Week 4 Project Planning Task

Task 1: Initial Estimate of Manufacturing Costs

Category	Item	Part Number	Source	Unit Price (AUD)	Quantity	Total Cost (AUD)
Components	MCU	ESP32-WROOM-32E	DigiKey	$7.75	1	$7.75
	Battery	3.7V LiPo Battery	Amazon	$27.00	1	$27.00
	BMS	BQ24075	DigiKey	$3.43	1	$3.43
	IMU	LSM6DSOTR	DigiKey	$6.12	1	$6.12
	Flex Sensors	FS-L-0055-253-ST	DigiKey	$12.73	5	$63.65
	Heartbeat Sensor	MAX30207CLB+T	DigiKey	$5.69	1	$5.69
	LCD Screen	MD21605G12W3-BNMLW-VE	DigiKey	$7.34	1	$7.34
	Speaker	K 23 - 8 OHM	DigiKey	$7.54	1	$7.54
	Push Buttons	EVQ-P7C01P	DigiKey	$0.48	2	$0.96
	Wires	-	DigiKey	~0.20	~10	~$2.00
	Passives (Resistors & Capacitors)	-	DigiKey	~$0.15	~30	~$4.50
	Gloves	Safe Work Gloves	Amazon	$5.00	2	$10.00
Shipping	DigiKey	-	DigiKey	-	1	-
	Amazon	-	Amazon	-	1	-
	JLCPCB	-	JLCPCB	$27.51	1	$27.51
Manufacturing	PCB	-	JLCPCB	$3.06	1	$3.06
	Labour	-	-	$47.70/hour	160	$ 7632
	Equipment	-	-	$100	1	$100
	Marketing	-	-	$100	1	$100
	Overheads	-	-	$50	1	$50
Total	**-**	**-**	**-**	**-**	**-**	**$8052.05**

Shipping:

- Amazon offers free shipping
- DigiKey offers free shipping for orders > $100 AUD which is the case here

Manufacturing:

- PCB cost is for 5x PCBs as per minimum order requirements on JLCPCB
- Labour hourly rate is based on average hourly wages for a Junior Engineer, according to Indeed. The number of hours is based on an estimate of 2x people working for 8x hours per week for 10 weeks.
- Equipment, Marketing and Overheads costs are all estimates

Estimate of Potential Profitability

Discount Factor P/A	10%				
Year	0	1	2	3	4
Cost	8052.05	7500	7500	7500	7500
Revenue	0	50000	60000	70000	80000
Future Value		42500	52500	62500	72500
Present value	-8052.05	38636.36	43388.43	46957.18	49518.48
NPV	170448.39				

Task 2: Work Breakdown Structure

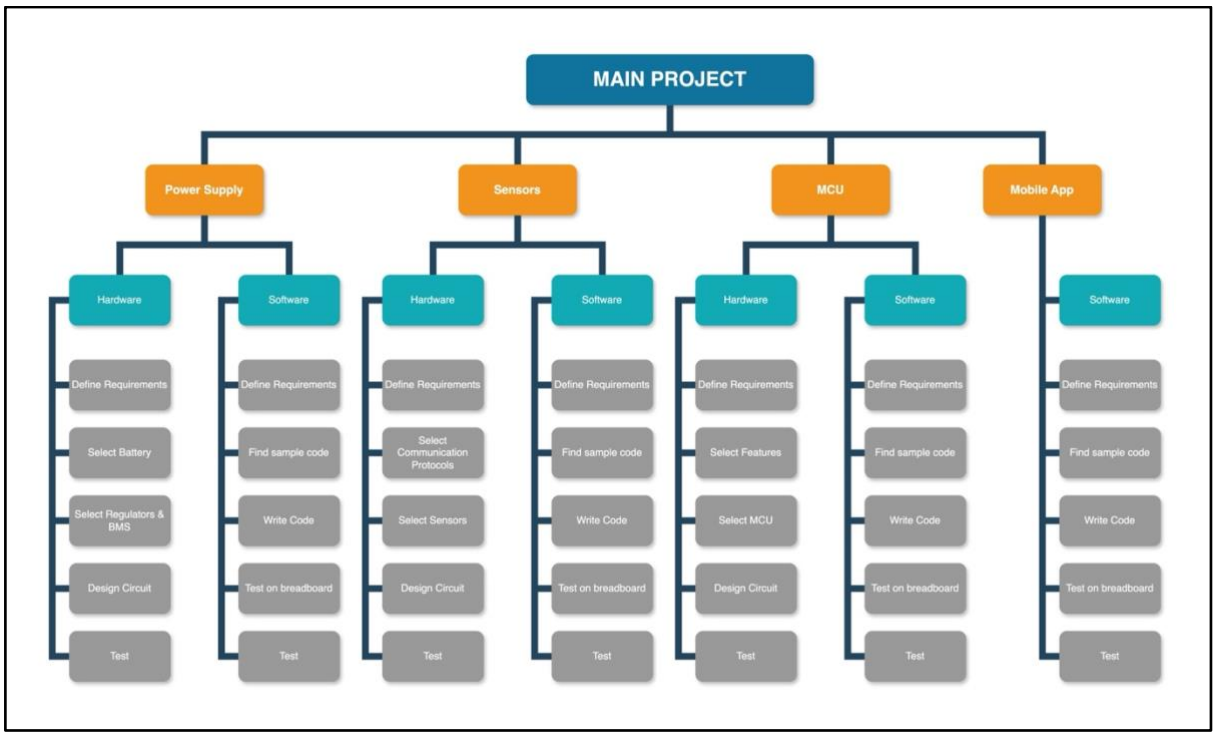
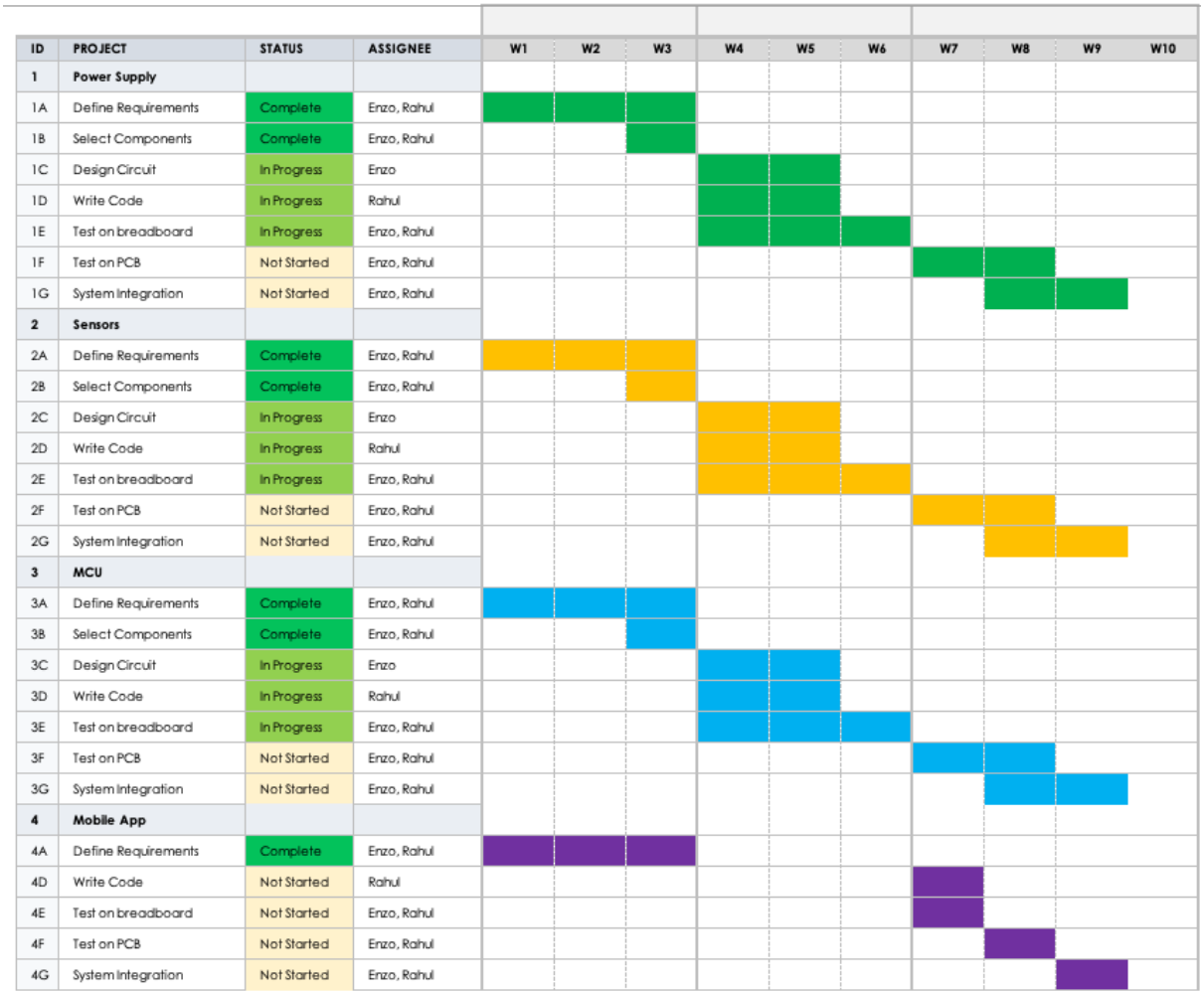


***Figure 1**: Work Breakdown Structure*

Task 3: Gantt Chart



ID	PROJECT	STATUS	ASSIGNEE	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10
1	**Power Supply**												
1A	Define Requirements	Complete	Enzo, Rahul										
1B	Select Components	Complete	Enzo, Rahul										
1C	Design Circuit	In Progress	Enzo										
1D	Write Code	In Progress	Rahul										
1E	Test on breadboard	In Progress	Enzo, Rahul										
1F	Test on PCB	Not Started	Enzo, Rahul										
1G	System Integration	Not Started	Enzo, Rahul										
2	**Sensors**												
2A	Define Requirements	Complete	Enzo, Rahul										
2B	Select Components	Complete	Enzo, Rahul										
2C	Design Circuit	In Progress	Enzo										
2D	Write Code	In Progress	Rahul										
2E	Test on breadboard	In Progress	Enzo, Rahul										
2F	Test on PCB	Not Started	Enzo, Rahul										
2G	System Integration	Not Started	Enzo, Rahul										
3	**MCU**												
3A	Define Requirements	Complete	Enzo, Rahul										
3B	Select Components	Complete	Enzo, Rahul										
3C	Design Circuit	In Progress	Enzo										
3D	Write Code	In Progress	Rahul										
3E	Test on breadboard	In Progress	Enzo, Rahul										
3F	Test on PCB	Not Started	Enzo, Rahul										
3G	System Integration	Not Started	Enzo, Rahul										
4	**Mobile App**												
4A	Define Requirements	Complete	Enzo, Rahul										
4D	Write Code	Not Started	Rahul										
4E	Test on breadboard	Not Started	Enzo, Rahul										
4F	Test on PCB	Not Started	Enzo, Rahul										
4G	System Integration	Not Started	Enzo, Rahul										

***Figure 2**: Gantt Chart*

Task 4: Risk Assessment

Technical					
Risk	**Likelihood**	**Impact of Risk**	**Severity**	**Mitigation Strategy**	**Contingency Action**
Sensor Signal Noise	Medium	High	High	Use low-pass filters and shielded cables; isolate analog and digital signals on PCB layout.	Re-route signal traces and add hardware filters. Use digital filtering fallback.
Poor Gesture Recognition Accuracy	High	High	High	Test with diverse gesture datasets; apply ML techniques or adaptive thresholds.	Retrain system with simplified gesture sets or manual tuning for reliable accuracy.
Microcontroller Memory Overflow	Low	Medium	Medium	Optimize firmware to store only essential variables; use memory-efficient data types.	Trim features in firmware or upgrade to MCU with higher memory if feasible.
Loose Wiring or Faulty Connections	Medium	High	High	Secure solder joints; use locking connectors and strain relief mechanisms.	Rewire or re-solder faulty joints. Replace cables/connectors and reverify.

Business					
Risk	**Likelihood**	**Impact of Risk**	**Severity**	**Mitigation Strategy**	**Contingency Action**
Low Market Adoption	Low	Medium	Medium	Engage with Auslan community early for feedback; showcase use cases to drive interest.	Pivot design for educational use or accessibility demos. Explore university partnerships.

Project Management					
Risk	**Likelihood**	**Impact of Risk**	**Severity**	**Mitigation Strategy**	**Contingency Action**
Missed Deadlines	Medium	High	High	Use a detailed Gantt chart; assign task owners and track weekly progress with buffer periods.	Rescope project: deprioritize low-impact features. Use weekend/makeup sprint.
Team Communication Gaps	Medium	Medium	Medium	Set weekly standups and shared task boards; ensure everyone is aligned.	Escalate blockers early. Allocate a group lead to facilitate communication.

Safety					
Risk	**Likelihood**	**Impact of Risk**	**Severity**	**Mitigation Strategy**	**Contingency Action**
	High	Medium	Low		
Battery Short Circuit or Overheating	Low	High	Medium	Add thermal cutoff and fuse. Use tested commercial battery pack with protection circuit.	Shut off glove immediately; switch to USB power for further debugging.