

Competition Tasks Details

(* All rules and objects are subject to change due to availability, space limitation, time constraints, etc.)

- * The items described here may not be the items in the competition due to availability.
- * A 30 cm x 30 cm work area should be defined by the contestants before the competition starts.
- * No hardware or software changes are allowed once the competition has started.
- * No hardware or software changes are allowed once we start the initial setup.
- * Robots are allowed to automatically use predefined tools.
- * The competition tasks should be performed in the specified order.

Initial Setup

Based on the work area specified by the contestants, the following objects are randomly placed in the work area by the volunteers right before the beginning of the competition. No hardware or software changes are allowed once we start to arrange the initial setup.

1. A silverware tray with 5 teaspoons, 1 pair of ice cube tongs, and 10 straws
Silverware tray: <https://www.amazon.com/Rubbermaid-Silverware-Cutlery-Tray-White/dp/B000QONEHQ/>



- Tea spoons: <https://www.amazon.com/Tramontina-Teaspoons-Commercial-Grade-Stainless/dp/B00M4MAP2A/>



- Ice cube tongs: <https://www.amazon.com/Tongs-Newness-Stainless-Steel-Inches/dp/B0185H92PS/>



Straws: https://www.amazon.com/Smoothie-Straws-Extra-Assorted-Colors/dp/B00IR3JL5C/ref=pd_sim_sbs_79_3?ie=UTF8&dpID=510YB6zbJhL&dpSrc=sims&preST=AC_UL160_SR160%2C160_&psc=1&refRID=A8DKCNHNPT9KB99X8F5A



2. Three bottles of water (500 ml). The caps are loosely put on the bottles. They can be removed after a quarter-turn of twist. The bottles are full initially.
Water bottle: <https://www.amazon.com/Bottled-Water-1-2-liter/dp/B009R5OSCK/>

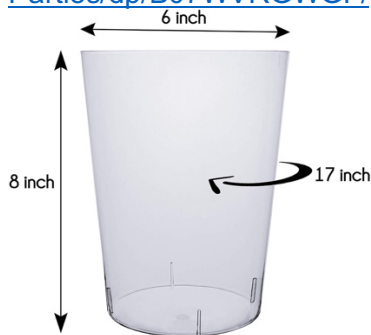
3. A tea box (no lid) full of instant matcha green tea powder
Tea box: <https://www.amazon.com/Kitchen-Canister-Set-Container-Organizers/dp/B07DJ83M8X/>



Matcha green tea powder: <https://www.amazon.com/Servings-Drinking-Smoothies-Concentration-Supplement/dp/B01DR7AKYS/>



4. An ice cube bucket with about 50 ice cubes
Ice cube bucket: <https://www.amazon.com/Exquisite-Disposable-Plastic-Bucket-Parties/dp/B07WVRGWGF/>



- Ice cubes: <https://www.amazon.com/Plastic-Crystals-Decoration-Centerpiece-DomeStar/dp/B01N4CMTJ8/>



5. A pile of to-go cups and lids (12 oz, 10 each). The to-go cups are loosely nested together in one pile.

To-go cups with lids: <https://www.amazon.com/100-Sets-Plastic-Cups-Flat/dp/B01GU5NS0M/>



Task

The task is to make five cups of matcha green iced tea to-go. The task has a total of 1,000 points.

Steps, Scores, and Rules

The robot should repeat the following steps five times to make five cups of matcha green iced tea to-go.

Step 1. Take the top to-go cup from the cup pile and place it on the table. (Level 1, 10 pts)

Rules:

The team will win 10 points if the robot can successfully pick and place one cup upward on the table.

The team will lose 3 points if the robot gets more than one cup.

The team will lose 5 points if the pile falls.

The team will lose 7 points if the pile falls and the team has to manually recover the cup pile.

Prepare for next step:

If the robot cannot finish the step properly, the contestant can give up and move on to the next step. Then the contestant can manually recover to the initial setup of the step and then set the cup up for the next step.

Step 2. Put one teaspoon of matcha green tea powder into the to-go cup. (Level 3, 30 pts)

Rules:

The team will win 10 points if the robot can pick out a teaspoon from the tray. The team can forfeit the 10 points by hand the spoon over to the robot.

The team will win 20 points if the robot can successfully scoop a full spoon of matcha green tea powder and transfer it to the to-go cup, and pour it into the cup without dropping powder along the way or out of the to-go cup.

The team will lose 5 points if the powder in the scoop is about a half spoon.

The team will lose 5 points if a substantial amount of powder fall out the spoon and out of the to-go-cup during transporting or pouring.

The team will lose all points if the to-go cup falls.

The robot should place the teaspoon to the side of the to-go cup for future use.

Prepare for the next step:

If the robot cannot finish the step properly, the contestant can give up and move on to the next step. Then the contestant can manually recover to the initial setup of the step and then finish step 2 manually.

Step 3. Open the water bottle cap and pour water into the to-go cup. (Level 5, 50 pts)

Rules:

The team will win 10 points if the robot can twist and remove the cap of a bottle successfully without knocking down the bottle. The team can forfeit the 10 points by manually remove the cap.

The team will win 30 points if the robot pours 260-300 ml of water into the to-go cup.

The team will win 10 points if the robot can put the bottle back and put on the cap of the bottle successfully with a quarter turn without knocking down the bottle. The team can forfeit the 10 points by manually putting on the cap.

The robot can drop an empty bottle out of the work area without putting on its cap and win that 10 points.

No refile is allowed for the bottles.

The team will lose all points if a bottle with water is dropped.

The team will lose all points if water spilled.

The team will lose all points if an-capped bottle with water falls.

Prepare for the next step:

If the robot cannot finish the step properly, the contestant can give up and move on to the next step. Then the contestant can manually recover to the initial setup of the step and then finish step 3 manually.

Step 4. Use the teaspoon to stir water (Level 2, 20 pts)

Rules:

The team will win 10 points if the robot picks up the spoon at the side of the to-go cup. The team can forfeit the 10 points by hand the spoon over to the robot.

The team will win 10 points if the robot uses the spoon to stir the water in the cup till the color of the water is even.

The team will lose all points if the cup is tipped over.

5 pts will be reduced if any water is spilled.

The robot can drop the used spoon outside of the work area.

Prepare for the next step:

If the robot cannot finish the step properly, the contestant can give up and move on to the next step. Then the contestant can manually recover to the initial setup of the step and then finish step 4 manually.

Step 5. Add two ice cubes into the to-go cup (Level 3, 30 pts)

Rules:

The team will win 10 points if the robot picks up the tongs from the tray and hold it ready for the next step. The team will forfeit the 10 points if the team manually adjust the tongs position in the robotic hand or manually hand the tongs over to the robot.

The team will win 20 points if the robot picks up two ice cubes from bucket and put them both into the to-go cup. The team will lose 5 points out of the 20 points if one ice cube is dropped out

of the to-go cup. For example, if the team put two ice cubes into the to-go cup, but dropped two on the table, the team will gain 0 point.

The team will lose all points if the cup is tipped over.
5 pts will be reduced if any water is spilled out or splashed out.

Prepare for the next step:

If the robot cannot finish the step properly, the contestant can give up and move on to the next step. Then the contestant can manually recover to the initial setup of the step and then finish step 5 manually.

Step 6. Put a lid on the to-go cup (Level 3, 30 pts)

Rules:

The team will win 10 points if the robot picks up a cup lid from the lid pile. The team will forfeit the 10 points if the team manually adjust the lid position in the robotic hand or manually hand the lid over to the robot.

The team will win 20 points if the robot puts the lid on the cup tightly. A volunteer will evaluate the tightness of the fit by lifting the cup and try to move the lid.

The team will lose all points if the cup is tipped over.
5 pts will be reduced if any water is spilled.

Prepare for the next step:

If the robot cannot finish the step properly, the contestant can give up and move on to the next step. Then the contestant can manually recover to the initial setup of the step and then finish step 6 manually.

Step 7. Transfer straw into a to-go cup with lid (Level 2, 20 pts)

Rules:

The team will win 10 points if the robot picks up one straw from the tray. The team can forfeit the 10 points by hand the straw over to the robot.

The team will win 10 points if the robot inserts the straw in the straw hole and reaches to the bottom of the cup while keeping the cup upright.

The team will only win 5 points if the straw does not reach to the bottom of the cup.

The team will lose all points if the cup is tipped over.
5 pts will be reduced if any water is spilled.

Dropping a straw will lose 5 pts each time.

Prepare for the next step:

If the robot cannot finish the step properly, the contestant can give up and move on to the next step. Then the contestant can manually recover to the initial setup of the step and then finish step 7 manually.

Step 8. Place the to-go cup to a defined location (Level 1, 10 pts)

The team will win 10 points if the robot picks up to-go cup with the drink inside and then place it to a defined location.

The team will lose all points if the cup is tipped over.

5 pts will be reduced if any water is spilled.

Prepare for the next cycle:

Once step 8 is over, the current worked-on cup will be removed manually. Then the contestant can manually recover the initial setup. But, there is no refill of any items or water.