

Home Service Challenge

v. 2019.1.6

| Participant (age) | Team Formation | Game Method | Robot Condition | Robot Type |
|---------------------|------------------------|-------------|-----------------|------------|
| Above Highschool | 2~4 person per team | League | Pre- Assemble | Autonomous |

1. Category Summary

Home Service Challenge is a competition to solve it's missions by developing Autonomous Driving & Manipulation Code with mobile platform (TB3) and ROS.

2. Robot Standard

- A. TURTLEBOT3 Waffle Pi and OpenMANIPULATOR-X are the official platform for this competition and robot should be assembled as Mobile Robot prior to its competition.
(Mobile Robot : Robot assembled by TURTLEBOT3 Waffle Pi and OpenMANIPULATOR-X together)
- B. **Using remote controller is prohibited and every mission must be completed autonomously.**
- C. Actuator of Robot is restricted to DYNAMIXEL-X series but, Size and Sensor of Robot can be freely modified and added as long as it does not affect the competition.

3. Regulation

- A. Competition Rules
- Place your robot at the start location in the middle part of stadium and starts mission after judge's start signal.
 - Using Manipulator to move 4 (four) different objects to each signed destination.
- Refer to each destination at 3-C(Mission Score)
 - When the contestant robot transport their last object to final location, the robot must place back into their starting position to complete match.

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B. Judging Standard

- i. Ranked according to its result (mission and time score)
- ii. **If you touch your Robot or PC during the match, 5 points will be deducted for each touch.**
- iii. In case touching Robot or PC , place your robot at the starting location and start again.
- iv. Mission time is 15 minutes and if robot stops more than 30 seconds, the match is automatically over.
- v. Tie score will be ranked by following instruction :
 - 1) Number of mission success
 - 2) Penalty Points
 - 3) Time Records

C. Mission Score

| Destination#1 (#00→#04) | Destination #2 (#03→#05) | Destination #3 (#01→#07) | Destination #4 (#02→#06) | Time Score (Differential by the rank) | Touching Robot or PC (Per) |
|----------------------------|-----------------------------|-----------------------------|-----------------------------|---|----------------------------------|
| 20 points | 20 points | 20 points | 20 points | 20 points | -5 points |

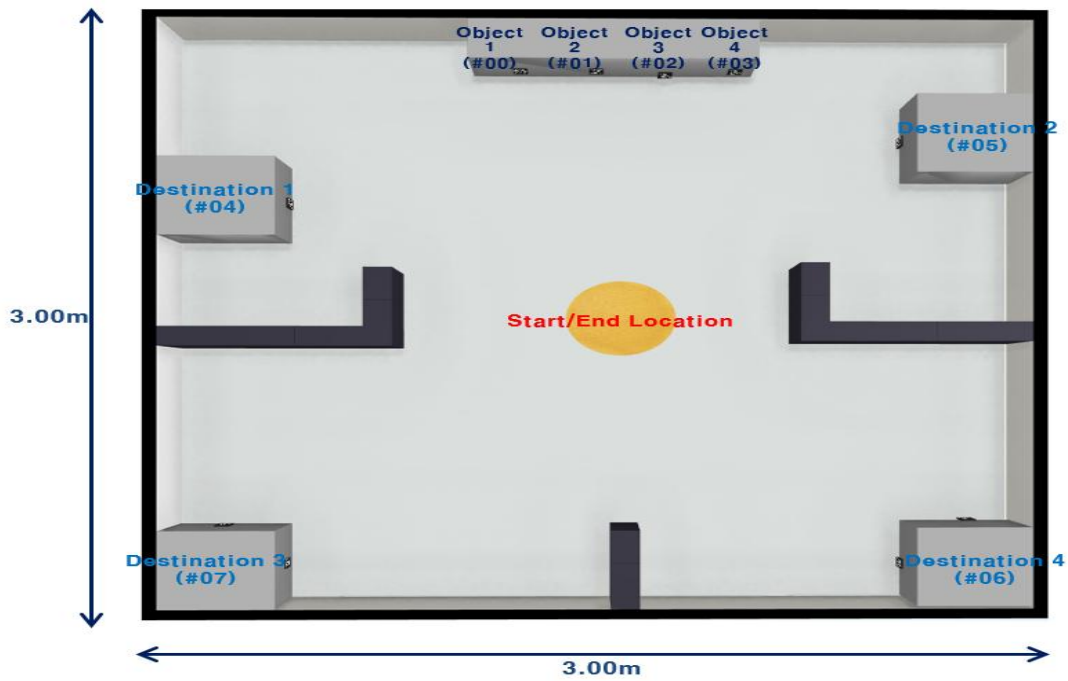
D. Others

- i. Any unexpected events not indicated in this regulation will be handled and decided by the decision of referee and committee.
- ii. ROBOTIS will open the stadium of this competition so that participants can practice in advance.
Timeline will be announced separately.

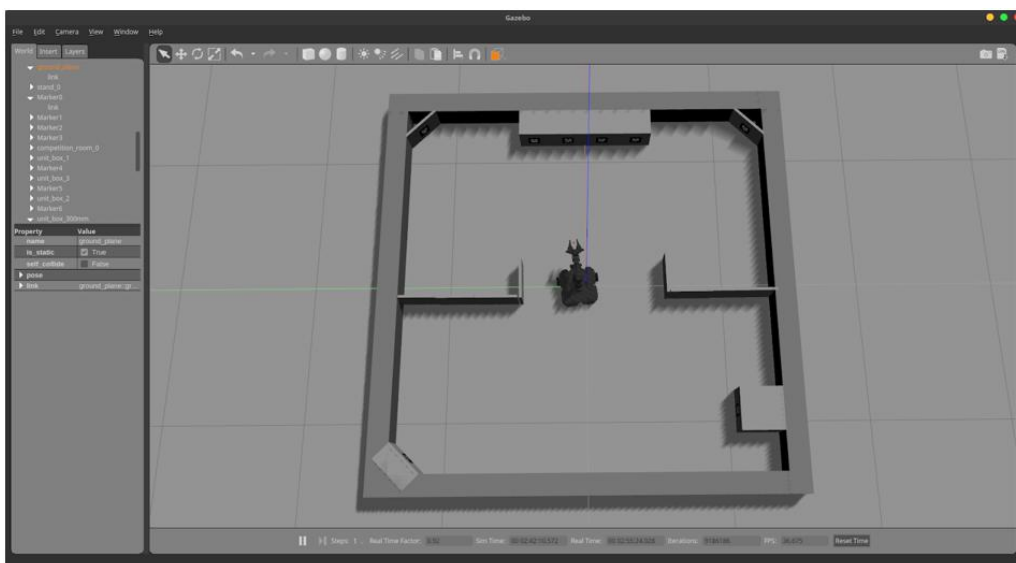
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4. Stadium Standard

A. Size : 3m x 3m x 0.2m



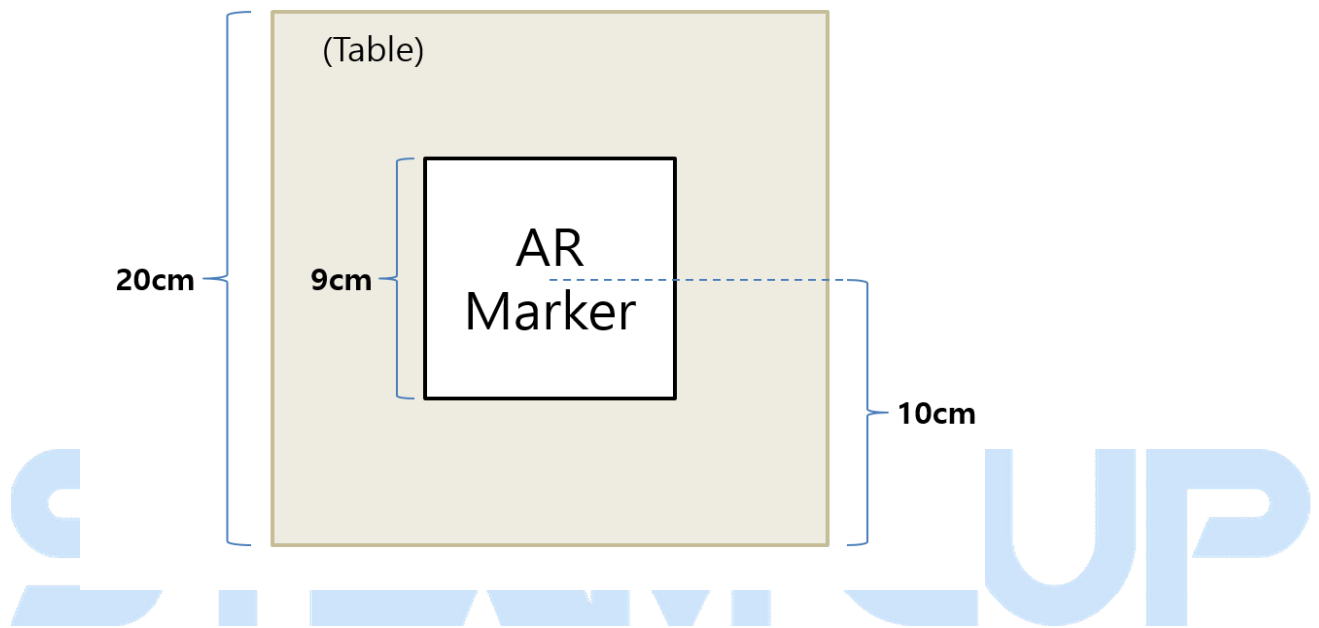
(Example of Gazebo simulation)



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B. AR Marker

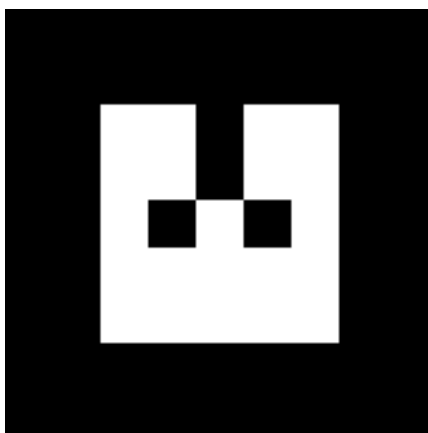
i. Size of AR Marker : 9cm X 9cm (Center height of AR marker from the ground: 10cm)



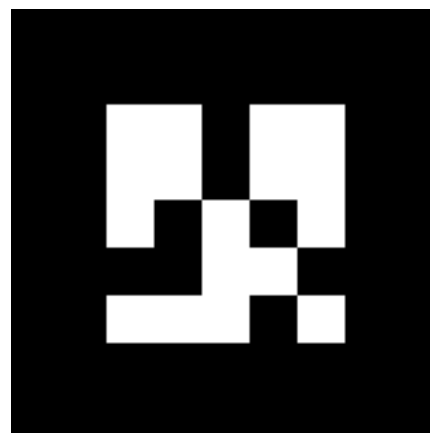
ii. AR Marker on Object : #00 ~ #03

AR Marker on Destination : #04 ~ #07

#00



#01

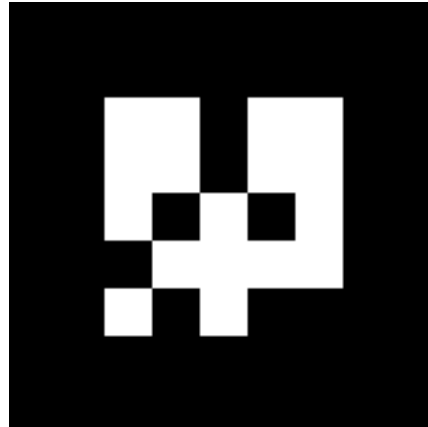


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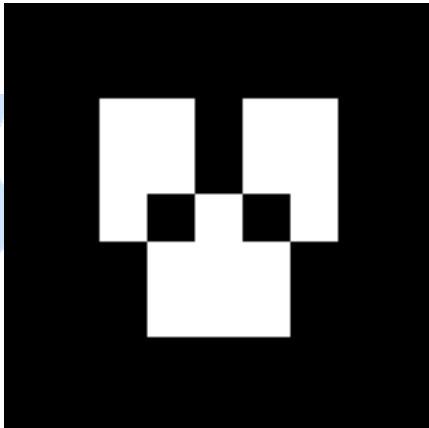
#02



#03



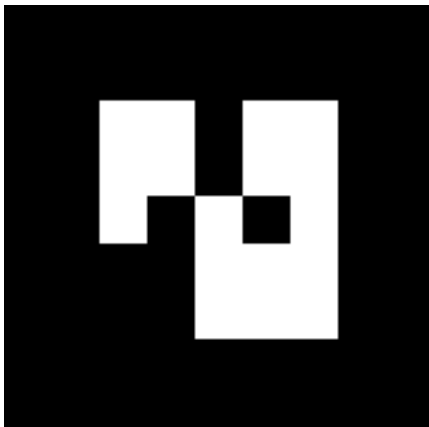
#04



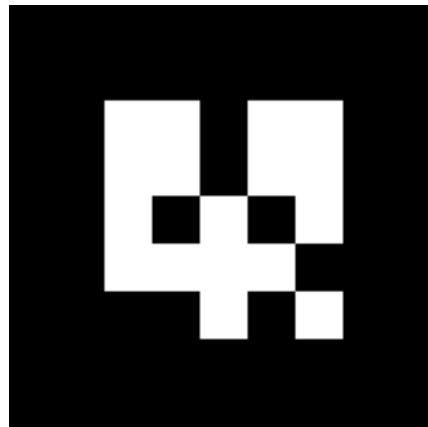
#05



#06



#07



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- C. Size of mission table (Length x Width x Height) : 100cm x 20cm x 20cm
 - * the design, width, and location of mission tables can be changed.

- D. Distance between each object : 2.1cm ~ 7.6cm
 - * the design, width, and location of mission tables can be changed.
 - * Objects are placed on the table 5cm apart from the edge of the table.

- E. Obstacles can be added in the stadium.

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