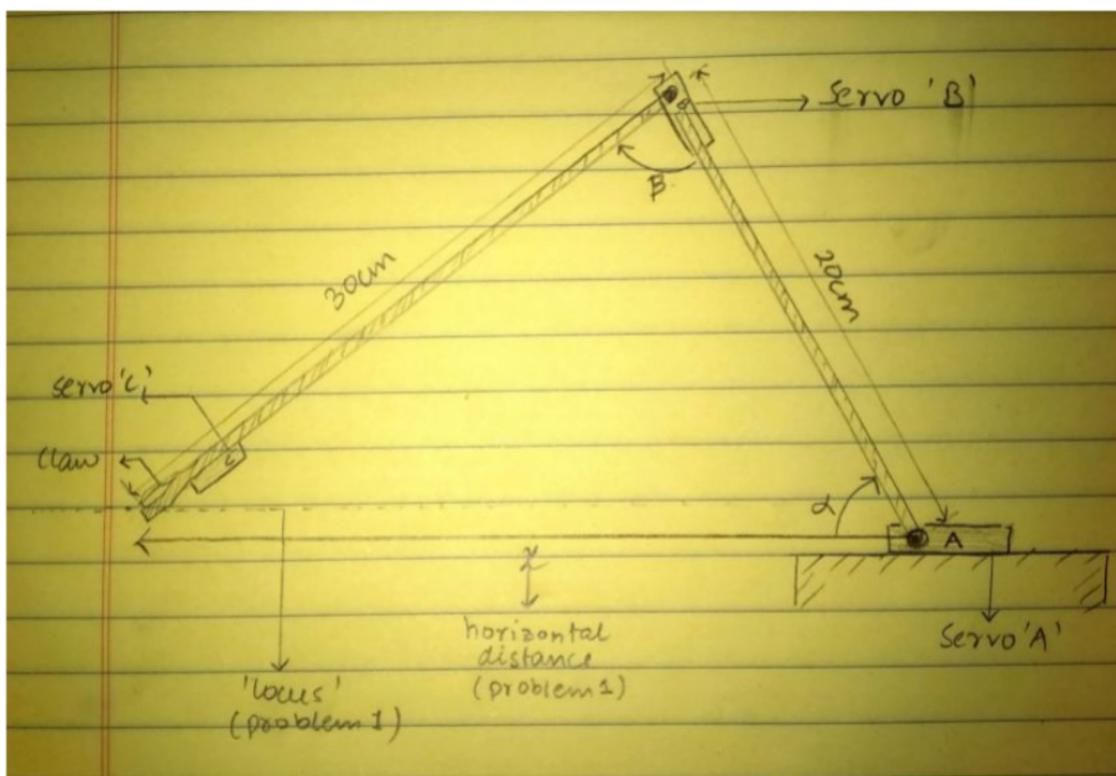


ASSIGNMENT 02.

Electronics and Arduino

Mini Project

In this assignment, you shall be designing the circuit and code for an extremely simple robotic arm. Suppose that you have been given an arm with 2 'joints'. Each joint is actuated by a servo motor, and can rotate up to 180 degrees. The placement of these servos and dimensions of the arm are illustrated below.



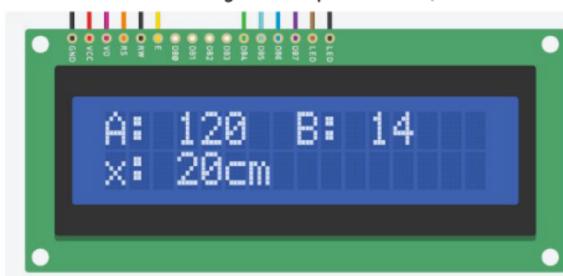
Servo A and B control the joints, while Servo C actuates the arm's 'claw' or 'grabber'.

Your circuit should include 2 normal servos as A and B, one micro servo as servo C, an Arduino, and an LCD screen (like [this](#)). Program the Arduino to accomplish the following tasks. Of course, TinkerCAD cannot simulate the entire physical arm assembly, only the servo motors. Therefore your code should actuate the servos to the correct angles corresponding to the required arm configuration.

1. Let the user control the horizontal distance (x) of the arm's claw, by turning a single potentiometer. The angles should always be such that the locus of the arm's tip is a straight line parallel to the ground. The LCD should also display this distance x .
2. Make the arm pick an object on the ground at a horizontal distance (x) of 20cm, and drop it at a distance of 40cm. Assume the claw grabs an object by turning the servo C 180 degrees, and then relaxes to drop the object by turning to 0 degrees. While moving the object, make sure the claw has sufficient clearance from the ground.

Note:

- The LCD should always display the angles of the servo motors, along with any other information demanded by the question, like so:



- Assume that the claw grabs objects when servo C is at 180° , and drops objects when it is at 0° .
- The angles labeled α and β can range from 0 to 180° .
- The horizontal distance (x) mentioned in problem 1 is, as shown in the above diagram, the distance from the base of the arm, parallel to the ground.
- Make sure to document your assumptions in the document you submit and the code comments too.

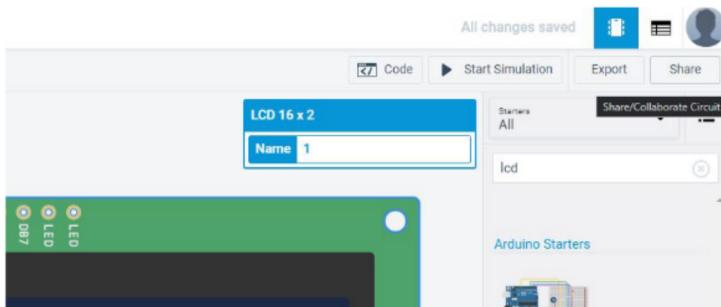
Instructions for submitting the assignment

Submission Guidelines

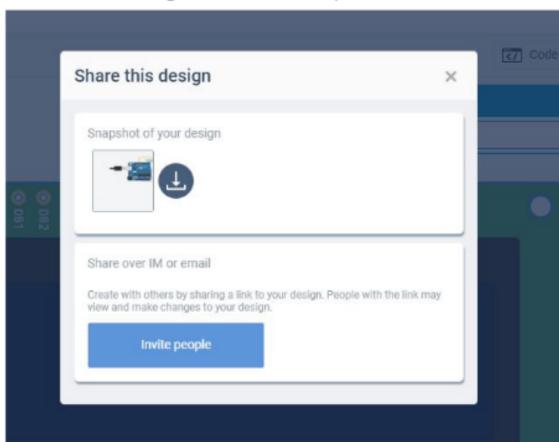
1. A **Google Doc/PDF** containing the link to the TinkerCAD circuit should be submitted as the mode of assignment on Google Classroom. You may describe the working of your circuit in a paragraph also.
2. The **deadline** for submitting the assignment is **24.05.2020 (23:59 hours)**. Late submissions would not be entertained.
3. The circuit you've tinkered with should be given **public access** for the instructors to check and provide feedback.
4. Solution to the project would be posted on 25.05.2020
5. You may post your doubts on Slack. But please do not share your circuits on it, or ask for the solutions.

How to share a TinkerCAD project

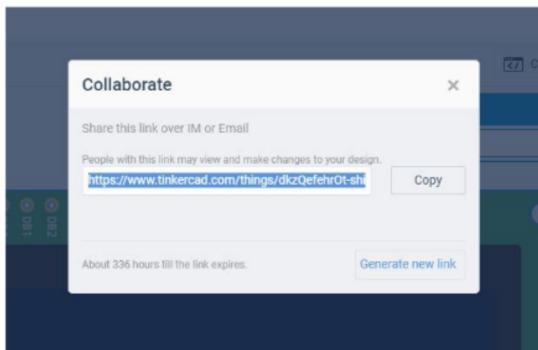
1. While editing your design, click on the *Share* button on the top right.



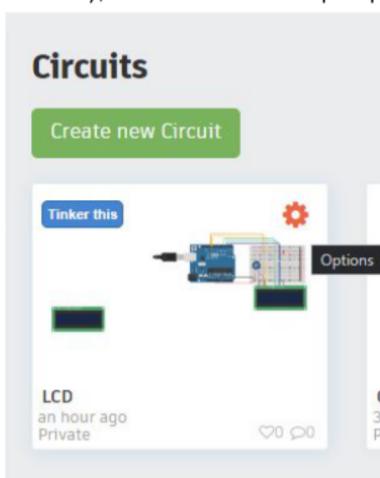
2. In the dialog box that opens, click "Invite people".



3. Copy the link shown.



4. Additionally, make the design public. Do this by going to your [dashboard](#).
5. Hover over the circuit you want to share, and click the options icon (as shown below), and then click properties.



6. In the properties dialog box, under "Privacy", choose 'public' in the list as shown below.

