

World Robot Summit 2020 World Robot Challenge Junior Category - Home Robot Challenge [Mini Size] Skills Challenge Task Specifications

Revision Date: October 9, 2019 (ver.1. 0. 0)

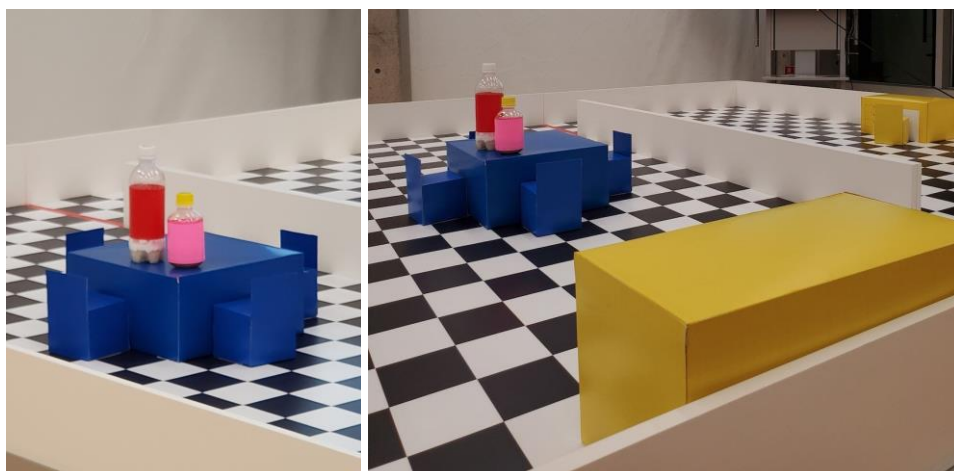
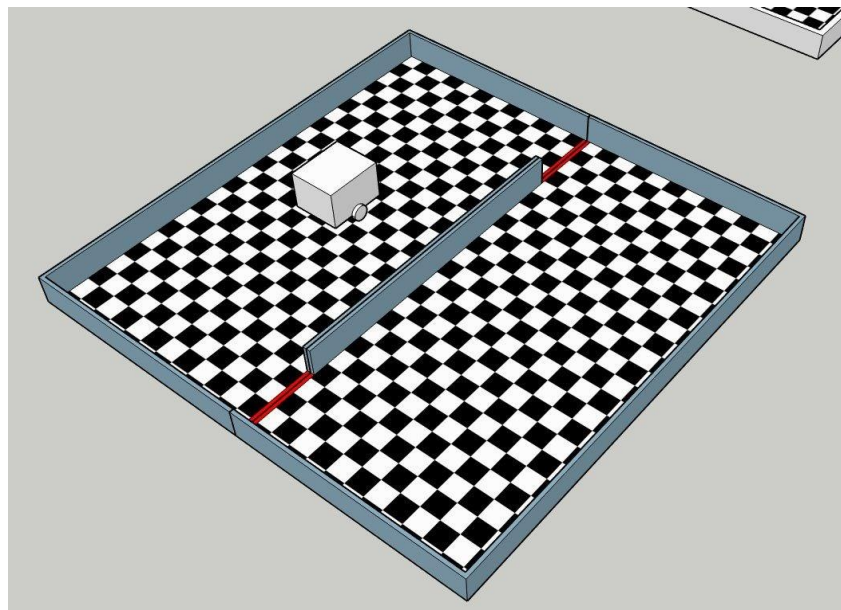
Teams will be given 3 x 10-minute time slots to complete the Skills Challenge Tasks. These may not be all at once and may be scheduled at different times during the competition. During the allocated 10 minutes, teams can elect to complete as many of the Tasks as they choose, in any order. Teams may perform as many attempts as they would like for each Task until they successfully complete the Task.

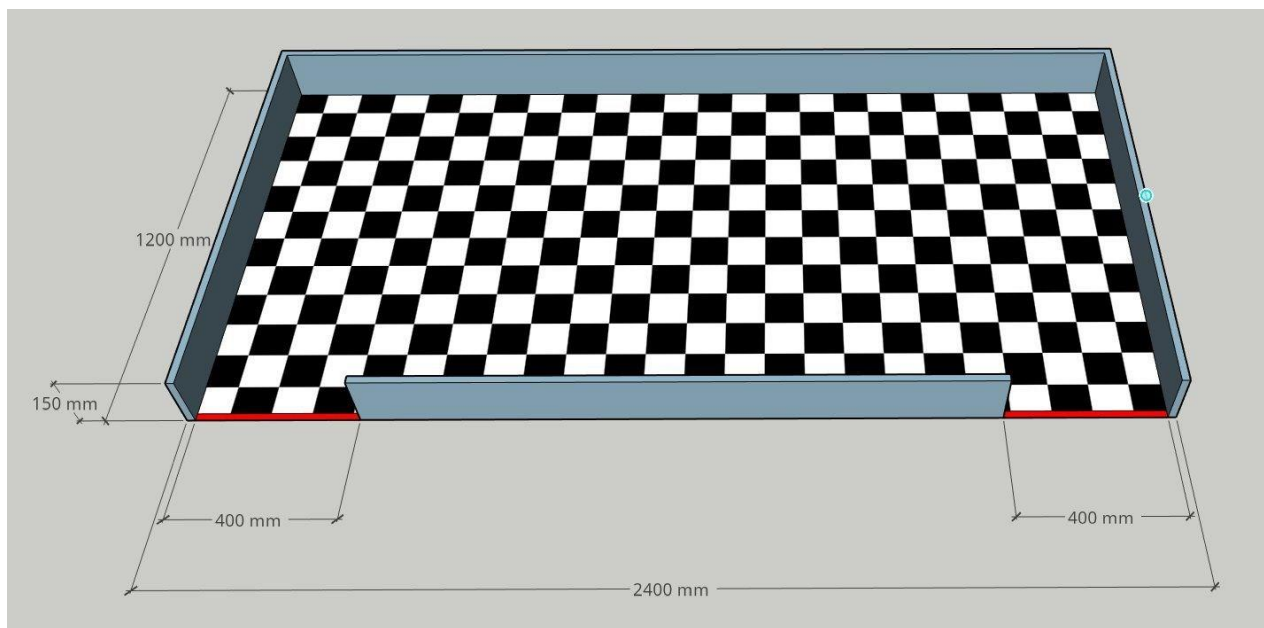
For Example:

- Team A could spend 10 minutes attempting to complete 'Guide 1'
- Team B could attempt 'Guide 2', twice, then switch to 'Follow 3' a few times and then back to Guide 1 for the rest of their 10 minutes.

Teams will be responsible for letting the judges know during the 10-minute runtime which Task they are attempting. Teams will be responsible for arranging the furniture as necessary for each Task they attempt. Furniture may be touched, but not moved from its initial position unless it forms part of the Task.

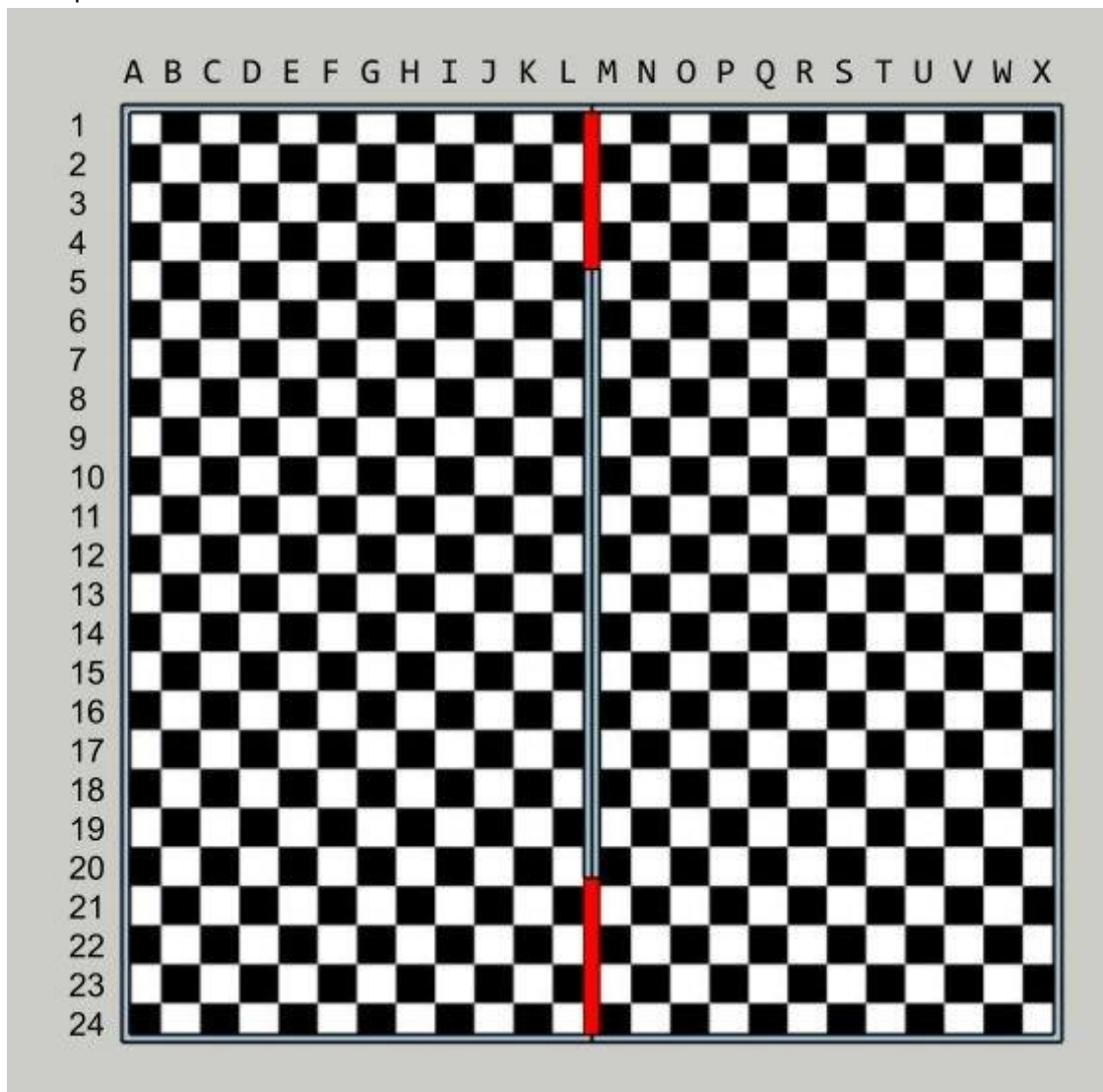
There are 11 Skills Tasks in total (4 x Guide, 3 x Follow, 4 x Pick). Each task will be assessed as either Complete/Incomplete and is worth 2.5%. A bonus 2.5% will be awarded to teams that pass all 11 Tasks.





Competition area (2 rooms) is 2400mm x 2400mm with walls that are 150mm high. Each Room is 1200mm x 2400mm. The floor of the field will have a 100mm x 100mm checker pattern. Be aware that due to the thickness of the walls, the checker pattern immediately adjacent the walls may not be exactly 100mm. Field Positions are referenced by a Column Letter and Row Number i.e. D15

Red flooring will be placed over the checkerboard between the rooms.



Due to the nature of construction, the dimensions of the rooms, doorways, checkerboard pattern etc. may vary by up to 10%.

Robot Guide:

Robot will start in a designated position and will travel to a goal while avoiding an obstacle. Once it reaches the obstacle (within two field squares), it will come to a stop and then notify that an object has been detected. Identification may take the form of a light, sound, raised flag or some other mechanism, to indicate to the judges that the object has been detected. The robot will then continue to the goal area. The robot must come to a complete stop in the finish area without touching a wall.

- Guide 1: Start Position: Robot must completely cover field location F2. Straight line drive to a Desk that is centered over field location G12. Identify the desk and continue on to finish with the robot covering a Field Location on Row 23.
- Guide 2: Start Position: Robot must completely cover field location F2. Straight line drive to a bottle that is placed on either G10 / G12 / G14 or G16 (as determined by dice roll). Identify the bottle and continue on to finish with the robot covering a Field Location on Row 23.
- Guide 3: Start Position: Robot must completely cover field location J2, Drive and identify the Desk centered at either J10/ J12 / J14 or J16. Navigate around the Desk and move to the bedroom and finish with the robot covering a Field Location on Row 23. The Table will be located at F22:H24
- Guide 4: Start Position: Robot must completely cover Field Location F2, navigate to a mystery object (to be revealed 1 day before skills challenge). This object will be placed centered on either E9 / E13 / E17 / G9 / G13 / G17 as determined by a dice roll. The robot will stop and identify the object and then proceed to Row 2 of the bedroom. The Bed, Desk and a Chair will be located somewhere in the bedroom. A Bookshelf will be blocking the Doorway between the rooms, located on Rows 1234.

Follow me: All tasks are Pass/Fail

Team Robots will start completely covering Field Position F2. The Lead robot start completely covering Field Position F5 and will traverse a predefined path to the finish position. The following robot must stay within 3 squares (30cm) of the lead robot at all times, but not make contact with the lead robot. The lead robot will have an outer form of a black cylinder 30cm in diameter, 30cm in height. It will have a white 'X' on the back, with a reflective square in the centre of the 'X'. The lead robot may change speed at any time.

- Follow 1: Straight line - Finish covering Row 23
- Follow 2: Left and right curves - Finish covering Row 23
- Follow 3: Path involving multiple 90 degree turns - Finish covering Row 23 in the 2nd room.

Pick and place. All tasks are Pass/Fail

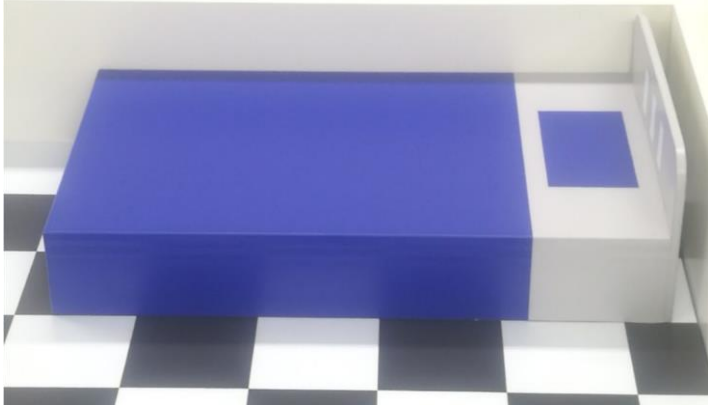
Robots will start completely covering F2 and move an object from one location to another. The robot must successfully release the object for the task to be considered passed. A successful release comprises of the robot no longer touching the object, and the object remaining where it was placed. Ie. Not falling over or falling off a piece of furniture.

- Pick 1: Move a Bottle from B8 and release it on J8. The centre of the bottle must be within J8.
- Pick 2: Move a chair located at P22 and place it beside the Desk located at W12:X14. The Chair should be no more than 2 squares away from the Desk.
- Pick 3: Move a Bottle from the Table located at I12:K14 and release on the Chairs located at D24:G24 (there are 4 Chairs lined up at the wall. the back of the chairs are facing the wall). Teams may place the Bottle in any position on the Table.
- Pick 4: Move a mystery object from the Chairs at location D24:G24 and release on the Table located at I12:K14 The Mystery object will be bigger than a cylinder 3cm diameter/height and smaller than 25cm diameter/height. Teams may choose from a variety of different Bottles that the organizers will provide. Bottles will have a solid color label (the colors will be announced at the venue).The Mystery Object and Bottles will have a weight of more than 50g and less than 100g

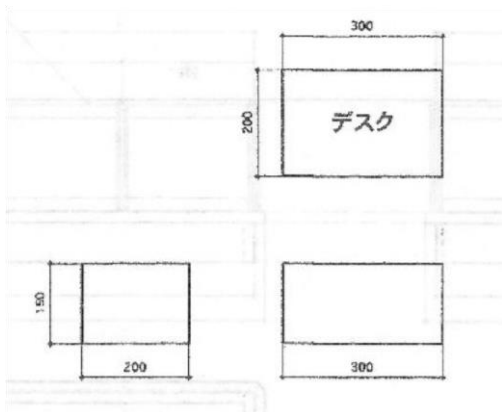
WRS Home Furniture Specifications.

The following pieces of furniture will be available for teams to use. Furniture is made of sturdy cardboard, but is not solid inside. Colors may be different at the competition.

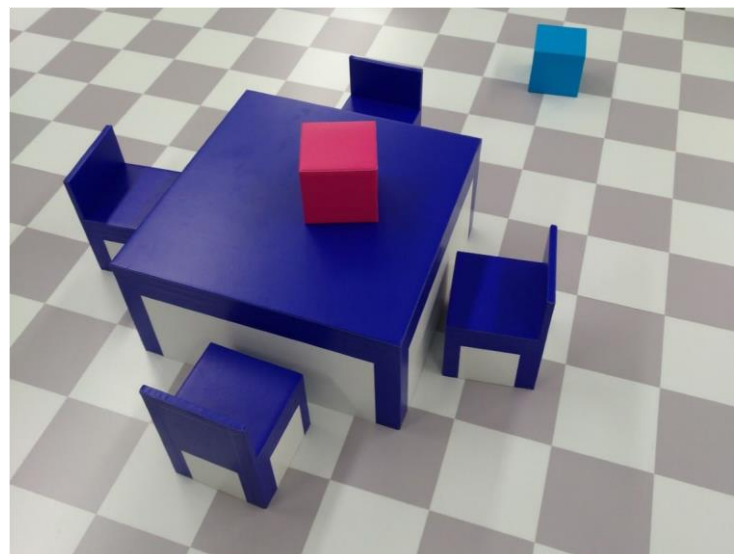
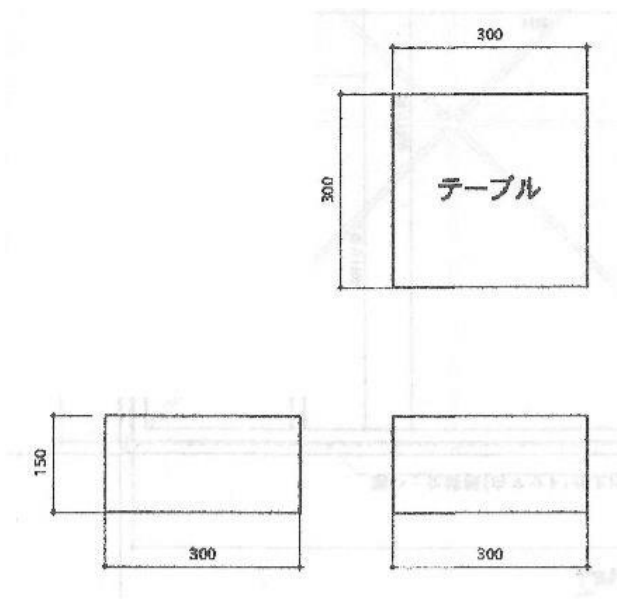
Bed - 200mm x 300mm x 150mm (Bedhead is 150mm high)



Bedroom Desk



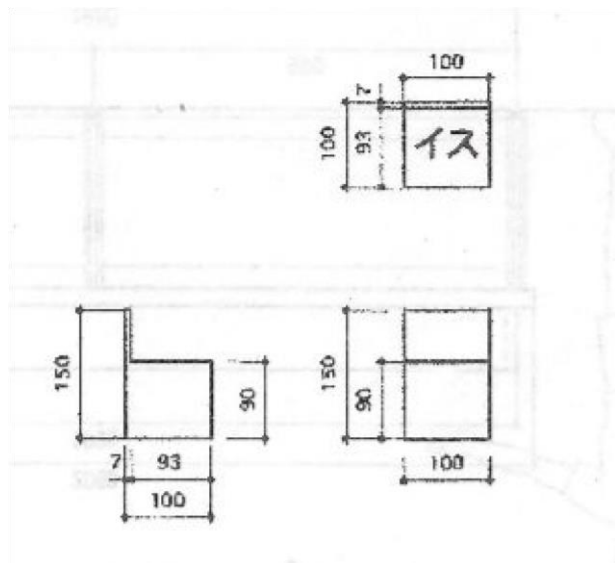
Kitchen Table



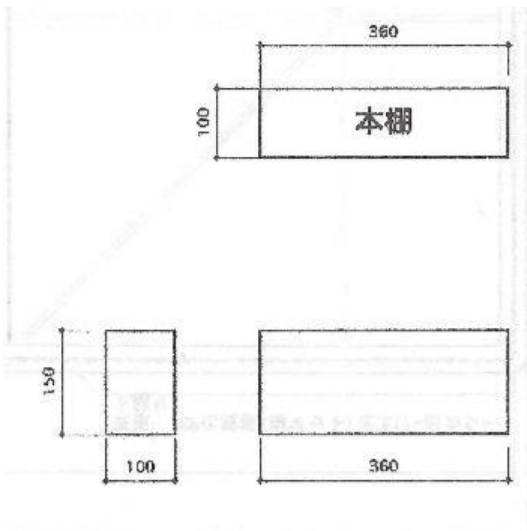
Kitchen Counter 200mm x 300mm x 200mm



Chairs



Kitchen Bookcase



Due to the wall thickness, objects placed against the walls may not exactly line up with the checkerboard floor.

Bottles

The organizers will provide a variety of different bottle shapes and sizes for teams to choose from.

The following is an indication of possible bottles. Bottles on the day of competition may vary from the picture below.

