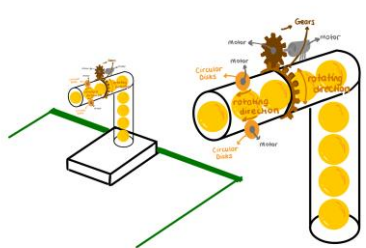
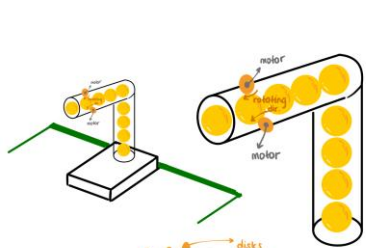
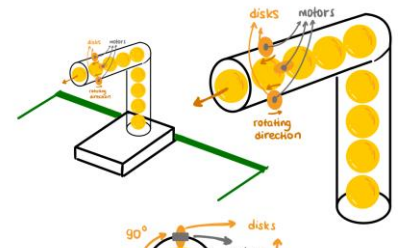
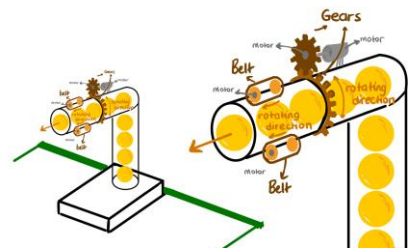
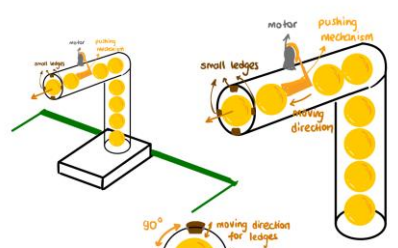
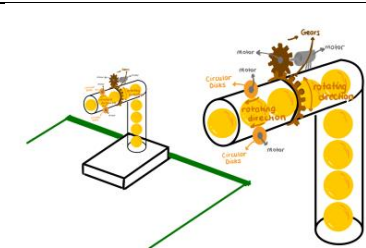
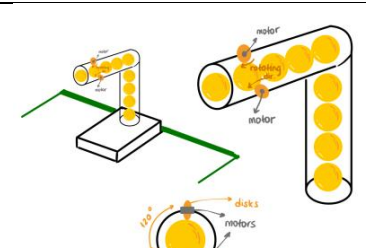
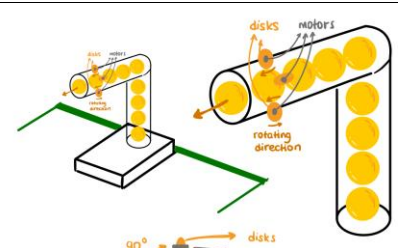
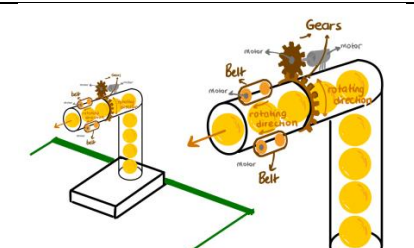
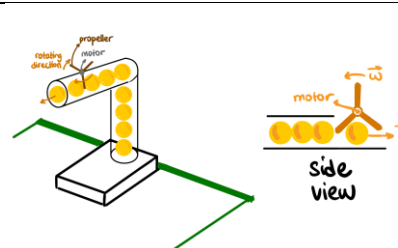
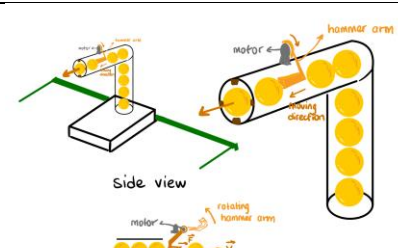
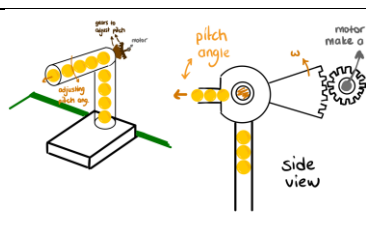
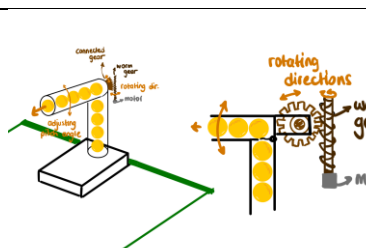
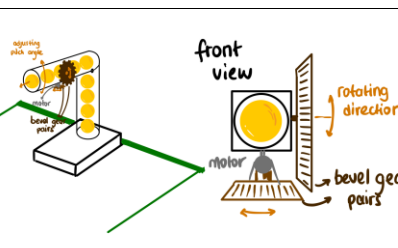
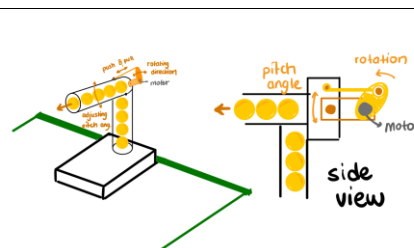
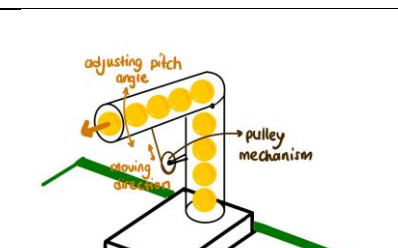
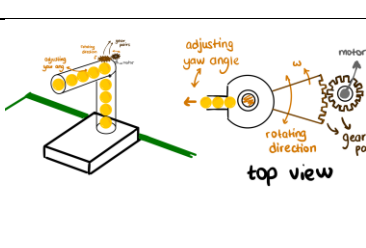
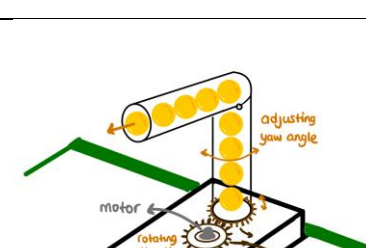
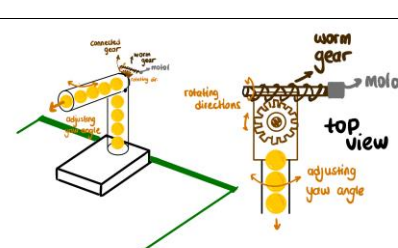
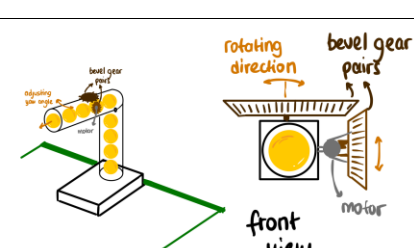
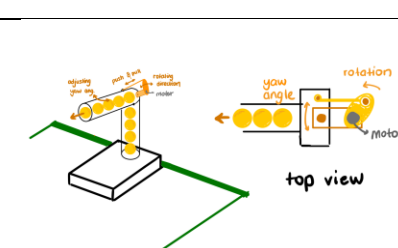
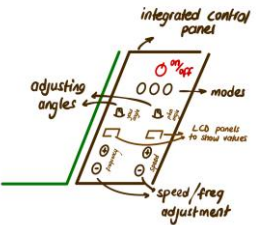
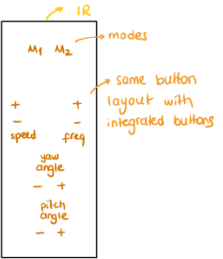
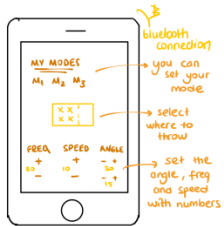
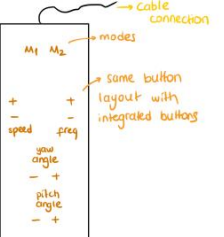
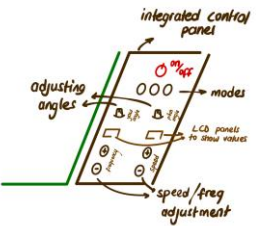
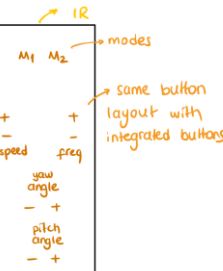
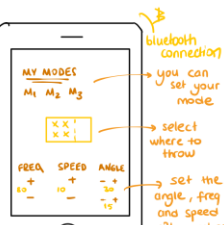
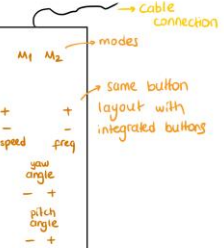
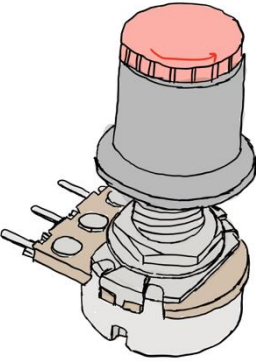
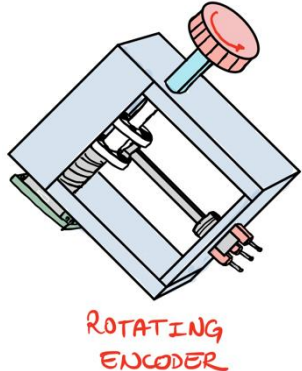
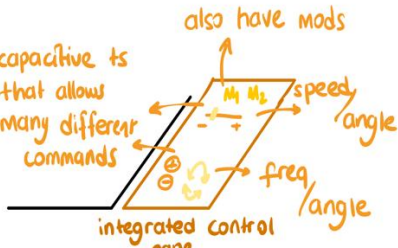
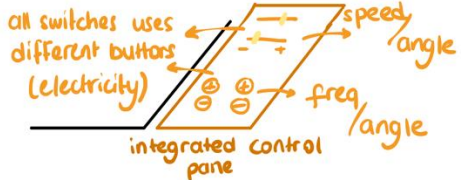
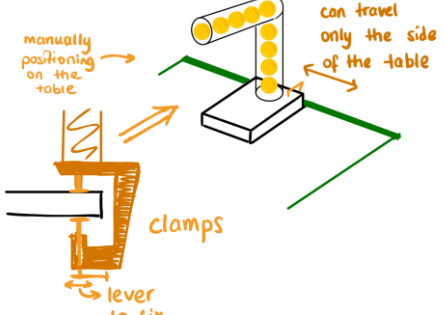
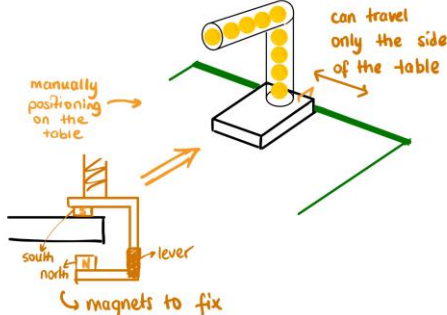
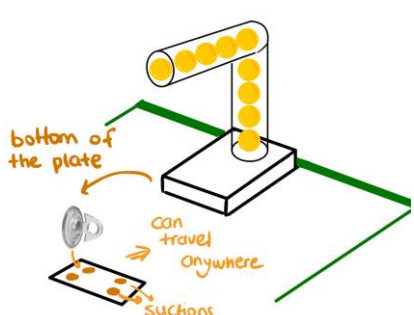
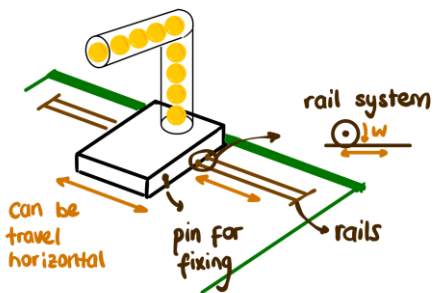
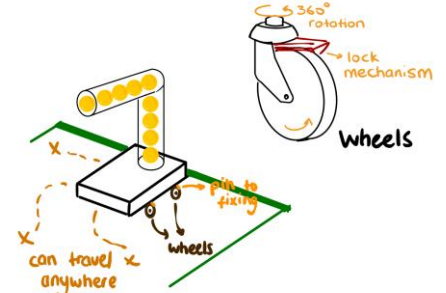
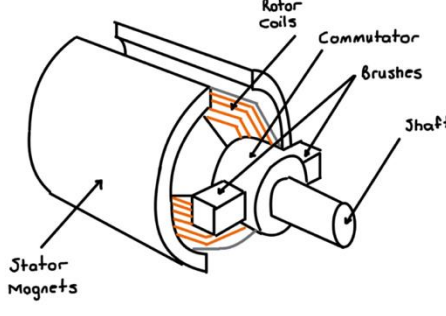
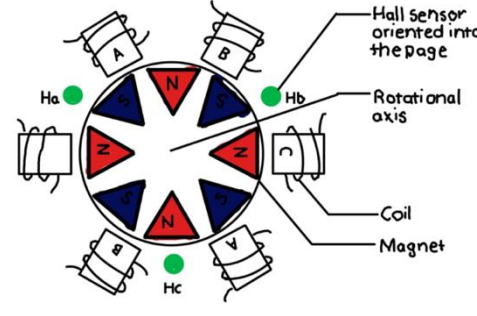
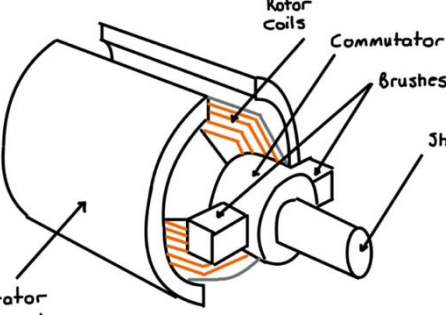
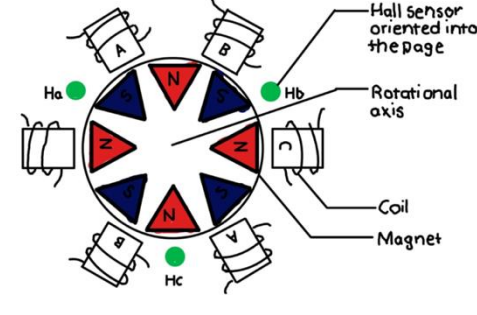
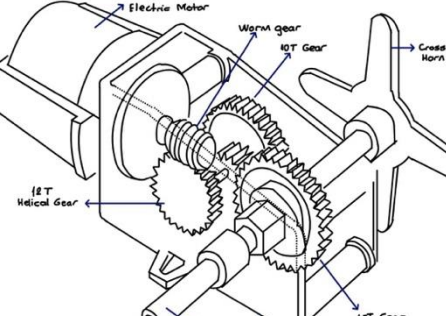
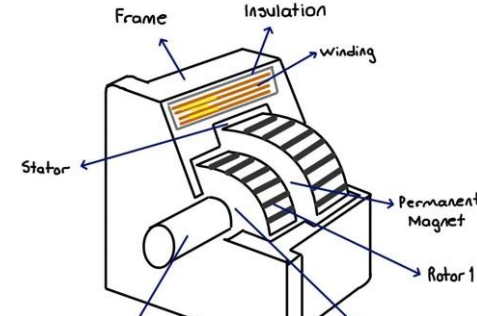
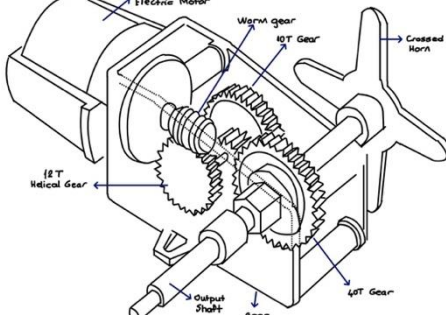
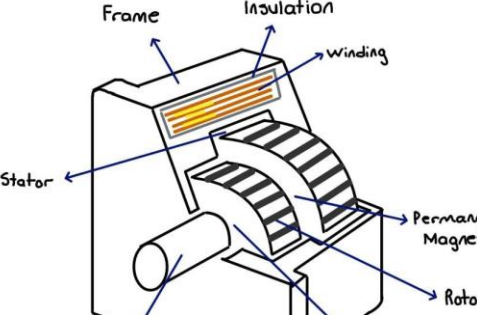


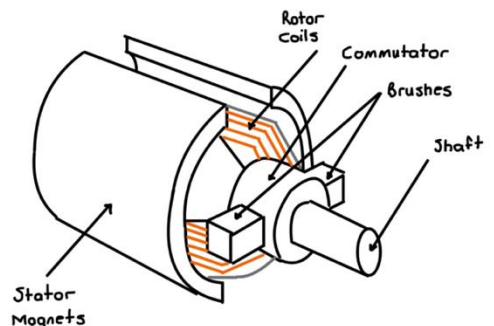
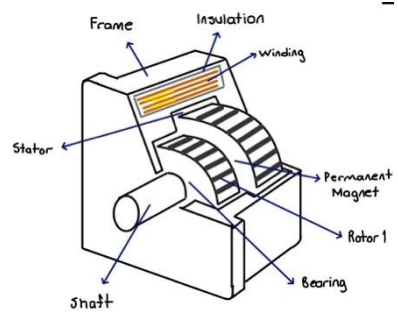
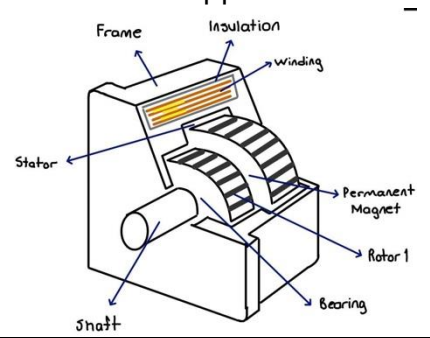
FUNCTIONS	CONCEPTS					
Giving spin to the ball	2 Wheels and Spinning Head	3 Wheels	4 Wheels	2 Tension Belt with spinning head	Small Ledges with Friction pad	
						
Giving speed to the ball	2 Wheels and Spinning Head	3 Wheels	4 Wheels	2 Tension Belt with spinning head	Throwing with propeller/paddle	Hammer
						
Giving pitch angle to the launching mechanism	Gear			Four bar	Rope-Controlled Head Pulley	
	Gear	Single worm gear	Bevel gear			
						
Giving yaw angle to the launching mechanism	Gear				Four bar	
	Gear 1	Gear 2	Worm gear	Bevel gear		
						

FUNCTIONS	CONCEPTS				
Accepting frequency information from the user	Integrated Controller	Remote Controller (IR)	Mobile Application	Wired Remote Controller	
					
Accepting trajectory information from the user	Integrated Controller	Remote Controller (IR)	Mobile Application	Wired Remote Controller	
					
Accepting numerical information from the user	Potentiometer with Buttons	Encoder with Buttons	Touchscreen	Buttons	
					
Allowing user to position the device	Manual Positioning			Rail System	Wheel System
	Clamps	Magnets	Suction Cups		
					



FUNCTIONS	CONCEPTS					
Preventing balls from escaping	Net	Spherical Wall	Wipers			
Storing the balls	Box	Tunnel - Closed Tube	Groove	Gravity Funnel		
Transferring balls to launch	Slider Crank	Maltese Wheel 2	Rotating Pusher	Gravity		
Giving the balls desired frequency	Slider Crank	Maltese Wheel 2	Rotating Pusher	Lid Mechanism	Hinge Mechanism	Rotating Hole
Transferring the balls from storage	Maltese Wheel 1	Spiral Lift	Translating Box	Belt Mechanism		

FUNCTIONS	CONCEPTS			
Controlling the spin of the ball	<p>DC</p> 	<p>BLDC</p> 		
Controlling the speed of the ball	<p>DC</p> 	<p>BLDC</p> 		
Controlling the yaw angle	<p>Servo</p> 	<p>Stepper</p> 		
Controlling the pitch angle	<p>Servo</p> 	<p>Stepper</p> 		

Controlling the ball feed for storage	<p>DC</p> 	<p>Stepper</p> 		
Controlling the ball feed for launching	<p>Stepper</p> 			
Controlling the ball frequency	<p>Stepper</p> 