Assignment: Parameter Identification Plan

The goal of this assignment is to decide as a group how we will divide up the various parameter ID tasks. Following is the division of tasks amongst the group members.
(Note: Some tasks may get overlapped as they will be completed as a team or in groups)

Task / Teammate	**Manan**	**Eric**	**Meet**	**Disha**
Materials			X	X
Mass and Inertia Properties				X
Link, joint stiffness		X		
Prototyping	X	X	X	X
Model Fitting using Python (Drawing comparison)	X			
Updating the code	X	X		
Updating the website			X	
Report Compilation	X	X	X	X

Description:

Materials:

Identification of the materials and servos to be used in construction of the robot. Identification of the relevant material parameters, especially material thickness and weight per unit area. Material weight per unit area will be used to find the rotational inertia of the links. The important parameters of the motor will also need to be determined, especially its holding torque. Disha and Meet are exploring for some thin, stiff and lightweight sheet materials for the laminate to make the origami structure. Currently we are studying the characteristics of a material named copper foil paper.

Mass and Inertia Properties:

After identifying the materials and the combination of laminates, we would have to study the mass and inertia properties of the laminated material (self weight of the material) to understand how the motion of the actual prototype will be affected due to the mass and inertia of the laminate. We will be doing load tests to identify these parameters.

Prototyping:

The initial prototyping tasks involve the testing of construction techniques in order to build prototype legs. These leg prototypes will be used to identify the other important leg parameters such as link and joint stiffness. Prototyping activity is divided into a few parts. The CAD designing for the laser cutting will be prepared by Eric, the laser cutting task will be done by Manan and Meet and Disha will be looking after the assembling part.

Link, joint stiffness:

The stiffness of the legs and the joints needs to be calculated. We plan to do this by applying lateral load to the link and then calculating the corresponding displacement.

Model Fitting using Python (Drawing comparison):

This involves finding the optimal parameters and then mapping it to see how well our model fits that data.

Updating the code:

Implementation of vertical ground reaction forces is needed. Implementation of directionally controlled friction forces or friction approximations is needed. Implementation of motors to control the limbs of the model is needed and the motor parameters need to be matched to the motors to be used. The motor actuation pattern also needs to be determined and implemented.

Updating the website:

The Github website needs to be updated regularly once any modifications are made. It will help us in easily finding the past experiment data to compare with new.

Data extraction approach:

Physical experiments with loads and external parameters would be used to extract data. Video recording may be implemented for better results.