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LAWRENCE TECHNOLOGICAL UNIVERSITY  
**ROBOFEST**

**Online World Championships (ROWC)**

**GAME**



**GolfBowl**



**Pre-Meeting and Judge Training**

**Sr Division**

**Thursday, October 8, 2020**

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# Pre-Meeting in Zoom / Dry-Run

- Please take the appropriate precautions regarding masks and social distancing during all activities associated with ROWC
- Teams, Coaches, and Local Judges are *required* to attend a pre-meeting/**dry-run** 48 hours (2 days) before the competition day for each category
- We will check Zoom setup, practice the use of Zoom Webinar, precheck the playing field setup, and train Local Judges
- General date/time for Judges and teams who cannot join the pre-meeting is Thursday October 8 at 7pm EDT
- This pre-meeting is essential for preparing the first online World Championship

# How to Manage, Judge, & Decide Winners for Game

- Team ID sign needed
- Team & robot intro time before unveiling challenges for special awards decided by Robofest office staff
- Need to check playing field setup before the official runs
- Each location must have **location judges** to proctor & prevent unauthorized activities. See next slides
- No impounding robots needed. We run all at the same time for each round
- Translators are allowed where needed
- Robofest reserves the right to make judgements and score adjustments based on review of team submissions

# Qualification & Roles of Location Judges for Game

- Location Judges (LJ) must complete and sign the Pre-Event Checklist, show it during check-in and submit with the official scores
- LJ must sign a pledge document and recite the pledge during the opening ceremony
- LJ needs to be a person who does not have any direct relation to the team and approved by the National Director
- LJ must attend Zoom training
- LJs are to proctor & prevent unauthorized activities
- LJ will score each round and submit the scores
- **LJs are responsible for capturing a video of each run for score verification and uploading it to our shared folder (link at end of presentation)**
- The video must show our identifiable Zoom sound in the beginning & the end of run for us to verify whether the video was taken during the official time
- The videos must be uploaded within 1 hour of the end of the competition

# Checklist for Check-in LHJs

## Check In Video

ROBOFEST

### ROWC GolfBowl Location Head Judge (LHJ) Pre-Event Checklist



LHJ\* is required to PRINT THIS CHECKLIST and check off each item before logging in to the Webinar on event day. During Check-in, show this completed and signed sheet to LTU Staff.

\*You must be registered as a Judge for the Event and ZOOM Webinar via the [Google Form](#) link

#### Prior to Event (check each item with a heavy mark so it is visible on camera):

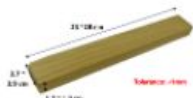
- ☐ Read and understand [2020 GolfBowl Rules](#) and [ROWC GolfBowl Rules Updates](#)
- ☐ Download and print the following items:
  - ☐ Paper Scoring Form (Print at least 2): [https://robofest.net/2020/GolfBowl\\_Scoresheet\\_kickoff.pdf](https://robofest.net/2020/GolfBowl_Scoresheet_kickoff.pdf)
  - ☐ Proctor Violation Report: [https://robofest.net/images/20172018/PDFs/Proctor\\_Forms.pdf](https://robofest.net/images/20172018/PDFs/Proctor_Forms.pdf)
  - ☐ Ball Marker Locator Jig (Optional - Print Actual Size and verify measurements with ruler) [http://www.robofest.net/images/1920/Ball\\_Marker\\_Jig.pdf](http://www.robofest.net/images/1920/Ball_Marker_Jig.pdf)
- ☐ Prepare GolfBowl Game Field (see section 2 of the rules) Check each item:
  - ☐ 1 Table on the floor
  - ☐ Weight of 4 bottles must be 75 grams (+/-1) (If determined by reviewing the video that the bottles are too light, the team may lose points or be disqualified)
  - ☐ Weight of a full water bottles must be approx. 524 grams
  - ☐ Electrical Tape must be smooth with no loose tape on the edges
    - ☐ Distance of No Robot Zone line & table edge near the hole slot must be 55 cm
    - ☐ Distance between two black lines must be 30 cm
  - ☐ Left and Right Templates are attached to the Hole-Slot and are on the floor centered with the table
  - ☐ Center Template centered and attached to the table
  - ☐ Height of Hole-Slot side walls equal to or lower than table top height-->
  - ☐ Bottle scoring jig (6 made of 2x4 Lego blocks)
  - ☐ Prepare: pencil, clipboard, measuring tape (at least 55 cm), ball markers (reinforcement stickers), tripod (optional)
- ☐ Prepare Zoom Webinar device (Laptop, Tablet or Phone)
  - ☐ stable internet connection
  - ☐ battery fully charged
  - ☐ camera accessible
  - ☐ set up so camera positioned as shown with the Game table in the foreground and team pit area is visible in the background, and space for team to stand between for intro
  - ☐ microphone/speakers (test volume, mute/unmute)
- ☐ Prepare Video & audio recording device
  - ☐ battery fully charged
  - ☐ enough memory storage



zoom Camera

#### Prior to Check-In on Event Day:

- ☐ Confirm Recording Judge has the recording device with battery and sufficient memory
- ☐ Confirm Coach has printed team sign and has it ready to show
- ☐ Confirm Coach has received Consent Form (online or hard copy) for each participant
- ☐ Check Robot Size w/h maximum 50x50x50 cm including expansion (the swing of the putter)
- ☐ Check Putter dimensions
- ☐ Check Robot has "Front" label
- ☐ Inspect Robot for any illegal materials (see sections 11 and 12 of rules)
- ☐ Assemble Judges and Team (with robot) to prepare for Zoom Webinar Check-in



I \_\_\_\_\_ verify that I have completed each item on this checklist (send an image of this form with the completed scoresheets).

10/01/20

# Zoom Webinar Panelist

- You will have received an email from “Robofest Coordinator <no-reply@zoom.us>”
- Use the unique link in the email to join the Zoom webinar as a Panelist
- Zoom webinar is slightly different from normal Zoom meeting

You are invited to a Zoom webinar.

Date Time:

Topic:

Join from a PC, Mac, iPad, iPhone or Android device:

[Click Here to Join](#)

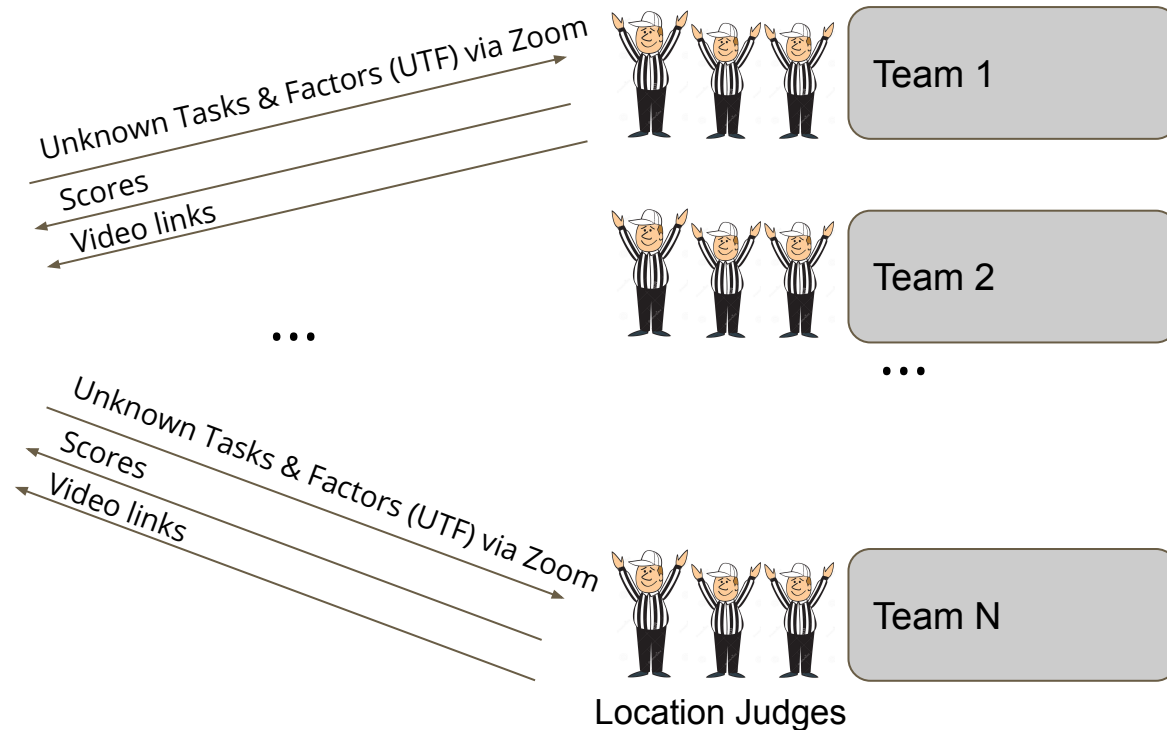
Note: This link should not be shared with others; it is unique to you.

[Add to Calendar](#) [Add to Google Calendar](#) [Add to Yahoo Calendar](#)

# Judging Concept: Game, UMC, and BottleSumo



Robofest Office at LTU

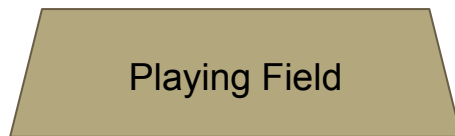


# Ideal Location Setup: Game Style Events



Coach

(Parents are encouraged to leave the location. They can join webinar as spectators or watch livestream on Facebook Live outside the location)

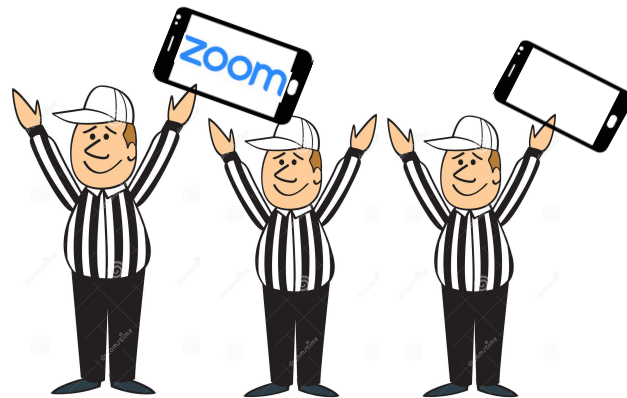


zoom

Camera

Landscape

Two devices with microphone & camera



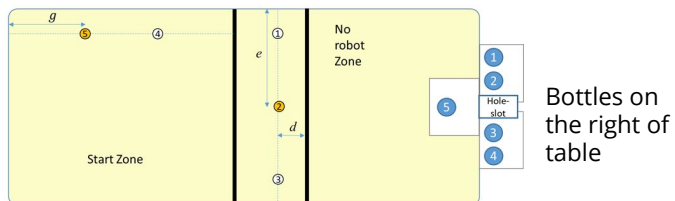
Location  
Head  
Judge  
(LHJ)

Location  
Judge 1

Location  
Judge 2 -  
Video  
recording

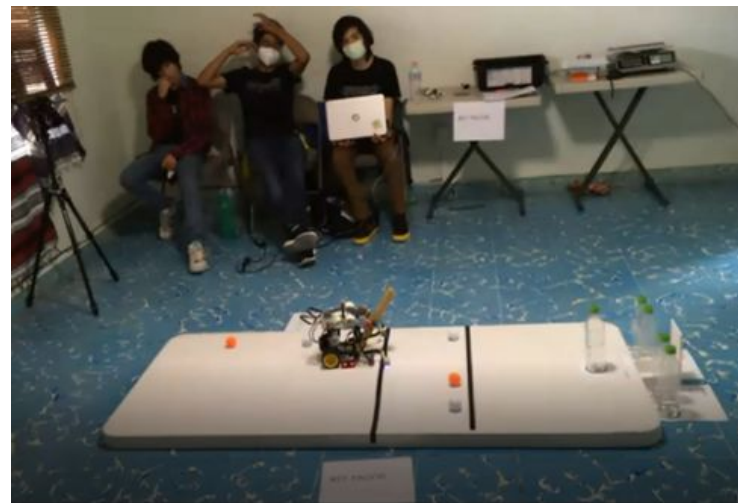
# Playing Field Set Up

## Team Table



Camera

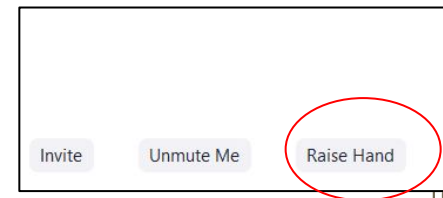
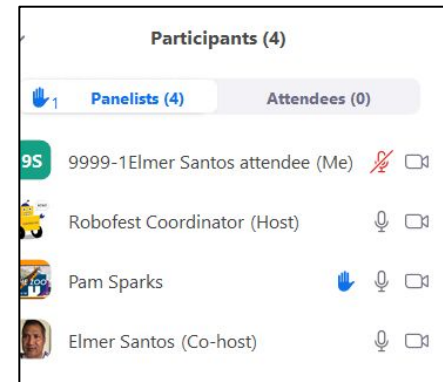
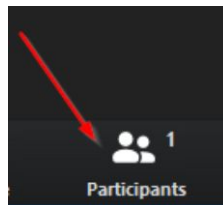
Set up so camera positioned as shown with the Game table in the foreground and team pit area is visible in the background, and space for team to stand between for intro



Common Camera View

# Using the “Raise Hand”

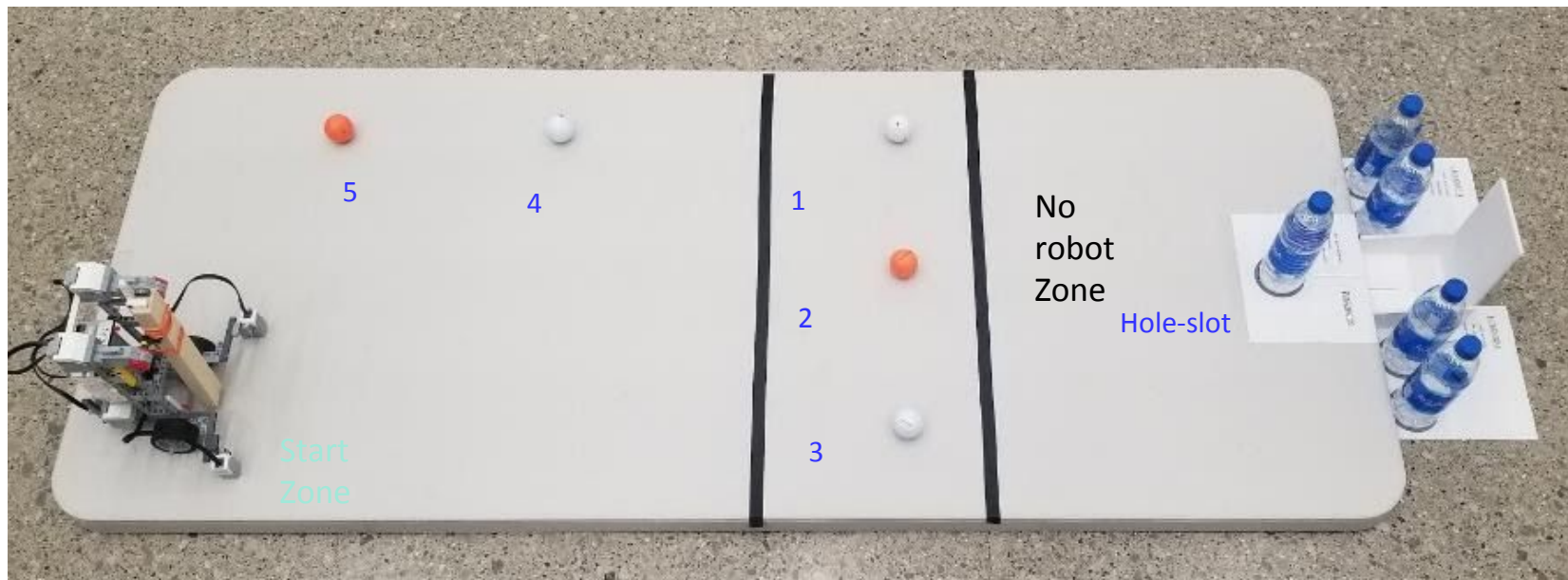
- “Raise Hand” is function available on Zoom Webinar
- Judges will use the “raise hand” to indicate that your site is ready
- Robofest Staff will be looking for all sites to have “raised hand before start a round
- If there is an issue before the start signal, Site should lower hand



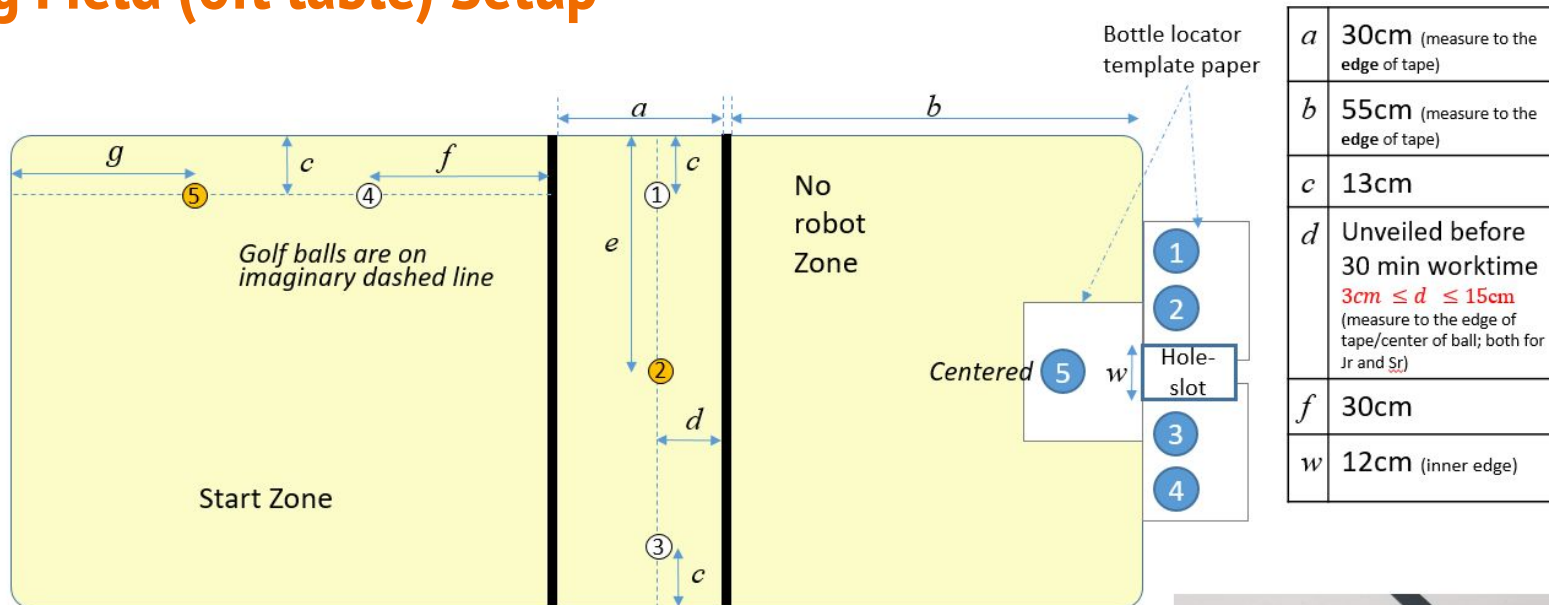
# GolfBowl Mission

- Develop an autonomous robot that:
  - Putts 5 golf balls into a Hole-slot with a wood piece attached to the robot.
  - Alternative partial points will be given if bottles on the floor are knocked (bowled) over or moved.
  - Penalty points are given if the bottle on the table is knocked over or moved.
- At the World Championship, additional unknown task(s) may be added

# Playing Field



# Playing Field (6ft table) Setup

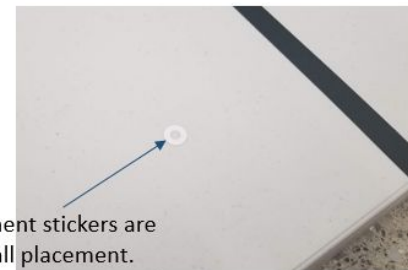


|              |  |
|--------------|--|
| $e \ \& \ g$ | Jr: Unveiled before 30 min worktime              |
|              | Sr: Completely unknown. Robots must detect them. |

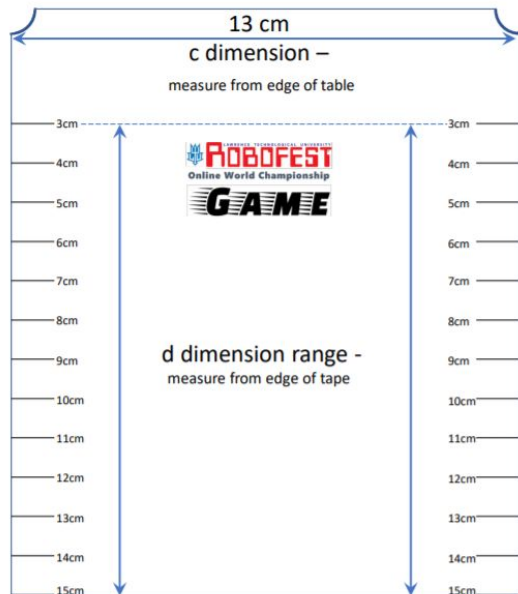
$$30\text{cm} \leq e \leq 45\text{cm} \quad 20\text{cm} \leq g \leq 40\text{cm}$$

$d, e, g$  values will be different for each round.

Hole reinforcement stickers are used to mark ball placement.



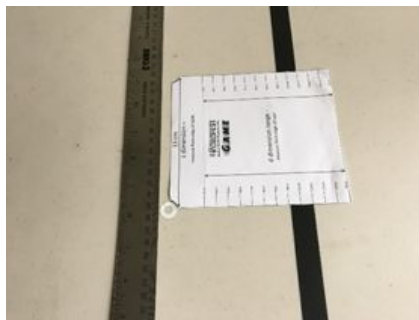
# Ball Location Jig (Optional)



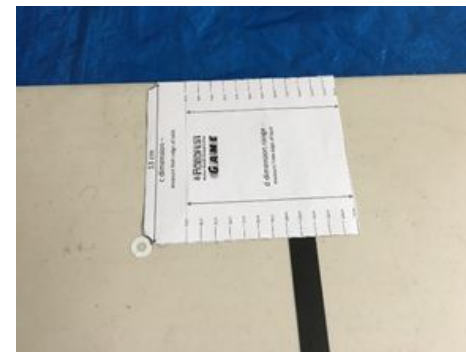
[jig\\_video](#)



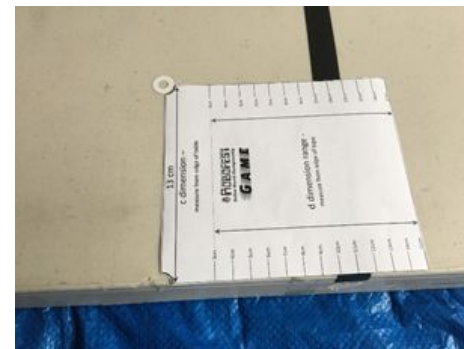
Ball 5 at g= 40 cm



Ball 2 at d= 10 cm, e= 45cm



Ball 1 at d= 10 cm

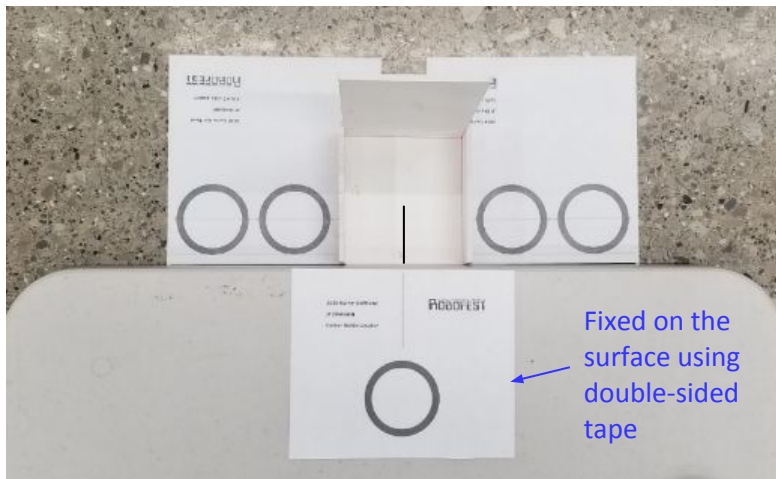


Ball 3 at d= 10 cm

# Game Synopsis

- White balls (balls 1, 3, 4) cannot be moved before putting. Orange balls (balls 2 & 5) may be moved by the robot before putting
- One full-reset of the playing field is allowed
- All the tasks must be done autonomously without any external help
- The robot may attempt/complete the putting in any order
- UTF (Unknown Task and Factors) will unveil the following just before the 30 minute work-time
  - The starting location and orientation of the robot
  - The locations of balls
  - How to end the game. New items/landmarks may be added on the table for the Game-Ending task

# How Bottles will be Prepared & Located



*Exact locations of bottles is defined on the "bottle locator template" papers. Same for both Jr and Sr*

*The size, shape and brand will be the same for all 5 water bottles on the playing field*



Initial Setup of bottles

Bottle Weight:

- #1, 2, 3, 4 Bottles: Partially full, around **75 gram**
- #5 full water bottle = around **524g** (Actual bottles to be used will be unveiled on the competition day.)

# Violations and Full-Reset

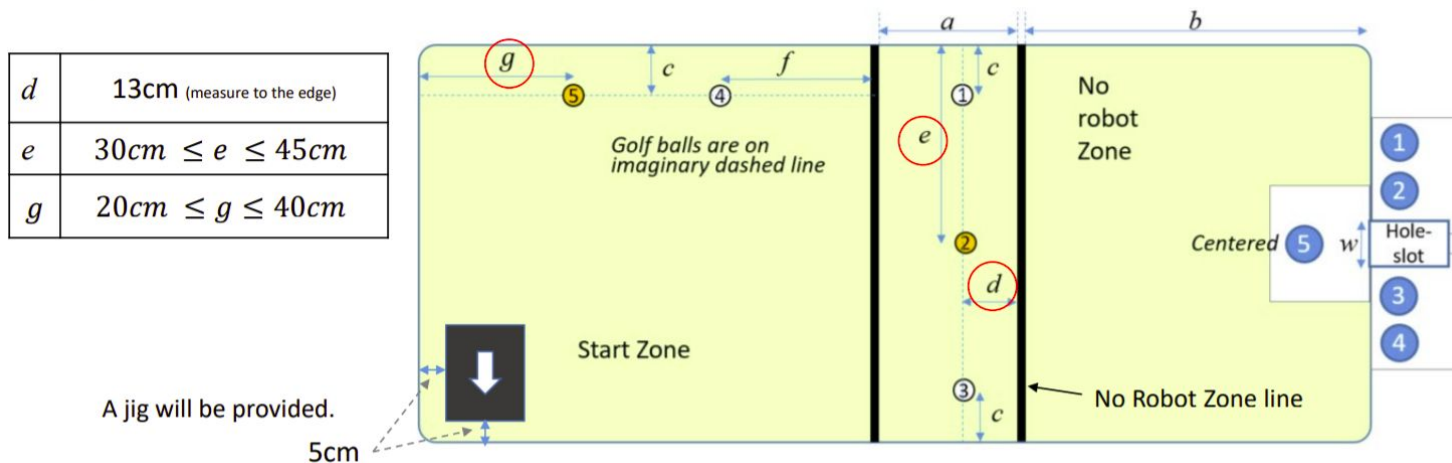
- When any of the following violations occur, Judges shall stop the game play immediately to avoid further disruption of the field:
  - Human touch of the robot or playing field materials. Once the robot starts moving, the player cannot touch it
  - Robot falls off the table
  - Robot invades the “No Robot Zone”. Any part of the robot must not **“touch”** the “No Robot Zone” table surface. On the black line is OK. A part of the robot can *hang over* the zone.
- The team can request one-time full-reset (with penalty points) at any time OR declare the end of the game. If reset is selected, time continues to run while Judges reset the table.
- Note : bottles moved or knocked (bowled) over by the above violations are not counted. Bottles will be reset.
- If the ball went into the hole-slot by the above violations, it shall not be counted. Judges will remove it.

# Invalid Putting Penalty for the Balls in the Hole-slot

- When a ball goes into the Hole-slot as the result of the following actions, Judges shall announce “Invalid Ball No. x” and the ball remains in the slot and is recorded as invalid ball on the scoring sheet.
  - Any ball goes into Hole-slot pushed or touched by robot body/part (not by the wooden putter)
  - White ball putted after moving (White balls must be putted from their original location)
  - White ball hit more than one time by wooden putter
- Note:
  - Bottles moved or knocked over by the invalid putting (not by violation) are OK and counted as they are
  - If balls moved off the table as a result of the invalid putting (not by violation), “balls removed from the table” point will still be awarded

# UTF Example (Sr)

- The starting location, ball locations and orientation of the robot: see the diagram below
- Game-Ending task: Detect the No Robot Zone line and stop there. The robot must be stopped with a sensor positioned above the line



# How to Score (1/2)

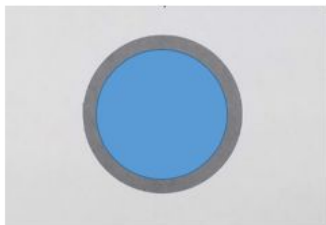
Scoring Sheet file can be found at: <https://www.robofest.net/index.php/current-competitions/game>

| Judging Items (to be checked when the Game is ended) |   | Point Value | Score Earned / Lost |
|--|---|-------------|---------------------|
| Bottle #1  | Completely knocked over   | 11          |                     |
|  | Moved outside the solid circle line                               | 3           |                     |
| Bottle #2  | Completely knocked over   | 13          |                     |
|  | Moved outside the solid circle line                               | 5           |                     |
| Bottle #3  | Completely knocked over   | 13          |                     |
|  | Moved outside the solid circle line                               | 5           |                     |
| Bottle #4  | Completely knocked over   | 11          |                     |
|  | Moved outside the solid circle line                               | 3           |                     |
| Bottle #5 (center)                                   | Completely knocked over OR<br>Moved outside the solid circle line | -2          |                     |
| W: Number of white balls in the Hole-slot            | 0    1    2    3  | 15 each     | $W \times 15 =$     |
| C: Number of colored balls in the Hole-slot          | 0    1    2   | 18 each     | $C \times 18 =$     |

# How to Score (2/2)

|  |   |                  |                  |
|--|---|------------------|------------------|
| I: Number of invalid* balls in the Hole-slot   | 0    1    2    3    4    5                                    | -3 each          | $I \times -3 =$  |
| R: Number of Balls removed from the table**  | 0    1    2    3    4    5                                    | 1 each           | $R \times 1 =$   |
| The robot remained intact throughout the run. No part was dropped on the table.  |   | 2                |                  |
| A full-reset was done (full-reset penalty)***<br><i>Note: partial reset is not allowed</i>   |   | <b>-3</b>        |                  |
| Game-Ending task is achieved   |   | 12               |                  |
| (*) Any ball putted not by wooden putter; white ball putted after moving or more than one hit.<br><br>(**) if a ball is in the Hole-slot, it gets this additional 1 point.<br><br>(***) when a violation occurs, the team can either stop the game or request a full-reset & rerun. When 2 <sup>nd</sup> violation occurs, the game is terminated. Grab the robot immediately! | <b>Total Score</b>  |                  | <i>Max. 100+</i> |
|  | If <b>Total Score</b> is <b>100+</b> , record time in seconds | <i>Time Left</i> |                  |
|  |   | <i>Elapsed</i>   |                  |

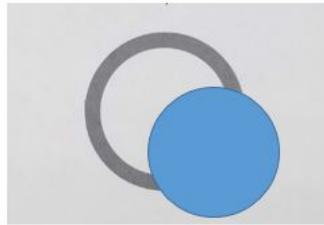
# Bottle Scoring Examples



Initial Bottle Position



Not Moved



Moved



Not Moved



Moved



Moved  
(Bottle completely out of circle)

***Blue circles here refer to the projection, not the bottom, of the bottle.***



Moved



Not moved

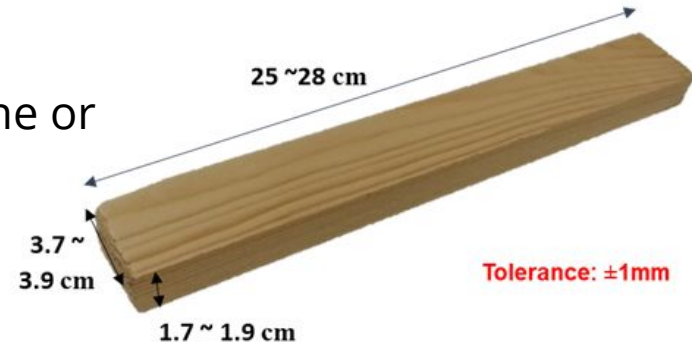
**Lego blocks as a jig will be used to check as shown above.**

# Robot Specifications

- Maximum size is 50 x 50 x 50 cm *including expansion* (the swing of the putter). There is no initial size requirement
- Weight limitation: none
- Any number of sensors/sensor types (unless it is harmful to humans)
- Any number/type of motors/servo motors (multiplexor is OK to use)
- Any material/robot kit may be used to construct your robot including tape, glue, bolts and nuts, rubber bands, etc.
- A Robofest Team ID and Name tag on top of the robot is required
- A label identifying the “Front” side of the robot is required
- Must have a display screen for the Game-Ending task that may require to display numbers

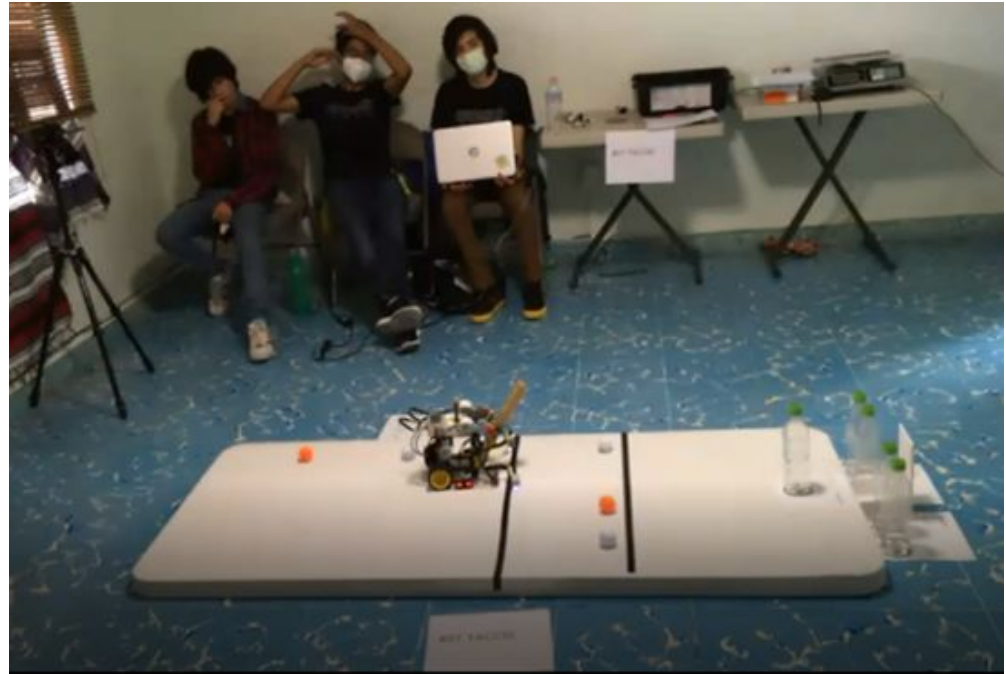
# Wood Putter Specifications

- United States Standard 1x2 un-painted wood piece
- Pine wood is recommended
- The dimension is shown on the right. The tolerance of the dimension is  $\pm 1$  mm. The wooden putter can be slightly modified (for example: drilled to make holes or sanded) as long as the dimensions are maintained
- The putter should be designed to hit the ball with wood part only
- Only one putter can be used
- The putter must be designed to be operated by one or more actuator(s)



# Check Zoom Setup

- Check microphone
- Camera view and angle
- Video view and angle
- Contact email
- Each team must be in a separate room



# Thank You!!!

- Upload your files (Videos, Scoresheets, Checklist) to <https://drive.google.com/drive/folders/1ViJ-NVpdfANJHaMRfPE59uBNhCqyPyq0?usp=sharing>
- Folder has been shared with the LHJ's
- If issues with upload, send video to [esantos@ltu.edu](mailto:esantos@ltu.edu)
- Results will be announced at the ROWC closing ceremony on Sat Oct 17
- Keep learning!



Lawrence  
Technological  
University

# Questions?

