<u>Assignment 1:</u> Learning to Control the Robotic Arm with Code

Requirements (before you begin):

- Raspberry Pi with Python installed (This was done with Saura)
- xArm connected via USB (connect the Robot Arm to the Raspberry Pi board (it's a USB A to USB Micro)
- Installed `xarm` Python package (on your raspberry pi - If not, get in your virtual environment and use code below)

Code:

```
pip install xarm
```

Step 0: Create a file

Enter the the virtual environment and Cd all the way into your robotic arm folder

Create a file and name it: **assignment1.py**

Step 1: Checking the assigned number label for each servo

Each servo should have a number label. However, the label is not written on the servo. Therefore, the first step would be running the code using different servo labels and making a note on the assigned number label for each servo.

Hint : There are a total of 5 servos, and they are labeled 1 through 5. Also note, we used position 700 assuming it's not in that position currently so make sure at least one servo is moving per label

Starter Code (Template):

```
import xarm
import time

# Connect to the xArm
arm = xarm.Controller('USB')

# Initial position (.setPostion([[servo label number, angle degree]]))
# try changing the servo label number (first digit) and run the code
```

```
xarm.setPosition([[1, 700]], wait=True)

print("Arm moved")
```

Reminder: To run the code, in your terminal type the following code

```
python assignment1.py
```

Question 1: Write 2-4 words for each servo label for your own future reference:

(ex: servo #1: most bottom servo)

Servo #1:

Servo #2:

Servo #3:

Servo #4:

Servo #5:

Step 2: Moving More Than One Servo at a Time

Replace the line of code (`xarm.setPosition([[1, 700]], wait=True)`) with the following:

Code :

```
arm.setPosition([[1, 200], [2, -60], [3, 30], [4, -30], [5, 10]],
wait=True)

print("Arm moved")
```

You can play around with this and see how the direction of the servo changes (ex: angle being positive and negative and how it would change the direction the servo moves)

Question 2: Fill in the blanks below with the position (angle degree) for each servo, to make the robotic arm standing straight up and the clamps are fully open.

Servo #:	Angel #:
Servo 1	

Servo 2	
Servo 3	
Servo 4	
Servo 5	

Step 3: Creating Multiple Movement by Running the Code Once

Change the numbers and add more steps if you like.

Code (template):

```
# Move to first position
arm.setPosition([[1, 200], [2, -60], [3, 30], [4, -30], [5, 10]],
wait=True)
time.sleep(1)

# Move to second position
arm.setPosition([[1, 800], [2, -30], [3, 50], [4, -60], [5, 20]],
wait=True)
time.sleep(1)

# Return to home
arm.setPosition([[1, 500], [2, 0], [3, 0], [4, 0], [5, 0]], wait=True)
```

Step 4: Film a Short Video

Film a short video of the robot moving with multiple different steps. Download this document as a PDF or take pictures of the filled-out worksheet if you printed it out and upload it along with your video to Google Classroom. And last but not least, congratulations on finishing the first assignment.