

# EGR 545 - Spring 2023 - Lab 3

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## **1 Question 4: Hit the Play button to run your program and see what happens. Did it work the first time? If not, what did you have to change to make it work?**

Our program mostly worked the first time we ran it, however, we had to make sure to raise the robot arm after stopping the suction cup at the end of the program.

## **2 Question 6: How many lines of code did it take to write the program using what you have learned before? How many points did you have to teach it?**

Using what we learned before, it took 43 lines of code to write the program. We needed to have the robot move 16 different times, with 10 unique points taught to the robot. It required this many points because we needed to teach the robot each position for each tank and for each position above the tank.

## **3 Question 9: Now change the MotionStyle of the Tank 1, Tank 2, Tank 3, and Tank 4 to JUMP. Double click on the MotionStyle box for each point and change it from MOVJ to JUMP. Now play the program. What does this change do to the program?**

This change causes the program to act very similarly to our first program but with way less code required and way less points taught to the robot. This is because our robot combines the 3 move actions from before into a single jump command.

## **4 Question 10: Compare the first dipping program to the second one with JUMPS and explain how it is more efficient.**

The first dipping program required 43 lines of code to accomplish the desired functionality. Also, it required a lot of points to be recorded for each movement since we needed to dip into each container. The second program, on the other hand, required only 15 lines of code to achieve the same functionality. It is much more efficient because those 3 move commands for each dip become a single jump command, with the height adjustment being handled automatically.

## **5 Conclusion**

### **5 Question 1: Describe a MOVL move using the Dobot.**

A MOVL move with the Dobot is a move where the Dobot arm will go from one point to the second point in a linear fashion. An example of this would be the Dobot arm where its initial position is hovering above a block and linearly moves down towards the block to pick it up.

## **5 Question 2: Describe a MOVJ move when using a Dobot.**

A MOVJ move with the Dobot is a move where the Dobot arm will jump from one point to the second point in an arc-like fashion. An example of this would be the Dobot arm picks up the block from the previous question and then jumps towards the next position to drop the block off. The MOVL move can do the same process by programming the Dobot arm to mimic the jump. However, this process will require one to code multiple actions to the Dobot arm that simulates the jump.

## **5 Question 3: What makes a Jump command more efficient to code than a MOVJ or MOVL?**

A jump is more efficient to code than a MOVJ or MOVL because it automatically handles the frequent changes in height that are required in a process such as dipping. When placing objects, we would like to raise and lower them in a straight vertical line because it is much more accurate. When using MOVJ or MOVL, we need to code every single movement, from the position above the desired point, down to the point, then straight back up. JUMP does this all in a single line.

## **5 Question 4: What kind of manufacturing process is dipping? Explain your answer.**

Dipping is a manufacturing process where an object is dipped into different tanks for a set amount of time. These tanks will likely contain a liquid that we want the object to be covered in. An example manufacturing process that uses dipping is anodizing.

## **5 Question 5: What is anodizing? Explain how it works and why we do it.**

Anodizing is the process of coating a metal surface to make it durable and prevent corrosion.

## **6 Going Beyond**

### **6 3. Raise the tanks using a block of wood provided by your instructor and fix the operation using the software. What is the most efficient way to do this?**

The most efficient way to do this is by changing the jump height in the Dobot software. This will let us clear the tanks, no matter how high they are raised. We will also need to change the height the robot goes down to when dipping since the tanks are raised.