

INTRODUCTION TO ROBOTICS

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What is ROBOT??????



Robot is a.....

MACHINE!!!!



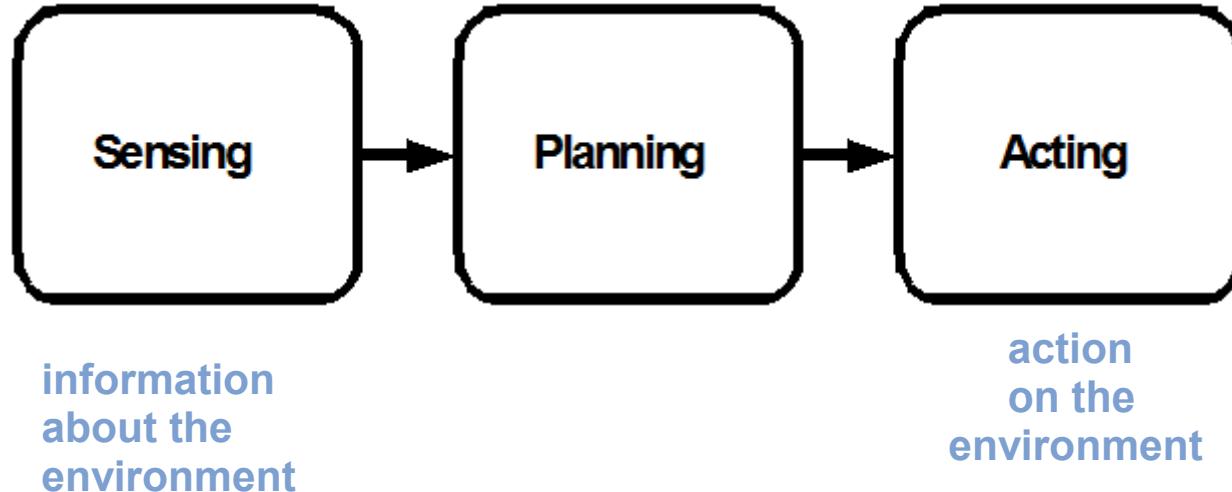
*Then what's the difference between
ROBOT and MACHINE???*



ROBOT has the *MIND* !!!!!

- ▶ Basically , Robot is a machine which senses its environment and performs a designated task in a way based on the feedback.
- ▶ Any automatically operated machine that replaces human effort, though it may not resemble human beings in appearance or perform functions in a humanlike manner.

Machines v/s Robots



- ▶ Every robot is a machine, but every machine is not a robot.
- ▶ Robots have a **FEEDBACK** system and can act accordingly.

Classification of Robots

- ▶ Manual – All tasks/movements are controlled by an operator.
- ▶ Semi-autonomous – Some tasks are autonomous.
- ▶ Autonomous – Every task is autonomous.



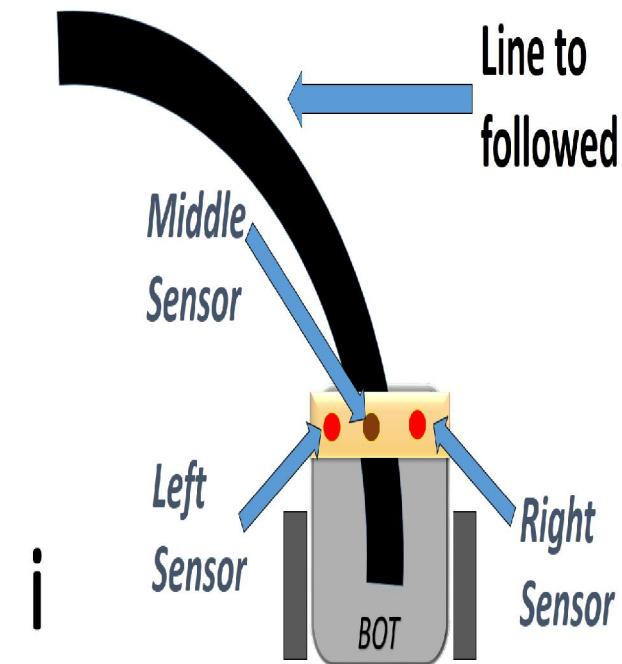
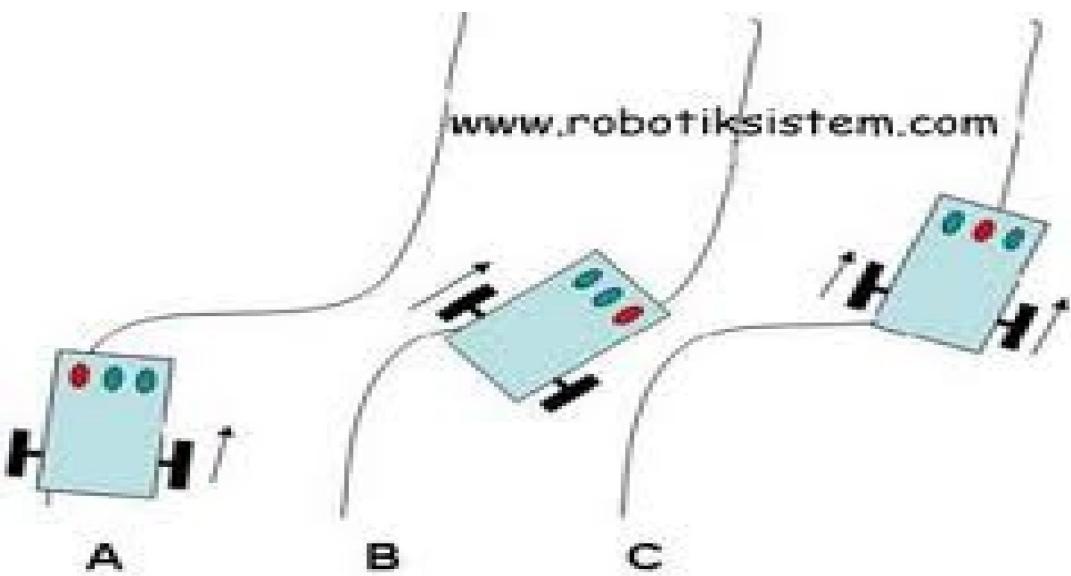
Some Common Types of Robots

- ▶ Line Follower
- ▶ Edge detector/Wall follower
- ▶ Quadcopter
- ▶ Self balancing robot
- ▶ Stationary Robots



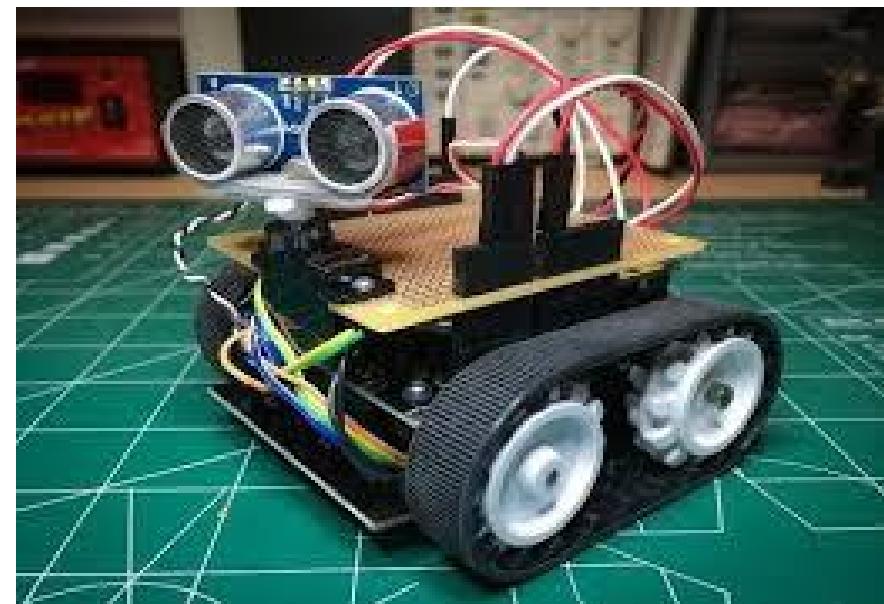
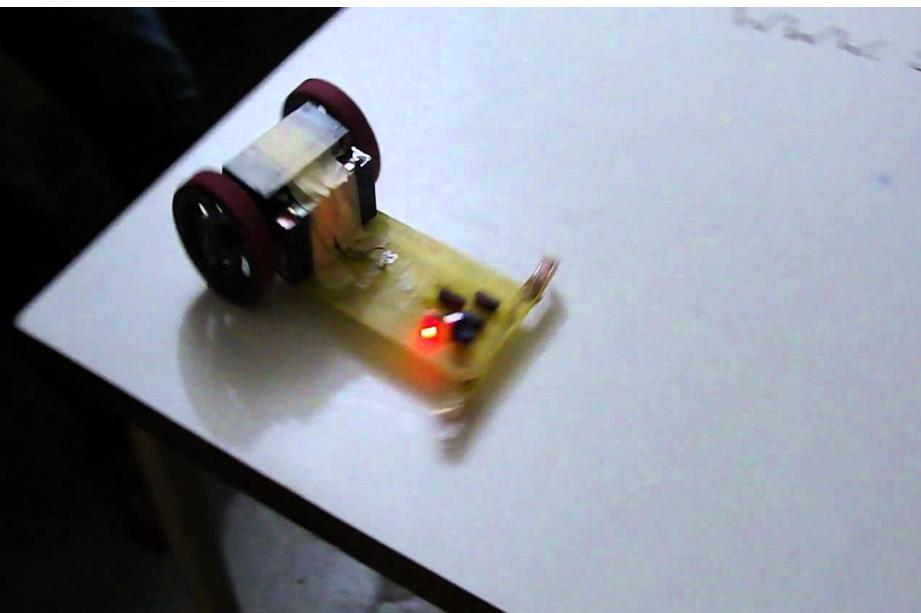
Line Follower

- As the name suggests, line follower is a robot that follows a particular path, using the difference between the color of the path and its adjacent surface.



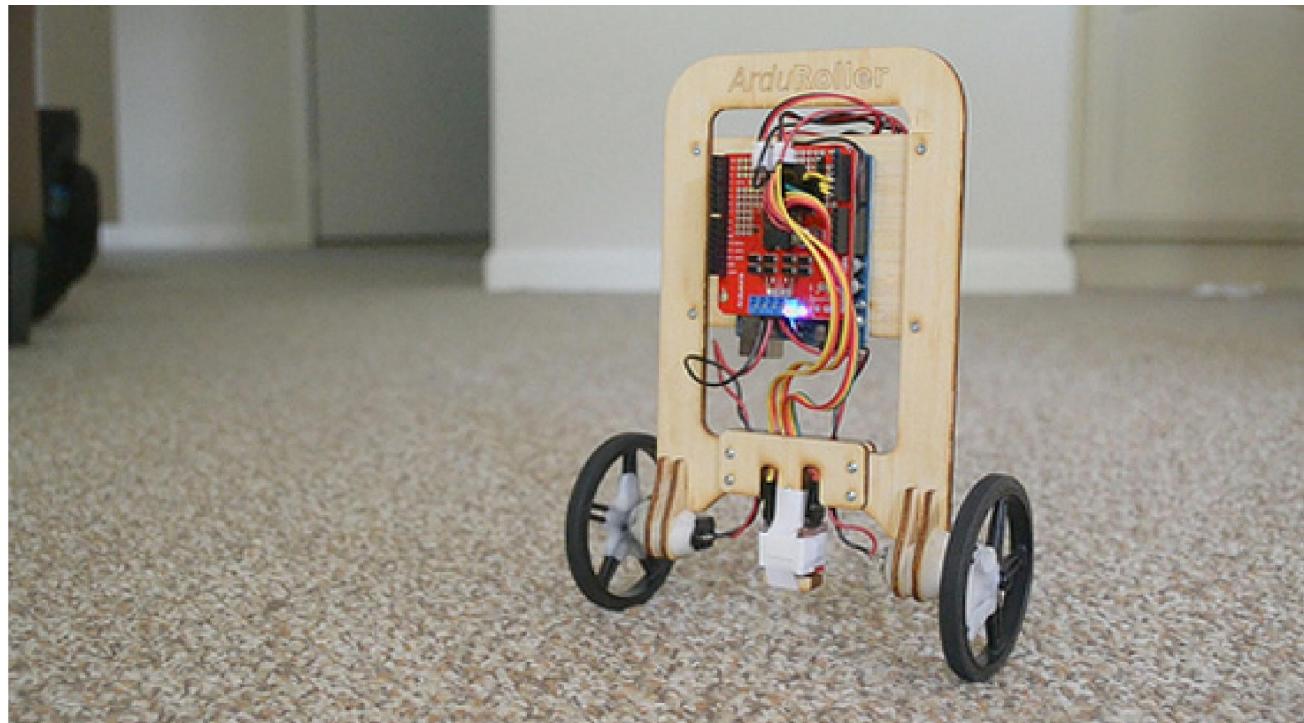
Edge Detector/Wall Follower

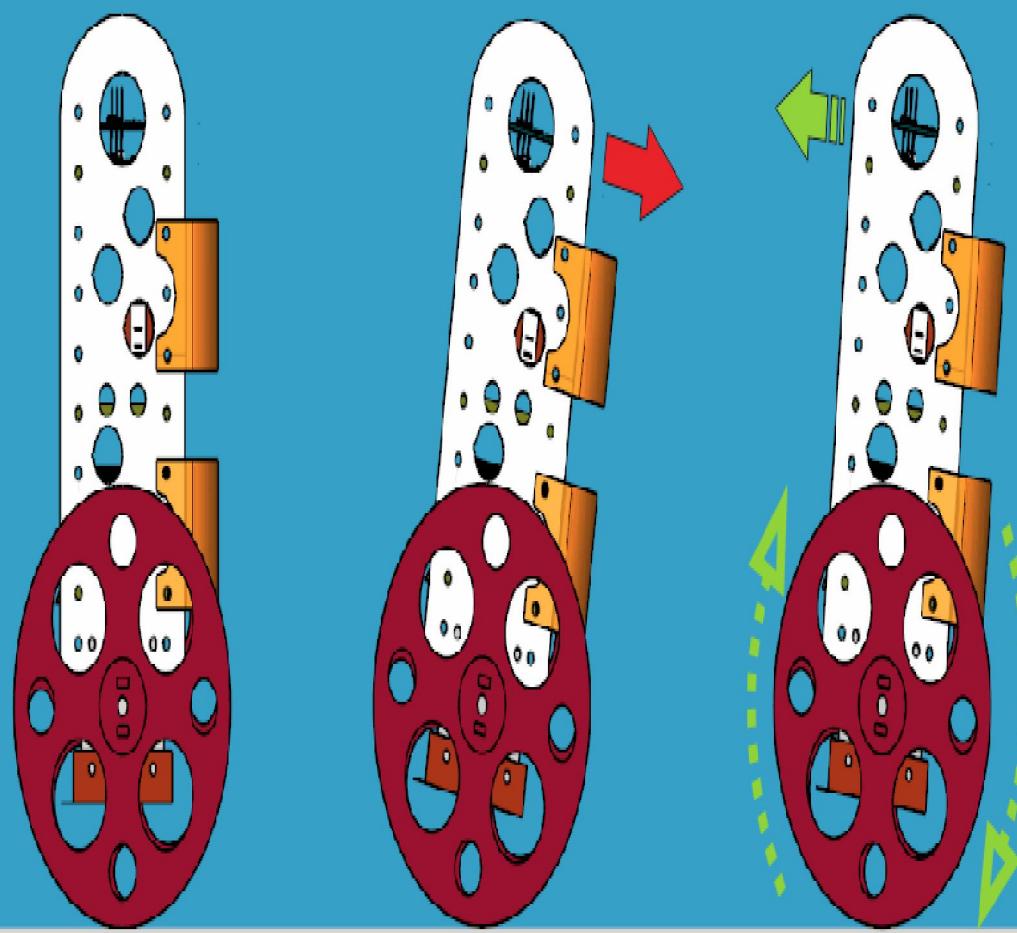
- These robots differentiate between directions by sensing distances of objects around the robot.



Self-Balancing robot

- ▶ These robots balance themselves vertically by sensing their alignment with the ground.

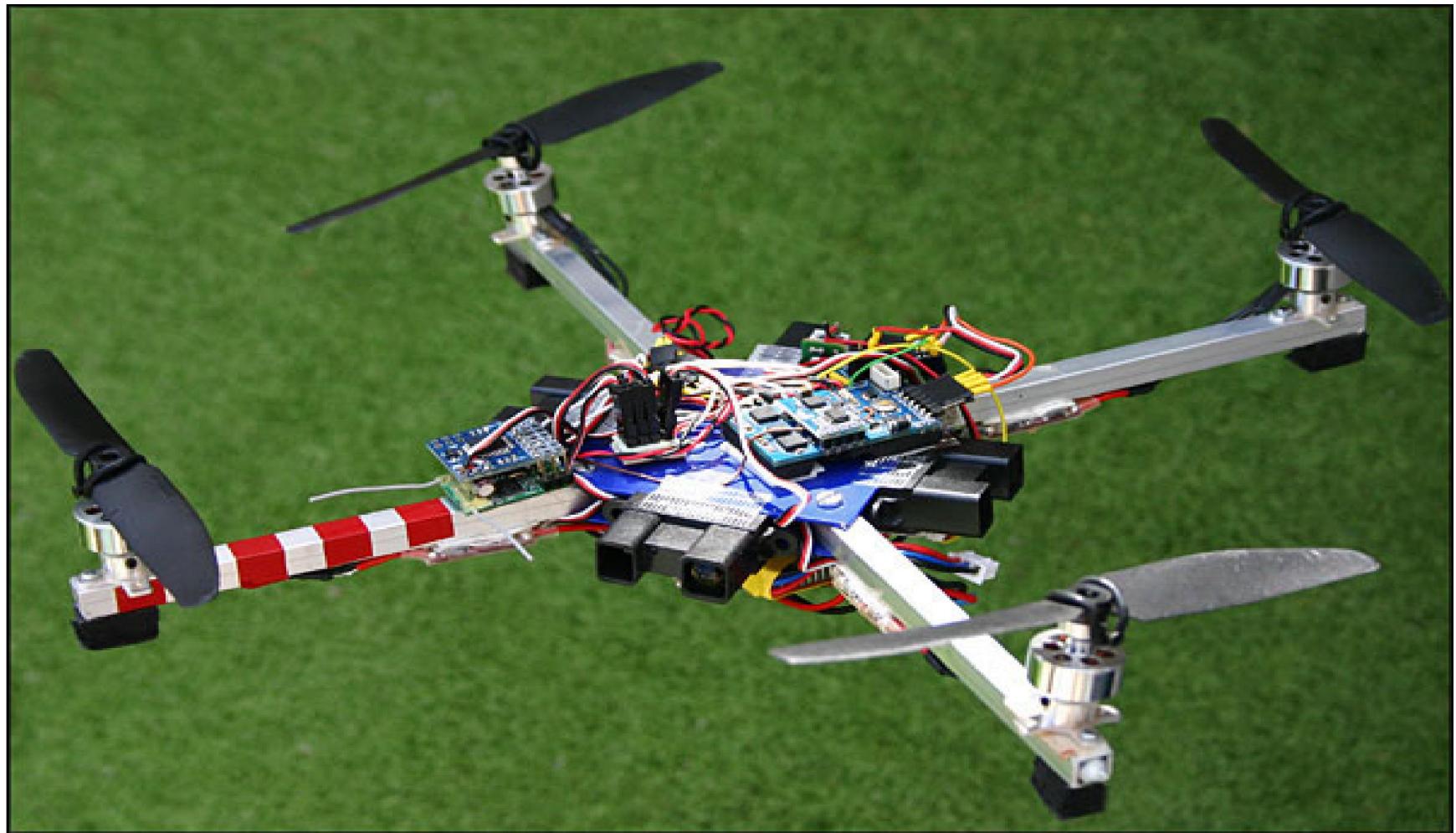




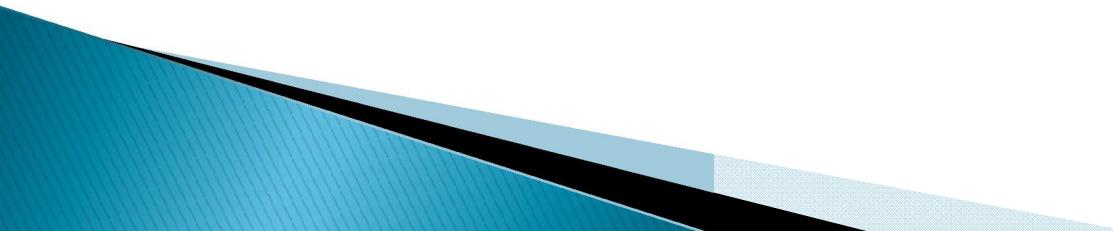
Quadcopter

- ▶ It has 4 propellers.
- ▶ 2 propellers rotate in clockwise direction and other 2 in anti-clockwise direction.
- ▶ Its not necessary that all motors move with same speed
- ▶ Due to weight distribution, wind direction, etc.

Quadcopter



*MECHANICAL
ASPECTS OF
ROBOTICS*



Basic Robot Mechanism

Sense

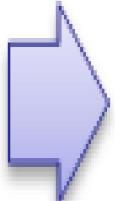
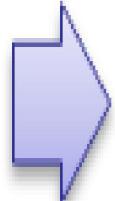
Retrieve data from sensors
Apply sensor fusion
Process images

Think

Execute navigation & mission planning algorithms
Implement advanced control loops
Control a robotic arm

Act

Connect to motors
Calculate wheel states
Simulation
Deployment to Embedded Hardware



*BASIC
MECHANICAL
PARTS OF A ROBOT*

This Include.....

- ▶ Chassis
- ▶ Wheels
- ▶ Actuator
- ▶ Motors
- ▶ Gear
- ▶ Griping and Lifting mechanism



CHASSIS

- ▶ To provide a frame for the robot.



WHEELS

There are generally four types of wheels used in making robots which are as follows:-

- ▶ Standard Wheels
- ▶ Castor Wheels
- ▶ Omni Wheels
- ▶ Mecanum Wheels

Standard Wheel



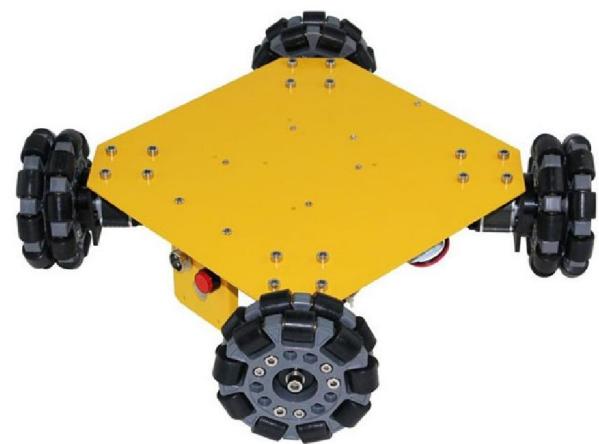
Standard Wheel

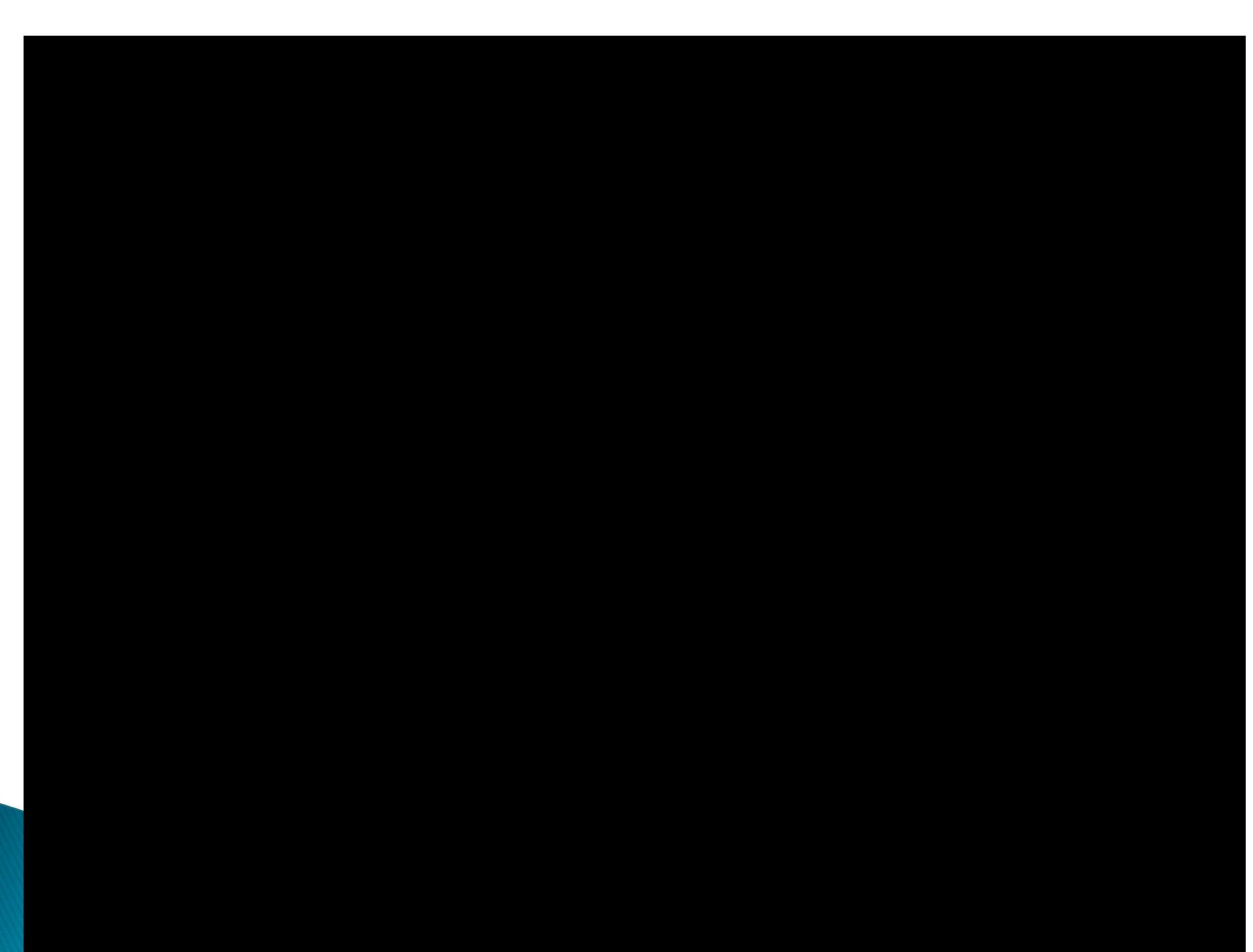
Castor Wheels



Omni wheels

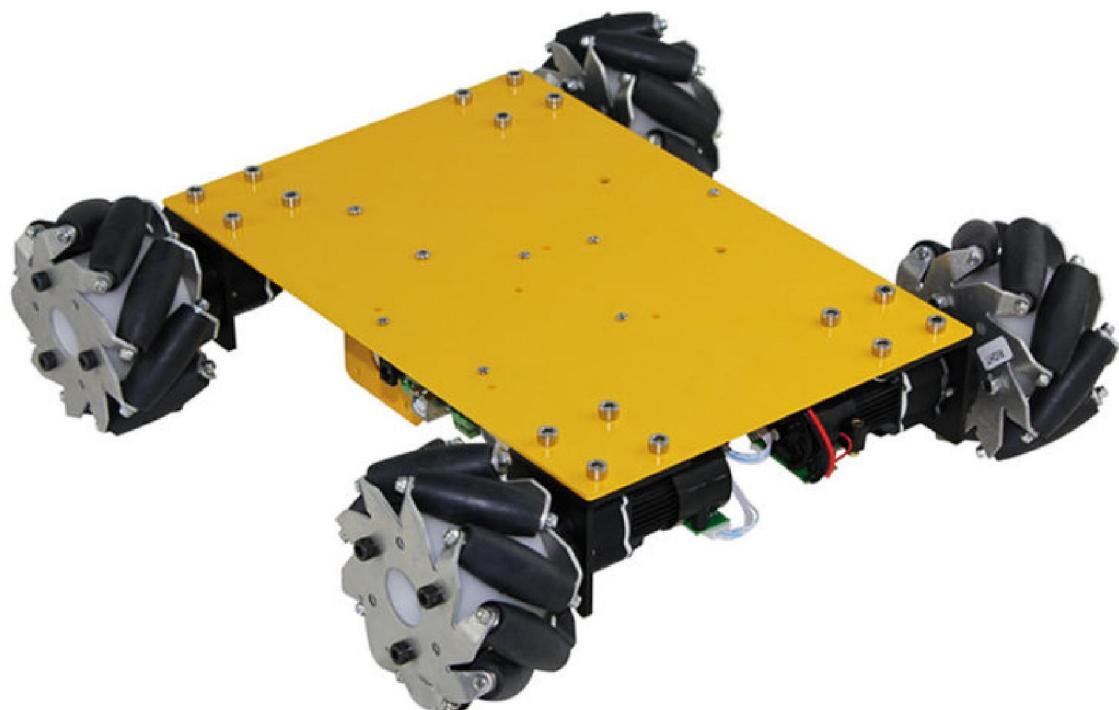
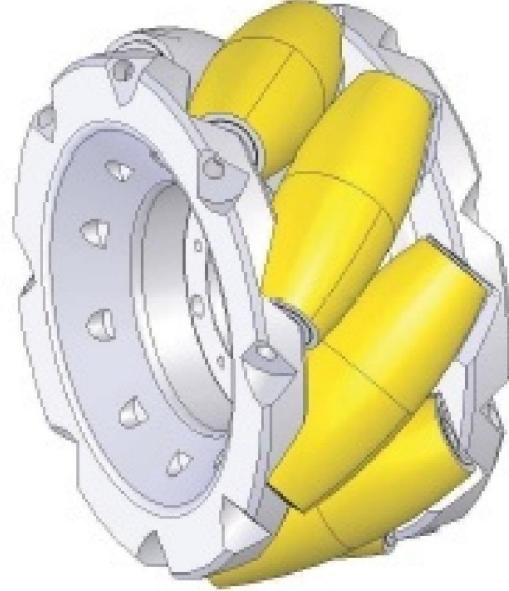
- Can move in many directions
- Wheels with small discs around the circumference which are perpendicular to the rolling direction. The effect is that the wheel will roll with full force, but will also slide laterally with great ease.





Mecanum Wheels

- It can move a vehicle in any direction.
- It is a conventional wheel with a series of rollers attached to its circumference.



Thank

you

