboard the robot
- For a game run, max 2 minutes are given and one full-reset is allowed
- All the tasks must be done autonomously without any external help
- UTF (Unknown Task and Factors) will be unveiled just before the 30 minute work-time
  - The starting location and orientation of the robot
  - Remaining object locations (Jr Div only)
  - New items/landmarks may be added on the table for the Game-Ending task
- STEM Learning Goals
  - Geometry/degrees/logic/computational thinking
  - Localization and navigation
  - Object detection and manipulation

# Playing Field (6ft table) Setup



Unveiled objects may start anywhere on the table other than in the designate start zone, including target zones and on top of pilings

#/ color	x (cm)	y (cm)	w (cm)
1	40	20	
2	80	50	
3		35	30
4		10	45
5	unveiled		
6	unveiled		
7	35	55	
8		60	40
9	on piling (see diagram)		
10	unveiled		

- Start zone (black side or green side), robot location and robot orientation will be unveiled **before the work-time**
- Jr: c, d, and locations of **5, 6, and 10** will be unveiled **before the work-time**
- Sr: c, d, will be unveiled **before the work-time**, locations of **5, 6, and 10** will be unveiled **after impounding**

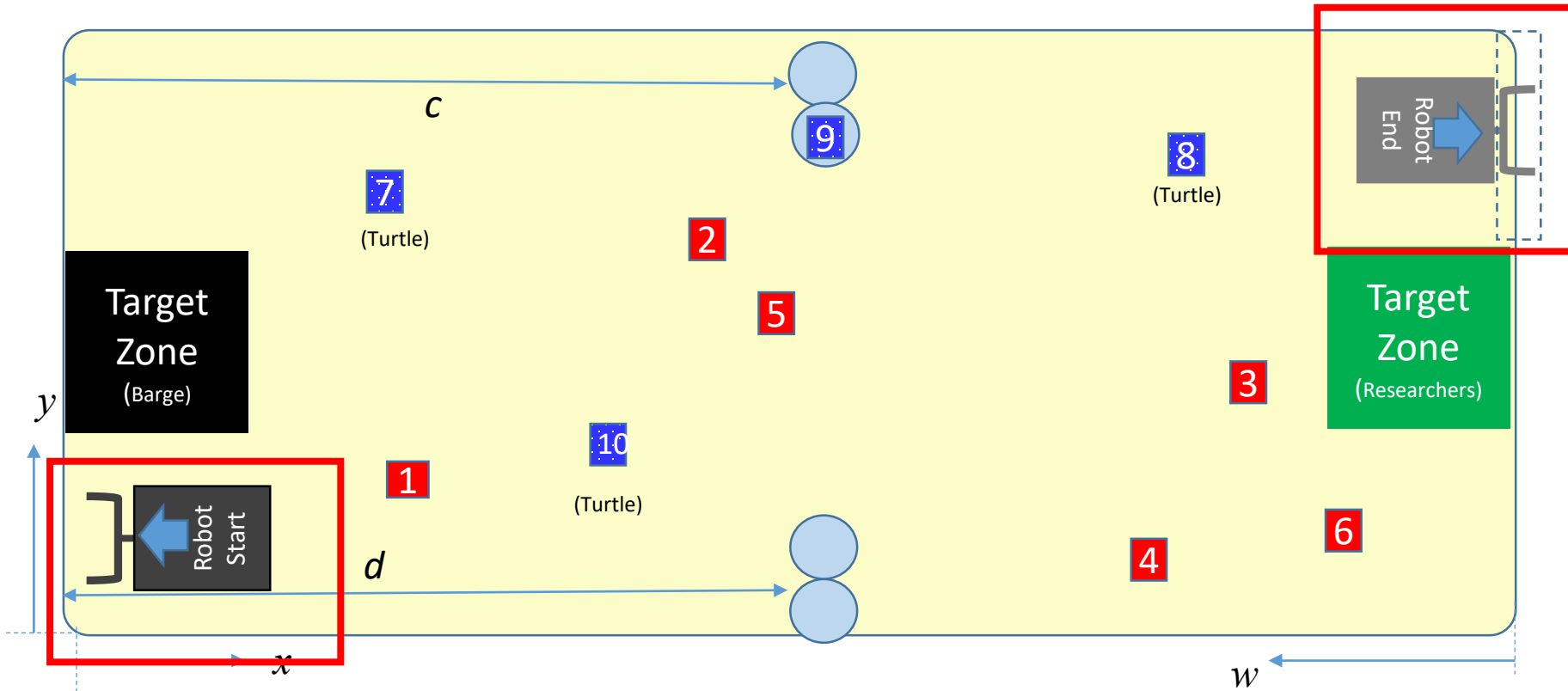


- Hole reinforcement stickers are used to mark the location of objects
- Object can be placed in any orientation/location as along as sticker is covered

# Differences between Jr and Sr age divisions

	Junior (5 <sup>th</sup> ~ 8 <sup>th</sup> grades)	Senior (9 <sup>th</sup> ~ 12 <sup>th</sup> grades)
Game-Ending Task	Easier	Harder
Location of objects	Unveiled before worktime	Unveiled after worktime
Location of the bottle barriers	Unveiled before worktime	Unveiled before worktime
Number of Trash objects	6	
Number of Turtle objects	4	
Number of onboard computer controllers	One	No limit
Vision sensor	Not allowed	Allowed

# UTF Example (Jr)

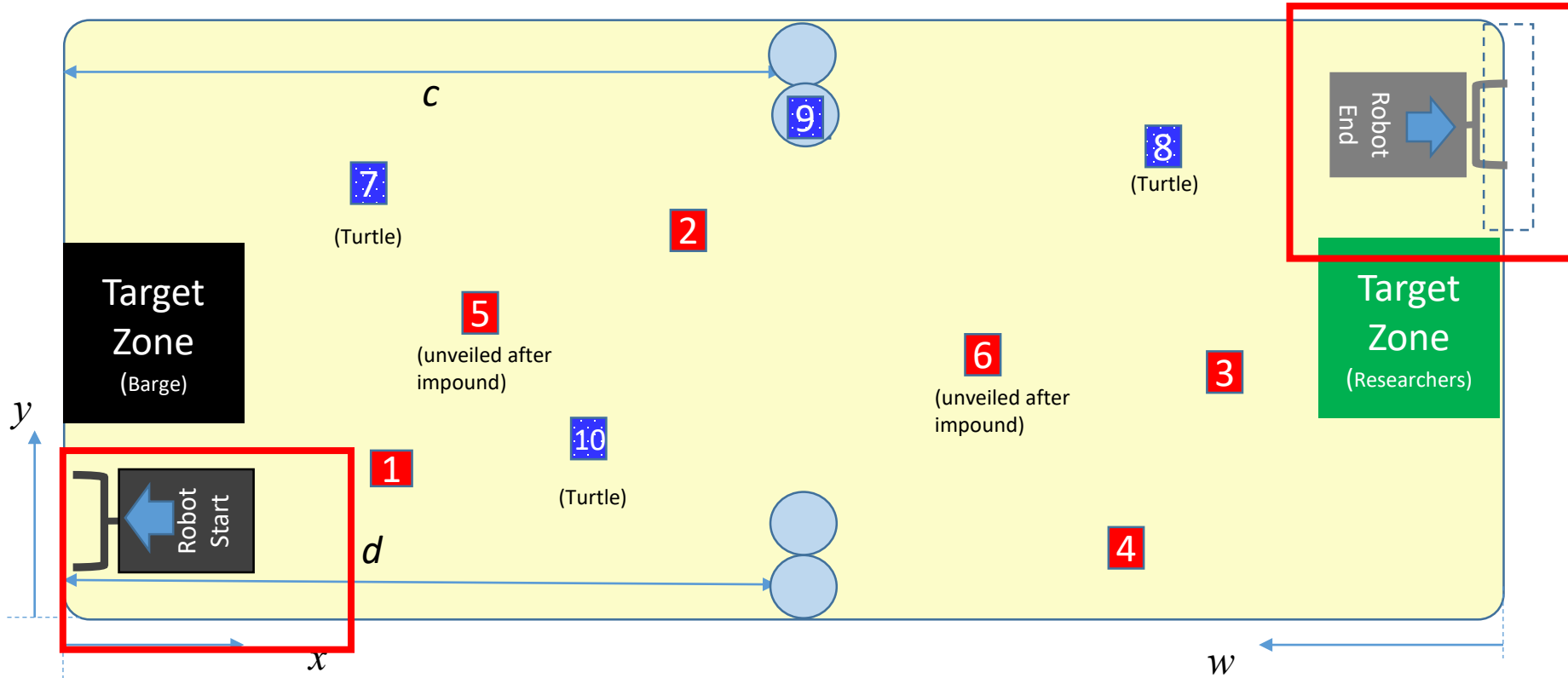


#/ color	x (cm)	y (cm)	w (cm)
5	80	40	
6		15	30
10	55	25	
<i>c</i>	90		
<i>d</i>	85		



- The starting location, orientation of the robot: black side Start Zone facing west table edge (see the “Robot Start” in the diagram above)
- Object locations: see table upper right
- Game-Ending Task: the robot must be stopped with a sensor positioned over the east edge north of the green target zone (see the “Robot End” in light gray color)

# UTF Example (Sr)



	x (cm)	y (cm)	w (cm)
5	unveiled after impound		
6	unveiled after impound		
10	unveiled after impound		
<i>c</i>	90		
<i>d</i>	85		



- The starting location, orientation of the robot: black side Start Zone facing west table edge. (see the “Robot Start” in the diagram above)
- Object locations: see table upper right
- Game-Ending Task: the robot must be stopped with a sensor positioned over the east edge north of the green target zone (see the “Robot End” in light gray color)

# Procedure/Rules to Play 2 Rounds (1/2) for in-person competition

- 1) Only contestants are allowed to access the pit area, team tables, practice fields, and official game fields throughout the competition, including during the setup time before the opening ceremony, during work time and breaks
- 2) When Unknown Tasks and Factors (UTF) are unveiled, teams will be provided a hard-copy of the UTF or it will be projected/displayed on a screen. See 9.1 and 9.2 for UTF examples
- 3) Teams will be given a 30-minute work-time after UTFs are unveiled to work on their robots. Prior to the start of the work time, all people except contestants and authorized staff/volunteers will be **dismissed** from the competition area(s)
- 4) During the practice time, teams must share the playing fields
- 5) All teams must submit their robot to the impound area when the 30 min work-time has expired. Robots may be taken to be impounded early. Only one team member should deliver the robot to the impound table. Penalty may be applied if not impounded in time
- 6) During the impounding process, judges will inspect the robots. (Size of the robot, Team ID & Name, “Front” label, number of computer controllers, etc.)



# Procedure/Rules to Play 2 Rounds (2/2) for in-person competition

- 7) No power will be supplied at the impound table and the entire robot must be impounded, including rechargeable batteries
- 8) Teams will compete in a pre-determined order decided by the site host
- 9) During the Game Rounds, all team members must remain in the team spectator area – no pit access allowed
- 10) When a team is called to compete, a maximum of two contestants per team are allowed to retrieve the robot from the impound area and to be present at the playing field during the run
- 11) Judge (or Emcee) will check if (1) timer is ready (2) judges' are ready, (3) teams are ready. Then count down "3-2-1 - Go" to start a Game Run
- 12) Contestants must stay near the Start Zone. They should not follow the robot. They can approach the robot only to end the run or when judge tells them
- 13) Final scoring is done after the run is over. A team member must sign the score sheet to confirm the team's score

# Violations, Full-Reset, End of Game Declaration

When any of the following violations occur, judges shall stop the game play (and robot if still moving) immediately to avoid further disruption of the field:

- Human touch of the robot or playing field materials. Once the robot starts moving, the player cannot touch it
- Robot falls off the table (Any part of the robot touches the floor)
- Any other illegal activities that judges determine

The team can request one-time full-reset (with penalty points) at any time **OR** declare the end of run. If reset is selected, time continues to run while judges reset the table.

Players can call for the end of the run but should not move the robot until instructed by the judge.

If the robot still moving when team calls “end of run” (or at the time limit) then no points will be awarded for the end of task which will require stopping.

# Scoring Sheet

Scoring Sheet file can be found at:

[2022 Scoresheet \(robofest.net\)](http://2022.Scoresheet(robofest.net))

Judging Items (to be checked at the end of the run)			Count	Point Value	Score Earned/Lost	max
#1	Turtles Total # of BLUE BLOCKS = 4  (*) any part of the location sticker is visible, includes objects on the table, on the robot, and on the floor. Do NOT count objects that are scored onboard the robot or in a target zone	Onboard the robot (max 2)		10		20
		In the Green Zone (max 2)		6		12
		In the Black Zone (max 2)		3		6
		Moved from original location*		2		8
2	Trash Items Total # of RED BLOCKS = 6  (*) any part of the location sticker is visible, includes objects on the table, on the robot, and on the floor. Do NOT count objects that are scored in a target zone	In the Black Zone		8		48
		In the Green Zone		4		24
		Moved from original location*		2		12
3	Piling Total # of Bottles = 4	Completely outside the Piling Zone OR Knocked Over		-6		
4	Game Ending Mission achieved	0 (no) 1 (yes)		10		
5	Robot Remained intact throughout the run	0 (no) 1 (yes)		10		
6	Reset was requested (reset penalty)	0 (no) 1 (yes)		-3		
			<b>TOTAL SCORE</b>			
			Total maximum score = 100			
			<b>Time Left in Seconds</b>			
			Record only if score is 100			

# How to Score Objects

- Objects are considered in the target zone if any part of the object is touching the target zone or in the airspace above the target zone
- Objects are considered moved from their location if any part of the location sticker is visible (includes on the robot and on the floor)
- Pilings (water bottles) are considered moved if they are completely out of the bottle zone (boundary line on template) or knocked over
- A Turtle object is considered “onboard” if the object is touching the robot and not touching anything else other than another Turtle or Trash object
- An object can only get credit for one status, the one giving it the most points

# Rules to Determine Winners & Break Ties

- Winners in each age division will be decided by the **average** 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
- For example:

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

# Reminders of General Rules and Restrictions

- Proctors are watching for the following violations:
  - Coaches or parents in the pit area during practice or work-time (except for initial transport of materials)
  - Coaches or parents accessing the practice or official game tables at any time
  - Verbal/electronic communication between the team and coach/parent while the team is setting up and practicing in the pit area and during work-time
  - Team members leave the pit unsupervised during work-time before their robot is impounded
  - Any team member alters his/her own robot after impounding
  - Team handles or interferes with another team's computer or robot, either in the pit or in the impound area
  - Destruction of property
  - Use of inappropriate words and/or behavior toward team members, other teams, audience, judges or staff
- Any violations can result in deduction of points or disqualification at the judges' 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

# FAQs

- What if objects are on the robot when the run ends? **Up to two Turtle objects are considered “onboard” the robot, the rest are considered as scored in the target if the objects are in the air space above the target, considered moved otherwise.**
- A player failed in starting the robot. Can the player retouch the robot to start? **Yes (will not be considered a rerun)**
- Robot is touching objects at the end of run. Is this OK? **Yes. The object will be scored the same as if there was no contact with the robot.**
- How are robots positioned in the Start Zone if they are larger than 25cm x 25cm? **Parts of the robot may hang over the start zone, but the footprint of the robot must cover the corner of the table that is in the start zone. Teams may position robots within 25x25cm anywhere inside the Start Zone.**
- Can Turtles and Trash start in the opposite target zone? **Yes. Unveiled objects may start anywhere on the table other than in the designate start zone, including on top of pilings. Objects may start in the opposite, or the correct, target zones.**
- What if an object is over the location sticker of another object at the end of the run? How is it scored? **Though unfortunate, the object is not considered as moved if the sticker is not visible.**
- Does it matter which Turtle (blue) objects are on the robot or in the target zone? **No. Can be any of the blue objects up to 2 on the robot and 2 in the Green (Researchers) base.**
- What if more than two Turtles are in a the target zone? **Two of them will be scored in the target zone and the rest will be scored as moved.**

# 17 FAQs continued

- Is a color sensor needed to sort the Turtles and Trash? **No. Turtle objects are taller than Trash objects, so size can be used to sort**
- What happens if Turtle or Trash objects come apart? **A scoring object that is not in one piece at the end of the round will not receive credit other than "moved"**
- To get the maximum score for the "Turtles", I should put two in the green zone and keep 2 on my robot? **Yes.**
- Turtle "9" will always be on the "inner" north piling (but piling location will vary)? **Yes. Turtle 9 will always be on the inner north piling, The location will be unveiled before work time.**
- Can objects be glued together? **No. Objects should stay together in most game situations.**
- Is there a minimum distance from the edge of the table to a block (turtle or trash)? **No.**
- What happens if the turtle falls off the pilings during play? **This is ok. Play will continue and turtle will be scored based on its final position.**
- Is a "bucket" allowed to be dropped from a robot and left in an end zone with turtles or trash in it? **Yes. A robot may be designed with a bucket that can be dropped and will still receive full points for "remaining intact" since it is part of the design.**