VLM Agentic Interface for Dobot Magician

Enter your command:

Pick up the blue block using suction. (Hint: the z is at -50)

Run

Capturing image...

Accessing webcam...

Image captured successfully!

Getting bounding boxes for workspace from image...

Workspace Bounding Box Agent:

```
[188,230,660,776]
```

Generating bounding boxes from image...

Bounding Boxes Agent:

```
- [200,259,308,325]green
- [199,321,307,390]green
- [332,441,529,566]blue
- [200,684,306,758]red
- [510,686,627,769]red
```

Spatial Analysis Agent:

```
Here's a description of the spatial relationships and relevant object properties for

**Objects:**

* **Target Object (Blue Block):**  Approximately 20x20x20 mm cube. It's composed of

* **Other Blocks:** There are three other foam blocks: two light green blocks togeth

* **White Paper:** A rectangular piece of white paper serves as a background or work

* **Robot Arm/End Effector:** A robotic arm with a suction cup end effector is posit
```

* **Surface:** The blocks and paper rest on a light brown wooden surface.

Spatial Relationships:

* The blue block is centrally located on the white paper.
* The green blocks are positioned in the upper left quadrant of the paper.
* The red blocks are placed on the right side of the paper.
* The robot arm is positioned directly above the blue block, suggesting it's in a su

Additional Useful Information for Planning:

* **Z-height:** The z-coordinate is given as -50 (assuming this is in mm, a relativ
* **Suction Cup Size:** Ensure the suction cup's diameter is sufficient to cover th
* **Block Stability:** The blocks appear stable and resting firmly on the paper. Ho
* **Obstacles:** No other major obstacles are immediately visible in the field of vi
* **Approach Angle:** The approach angle of the suction cup should be perpendicular
* **Lighting:** The overhead lighting is sufficient to provide good visibility.

This information should provide a good foundation for developing a pick-and-place pl

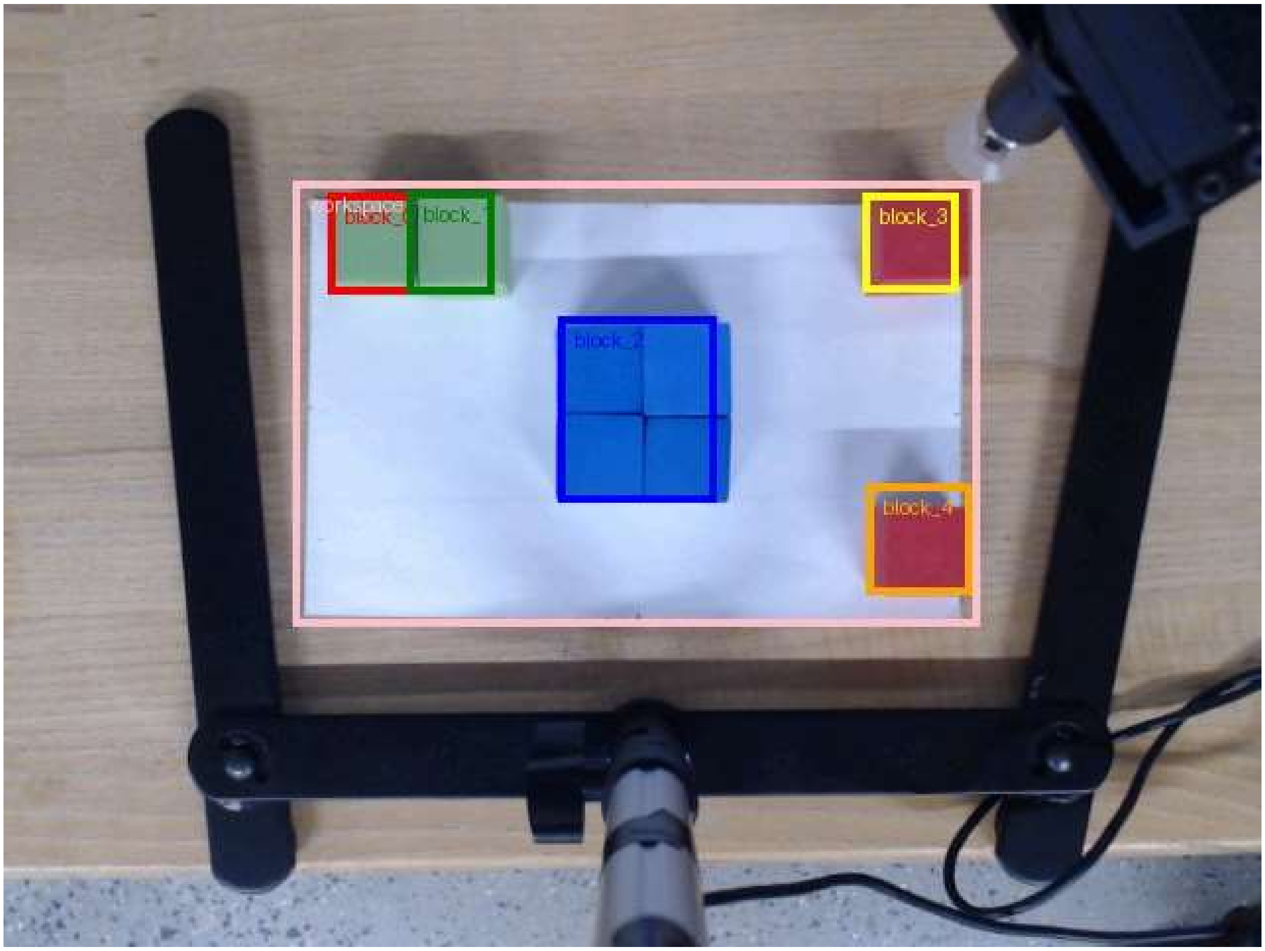

Image with Bounding Boxes

```
[[230. 188.]
 [776. 188.]
 [230. 660.]
 [776. 660.]]
```

```
{'block_0': [(297.45762711864404, 89.37728937728943), (297.45762711864404, 65.201465
```

```
{'block_0': [89.37728937728943, 297.45762711864404, 65.20146520146524, 274.576271186
```

```
{}
```

Logic Steps Agent:

```
Since no specific coordinates are provided for the blue block, I will assume the cen

**Step-by-Step Procedure for Picking up the Blue Block with Dobot Magician using Suc

1. **Move to Pre-Pick Position:**
    * **Command:** `moveTo(250, 0, -30, 0)`  (Move above the blue block, leaving som
    * **Rationale:** This positions the suction cup directly above the block at a sa

2. **Descend to Pick-up Height:**
    * **Command:** `moveTo(250, 0, -50, 0)` (Descend to the surface height of the bl
    * **Rationale:**  This lowers the arm to engage the suction cup with the block.

3. **Activate Suction:**
    * **Command:** `activateSuction()`  (This command assumes the Dobot Magician API
    * **Rationale:** This engages the suction cup to firmly grip the blue block.

4. **Ascend with Block:**
    * **Command:** `moveTo(250, 0, -30, 0)` (Raise the arm slightly to clear the sur
    * **Rationale:** This lifts the blue block clear of the surface, ensuring it's n

5. **Move to Safe Drop-off Position (Optional):**
    * **Command:** `moveTo(280, 50, -30, 0)` (Move to a designated position to hold
    * **Rationale:**  Moving the block to a secondary position offers a safe place b

6. **Deactivate Suction:**
    * **Command:** `deactivateSuction()`
    * **Rationale:**  This releases the suction cup from the block. This should be d

7. **Return to Home Position (Optional):**
    * **Command:** `moveTo(250,0,0,0)` (Return the arm to a home position.)
    * **Rationale:**  A good practice to end the sequence in a known safe position.


**Important Considerations:**

* **Error Handling:**  The code should include error handling to deal with potential
* **Speed Control:**  The `moveTo()` commands should specify speeds to prevent overl
* **Calibration:**  While the problem states "no calibration", precise operation hea
* **API Specifics:**  These commands are illustrative. The actual Dobot Magician API
* **Bounding Box Data:**  Using the bounding box data of the blue block would give m


This detailed plan provides a solid framework.  Remember to replace placeholder comm
```

Coding Agent:

~~~~
```python
import DobotDllType as dType

# Connect to Dobot
api = dType.load()
state = dType.ConnectDobot(api, "", 115200)[0]
print("Dobot Connected...")

# Set parameters (velocities, accelerations, etc.) - Do once.  Adjust as needed.
dType.SetHOMEParams(api, 200, 200, 200, 200)
dType.SetPTPJointParams(api, 200, 200, 200, 200, 200, 200, 200, 200)
dType.SetPTPCommonParams(api, 100, 100)
dType.SetPTPCoordinateParams(api, 200, 200, 200, 200, 0) # Adjust as needed for sp

ptpMode = 2 # Linear Mode

# 1. Move to Pre-Pick Position
x = 250; y = 0; z = -30; rHead = 0
dType.SetPTPCmd(api, ptpMode, x, y, z, rHead, 0)
dType.dSleep(2000) # Wait for movement to complete

# 2. Descend to Pick-up Height
z = -50
dType.SetPTPCmd(api, ptpMode, x, y, z, rHead, 0)
dType.dSleep(2000)

# 3. Activate Suction
suction_cup = 1
~~~~

~~~
enable_pump = 1
ctrl_mode = 1
dType.SetEndEffectorSuctionCup(api, suction_cup, enable_pump, ctrl_mode)
dType.dSleep(2000) # Allow time for suction to engage

# 4. Ascend with Block
z = -30
dType.SetPTPCmd(api, ptpMode, x, y, z, rHead, 0)
dType.dSleep(2000)

# 5. Move to Safe Drop-off Position (Optional)
x = 280; y = 50; z = -30
dType.SetPTPCmd(api, ptpMode, x, y, z, rHead, 0)
dType.dSleep(2000)

# 6. Deactivate Suction
enable_pump = 0
dType.SetEndEffectorSuctionCup(api, suction_cup, enable_pump, ctrl_mode)
dType.dSleep(2000)


# 7. Return to Home Position (Optional)
x = 250; y = 0; z = 0; rHead = 0
dType.SetPTPCmd(api, ptpMode, x, y, z, rHead, 0)
dType.dSleep(2000)

# Disconnect from Dobot
dType.DisconnectDobot(api)
print("Dobot Disconnected...")
```
~~~

Python code successfully written to demo-magician-python-64-master\DobotControl.py