

## Lab 3.1.1 Solutions

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### 1 Waldo Input

3. 1. 1. I plan to make a Waldo system that looks like a dog with 3 DoF. There will be servo motors attached to three of the dog's body parts - tail, face/neck, and ears. [1](#) shows the CAD of the dog that I plan to make. I also plan to paint/colour the dog to give it the actual appearance.

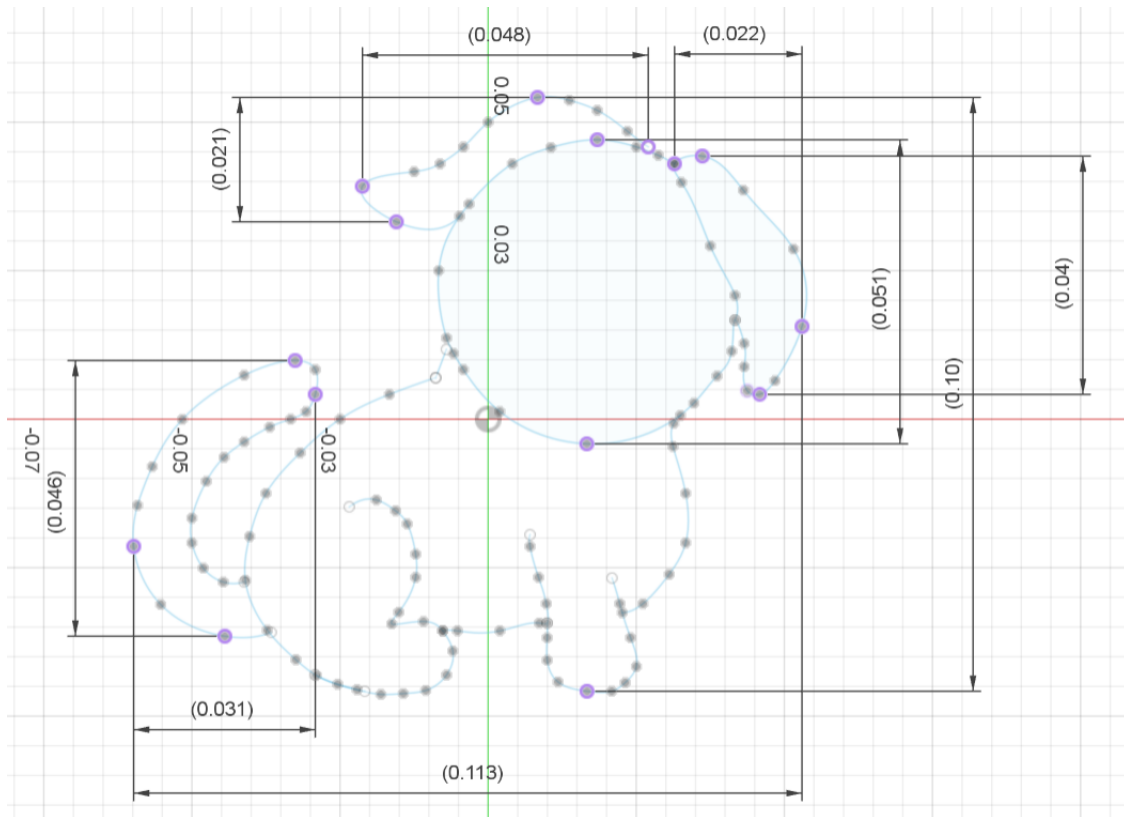


Figure 1: Dimensioned drawing of Waldo dog; units in metre (m)

The body of the dog (with the paws) would be fixed and either mounted on a box or kept flat on the table. The connection of the tail with the body would have a servo motor with its axis either coming out of the plane or going upwards to enable the dog to "wag" its tail. The face-body joint would have another servo with its axis

coming out of the plane so that the dog can "nod" from side to side. Lastly, both the ears would be connected to a string or a connector which would be connected to a servo motor. As the servo rotates left or right, the string/connector would move up or down thus making both the ears move up and down.

In the drawing, the dimensions of the diagram are approximately 11.3 cm x 10 cm. This would be the dimensions of the Waldo input, and the output would be scaled approximately 1.5 times. I plan to make the input and output the same way or with the same orientation. For the input, instead of the actual ears I might just keep a knob or a slider.

SG90 servos can rotate approximately  $90^\circ$  in each direction. I will be giving inputs well within that limit. I plan to make the tail lift up about  $70^\circ$ , make the face rotate about  $30^\circ$ , and ears about  $30^\circ$  too.

The electronic connections I am not explaining in this report, but roughly the input will be sensed by the sensors, sent to the encoders, which will be processed by the ItsyBitsy, then sent to the servo motors to move the respective joints on the output.

## 2 References

1. Latex template from the course CIS 5190 taught this fall.
2. MEAM 5100 Fall 2024 Lecture Slides.
3. Previous year lab videos posted on Canvas.
4. Took dog photo outline from url: <https://tinyurl.com/meam510dog>