# 3. Grip Robot

In robotics, Degree of Freedom means how much flexibly articulated joint of a robot can move. Maximized DOF of articulated joint of a robot in the three-dimensional space we live is 6. 0 DOF signifies that it is fixed with no movement.

Six degrees of freedom (6DOF) consists of 6 components; three in translation and three in orientation.

1. Moving up and down (heaving)
2. Moving left and right (swaying)
3. Moving forward and backward (surging)
4. Tilting forward and backward (pitching)
5. Turning left and right (yawing)
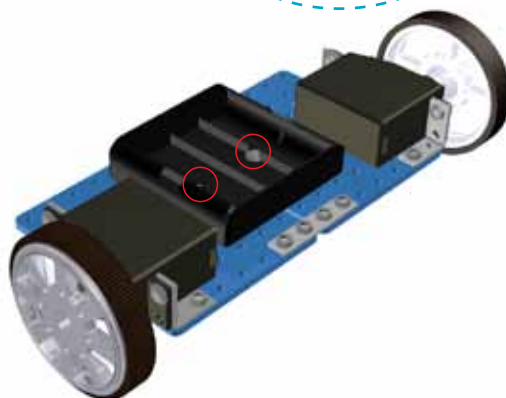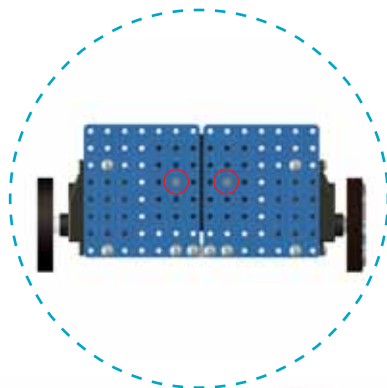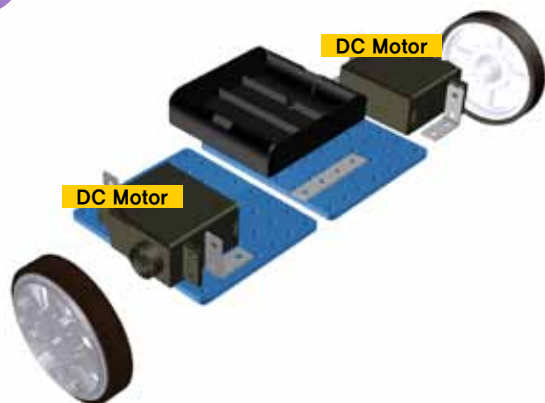6. Tilting side to side (rolling)

The first three is involved in translation, and the last three is involved in rotation. How are the 6 components specifically applied to a robot arm is illustrated in the in the below pictures.
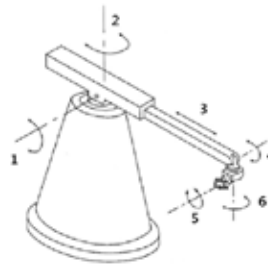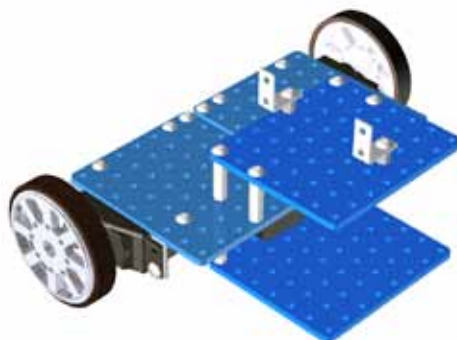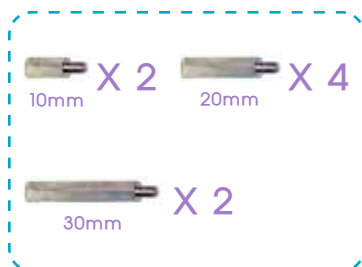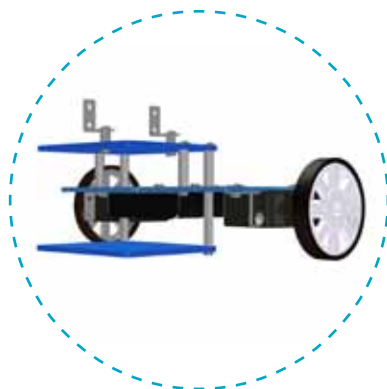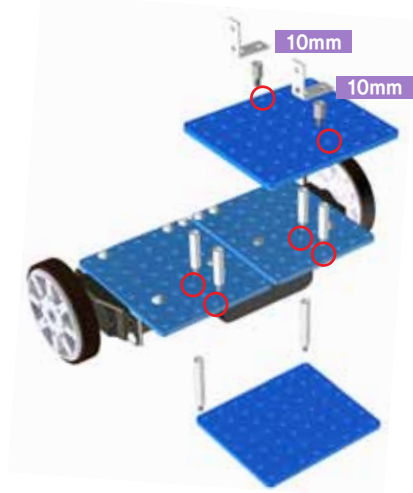

Motions of number 1 through number 3 are base-lined on the joint which is connected to the base of robot arm. The motions consequently play the role of transporting grippers of a robot. Motions of number 4 through number 6 create rotation about three perpendicular axes, often termed pitch, yaw, and roll in aeromechanics.

Motion number 1, 2 and 3 are available for robot arm of the Gripper. Motion number 1 is only able to move up and down (heaving); motion number 2 is able to move the body to left and right (swaying) side; and motion number 3 is able to move the body forward and backward (surging). On the other side, DOF totals up to 3, as motion number 4, 5 and 6 remain irrelevant, the wrist of the Gripper being fixed.
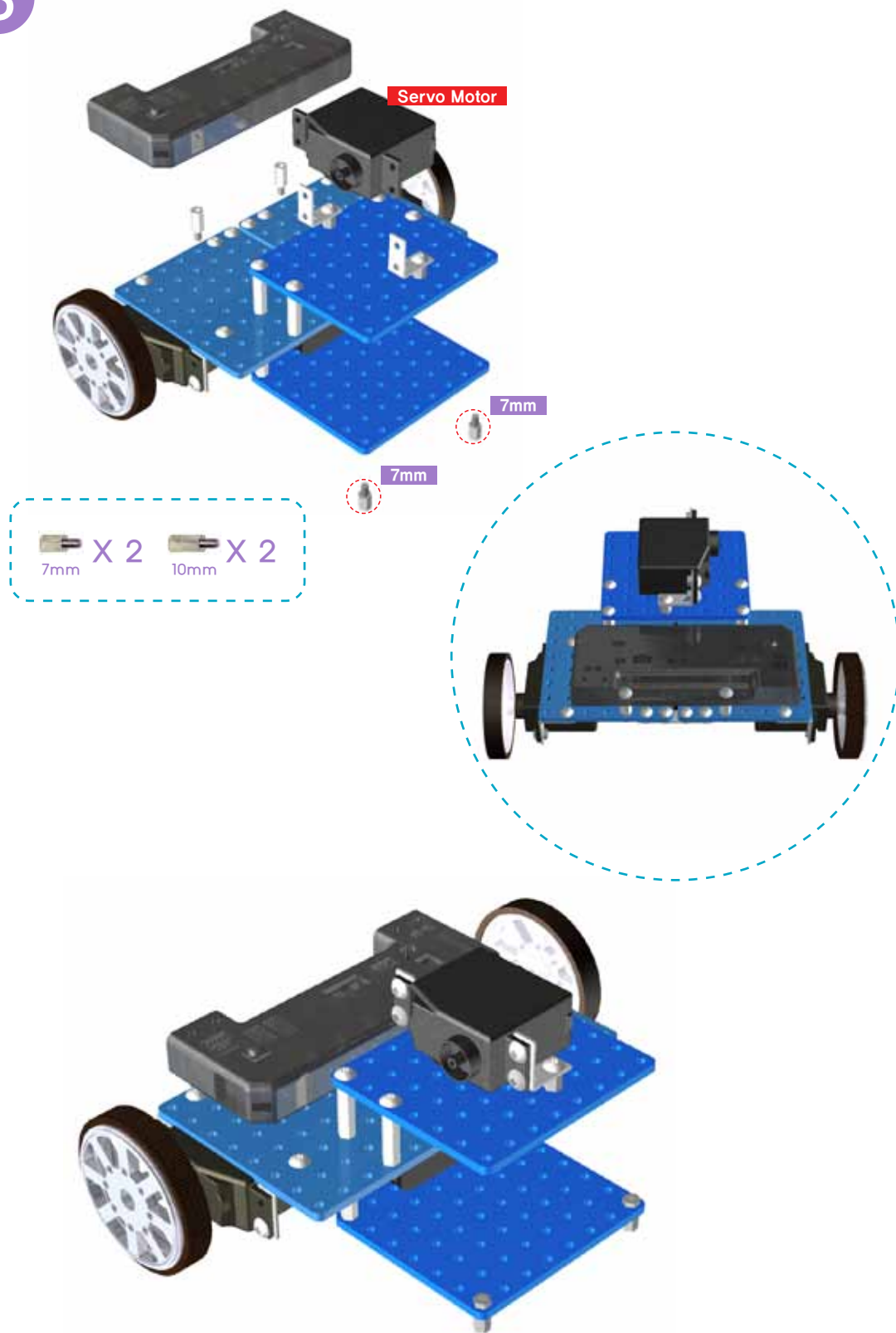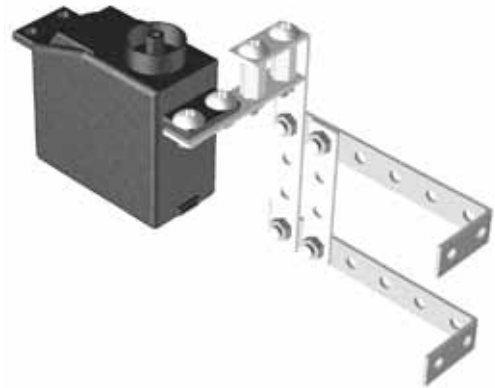
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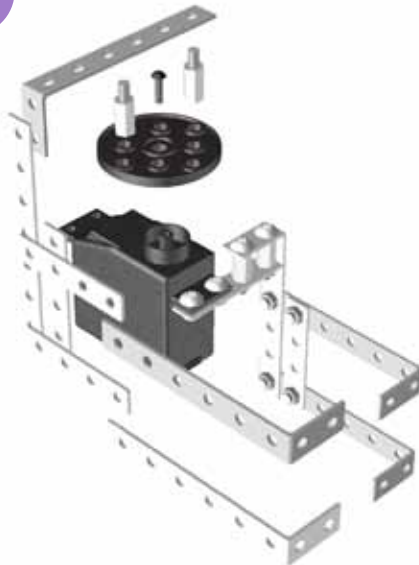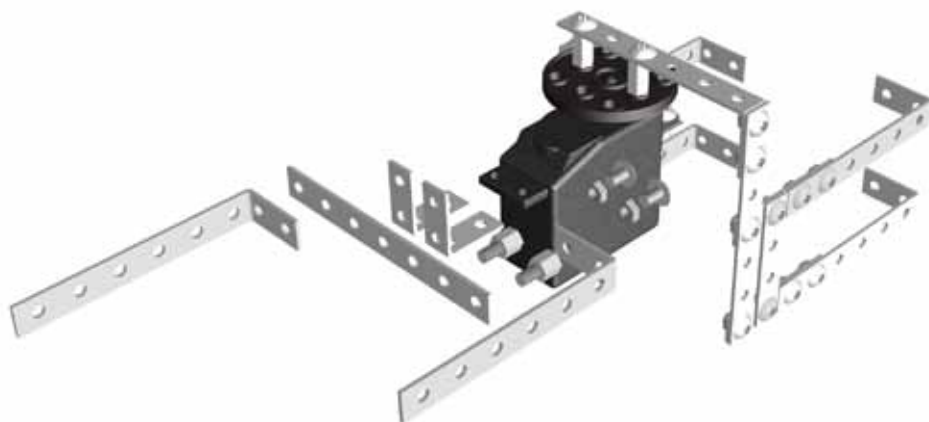
DC Motor
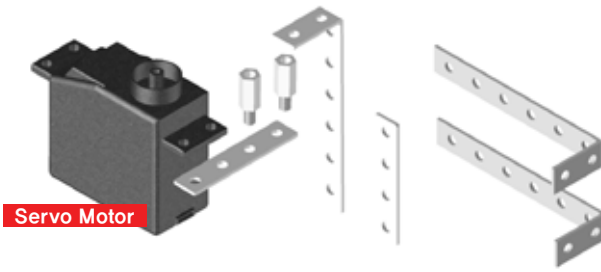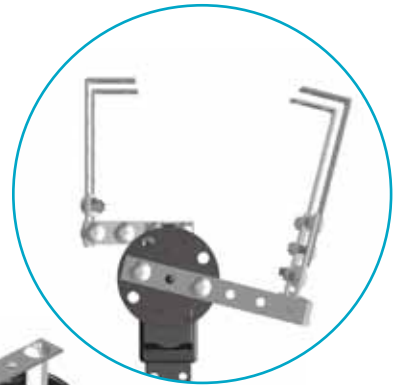
DC Motor

2

10mm

10mm

10mm X 2   20mm X 4

30mm X 2

3

Servo Motor

7mm

7mm

7mm X 2   10mm X 2

4

Servo Motor

10mm X 2

5

10mm X 4   X 4

6

5mm X 2

7

Nylon Nut

S2

M2

S1

M1

M2   S1

S2

ROBO LINK
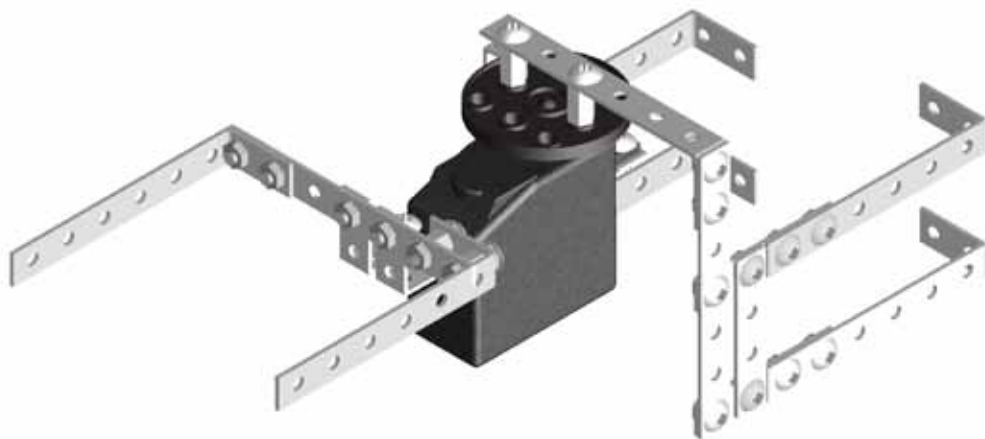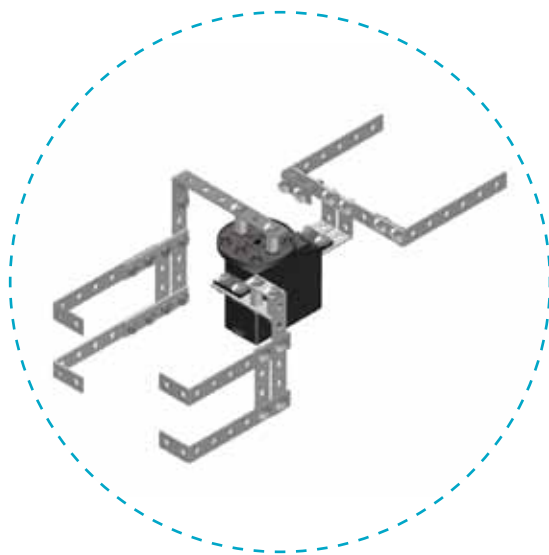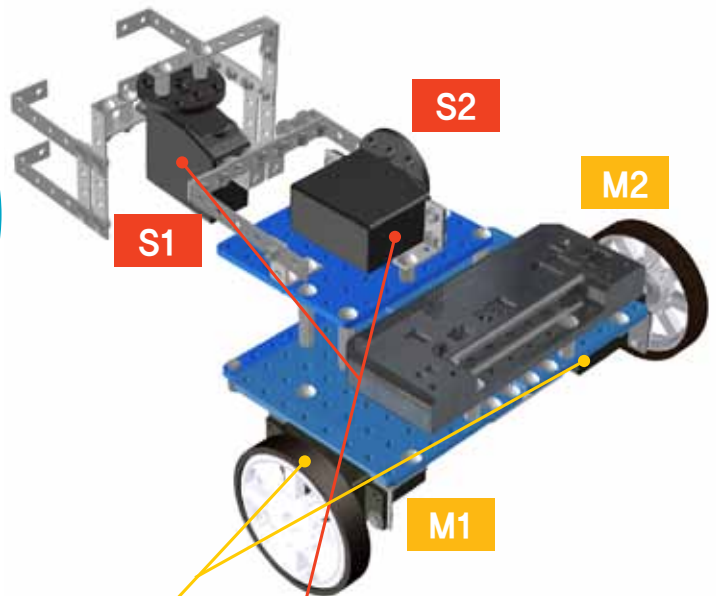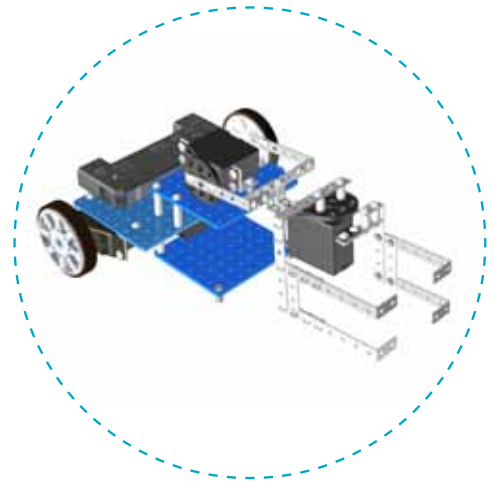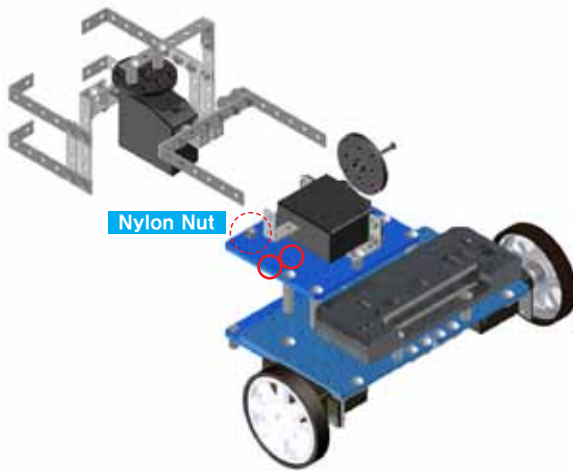
Acting Module

For driving Grip Robot, select and press program mode 3.

> In Smart Rokit Step 2, program is due to be running on with number 2 toggle of DIP switch turned upward. In other words, Smart Rokit Step 2 basically uses channel number 3. Refer to '2. Channel set-up for remote control' in page number 15 that gives you more in details for further reference.

For-ward

Left

Right

Back

Increase Speed

Decrease Speed

Gripping Motion

Lift Up

Lift Down

ROBO LINK
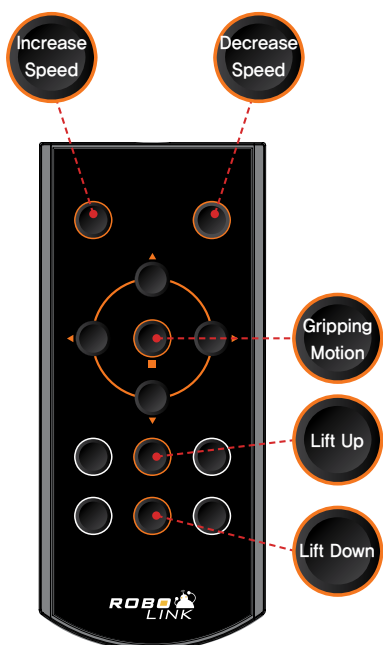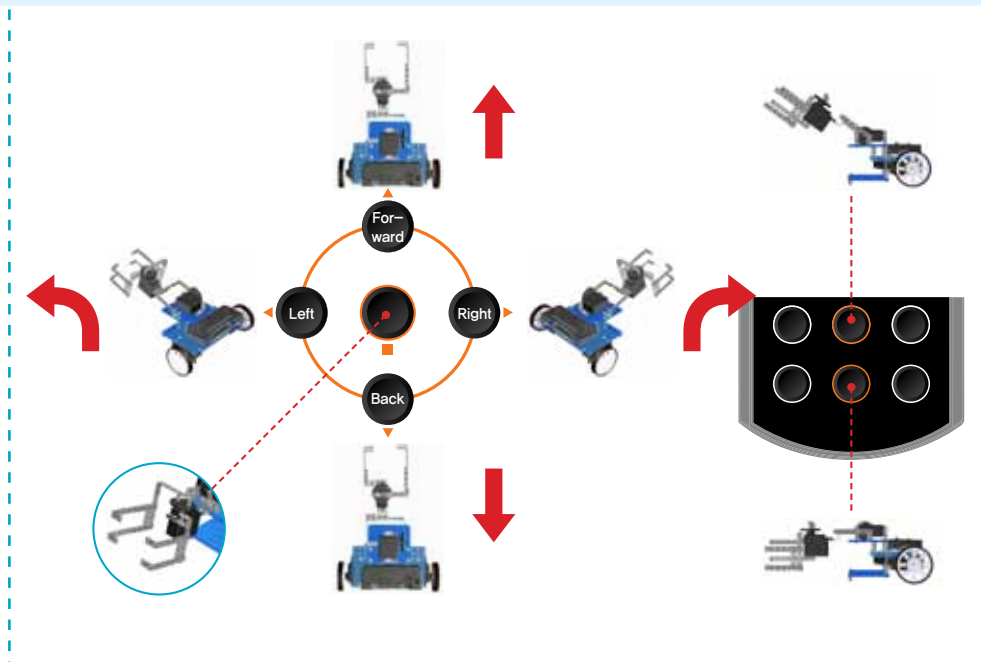
When the speed increases, a brightness of the light increases.

When speed is high

When speed is low

Play the Game!

1. Two or three competing teams are suitable for the game.

2. Draw the lines as many as the 2 more than the number of players of a team, at intervals of 1 or 2 meter(s), as shown in the below picture. Then, line up with a number of paper cups on the first line. Get the player number 1 robot of each team ready on the second line. In the same manner, get the player number 2 ready on the third line, and number 3 on the fourth line. The last line is for arrivals.

3. As soon as the game is on, let the grip robot players ready on the second line advance forward to grip the paper cups placed on the first line. Once the robot players have gripped them successfully, make the robot players carry them backward to the next players on the third line. Here at this point, paper cups must not be dragged along. Paper cups must be lifted up and carried on to the next player.

4. When arrived at the third line, the first grip robot players of each team hand the paper cups over to next players ready on the third line. There is no specific rules for in what manner the paper cups should be delivered to next players. Yet, remocon operators should not use their hands to help their robots while handing the paper cups over.

5. Based on the rules and manners stated above, the team who come at arrivals line first wins the game. At this moment, the paper cup should be completely put down on the ground for every player's recognition. It could be given disadvantages either when the paper cup rolls over at the last minute or when the paper cup is crushed down in a tight grip.