W3B CIM [Dobot Pick & Place] Dobot Magician A. Pick and Place

CHRIS & JIM CIM
COMPUTER INTEGRATED MANUFACTURING

Portfolio link

https://m-jeide.github.io/eng-portfolio/CIM/Dobot%20Magician

WARNING:

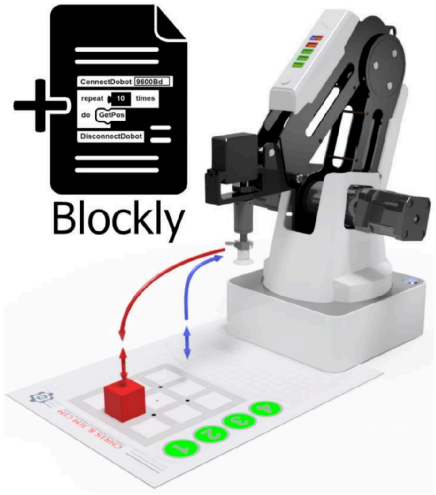
Caution: NEVER wire anything to the Dobot Magician while it has power on. ALWAYS shutdown the Dobot before making connections or damage to the robot could occur.

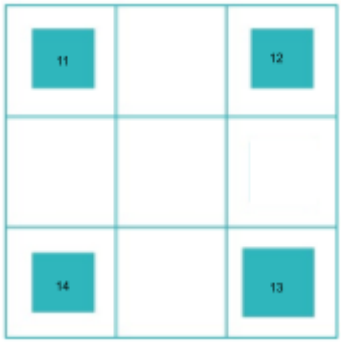
INTRODUCTION

Robotic arms are excellent for performing pick and place operations such as placing small electronic components on circuit boards, as well as large boxes on pallets. A pick and place operation will require at least 5 points:

1. A home or safe location
2. A position above the object
3. A position at the object
4. A position above the drop off
5. A position at the drop off

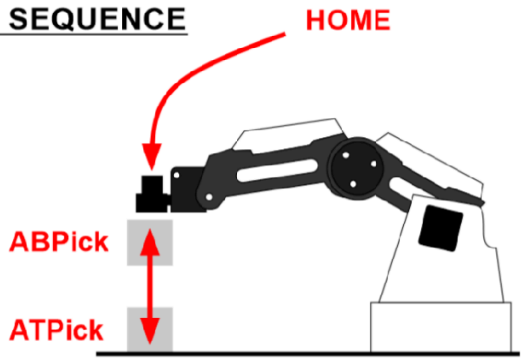
In this activity you will learn how to make a basic *Pick and Place* operation in blockly. Through this activity you will learn how to program the robot to move and turn on it's suction cup in blockly

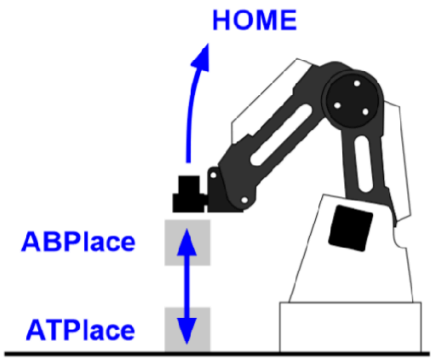




PICK & PLACE SEQUENCE

1. HOME
2. ABPick
3. ATPick
4. Vacuum On
5. ABPick
6. ABPlace
7. ATPlace
8. Vacuum Off
9. ABPlace
10. HOME



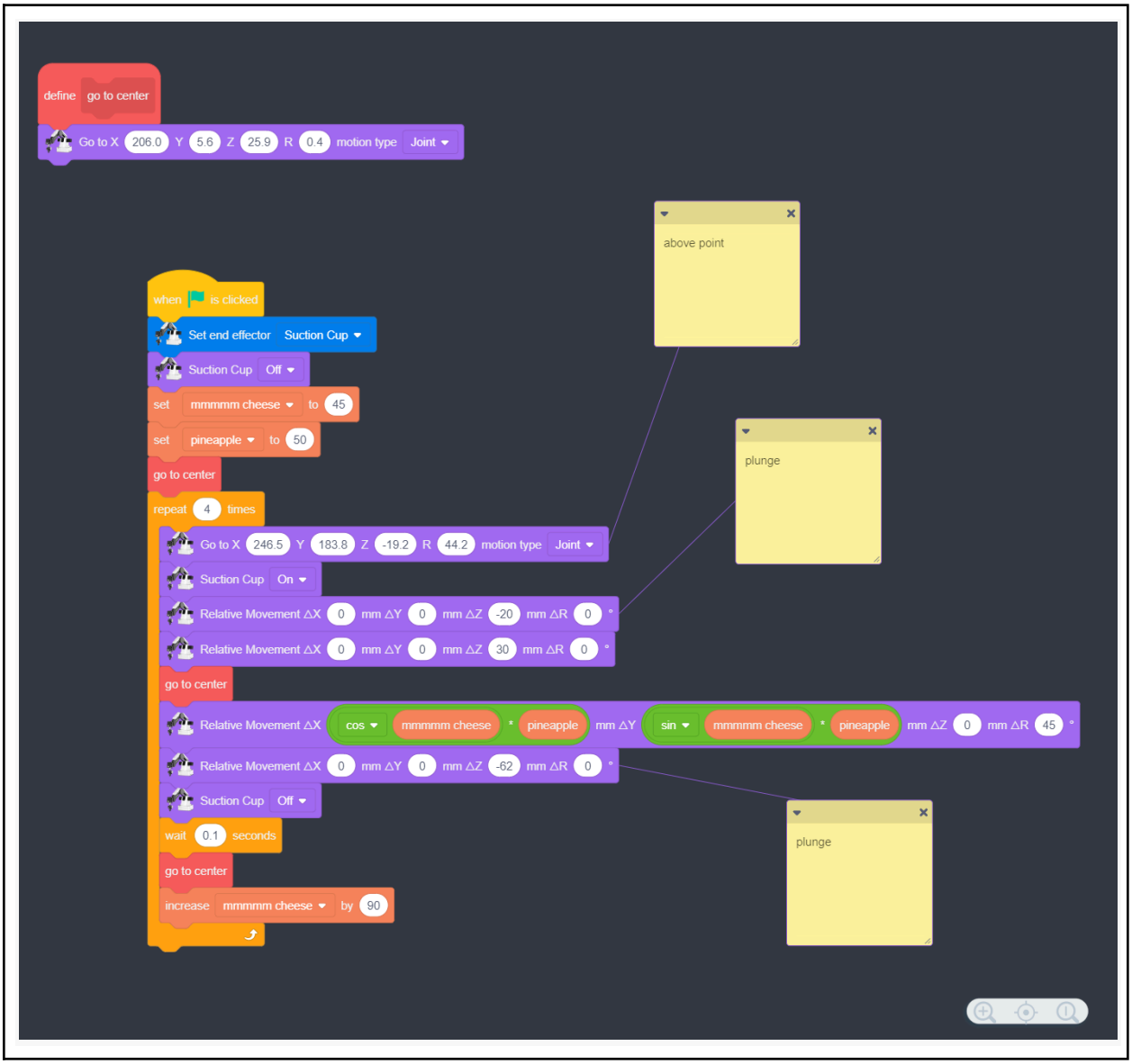


Please note block offset was a variable starting at 45 incremented by 90 after each block.

Complete the table below with all of the XYZ coordinates needed for all four blocks placed on the four corners.				
	X	Y	Z	R
1.Home	206.0	5.6	25.9	0.4
2.Above Pick (Position 11)	246.5	183.8	-19.2	44.2
3.At Pick (Position 1) RELATIVE TO POSITION 11	0	0	-20	0
5. Above Pick RELATIVE TO POSITION 1	0	0	+30	0
6.Above Place (Position 12) RELATIVE TO CENTER	+cos(block_offset)*50	+sin(block_offset)*50	0	45
7.At Place (Position 2) RELATIVE TO POSITION 12	0	0	-62	0
9.Above Place (Position 12)	206.0	5.6	25.9	0.4
10. Home	206.0	5.6	25.9	0.4

Video of Pick and Place Routine
https://www.youtube.com/watch?v=oI8b12Q2PBs

Screenshot of positions on the Dobot Software



If your set-up did not work correctly the first time, what did you have to do to make it work?

Our original code didn't work because we forgot to go up after we picked up a cube from the gravity feeder, plus, some of the trials failed because the feeder or placement grid or slightly out of place from our original setup.

Conclusion

1. What are the five needed positions for a pick and place operations?

Home, above pick, at pick, above place, at place

2. Explain in your own words why it was necessary to add delay times into the program in the space below.

The robot really wanted to go home rather than letting the cube drop, adding a delay prevented it from taking the cube with it.

3. What is the purpose of the safe positions that are programmed above the object before it is picked up.

We don’t want to hit any objects below.