KLE TECH.

KLE Technological University

Creating Value
Leveraging Knowledge

CARROM ROBOT

Engineering Exploration Course Project

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Under the guidance of

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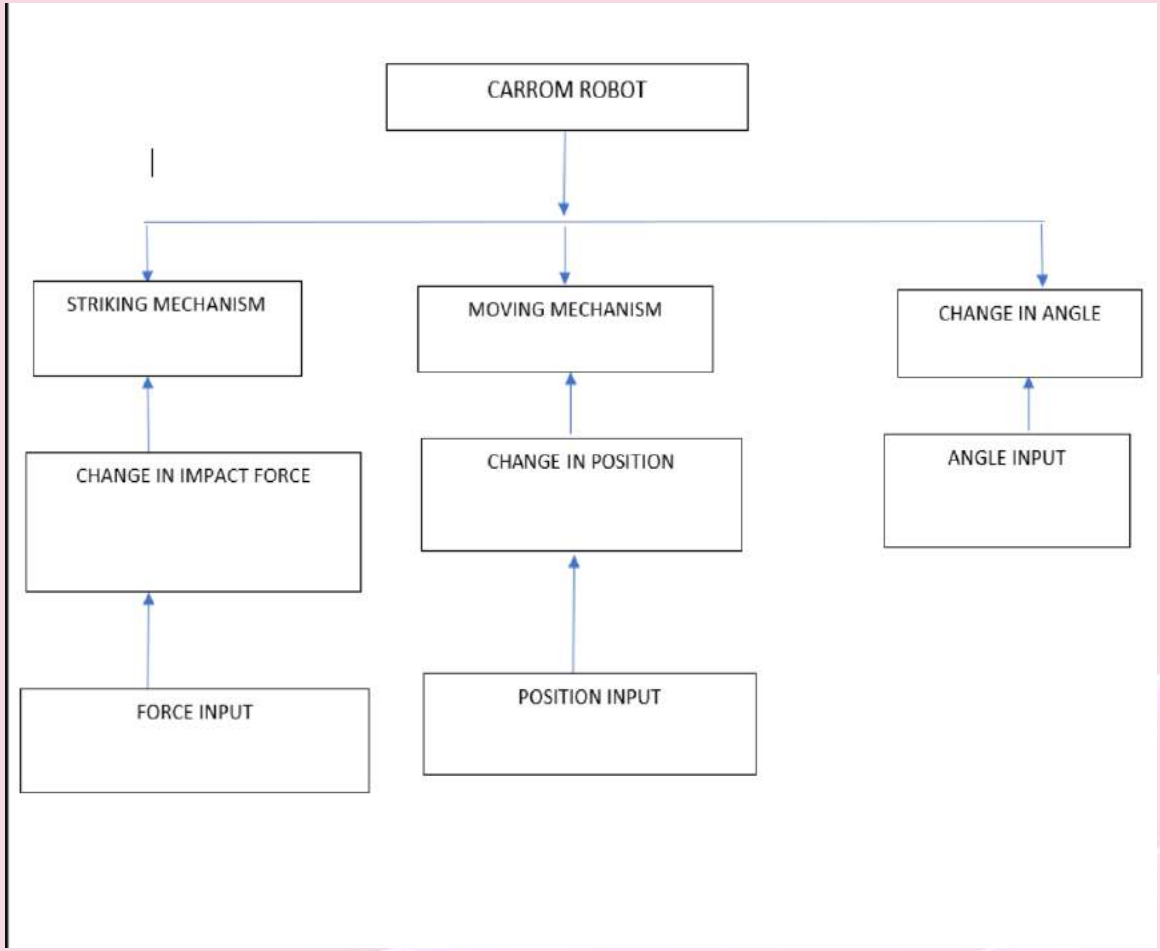
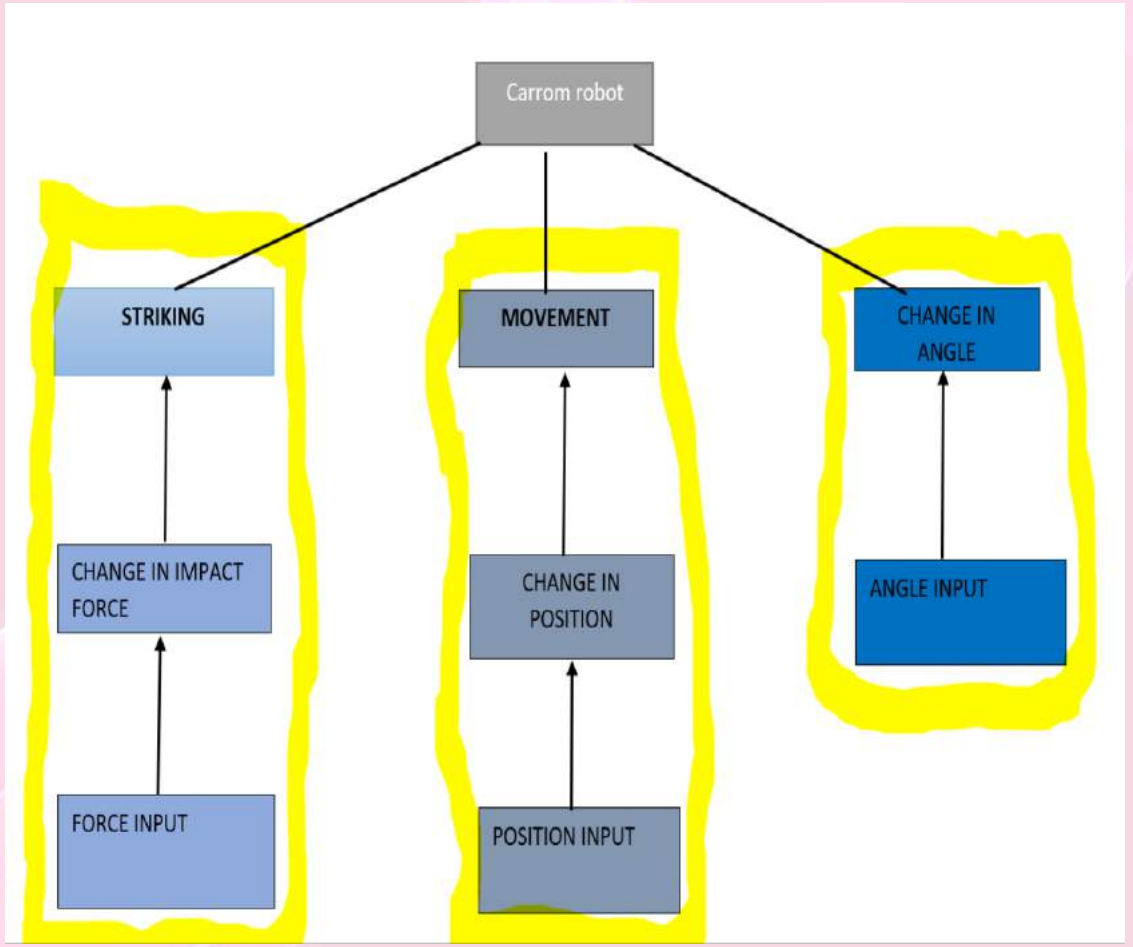
Problem Definition

Design a semi-automatic carrom robot , which is able to compete in a match of carrom with the other device . The robot is attached to one side of the board and is able to hit the striker at different angles. Robot should be of size of 25 *25 * 25 cm , size of the carrom board should be of 75 *75 cm. Budget to build the robot should be within Rs .4000,the duration to make the robot ready is within 3 months . Robot should hold the carromboard , the striker and also move on carromboard . Robot should rotate as per user instructions and also hit the striker with impact force.

Function Tree and Functional clustering





Sub Systems Identified

SUBSYSTEM 1 : Control and interface of robot.

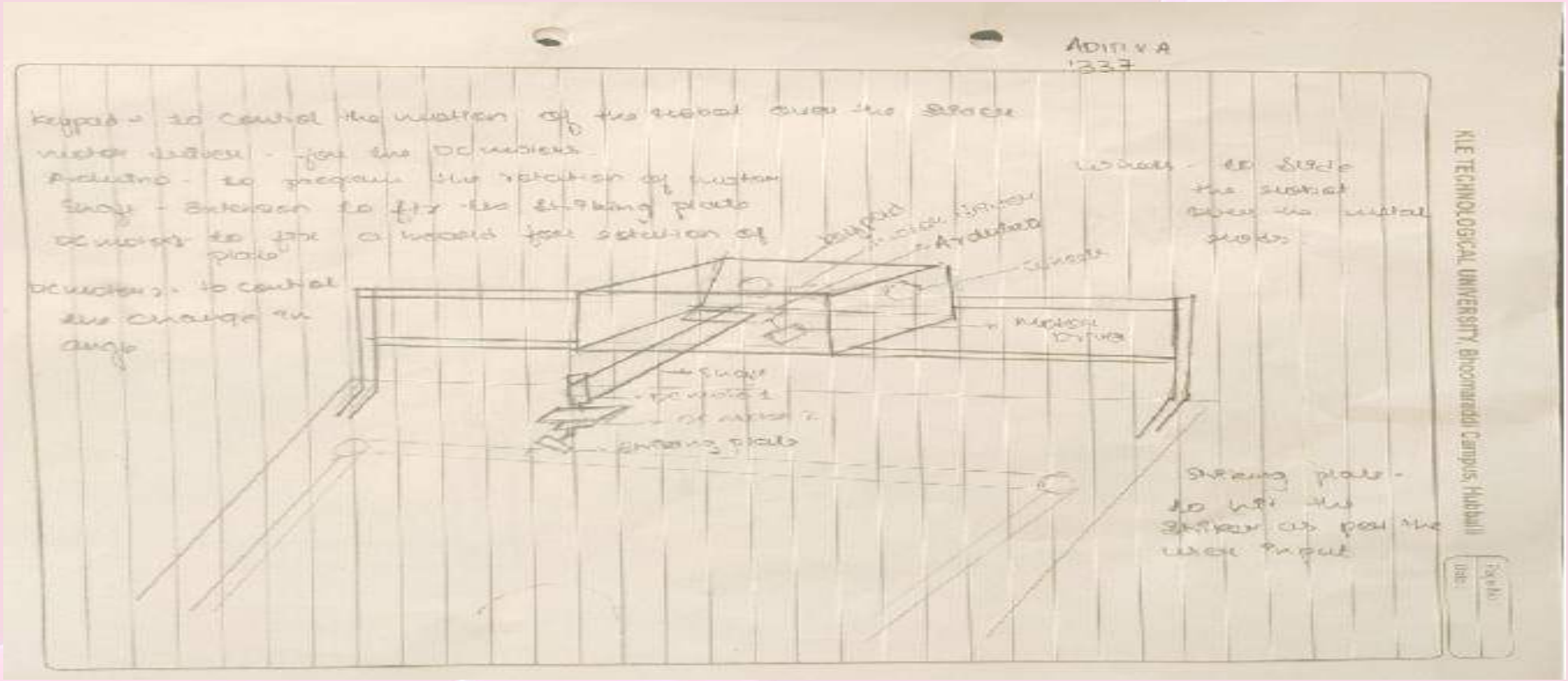
SUBSYSTEM 2 : Movement of robot.

SUBSYSTEM 3 : Angle change of robotic arm.

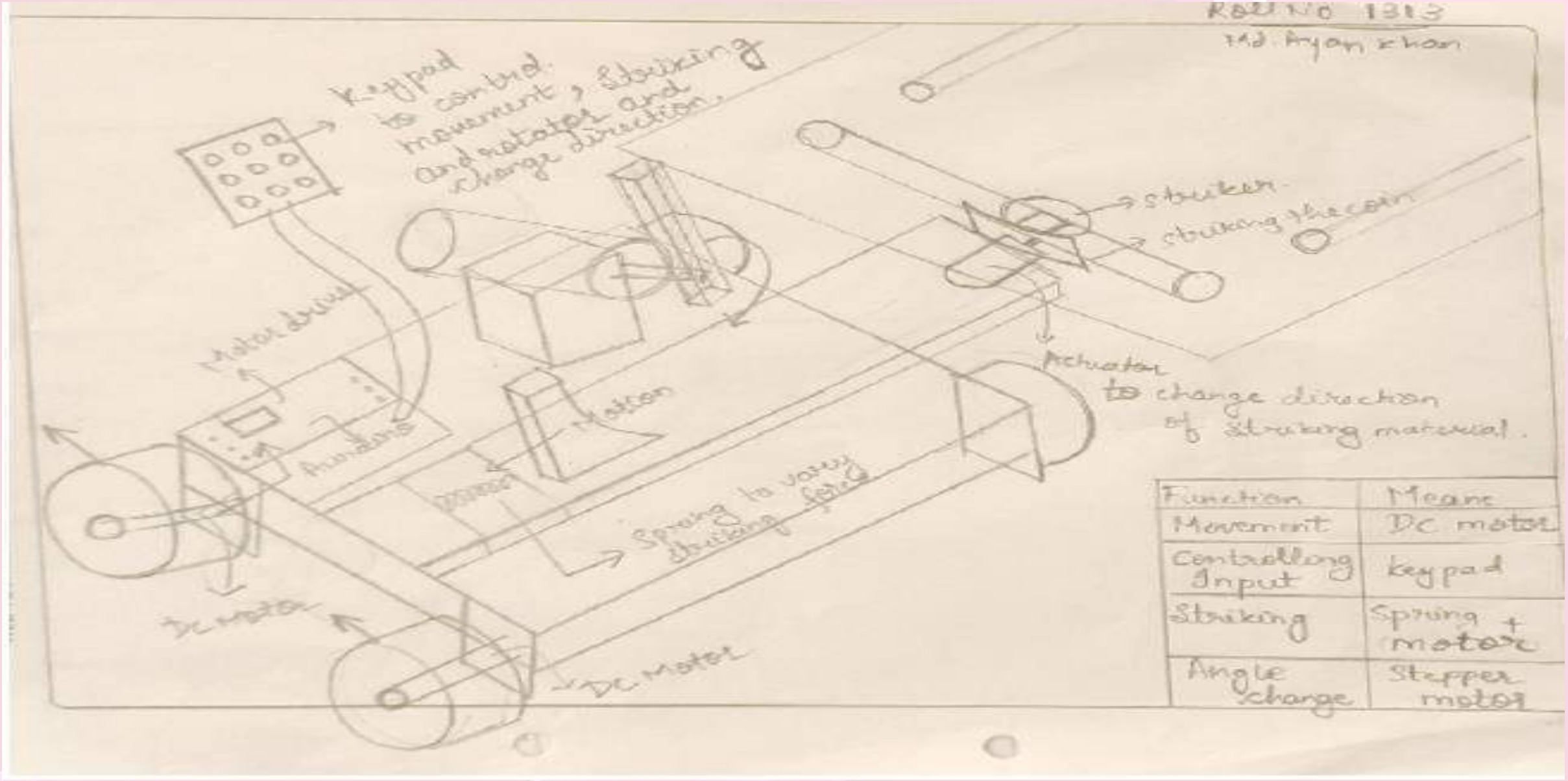
SUBSYSTEM 4 : Striking mechanism.

Generated Concepts

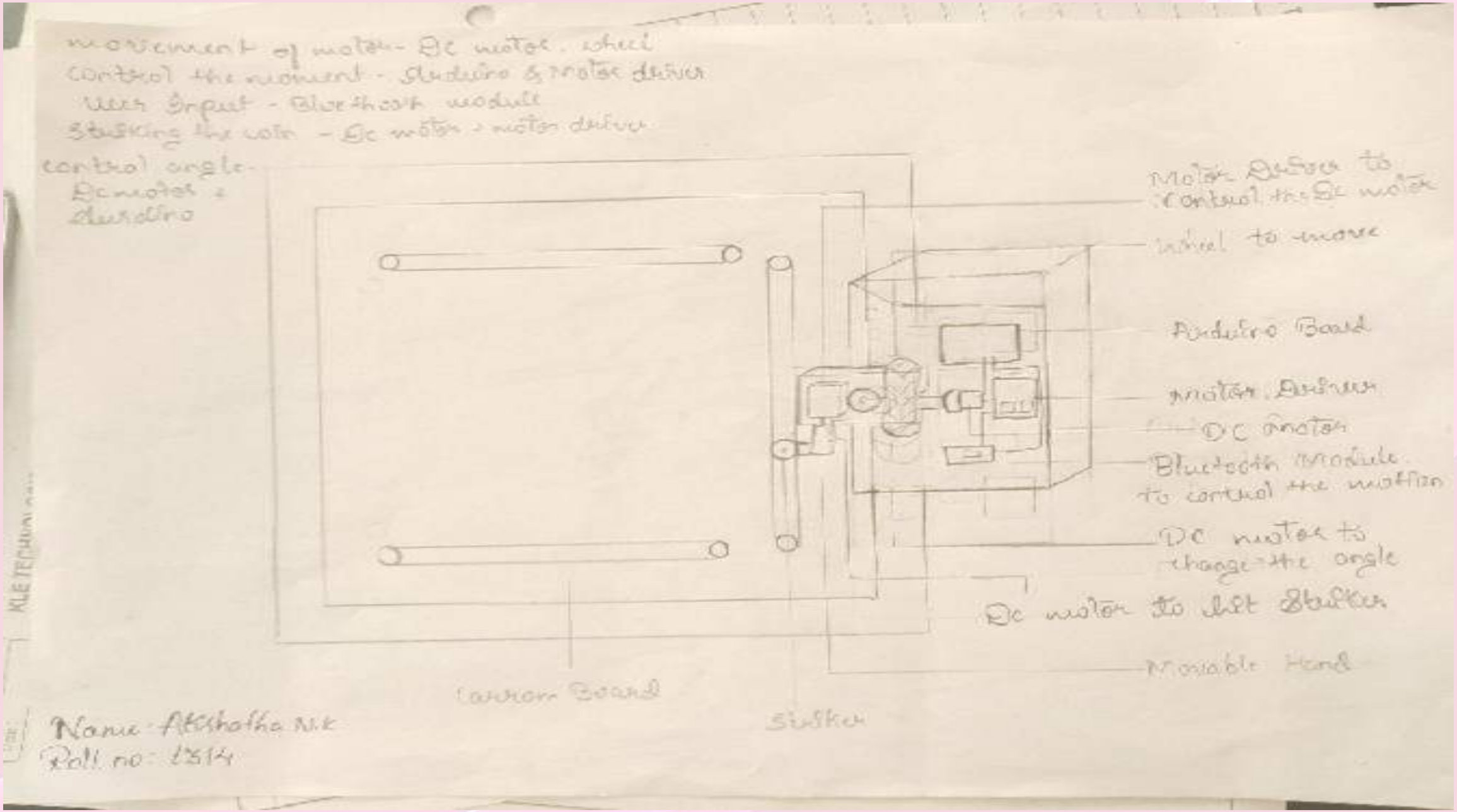
CONCEPT 1 :



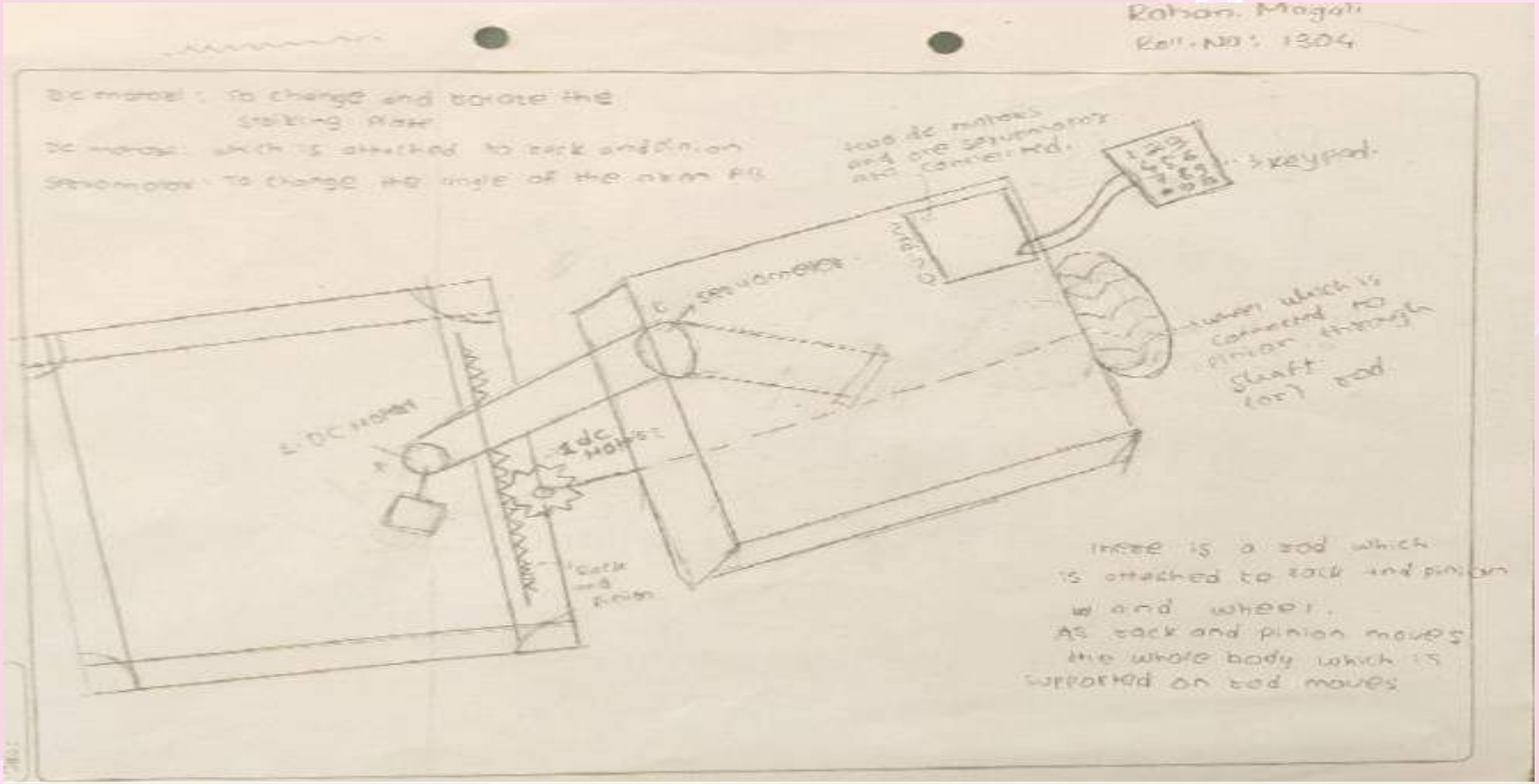
CONCEPT 2 :


ROLL NO 1313
Md. Aryan khan
Keypad to control movement, striking and rotation and change direction.
striker striking the coin
Actuator to change direction of striking material.
Motor driver
Arduino
motion
Spring to vary striking force
DC motor
DC motor
Function | Means
Movement | DC motor
Controlling Input | keypad
Striking | Spring + motor
Angle change | Stepper motor

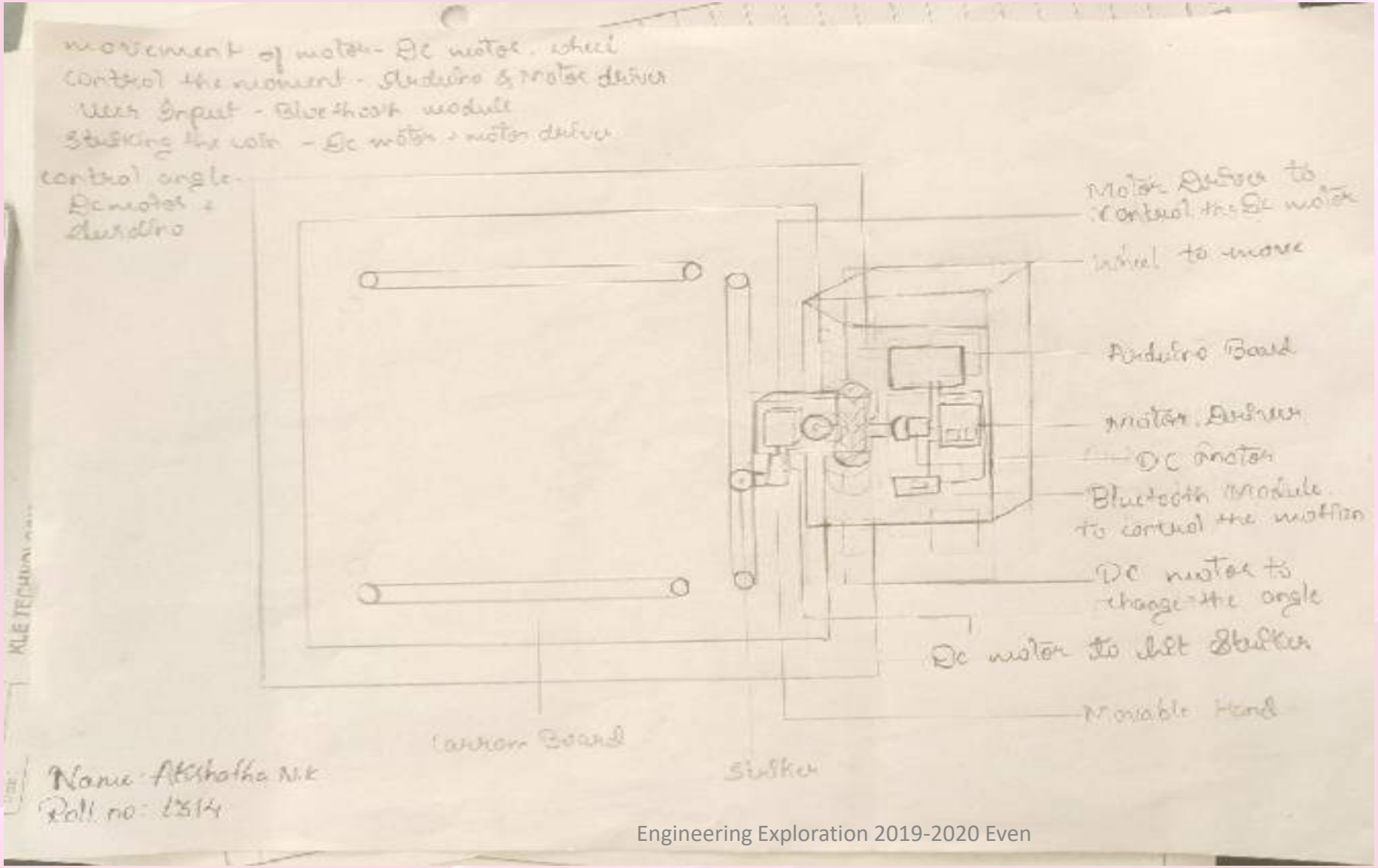
CONCEPT 3 :


movement of motor - DC motor, wheel
control the movement - Arduino & motor driver
User input - Bluetooth module
Sticking the coin - DC motor + motor driver
control angle - DC motor + Arduino
Motor Driver to control the DC motor
wheel to move
Arduino Board
motor Driver
DC motor
Bluetooth module to control the motion
DC motor to change the angle
DC motor to lift Sticker
Movable Hand
Carrier Board
Sticker
Name - Akshatha N.K
Roll no: 1514

CONCEPT 4 :


Rahan. Magati
Roll. NO: 1304
DC motor: To change and torque the steering gear
DC motor: which is attached to rack and pinion
Servomotor: To change the angle of the arm fit
two dc motors and one servomotor are connected.
keypad
servomotor
2 DC motors
1 dc motor
rack and pinion
wheel which is connected to pinion through shaft (or) rod
Here is a rod which is attached to rack and pinion and wheel.
As rack and pinion moves the whole body which is supported on rod moves

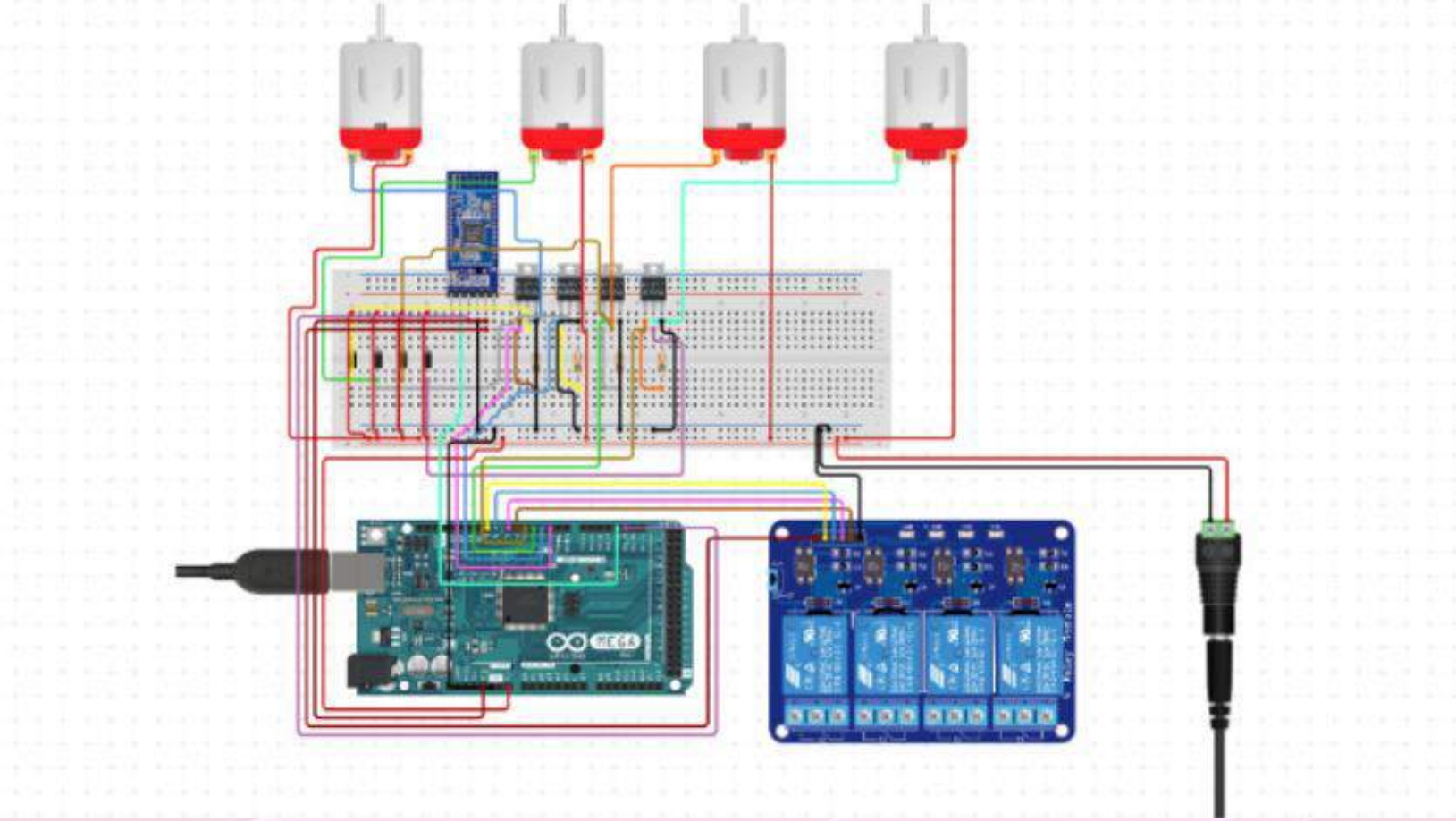
Selected Concept



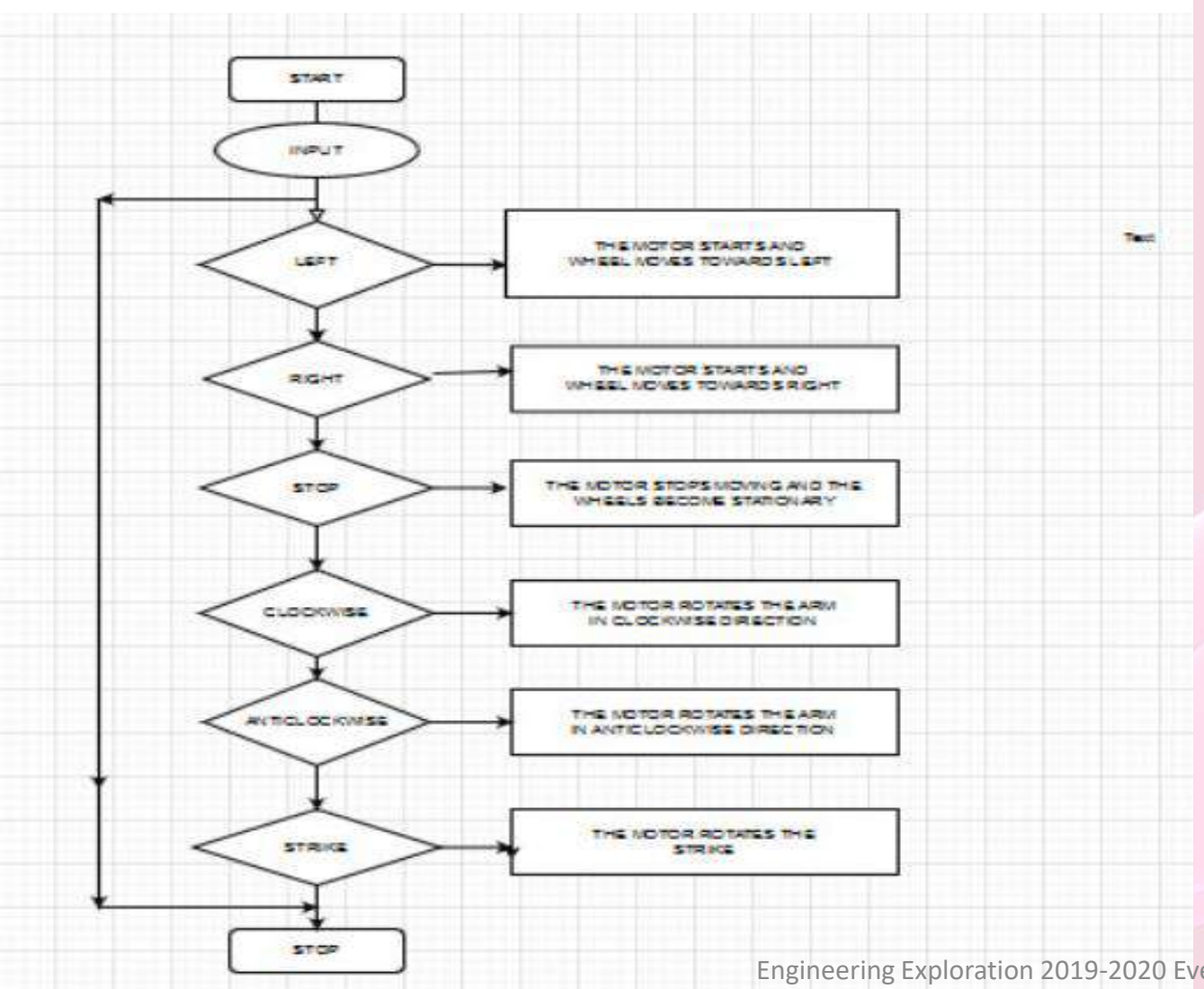
Virtual Implementation

3D model of the entire system

Circuit diagram of the entire system



Flow chart / Simulink model of the entire system



Bill of materials required for the entire system

SL.NO.	PART NAME	MATERIAL WITH WHICH PART IS MADE	DESCRIPTION	QUANTITY REQUIRED
1.	DC MOTOR	CARBON STRUCTURE	60rpm	2
2.	DC MOTOR	CARBON STRUCTURE	30rpm	1
3.	DC MOTOR	CARBON STRUCTURE	200rpm	1
4.	RELAY MODULE	-------	4 CHANNELED	1
5.	ARDUINO MEGA-2560		AT2560	1
6.	BLUETOOH MODULE	----------	-----	1
7.	CHASIS	METAL	----	5
8.	WHEELS	PLASTIC WITH RUBBER COATING		2
9.	BATTERY	DRY CELL		1
10.	N CHANNEL MOSFET	-----	60V,30A	4
11.	DC ADAPTOR	---		1
12.	JUMPER WIRES	Copper wires	MALE TO MALE	
13.	JUMPER WIRES	Copper wires	MALE TO FEMALE	
14.	CONNECTING CABLES	Copper wires	SINGLE STRANDED WIRE	
15.	DOUBLE SIDED TAPE	ADHESIVE		1
16.	NUTS AND BOLTS	----		
17.	RESISTOR	------	10KOhm	4
18.	BREADBOARD	-----		1
19.	FEMALE DC POWER ADAPTER	-----		1
20.	USB CABLE	-----		1

Motor Sizing and Battery Sizing of the entire system

MOTOR SIZING FOR THE SYSTEM

SI.NO	MOTOR USED	QUANTITY	RPM USED	PURPOSE OF USE
1	DC motor	2	30	for movement of robot
2	DC motor	1	10	for angle change of robotic arm
3	DC motor	1	200	to strike the coin

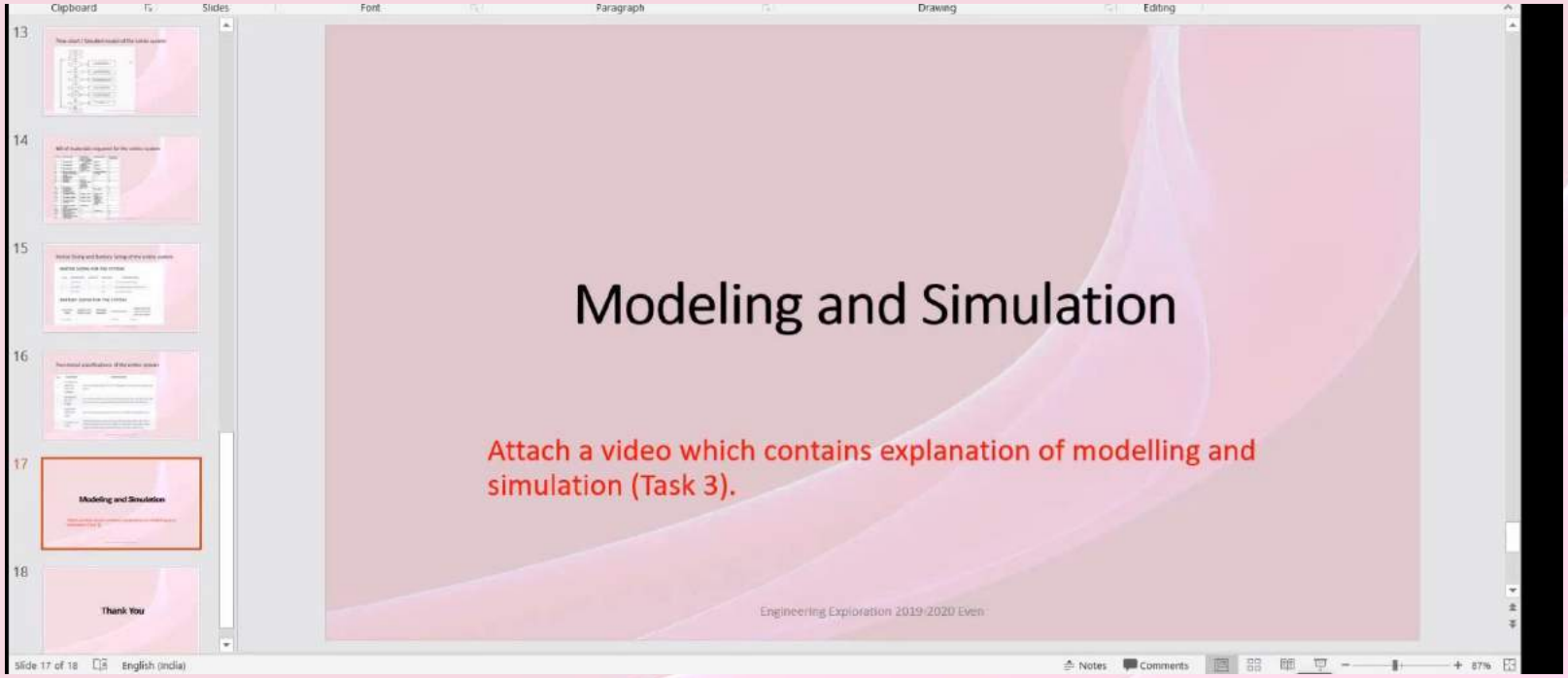
BATTERY SIZING FOR THE SYSTEM

ACTUATOR USED	QUANTITY OF MOTOR USED	BATTERIES REQUIRED	SPECIFICATIONS	DURATION UPTO WHICH BATTERY SUPPLIES ENERGY
DC motor	4	1	12V,5Ah	4.166 h

Functional specifications of the entire system

S.no	FUNCTION	SPECIFICATION
1	CHANGE THE ANGLE OF ARM FOR STRIKING	The arm should rotate from 0 to 180 degree until the user pushes stop button
2	MOVEMENT OF THE ROBOT	The robot should move along the length of the carrom board from left to write and vice versa according to instructions given by the user
3	TAKE INPUT FROM THE USER	The robot should take input from the user within the range of 10 m
4	STRIKING THE COIN	The striking clamp which is fixed on the DC motor.When the motor receives the input to strike it rotates in anticlockwise thus the clamp rotates in anticlockwise and strikes the coin with impact force

Modeling and Simulation



Thank You