



機電整合(四) Project Proposal

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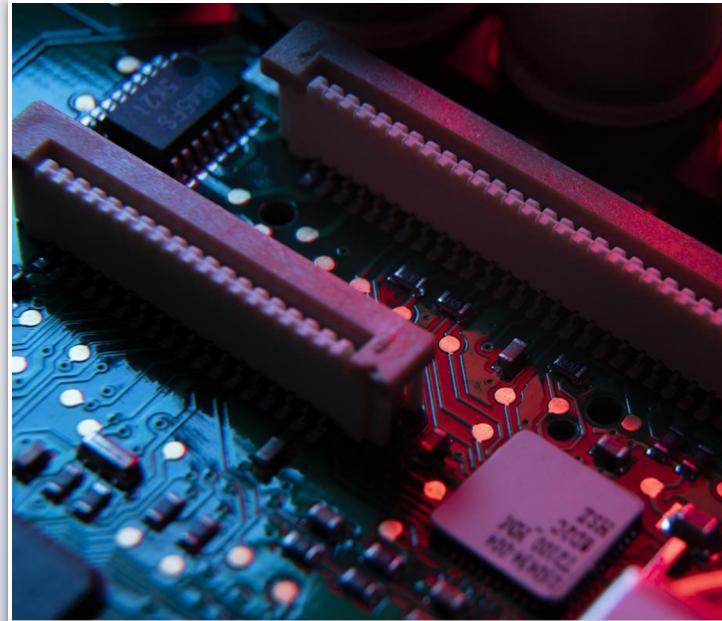




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Design

02

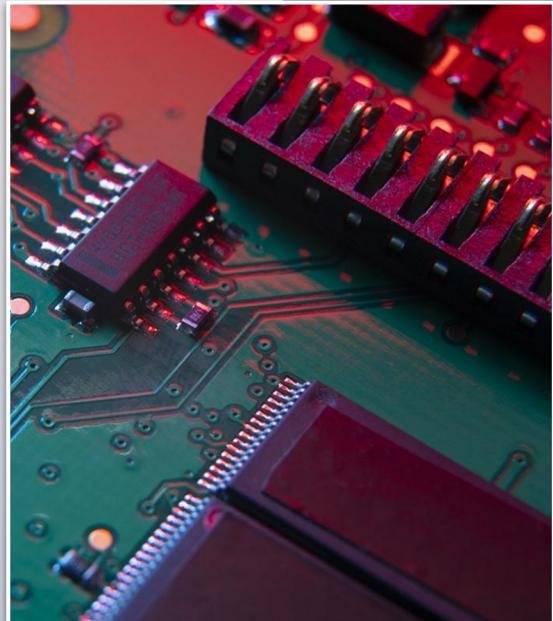
Electrical
Design

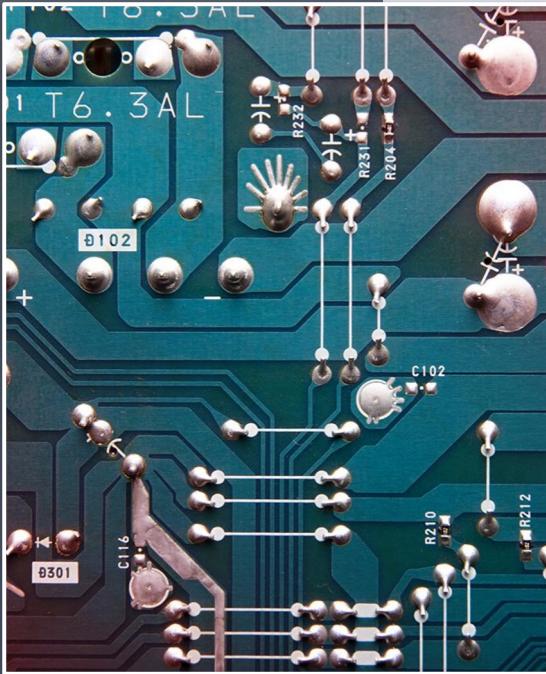
03

Material
List

04

Schedule
Teamwork





01

Mechanical Design

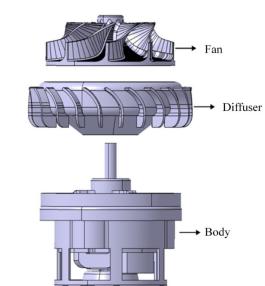
Fan, Suction Inlet, Brush, Weight, etc.

Including Parts

01

Fan Design

Shape, power,
drawings

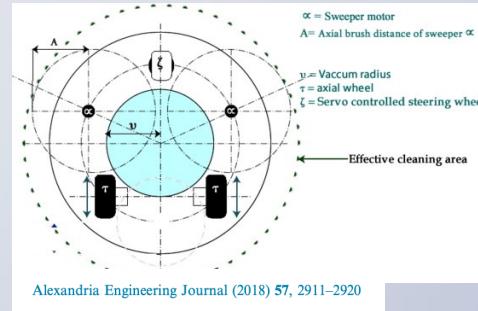


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02

Suction Inlet

Position, size, shape

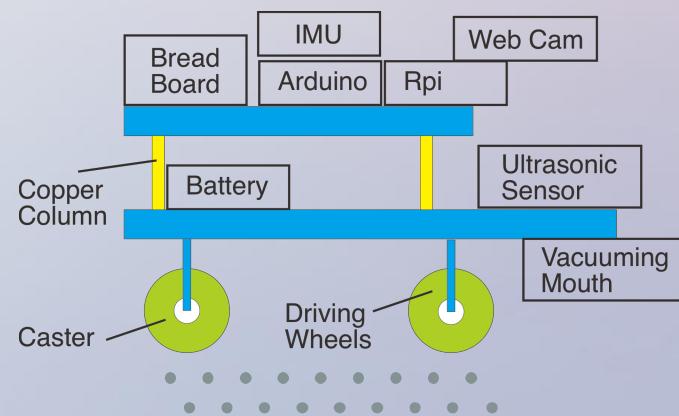


03

Brush

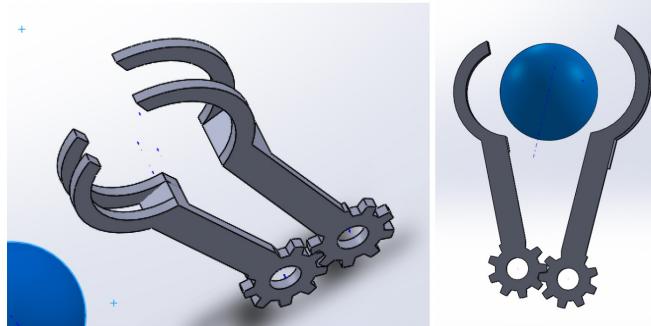
Size, position, motor

Deflection validation



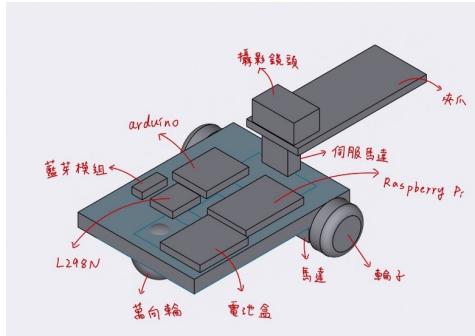
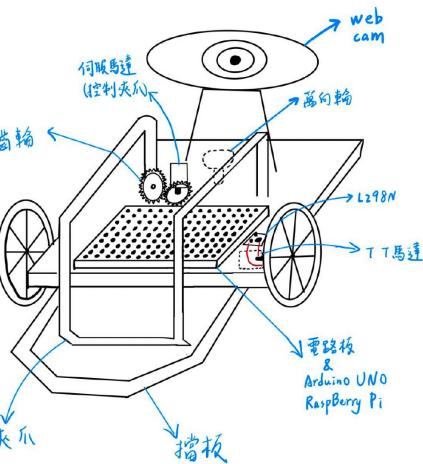
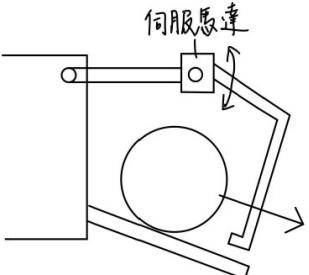
Examples (Last Year)

- 夾爪大致樣貌

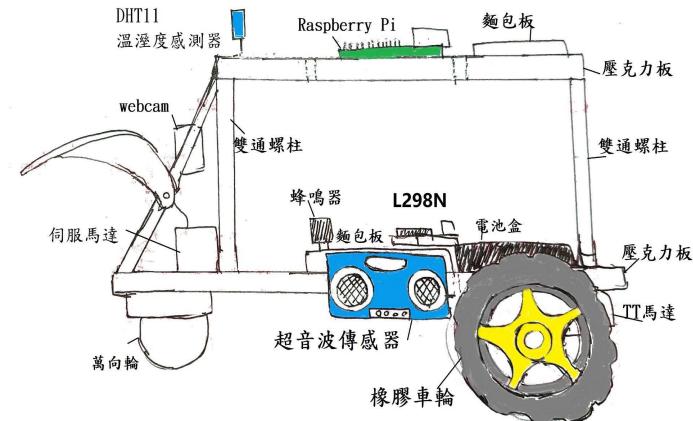
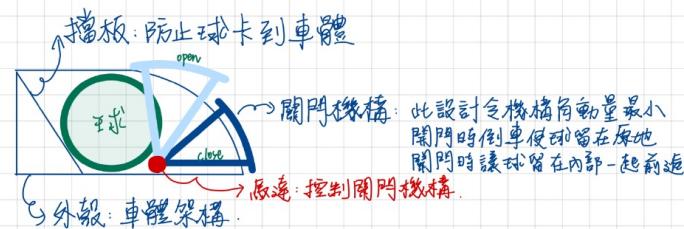


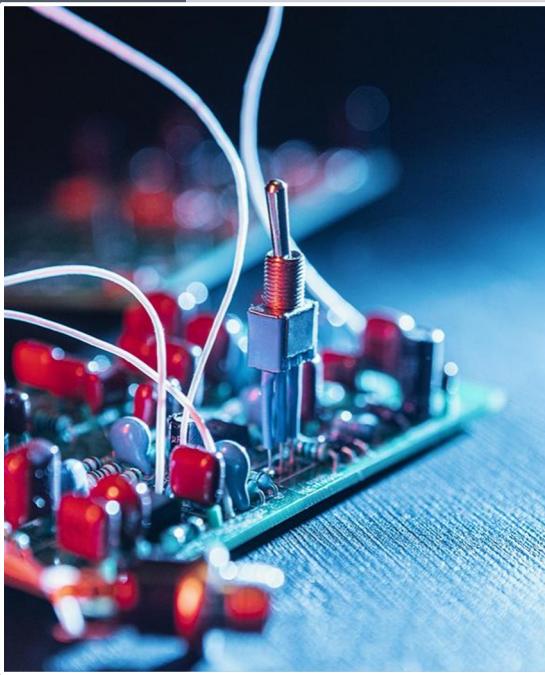
設計概念

- 以Arduino與Raspberry Pi做回傳影像、感測器數據與元件控制。
- 以伺服馬達控制夾爪機構升起與放下。



夾爪設計圖（關球機）





02

Electrical Design

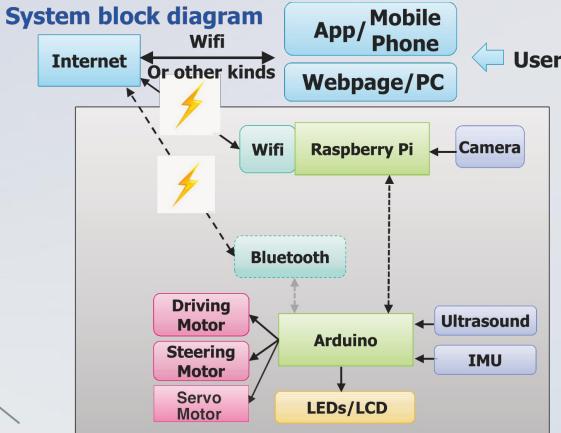
Block diagram, Software, Flow Chart

•••

Including Parts

01

Block diagram



02

Software

App inventor2,
Bluetooth

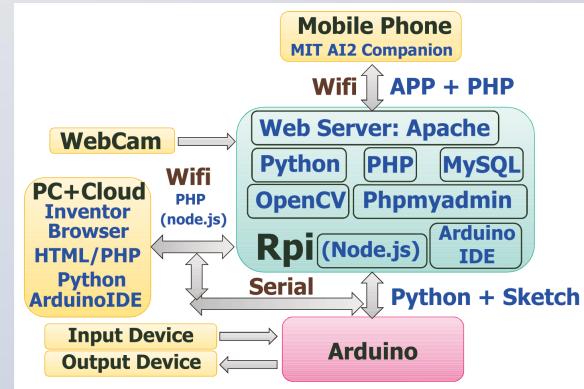
03

Flow chart

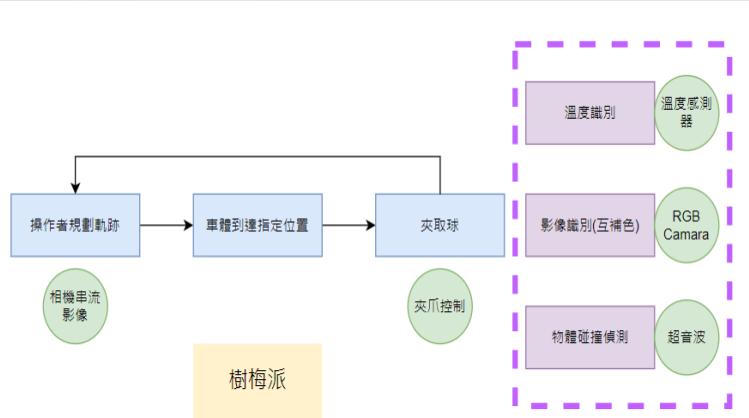
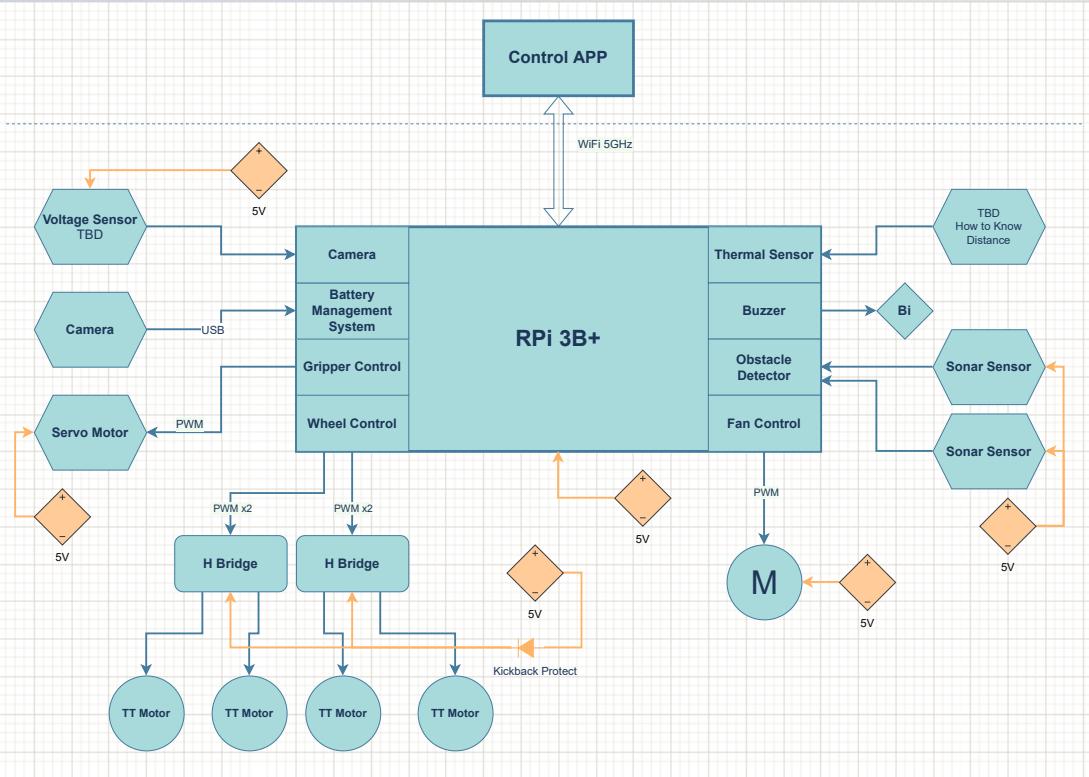
For remote control, etc.

04

Others



Examples (Last Year)

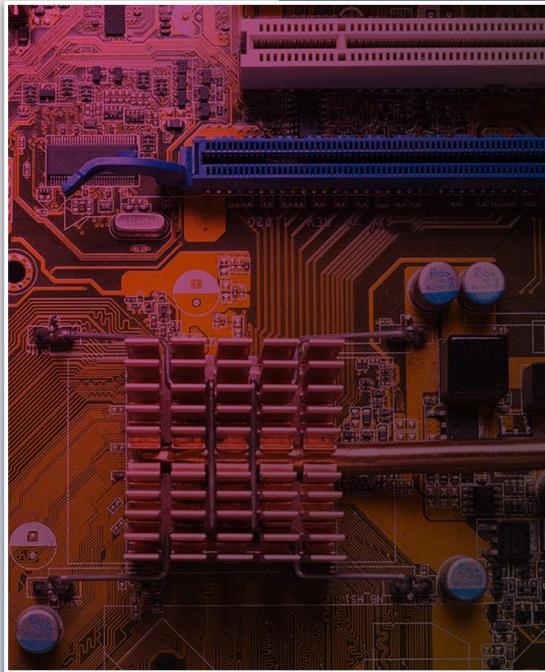




03

Material List

Components, Electrical parts, 3D printer



Including Parts

01

Materials

Wooden plates,
acrylic board



02

Electronics

Batteries, motors, etc.



03

3D Printer



04

Others

Examples (Last Year)

二、採用的材料

材料	數量	來源	用途
壓克力	-	-	車身
3D列印	-	助教	製作夾爪
伺服馬達SG90	1	期初所發材料*1	夾爪
直流馬達	2	期初所發材料	車的移動
L298N(馬達驅動版)	1	期初所發材料	配合驅動兩個直流馬達
萬向輪	1	助教	前輪
小麵包版	1	助教	配線
車輪	2	期初所發材料	車的移動
電池盒	1	助教	電池電源
webcam	1	期初所發材料	看前面有什麼
DHT11	1	期初所發材料	量測熱源溫度
蜂鳴器	1	期初所發材料	快撞到的警示
超音波傳感器HC-SR04	1	期初所發材料	偵測是否快撞到
杜邦線	若干	助教	導電
raspberry pi	1	期初所發材料	開發板&wifi
arduino	1	期初所發材料	開發板

組裝方式：

1. 各零件相對位置如設計圖呈現。
2. Arduino 與 L298N 利用螺絲鎖在壓克力板上。
3. Raspberry Pi 利用保麗龍膠黏在壓克力板上。
4. 馬達(驅動輪子)利用保麗龍膠黏在壓克力板下。
5. 萬象輪利用螺絲鎖在壓克力板下。
6. 藍芽模組利用接線控制其擺放位置。
7. 將伺服馬達鎖在夾爪上，再將伺服馬達利用保麗龍膠黏在壓克力板上。
8. 攝影機利用保麗龍膠黏在夾爪上。

(1)目前擁有的材料： (2)目前尚無的材料：

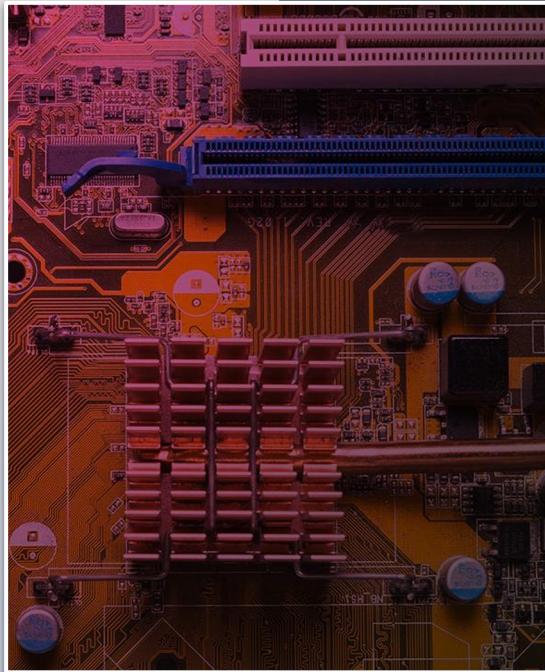
1. Arduino
 2. L298N
 3. RPI
 4. Web camera
 5. 萬向輪
 6. 橡膠輪*2
 7. 馬達*2
 8. DHT 11(溫度感測器)
 9. 超音波感測器
 10. 蜂鳴器
1. 車板(壓克力)
 2. 夾爪(3d print)
 3. 銅柱、隔離柱
 4. 螺絲
 5. 電池與電池盒(電源for motor)
 6. 藍芽模組



04

Schedule Teamwork

How to link with students' careers?
What is next?



Including Parts

01

Gantt Chart



02

Work Assignment

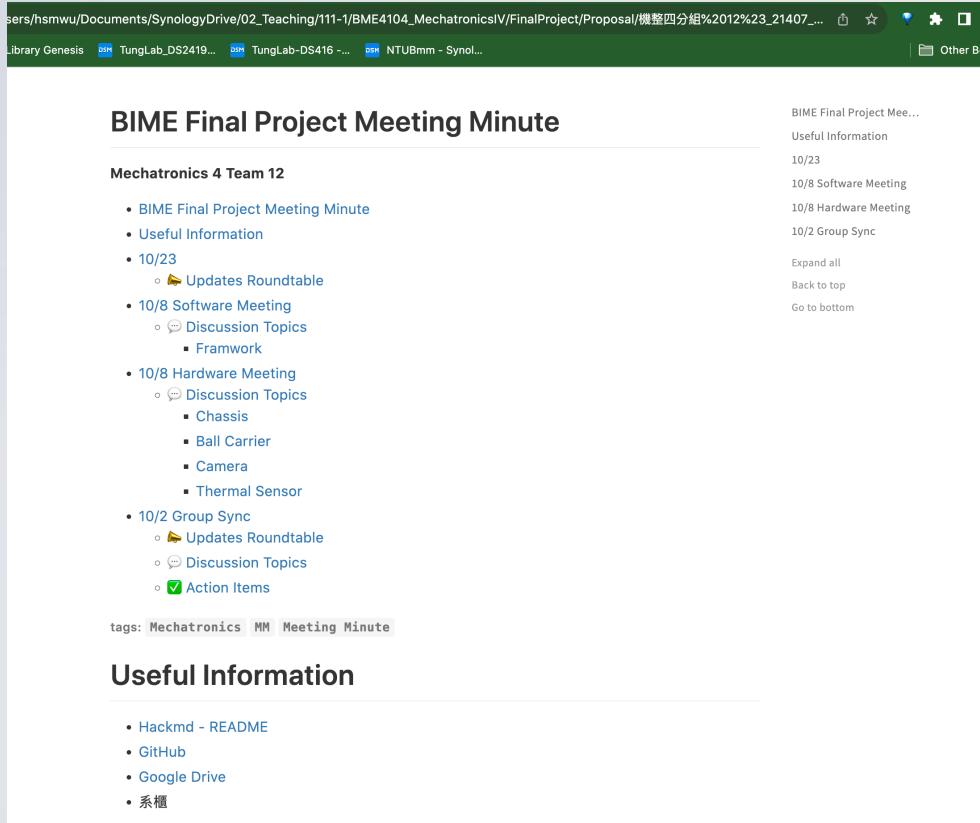
03

Others

Examples (Last Year)

October 2022						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					- BIME Final Development, 42.83 days -	1
					Initial Project, 4 hrs	
2	3	4	5	6	7	8
			BIME Final Development, 42.83 days			
Initial Project, 4 hrs		Ensure the Requirement, 1 day		Planning Schedule, 2 days	Block Diagram, 2 days	Scope Complete
						Plan the Bold Structure, 5 days
9	10	11	12	13	14	15
			BIME Final Development, 42.83 days			
		DP1 Board Developing, 3 days		DP1 Board Manufacturing, 1 wk		Car Body Design, 5 days
		Plan the Bold Structure, 5 days				
16	17	18	19	20	21	22
			BIME Final Development, 42.83 days			
		DP1 Board Manufacturing, 1 wk		DP2 Board Developing, 7 days		
		Car Body Design, 5 days				Gripper Design, 5 days
23	24	25	26	27	28	29
			BIME Final Development, 42.83 days			
		DP2 Board Developing, 7 days				
		Car Body Assembly, 2 days				
			Gripper Design, 5 days			
				Wheel Control Implementation, 4 days		
				Controller Testing, 2 days		
30	31					
			BIME Final Development, 42.83 days			
			DP2 Board Manufacturing, 1 wk			
		Controller Testing, 2 days				

Examples (Last Year)



The screenshot shows a web browser window with a dark theme. The address bar contains a URL related to a Synology drive. The main content area displays a meeting minute for 'BIME Final Project Meeting Minute' by 'Mechatronics 4 Team 12'. The page includes a sidebar with navigation links like 'BIME Final Project Mee...', 'Useful Information', and '10/23'. The main content lists meeting topics and action items, with some items marked as completed (e.g., 'Action Items'). Below the content is a 'tags' section and a 'Useful Information' section.

BIME Final Project Meeting Minute

Mechatronics 4 Team 12

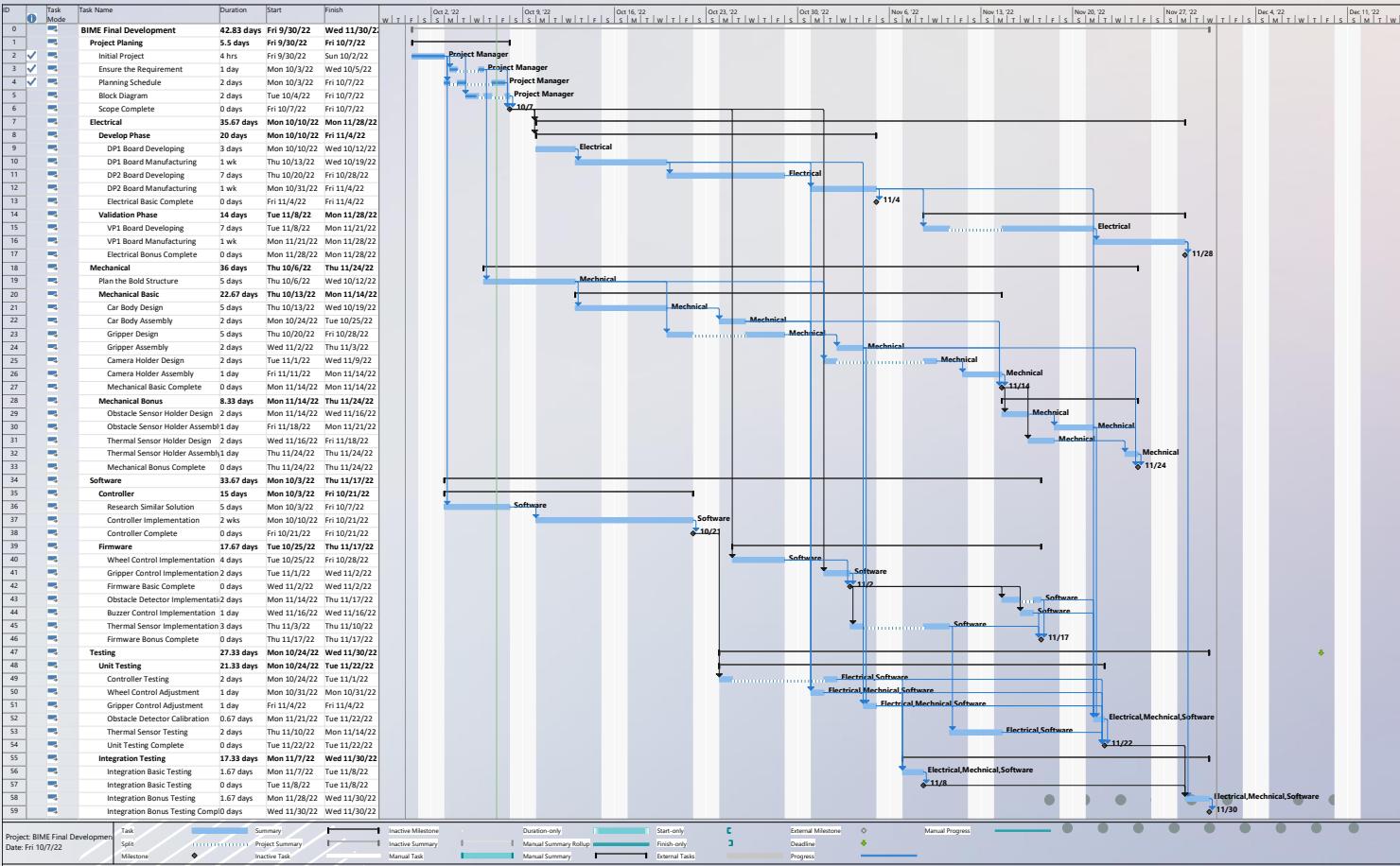
- BIME Final Project Meeting Minute
- Useful Information
- 10/23
 - 🎤 Updates Roundtable
- 10/8 Software Meeting
 - 💬 Discussion Topics
 - Framework
- 10/8 Hardware Meeting
 - 💬 Discussion Topics
 - Chassis
 - Ball Carrier
 - Camera
 - Thermal Sensor
- 10/2 Group Sync
 - 🎤 Updates Roundtable
 - 💬 Discussion Topics
 - ✅ Action Items

tags: Mechatronics MM Meeting Minute

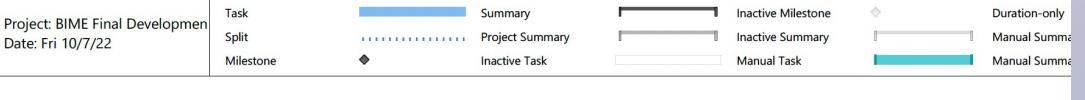
Useful Information

- Hackmd - README
- GitHub
- Google Drive
- 系櫈

Examples (Last Year)



ID	Task Mode	Task Name	Duration	Start	Finish	W	T	F
0		BIME Final Development	42.83 days	Fri 9/30/22	Wed 11/30/22			
1		Project Planing	5.5 days	Fri 9/30/22	Fri 10/7/22			
2	✓	Initial Project	4 hrs	Fri 9/30/22	Sun 10/2/22			
3	✓	Ensure the Requirement	1 day	Mon 10/3/22	Wed 10/5/22			
4	✓	Planning Schedule	2 days	Mon 10/3/22	Fri 10/7/22			
5		Block Diagram	2 days	Tue 10/4/22	Fri 10/7/22			
6		Scope Complete	0 days	Fri 10/7/22	Fri 10/7/22			
7		Electrical	35.67 days	Mon 10/10/22	Mon 11/28/22			
8		Develop Phase	20 days	Mon 10/10/22	Fri 11/4/22			
9		DP1 Board Developing	3 days	Mon 10/10/22	Wed 10/12/22			
10		DP1 Board Manufacturing	1 wk	Thu 10/13/22	Wed 10/19/22			
11		DP2 Board Developing	7 days	Thu 10/20/22	Fri 10/28/22			
12		DP2 Board Manufacturing	1 wk	Mon 10/31/22	Fri 11/4/22			
13		Electrical Basic Complete	0 days	Fri 11/4/22	Fri 11/4/22			
14		Validation Phase	14 days	Tue 11/8/22	Mon 11/28/22			
15		VP1 Board Developing	7 days	Tue 11/8/22	Mon 11/21/22			
16		VP1 Board Manufacturing	1 wk	Mon 11/21/22	Mon 11/28/22			
17		Electrical Bonus Complete	0 days	Mon 11/28/22	Mon 11/28/22			
18		Mechanical	36 days	Thu 10/6/22	Thu 11/24/22			
19		Plan the Bold Structure	5 days	Thu 10/6/22	Wed 10/12/22			
20		Mechanical Basic	22.67 days	Thu 10/13/22	Mon 11/14/22			
21		Car Body Design	5 days	Thu 10/13/22	Wed 10/19/22			
22		Car Body Assembly	2 days	Mon 10/24/22	Tue 10/25/22			
23		Gripper Design	5 days	Thu 10/20/22	Fri 10/28/22			
24		Gripper Assembly	2 days	Wed 11/2/22	Thu 11/3/22			
25		Camera Holder Design	2 days	Tue 11/1/22	Wed 11/9/22			
26		Camera Holder Assembly	1 day	Fri 11/11/22	Mon 11/14/22			
27		Mechanical Basic Complete	0 days	Mon 11/14/22	Mon 11/14/22			
28		Mechanical Bonus	8.33 days	Mon 11/14/22	Thu 11/24/22			
29		Obstacle Sensor Holder Design	2 days	Mon 11/14/22	Wed 11/16/22			
30		Obstacle Sensor Holder Assembl	1 day	Fri 11/18/22	Mon 11/21/22			
31		Thermal Sensor Holder Design	2 days	Wed 11/16/22	Fri 11/18/22			
32		Thermal Sensor Holder Assembl	1 day	Thu 11/24/22	Thu 11/24/22			
33		Mechanical Bonus Complete	0 days	Thu 11/24/22	Thu 11/24/22			
34		Software	33.67 days	Mon 10/3/22	Thu 11/17/22			
35		Controller	15 days	Mon 10/3/22	Fri 10/21/22			
36		Research Similar Solution	5 days	Mon 10/3/22	Fri 10/7/22			
37		Controller Implementation	2 wks	Mon 10/10/22	Fri 10/21/22			
38		Controller Complete	0 days	Fri 10/21/22	Fri 10/21/22			
39		Firmware	17.67 days	Tue 10/25/22	Thu 11/17/22			
40		Wheel Control Implementation	4 days	Tue 10/25/22	Fri 10/28/22			
41		Gripper Control Implementation	2 days	Tue 11/1/22	Wed 11/2/22			
42		Firmware Basic Complete	0 days	Wed 11/2/22	Wed 11/2/22			
43		Obstacle Detector Implementati	2 days	Mon 11/14/22	Thu 11/17/22			
44		Buzzer Control Implementation	1 day	Wed 11/16/22	Wed 11/16/22			

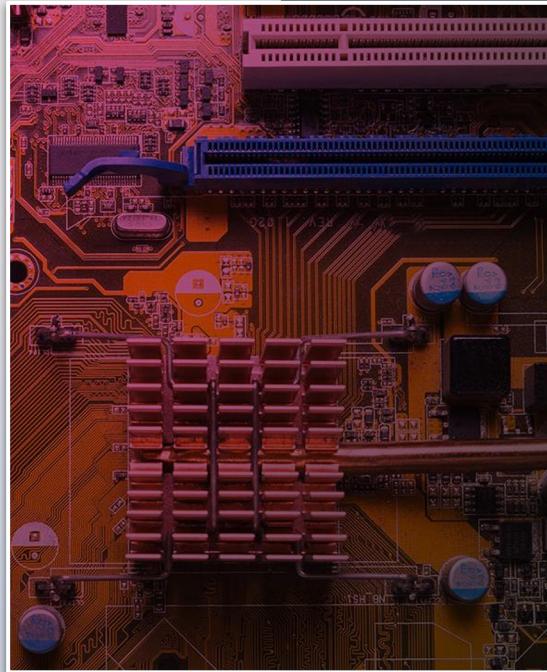




05

Difficulties

Possible Challenges



Examples (Last Year)

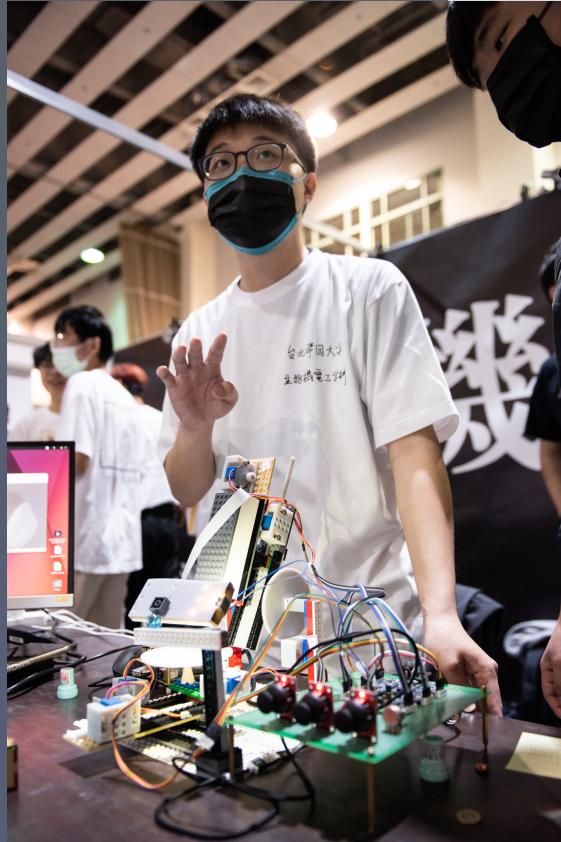
預想關卡突破可能會遇到的問題

- 無法影像辨識障礙物
- 遠端遙控可能會產生延遲，造成操作及辨識困難
- 兩端之馬達實際轉速可能會有誤差，造成非理想的旋轉模式，需校正參數
- 夾爪之底板須測試傾斜度，確保目標能進入夾爪
- 溫度感測器靈敏度可能太低，需消耗過長時間判斷

預想關卡突破可能會遇到的問題：

1. 攝影機角度需要不斷調整，需要能夠在抓取球時看到球，又要在行走時能夠看到前方障礙物。
2. 車身過長有可能過長，轉彎時會碰到障礙物。
3. 取球時，可能無法精準控制位置。
4. 硬體設備連接問題。

1. 利用WebCam只能看到前方的畫面，側邊若有障礙物可能會撞上，兩側可能需要使用IR或Ultrasonic來偵測障礙物距離
2. WebCam影像利用WiFi，可能會因為傳輸距離與屏蔽效應導致視訊傳到電腦會有延遲
3. Raspberry Pi散熱問題，擔心機體過熱導致當機。



Thank you

Q & A