

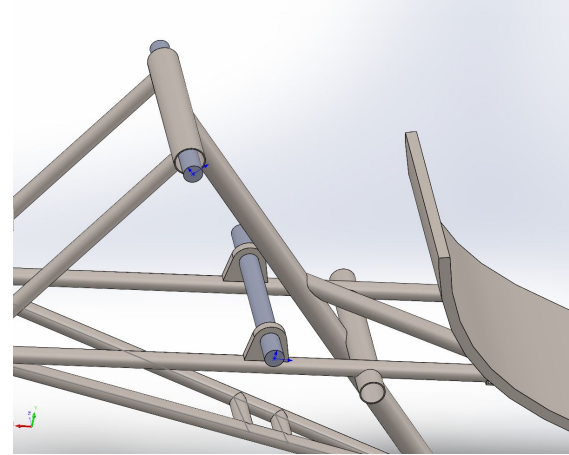
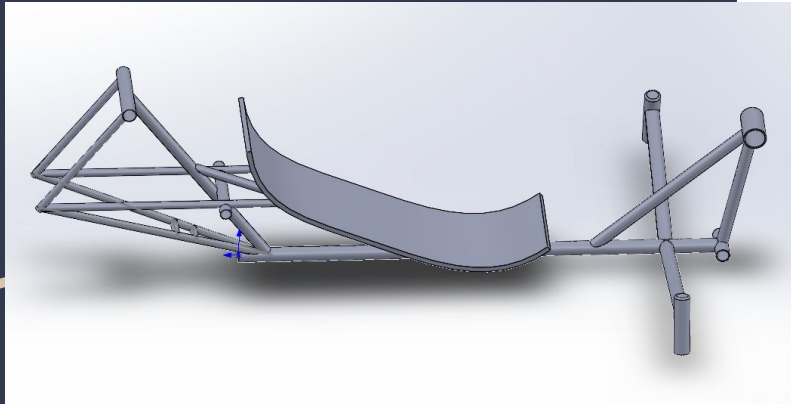
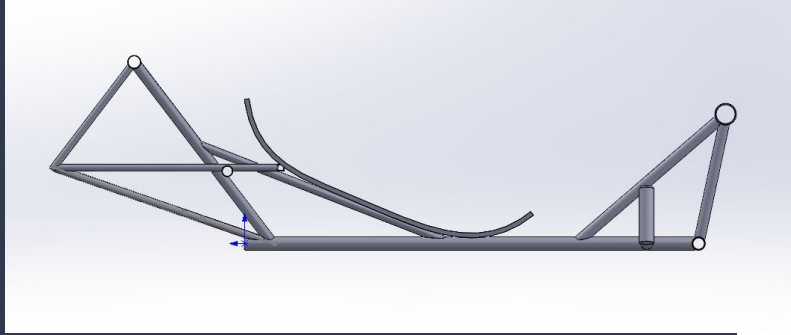
Human-Powered Vehicle Team

Hardware Review

By: Yen C., Yujie Z., Abdulh A., Daniel Q., Connor T.

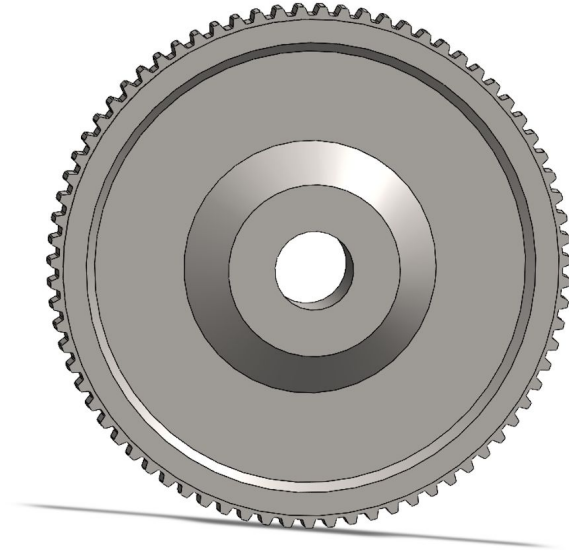
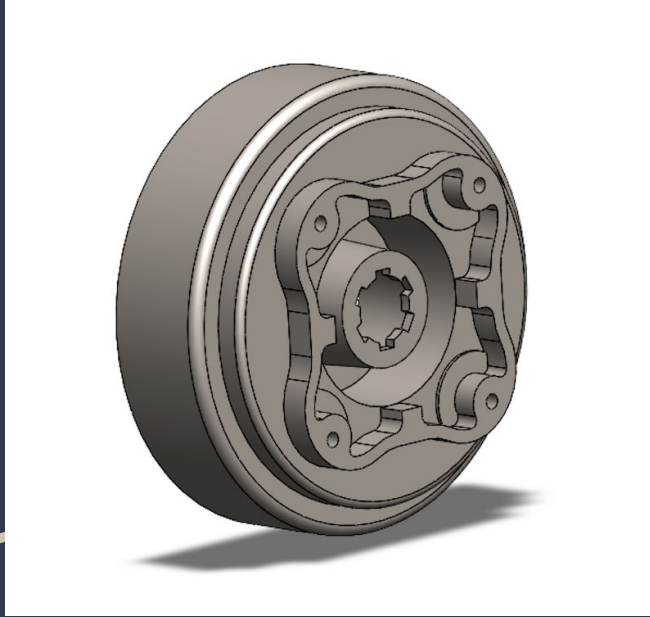


Frame CAD Design



Dimension: 75" x 38" x 34.5" (without wheel)

Flywheel and Clutch CAD



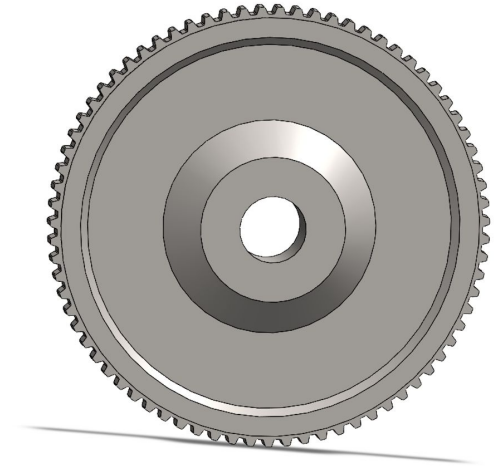
Clutch Design

Material			cork on steel or cast iron ▾
Surface Finish			
Outer diameter	D	in	11.811
Inner Diameter	d	in	1
Thickness	th	in	0.25
Actuating Force	F	lb	200
Contact Pressure	P	psi	1.838616765
Wear Coefficient (Clutch)	K	$\text{in}^3 \cdot \text{min} / (\text{lb} \cdot \text{ft} \cdot \text{h})$	0.00013
Wear Coefficient (Flywheel)	K	$\text{in}^3 \cdot \text{min} / (\text{lb} \cdot \text{ft} \cdot \text{h})$	0.000017
Coeff. of Friction	u		0.5
Angular Velocity	v_ang	rad/s	0.3912559018
Peripheral Velocity	V	ft/min	0.9781397544
time used	t	hour	100
Revolutions		rpm	147.5
Desired Safety Factor			1.5
Max Pressure	P_a	psi	1.838616765
Clutch Wear	w	in	0.02337951396
Flywheel Wear	w_	in	0.003057321056
Contact (Normal) Force	F	lbf	31.22316759
Frictional Force	fric	lbf	15.6115838
Torque Capacity	T	lb-ft	4.166666667
Max Torque	SFT	lb-ft	2.777777778

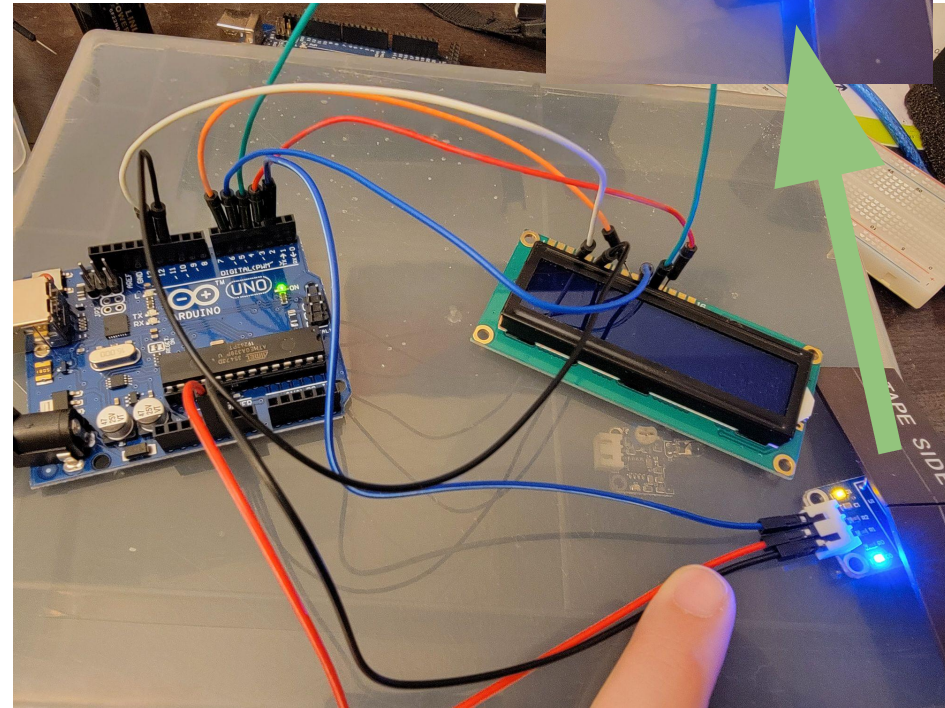
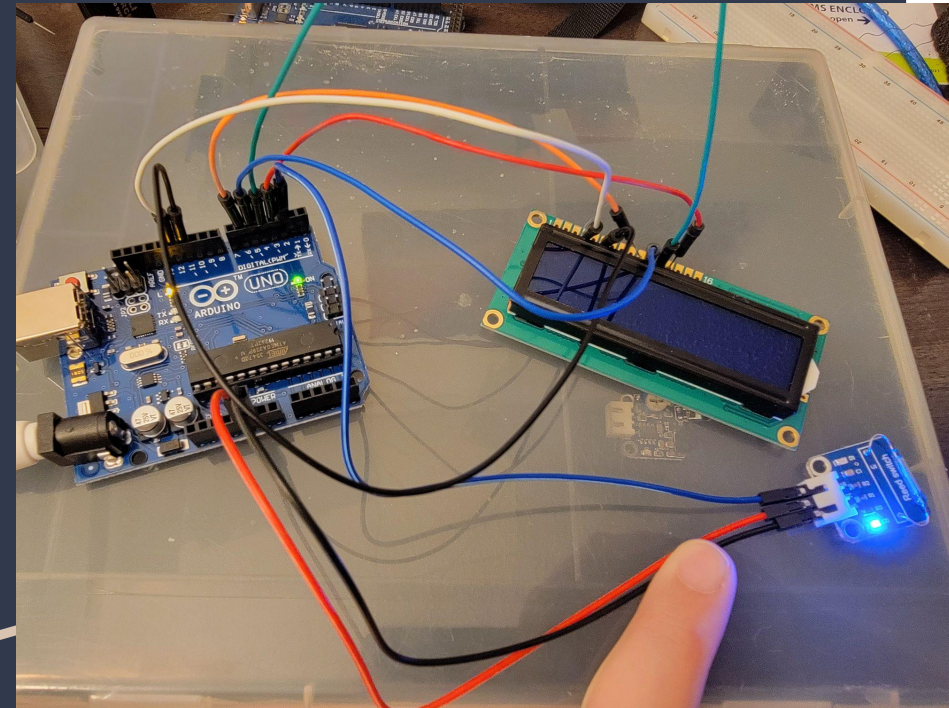


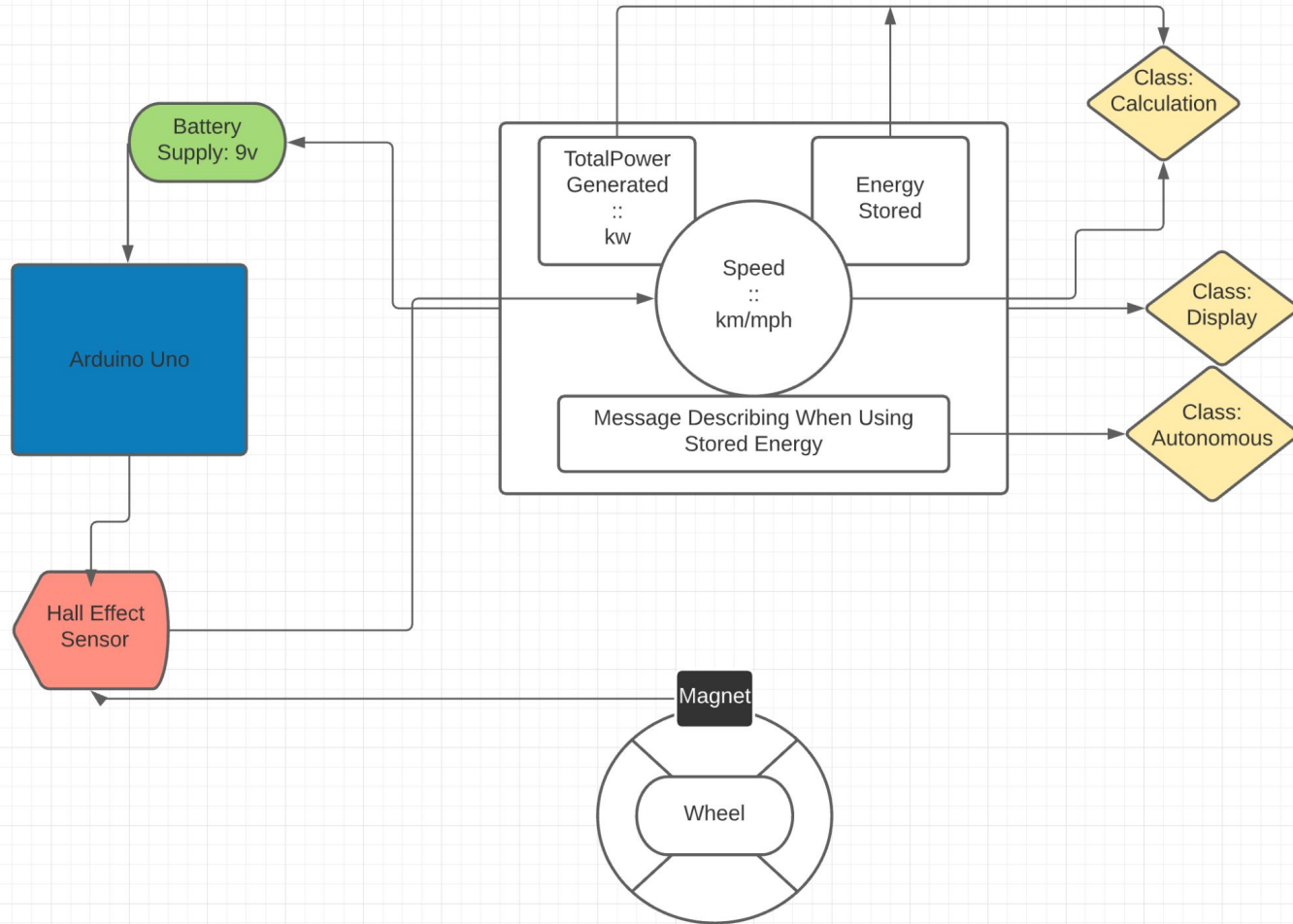
Flywheel Design

r	0.1	m	M.O.I. disk	KE	Angular Velocity	Momentum
m	3	kg	I_d	KE_d	w_d	
H	3.728	KW	0.015	11.184	38.61605	115.8481765
t	3	s			6.145936	
rho	7700	kg/m^3			368.7561	
			Volume	Thickness		
			v_d	h_d		
			0.000389	0.01240168388		
				12.40168388		
			M.O.I hoop	KE	Angular Velocity	Momentum
			I_h	KE_h	w_h	
			0.03	11.184	27.30567	81.9170312
					4.345833	
					260.7500	



Sensory & Display Hardware





Purchase Order

Pitbike clutch: GOOFIT Heavy Duty Manual Clutch Set for 50cc 70cc 90cc 110cc 125cc Dirt Pit Bike

Flywheel stock: Steel

Display: SunFounder IIC I2C TWI Serial 2004 20x4 LCD Module Shield for Arduino R3 Mega2560

Sensors: Hall Effect Sensor US1881 Latching

Magnets: 1.26 x 1/8 Neodymium magnets

Schedule

	Early August	Mid August	Late August	Early September	Mid September	Late September	Early October	Mid October	Late October	Early November	Mid November	Late November	Early December
<i>Proof of concept</i>	Finished												
<i>Re-do Design</i>			Finished	Finished									
<i>Self Learning</i>			Finished	Finished									
<i>Arduino Prototype</i>				Finished	Finished								
<i>Hardware Review 1</i>					In Progress								
<i>Order Parts</i>						In Progress	In Progress						
<i>Begin Build</i>							Future	Future					
<i>Midpoint Presentation</i>							Future						
<i>Finish Build</i>								Future					
<i>Hardware Review 2</i>								Future					
<i>Polish Software</i>									Future				
<i>Testing</i>								Future	Future				
<i>Polishing</i>									Future	Future			
<i>Final Presentation</i>										Future	Future		
<i>Deliver Final Report & Presentation</i>												Future	Future

Legend: ■ Finished ■ In Progress ■ Future