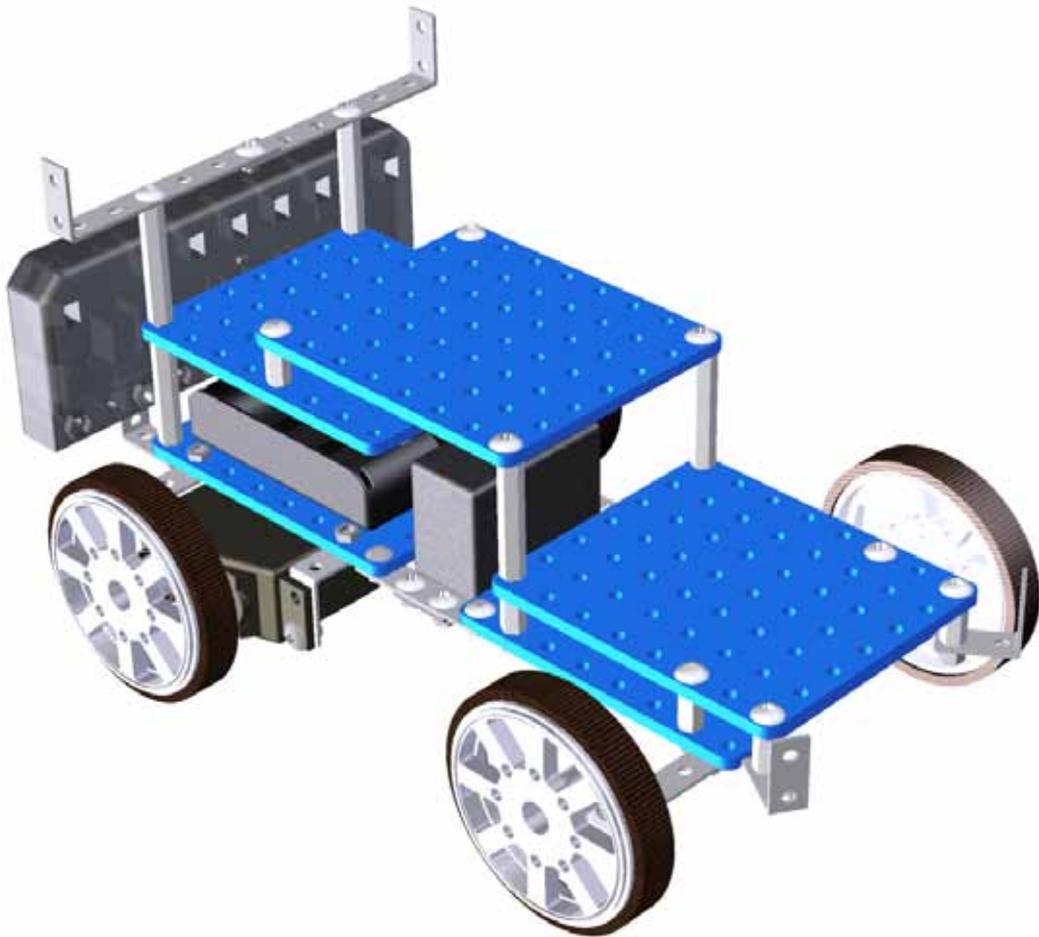


2. Dune Buggy Robot



Introduction and working principle

– External forces working on car

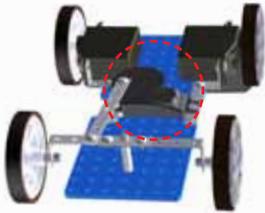
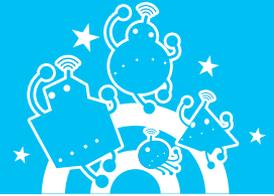


Figure 1. Dune Buggy Robot

Dune Buggy Robot has four wheels, two at the front and two at the rear. But, in reality, the two wheels located at the rear are only driven by the engine. This configuration is referred to as rear-wheel drive (RWD) layout.

As illustrated in the figure of the left, two DC motors are hired to control rear wheels and a servo motor is employed to steer front wheels. The layout of a rear-wheel-drive car has the benefit of enjoying speedy acceleration & traction power and superb steering ability. On this account, most racing cars including F1 use rear-wheel drive.

While a car is running, various forms of forces are applied to it. They are termed as six components aerodynamic force and moment. The six components are taken into account when designing cars.

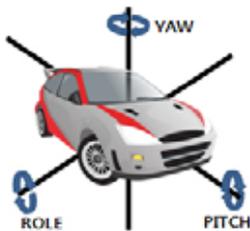


Figure 2.

Six-components of force and torque in aerodynamics

1. Drag – It is the aerodynamic force that opposes a solid object's motion through the air.
Air resistance.
2. Lift – It is the force that directly opposes the weight of a solid object and upholds it in the air.
3. Side force – It is the external force working from a side (wind).

Torques along the three principal axes, based on the center of gravity of car.

4. Yawing Moment (A yaw motion) is a side to side movement of the car front.
5. Pitching Moment (A pitch motion) is an up or down movement of the car front.
6. Rolling Moment (A roll motion) is an up and down movement of the car body.

* The advantages of aerodynamics using six components force and moment in car designing can be summarized as follows. It helps to: Make cars more stabilized in driving, Make handling improve, Better perform indoor circulation efficiency, Decrease noise while driving, Give a chance of reducing fuel consumption, Make engine and braking system better perform.

Out of the six components, the most influential one is drag force, sometimes called air resistance. Efforts are made to lower the car body or to minimize projected area of the car.

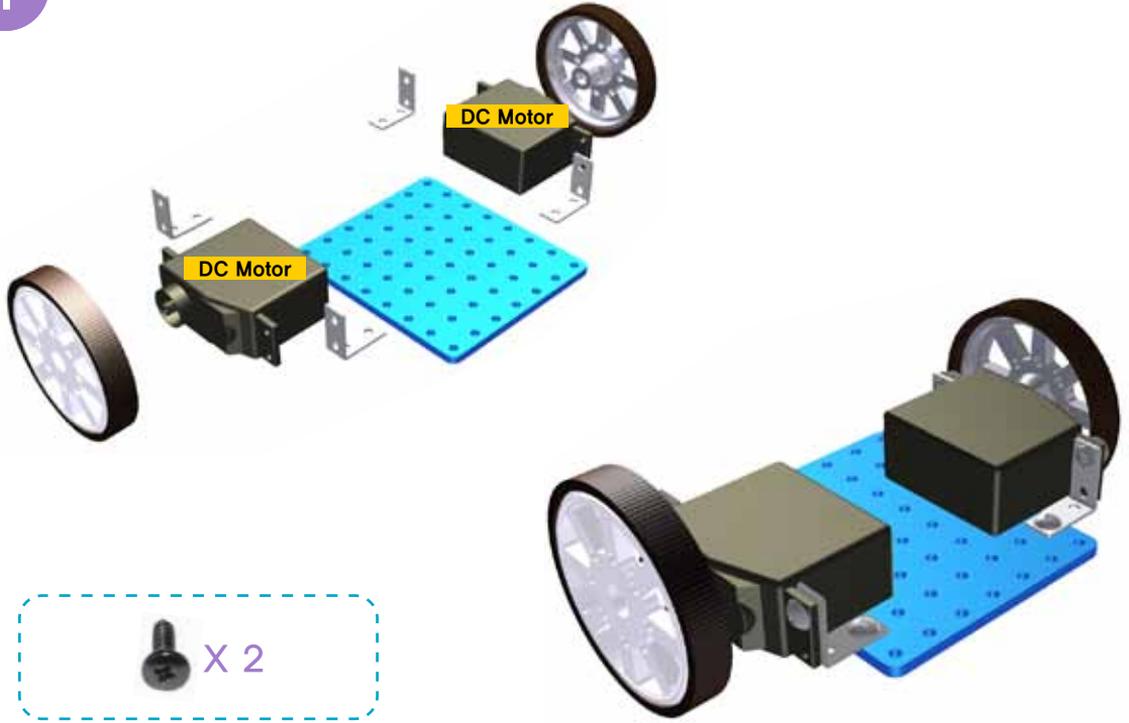


Figure 3. Rear Wing

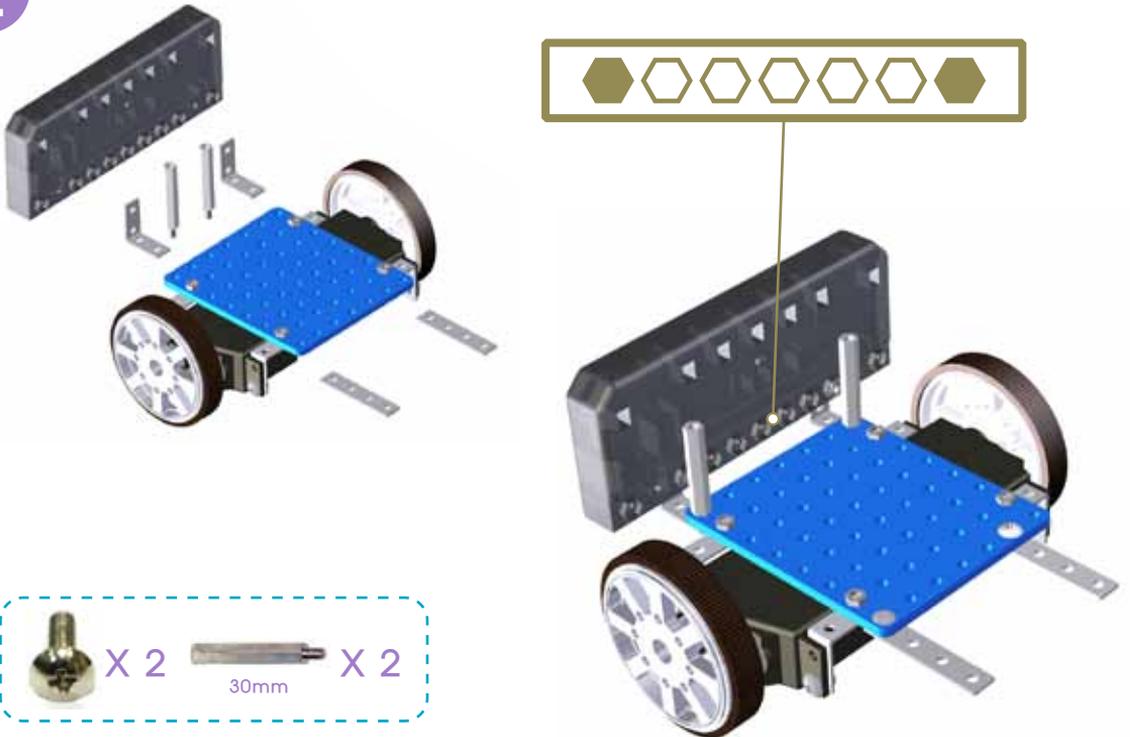
The dynamic principle applied to Dune Buggy Robot: Rear Wing

The significant effect of rear wing assembly is to create the car's down force. Down force is a downwards thrust created by pressing the race car against the surface of the track, or a lift directing perpendicularly to the surface.

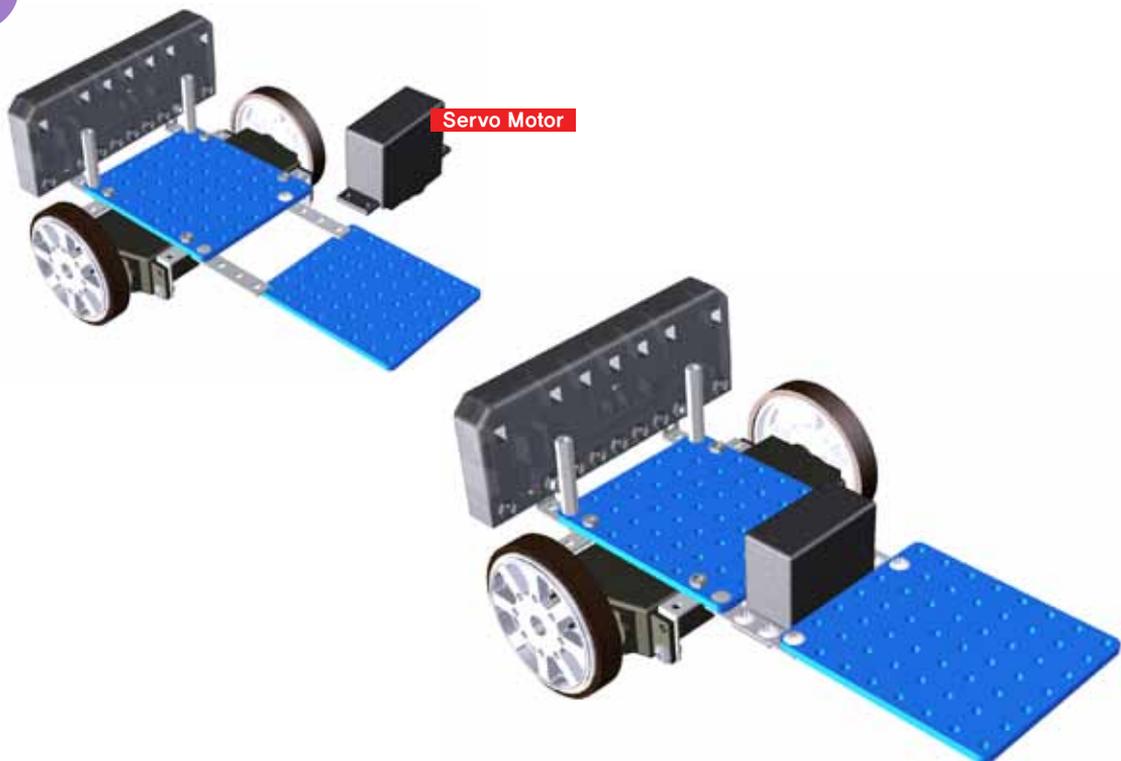
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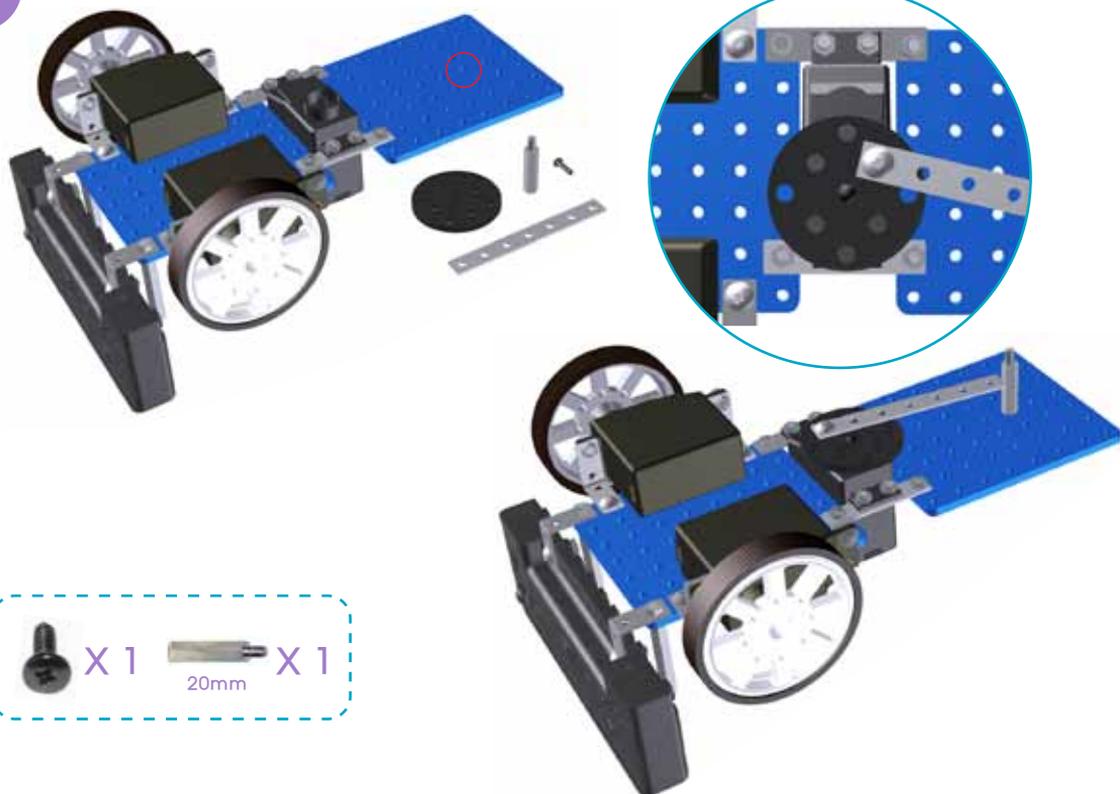
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3



4



5



X 4



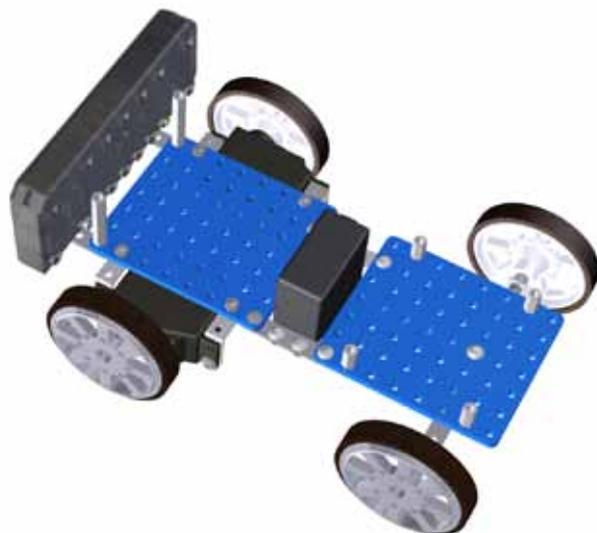
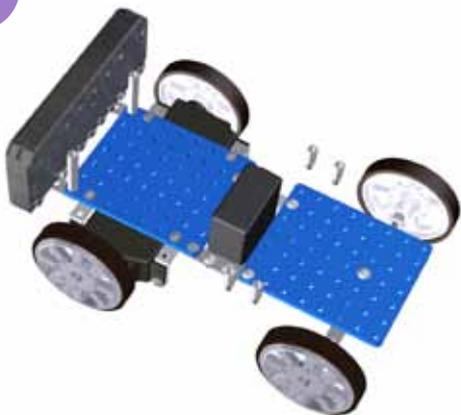
X 3



X 2

10mm

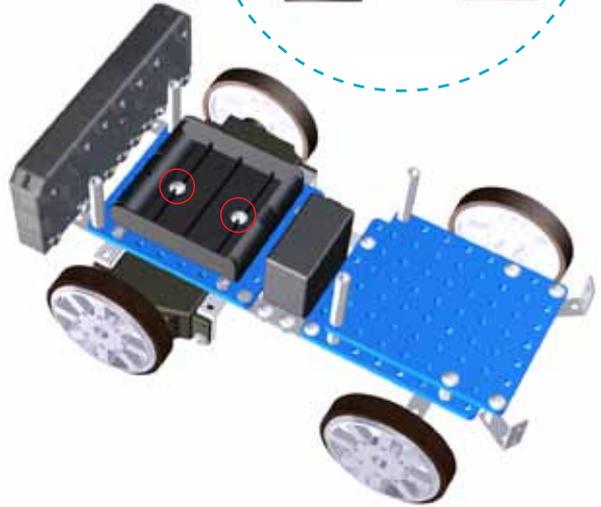
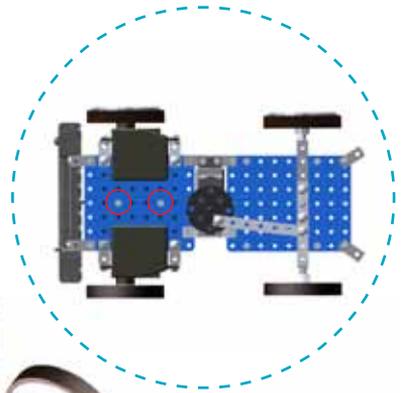
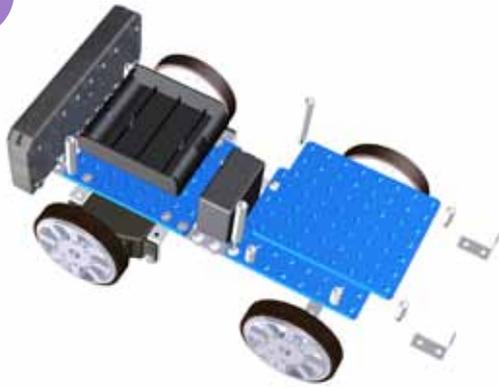
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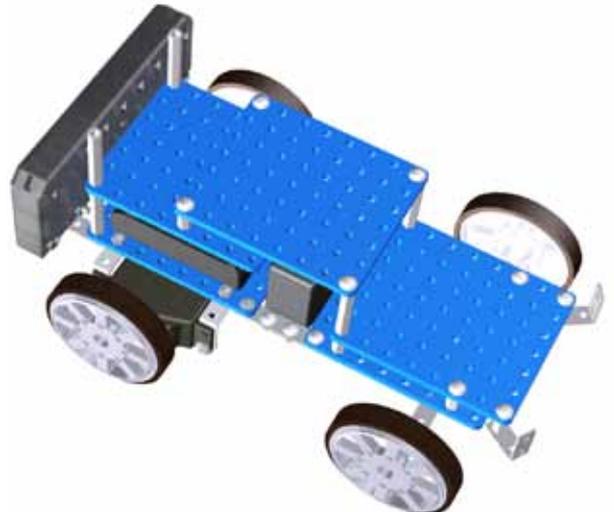
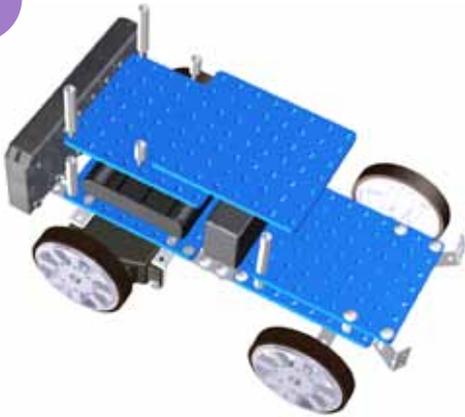
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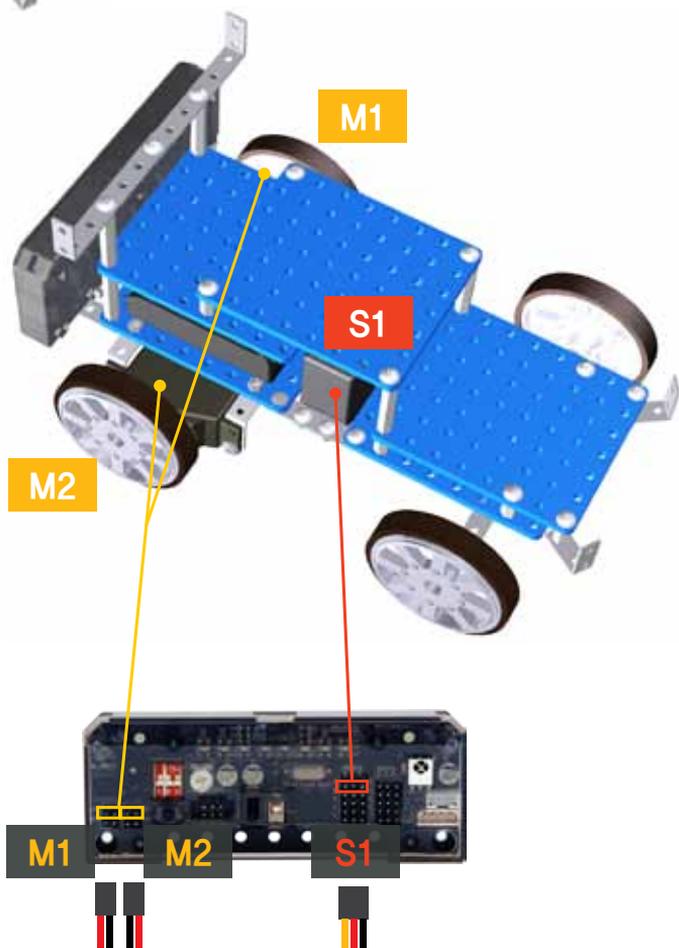
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8



9



Scan the QR code with your
Smart phone, and watch
How the robot is driven. →



ROBO LINK

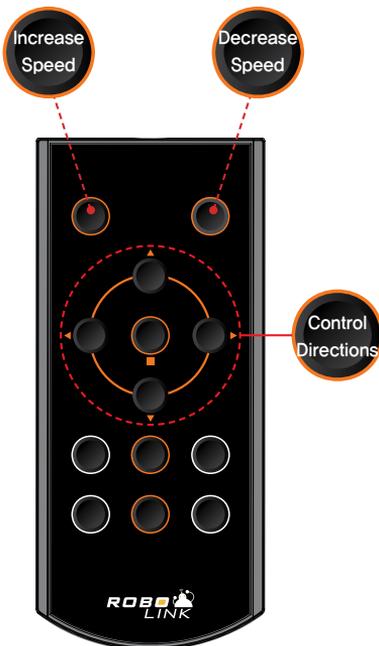
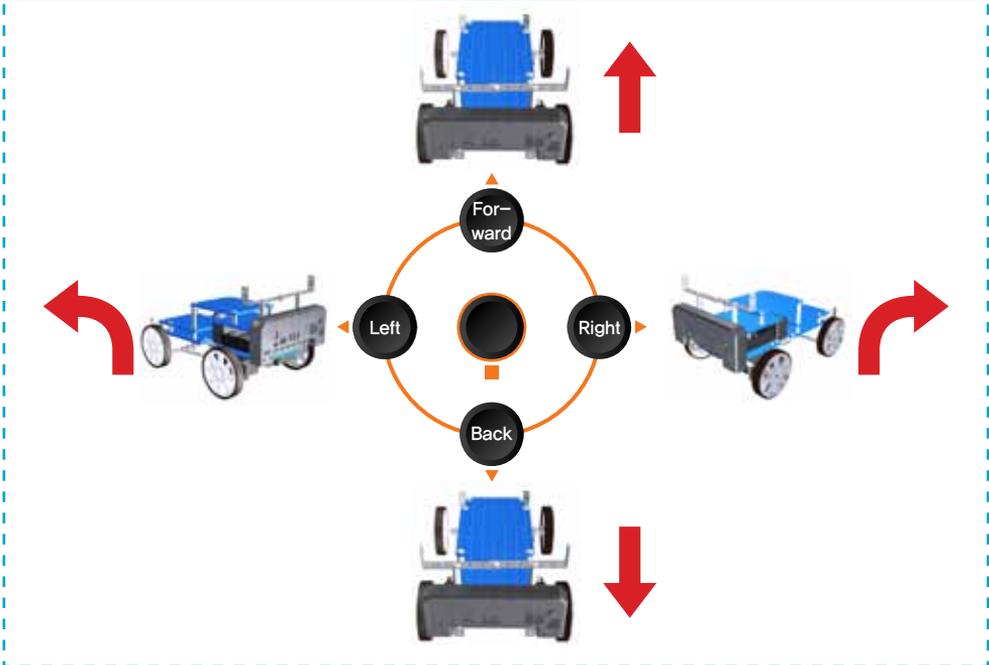
Acting Module



For driving Dune Buggy Robot, select and press program mode 2.



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.



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



When speed is high



When speed is low



Play the Game!

1. A group of 2~4 players is best suitable to play the game.
2. Form and make an arena for a race game, with obstacles placed at the center and its neighboring area. If obstacles are not available, mark a few number of spots instead of obstacles. A large round table is good for arena, and the obstacles can be replaced by the plausible objects around us.
3. Fix a Check Point (Line) where Dune Buggy Robots start racing all together. Each time a Dune Buggy Robot makes around from and finishes at the point, it is counted as completing one round.
4. Who has completed three rounds of run first within shortest period of time wins the game (Depending on the size of the arena, the number of must-run rounds can be differently set down).

