

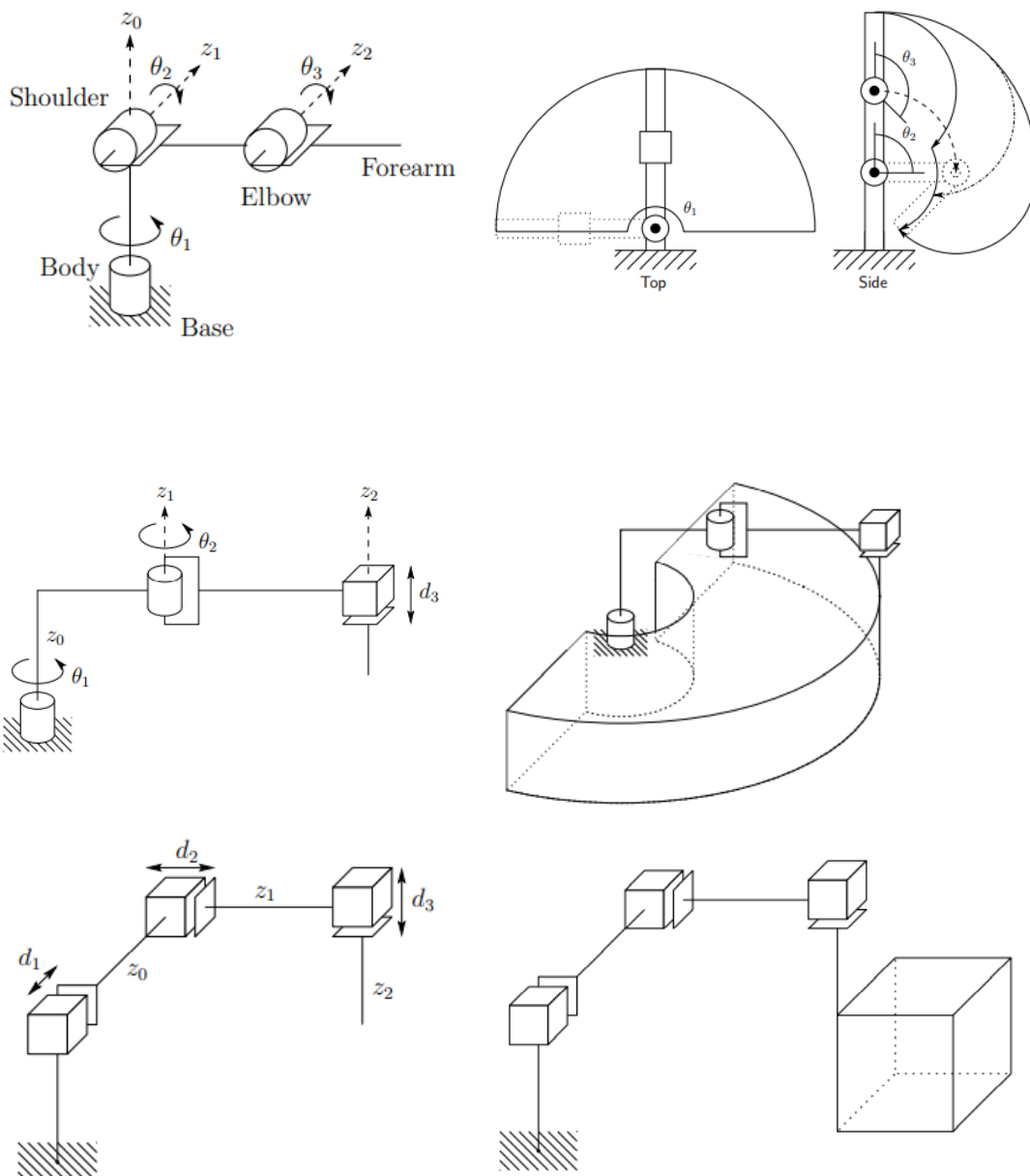
Workspace

An important consideration with any robot is the set of all possible points (usually represented by X, Y, and Z coordinates) that it can reach. And we refer to this **volume** as the workspace of the robot.

Watch the video

<https://www.youtube.com/watch?v=FORcPhBaa50&t=91s>

Write down the **name** and the **DoF** of the robot type and the **shape** of the workspace of the following robot types.



What kind of robot does DOBOT Magician belong to?

Practical Session:

Familiar with the HOME position within the workspace of DOBOT

What is the position of the HOME position?

	X coordinate	Y coordinate	Z coordinate
Trial #1			
Trial #2			
Trial #3			
Trial #4			
Trial #5			

Take the average to find the HOME position.

X : _____, Y : _____, Z : _____

Repeatability and Accuracy

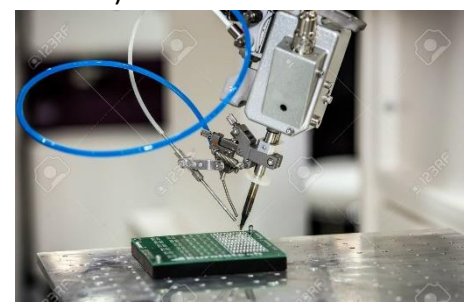
A robot has many measurable characteristics, which will have a direct impact on the effectiveness of the robot during the execution of its tasks. The main measurable characteristics are **repeatability** and **accuracy**.



- The **repeatability** of a robot is defined as its ability to achieve repetition of the same task.
- The **accuracy** is the difference between the requested task and the obtained task (i.e. the task actually achieved by the robot).

Discussion

- Can DOBOT repeatedly reach the HOME position with high precision?
- Why is repeatability and accuracy so important when deploying DOBOT to solder chips on a circuit board?



Teaching & Playback Mode

A system to teach the DOBOT how to move. It enables the DOBOT to accomplish recorded movements by manual control.

Experiment 01: Ability to move to a specific position accurately

- Home the DOTBOT
- Mark a cross on the paper, say point A
- Hold down the unlock key, move the arm to point A
- Note the recorded coordinates of point A

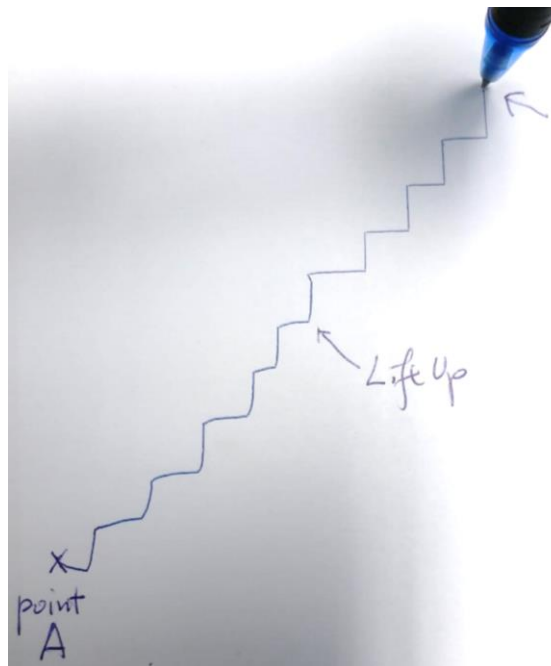


	MotionStyle	Name	X	Y	Z
1	MOVJ		216.331	-58.2159	-54.3441

- Lift up a bit using the button Z+ to minimize the friction
- HOME the DOTBOT
- Click the play button
- Repeat the task several times

Experiment 02: Ability to follow a zigzag path as ordered

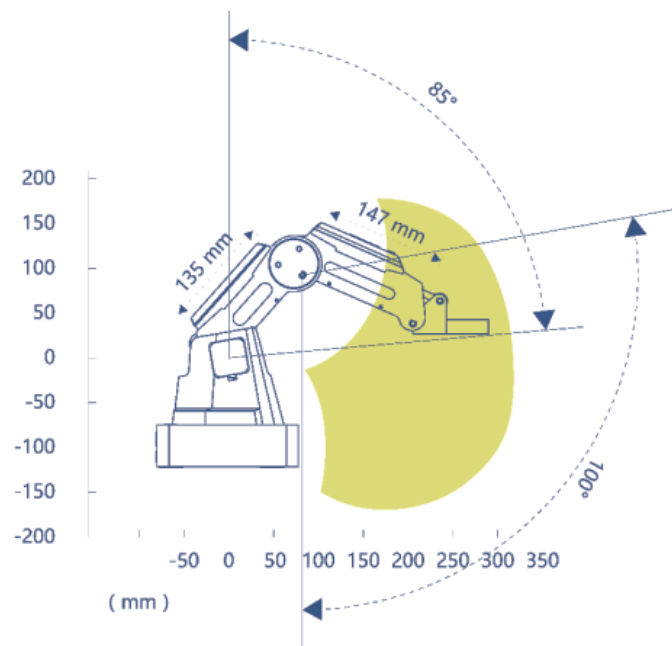
- Mark the starting point as A
- Increment X coordinate by clicking button X+ 5 times
- Increment Y coordinate by clicking button Y+ 5 times
- After several steps, lift up the pen using Z+ and repeat the process



Try to explain the features observed on the zigzag path

Experiment 03: The XZ workspace plot

- For the XZ plot, Lock the shoulder, turn and extend the elbow and/or the hand.
- Move 5 degree at a time and note down the hand positions (X, Y, Z), which then is plotted on the graph paper provided.
- Compare yours with the one printed on the data sheet provided by the company

Experiment 04: Find the volume/surface area of a rectangular block

- Locate and write down the coordinates of the vertexes
- Calculate the length of the sides
- Calculate
 - the volume of the block
 - the surface area of the block

