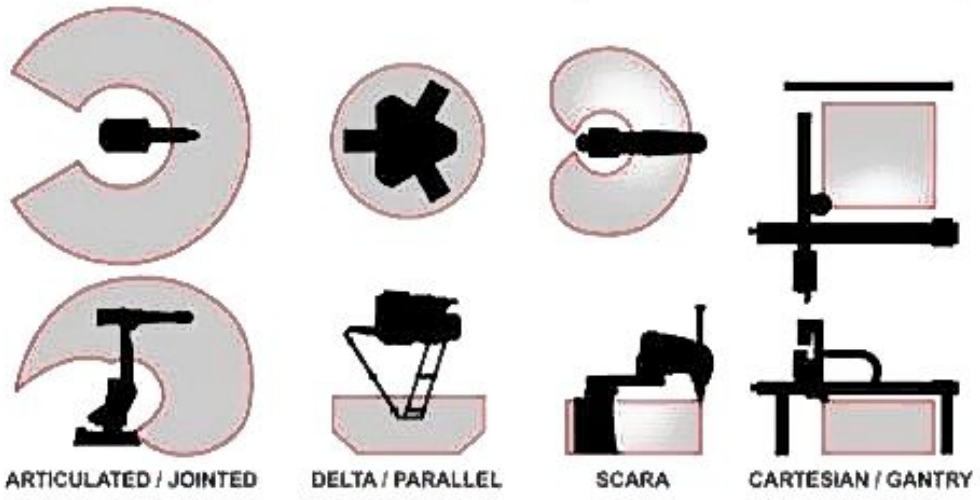
STEM Education Works™

INTRODUCTION TO ROBOTICS

DOBOT
MAGICIAN

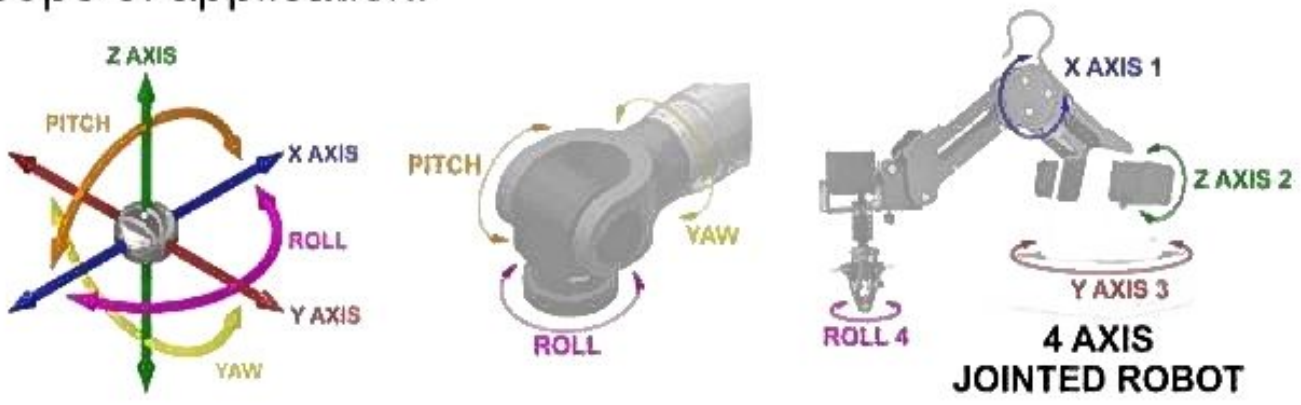
Robotics Work Envelope

Work Envelope: Defined as the range and area each robot may work within. The shape and size of the envelope is determined by a robot's degrees of freedom, style of movement (linear or rotation) and size/range.



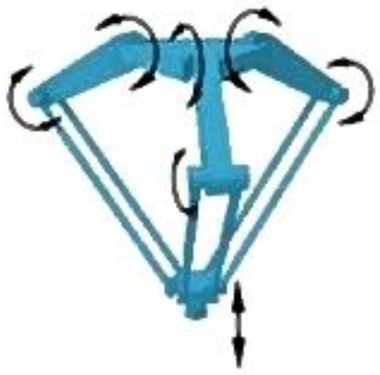
Degrees of Freedom

Degrees of Freedom (DoF): Defined by the number of joints that can be controlled and provide each design with its range of motion. Industrial robots can have up to six degrees of freedom. Robots with more degrees of freedom of have a greater range of motion and a wider scope of application.



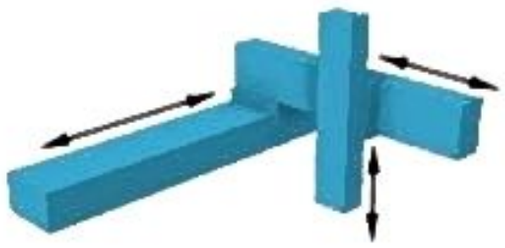
Types of Industrial Robotics

Articulated/ Jointed



Parallel/ Delta

SCARA



Cartesian/ Gantry

Definitions

Workcell: A workcell is the complete environment around each robot. May include tools, machines and/or other robots.

Payload: The size and weight of the material each robotic arm can lift. A robot's total payload must also include the existing weight of the robots end effector or tooling.

Teach Pendant: A handheld device used to manually control, program, and troubleshoot a robotic arm without the need for a full terminal.

Parts of a Robot

End effector / End of Arm Tooling (EoAT): A robot's end effector is defined as the tooling added to the end of a robot's arm that allows it to perform specific operations.

Examples: Spot Welders, Paint Sprayers, Grippers, Inspection Probes

OUTPUTS

Parts of a Robot

Sensors: Provide feedback as inputs to the robot's controller about its environment. Sensors can be used to find objects, differentiate objects, keep robots from colliding into obstructions, other robots, or identify when unwanted obstacles have entered the workcell.

INPUTS