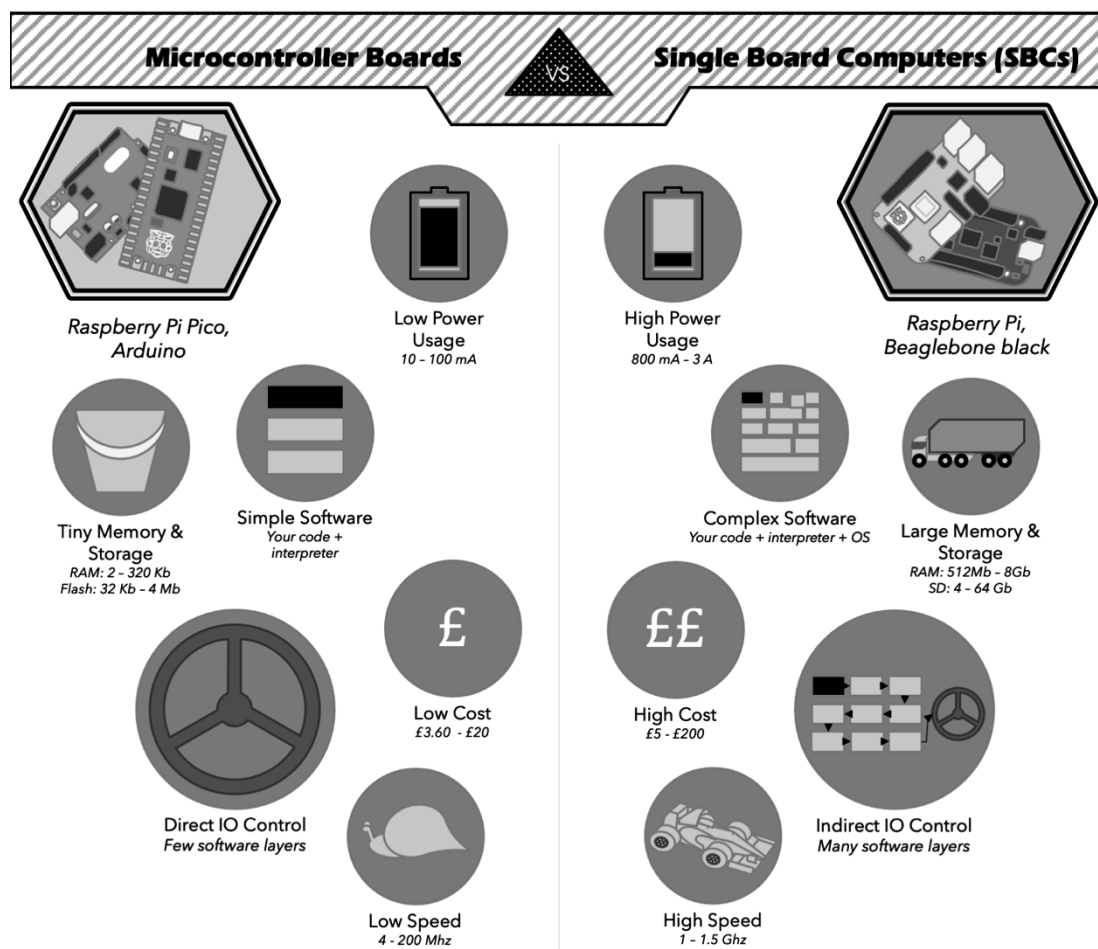
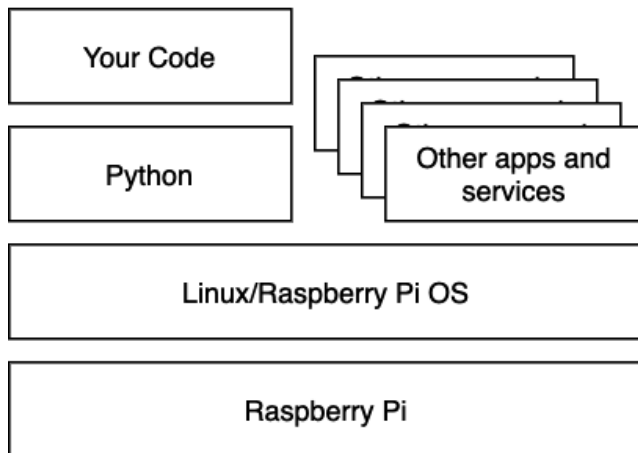


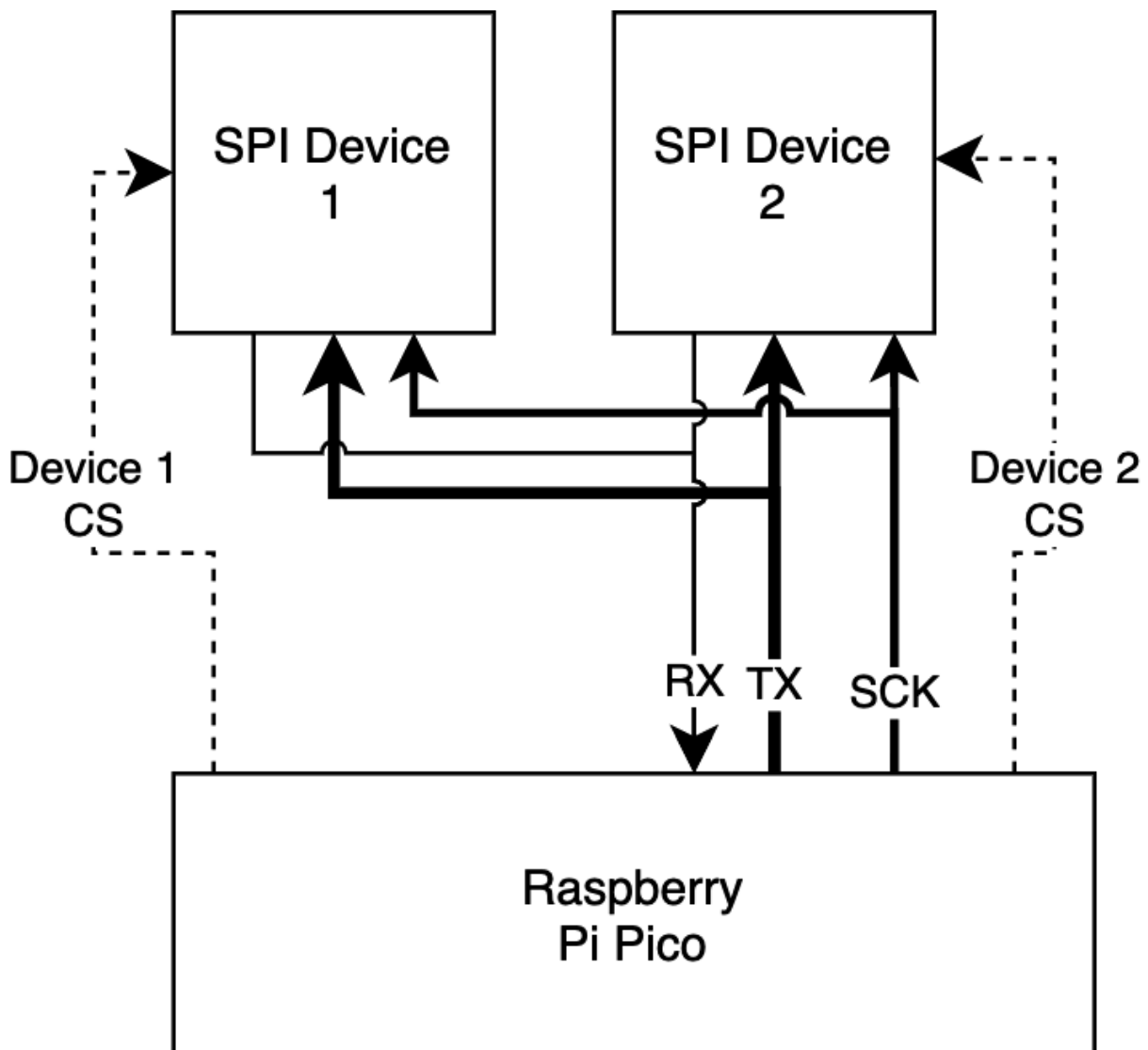
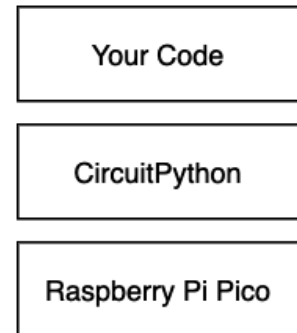
Chapter 1: Planning a Robot with Raspberry Pi Pico

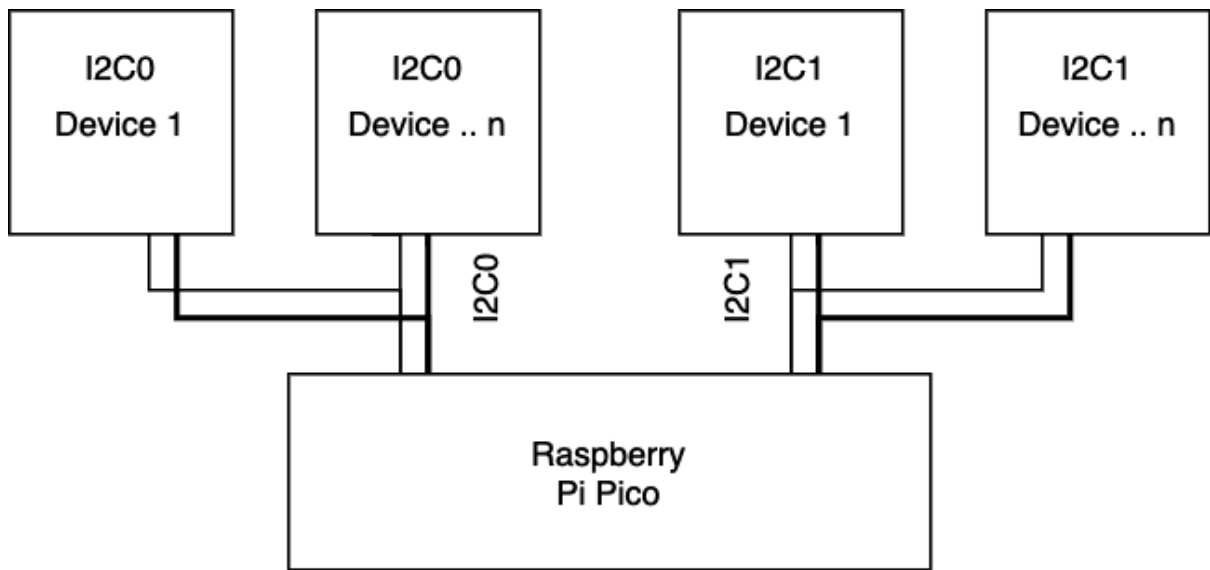


The Linux Computer

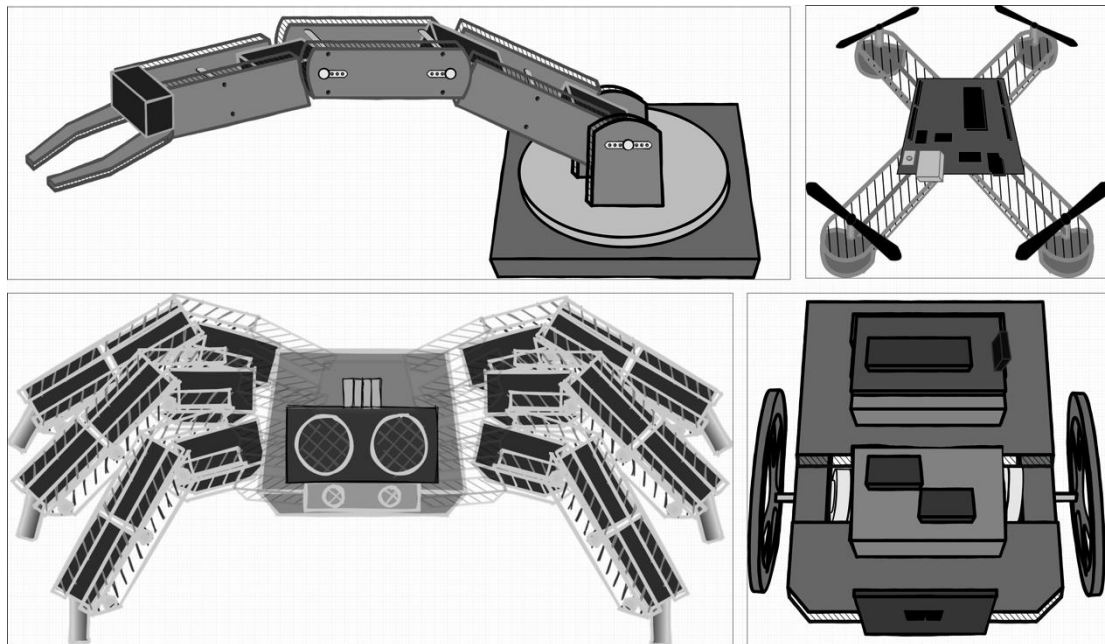
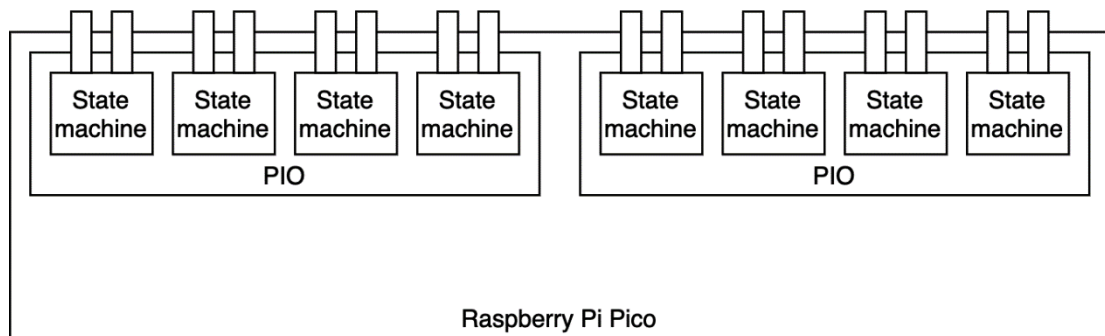


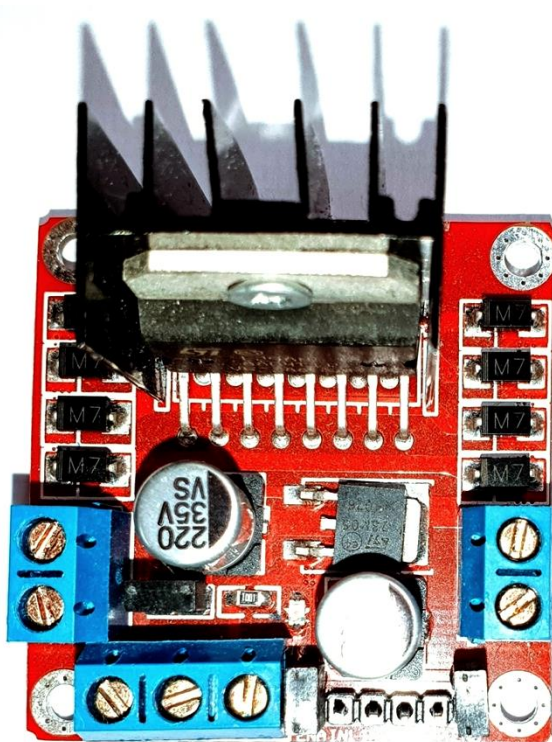
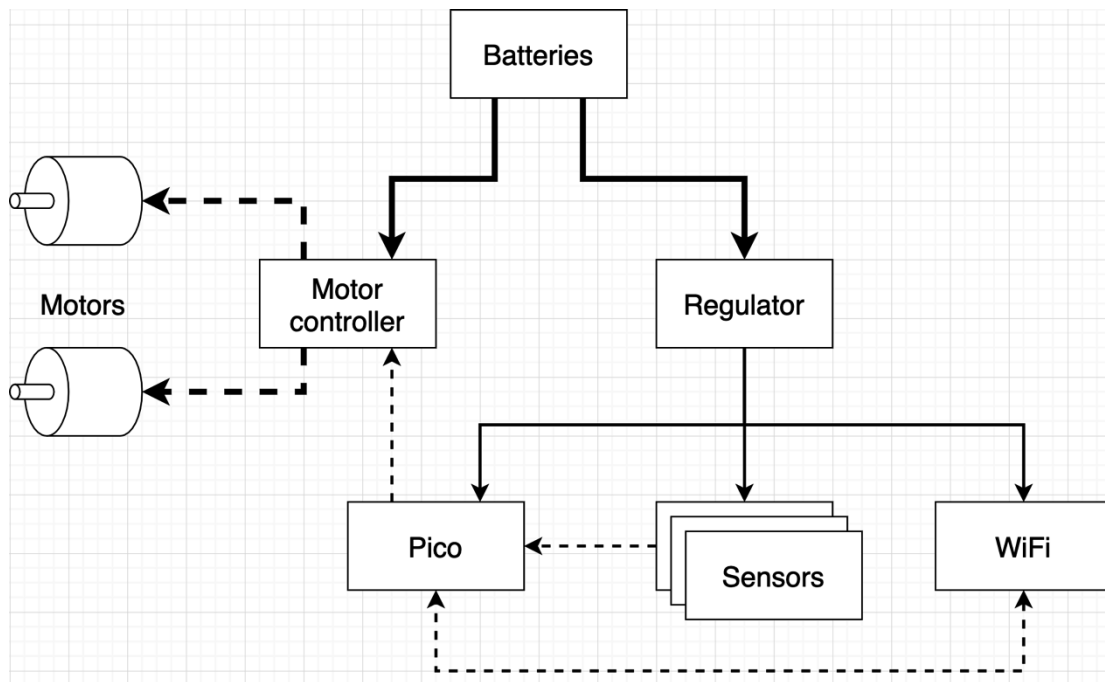
Raspberry Pi Pico

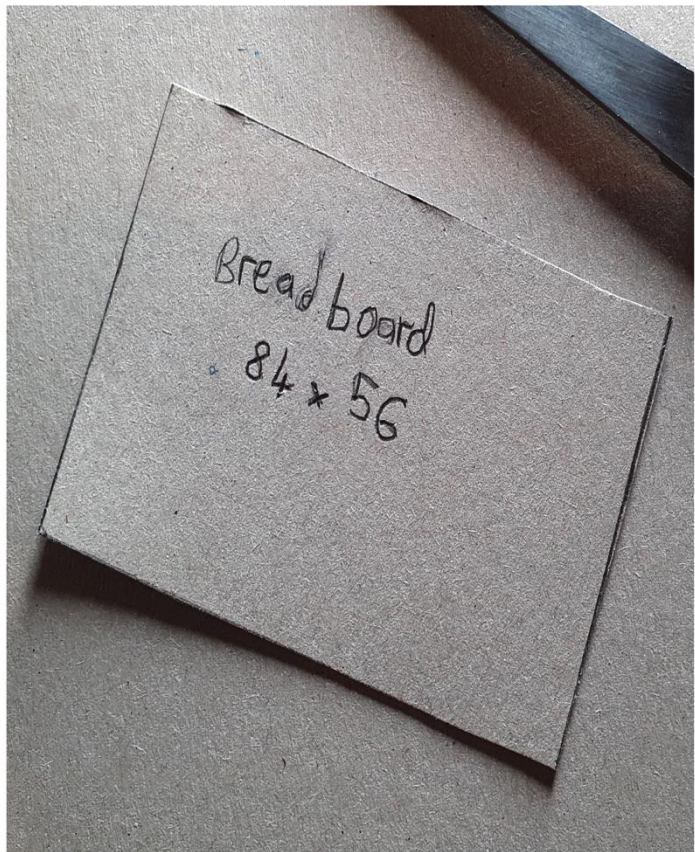
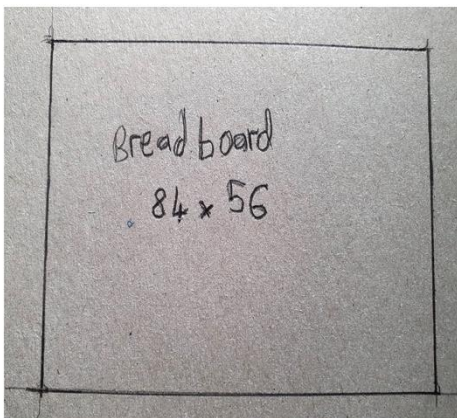
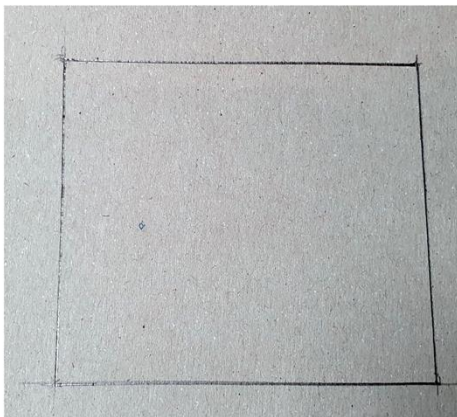
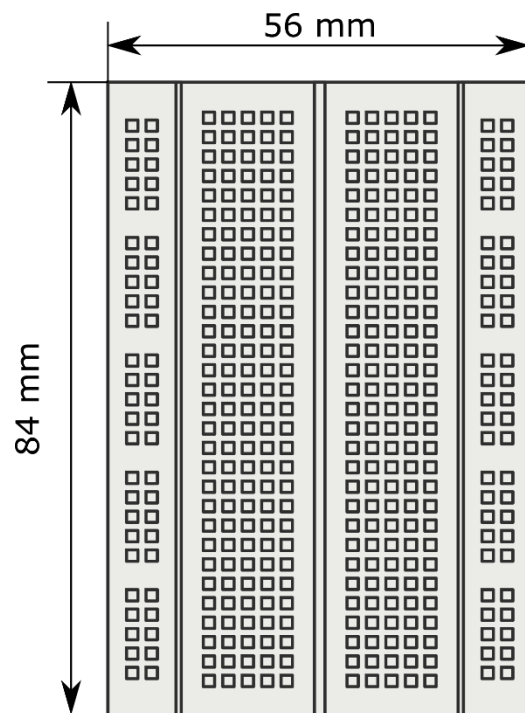


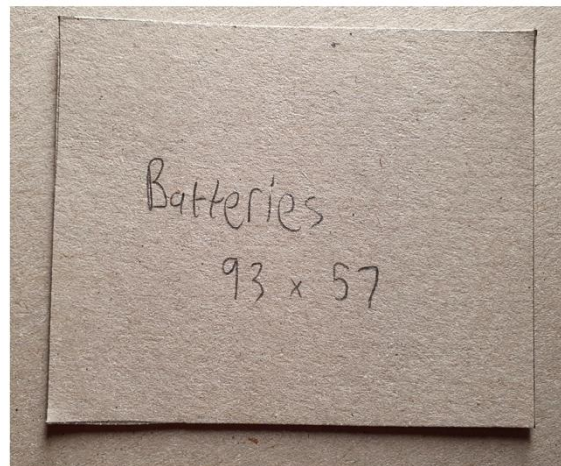
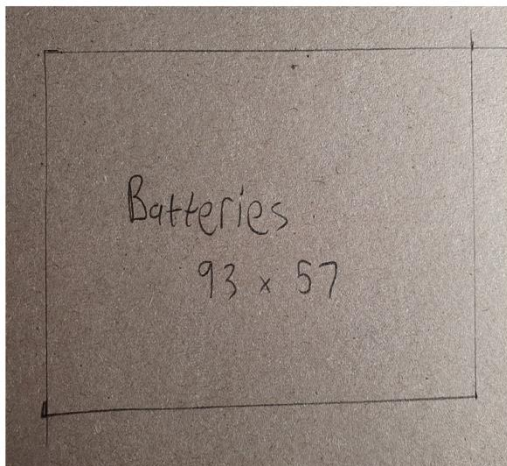
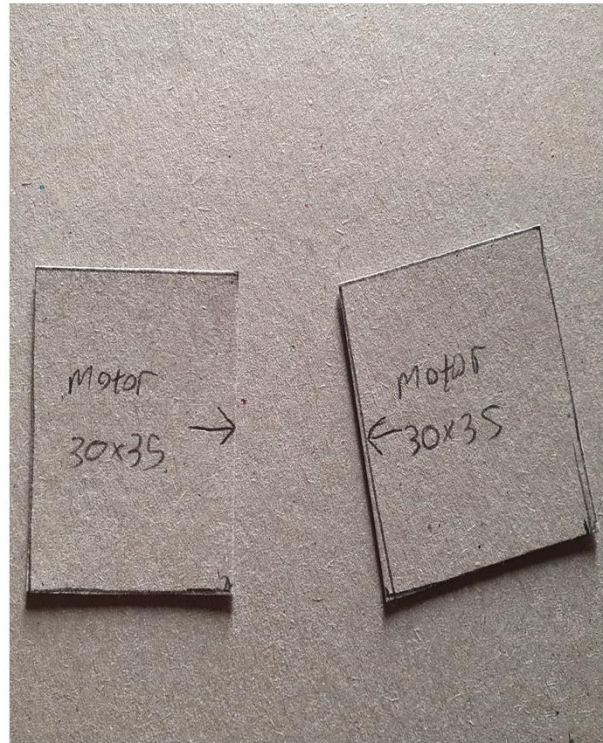
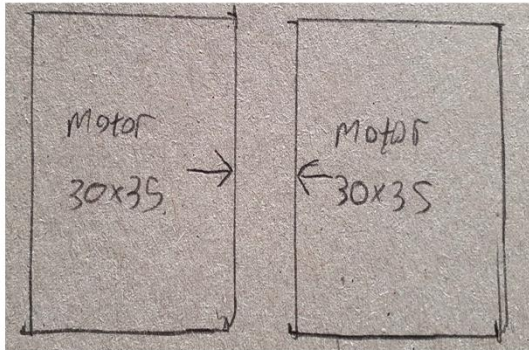
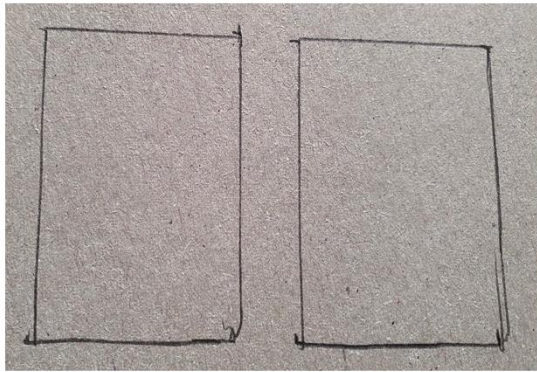


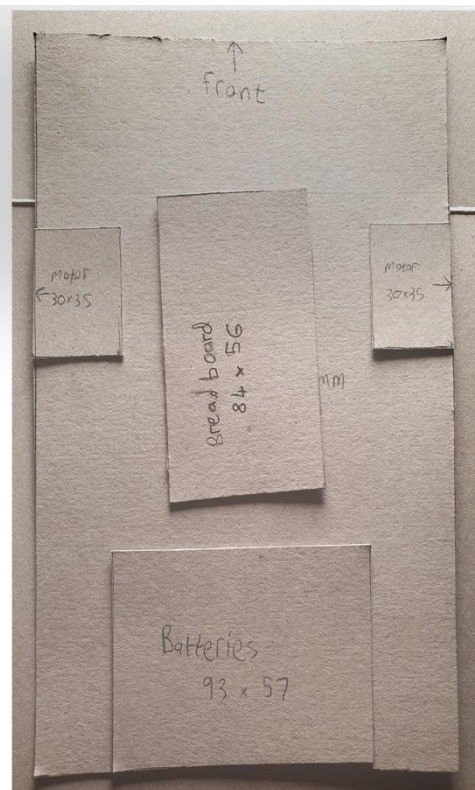
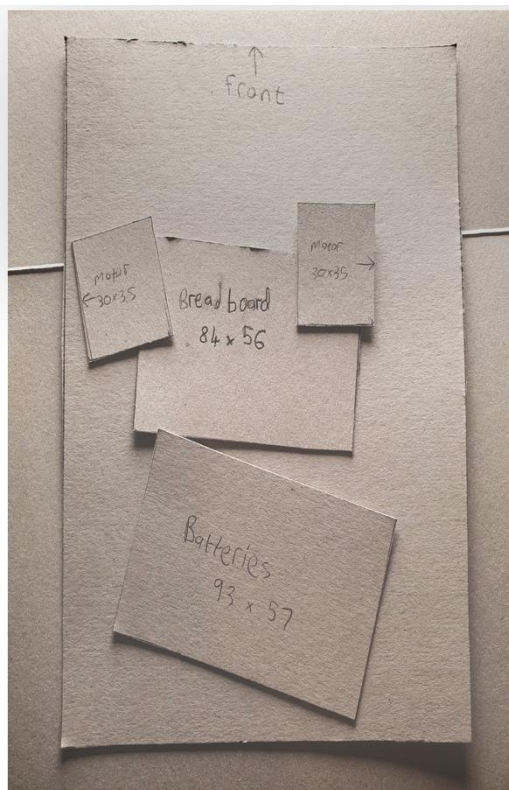
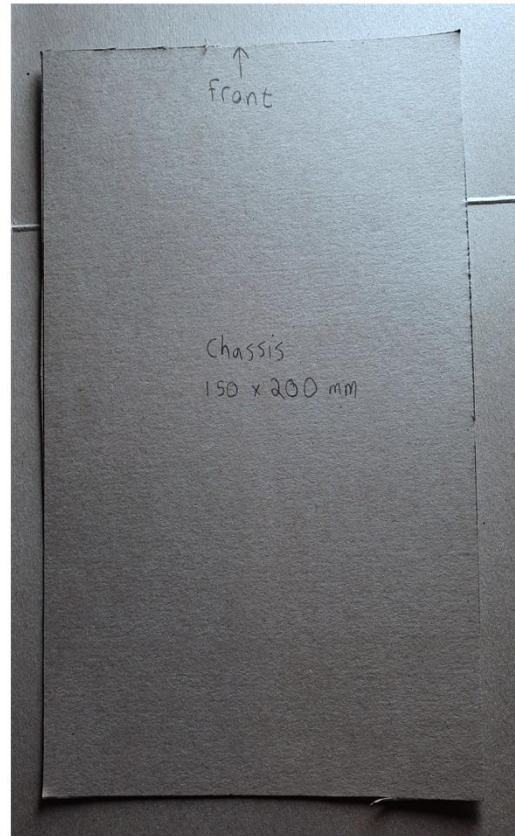
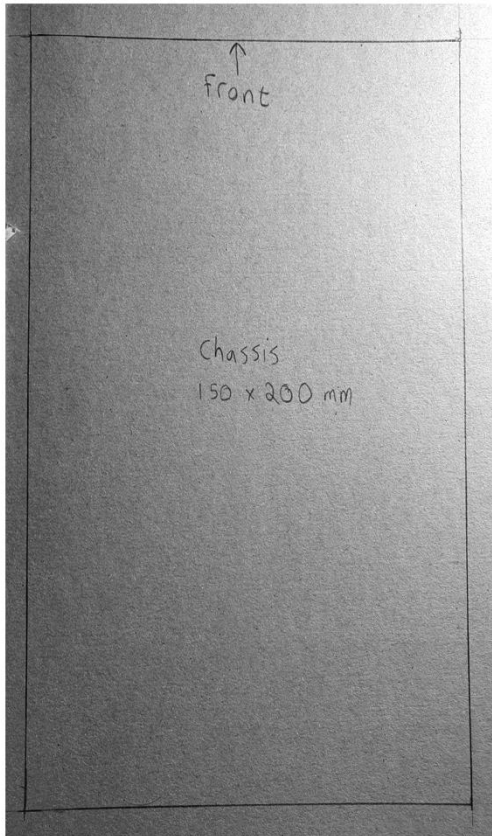
IO Pins



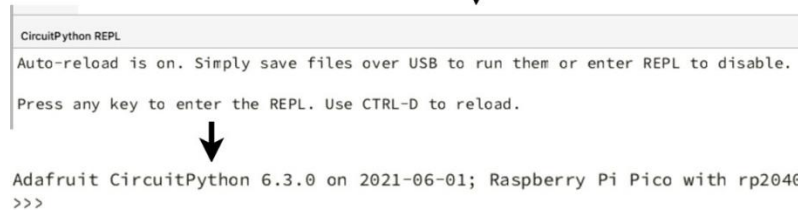
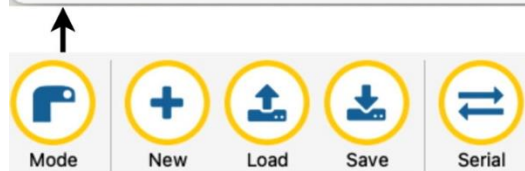
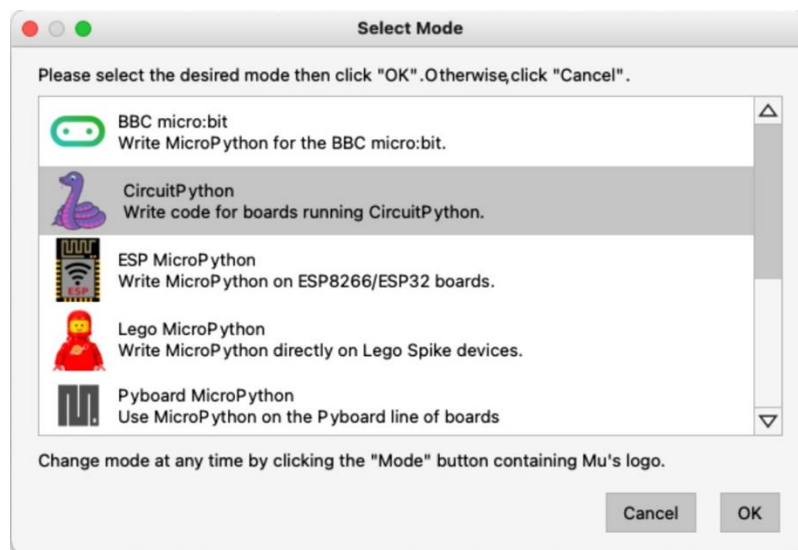
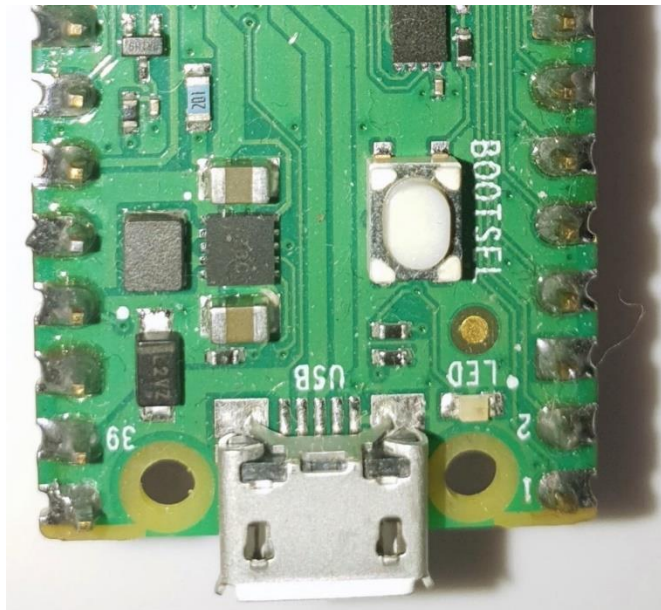


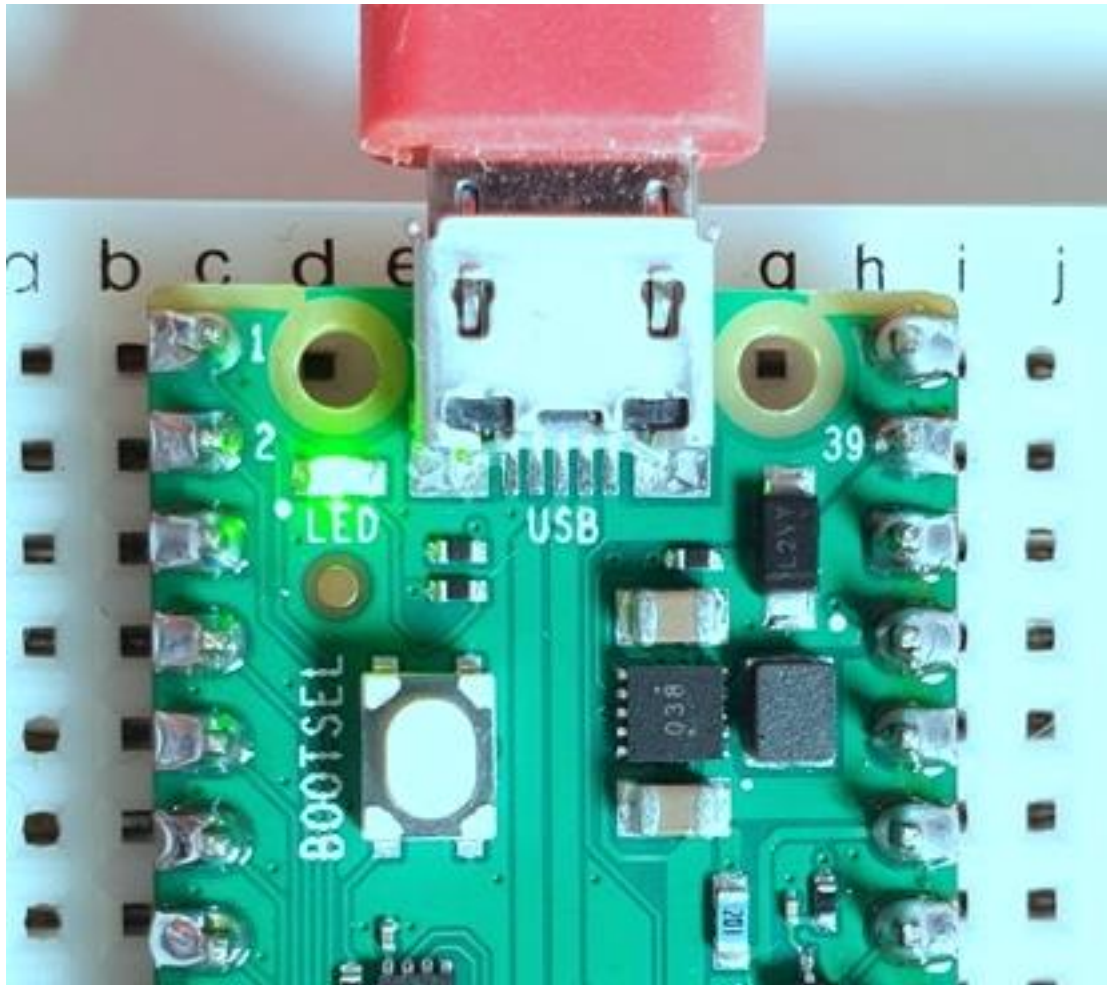




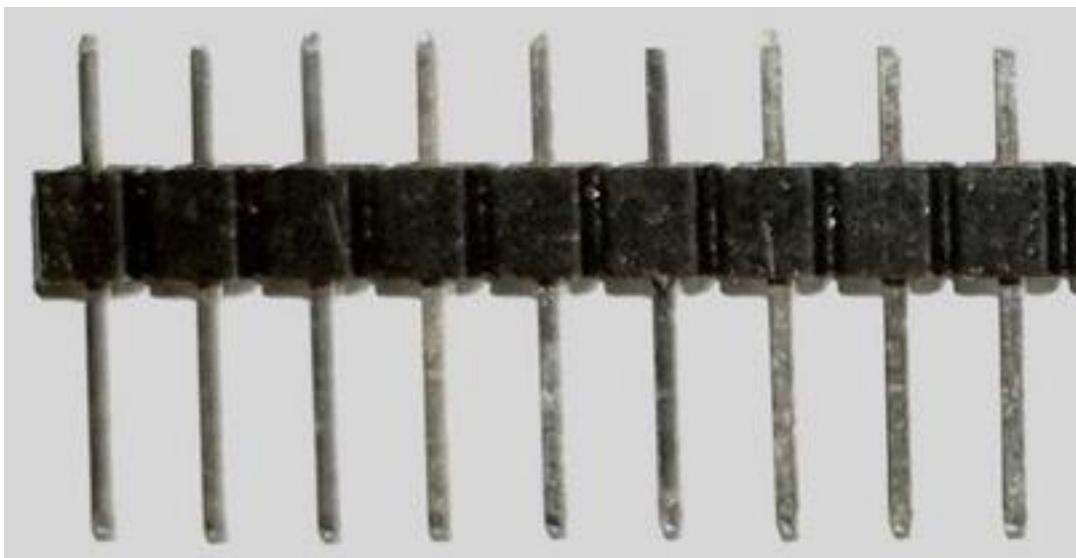


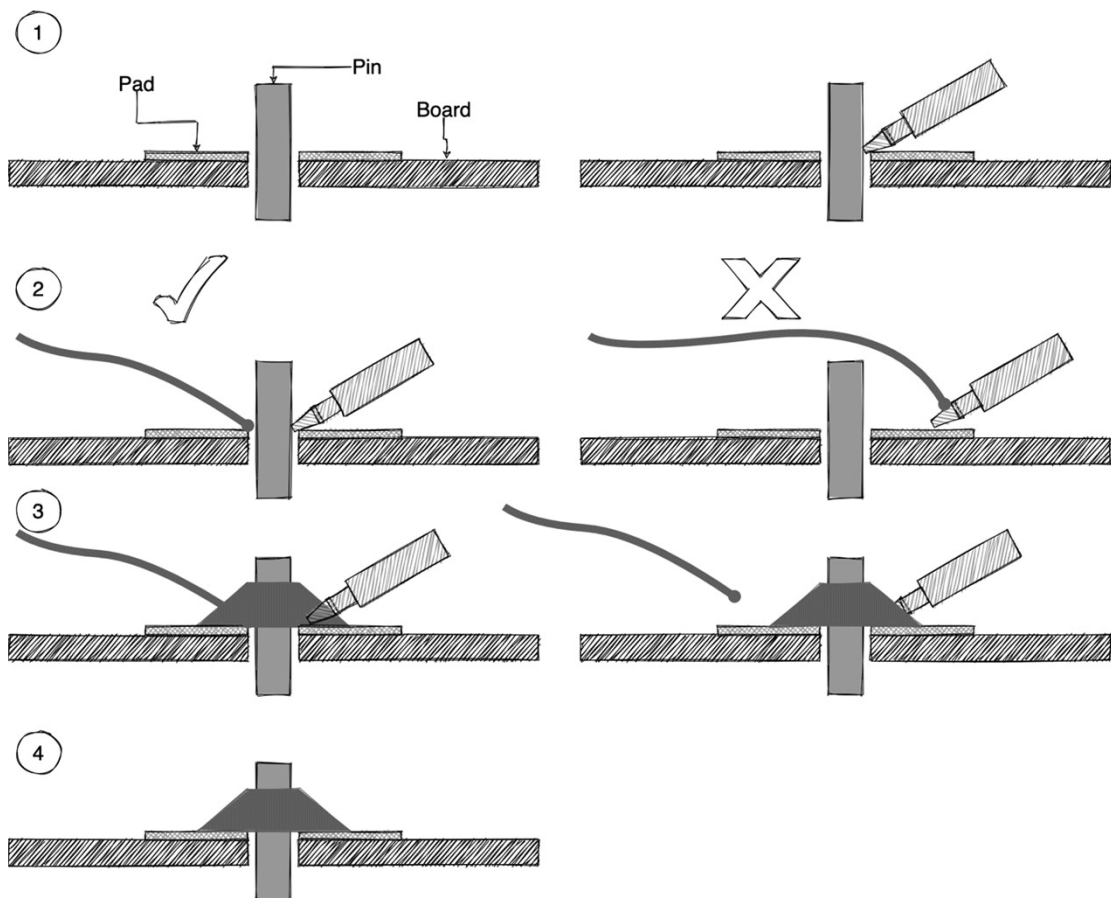
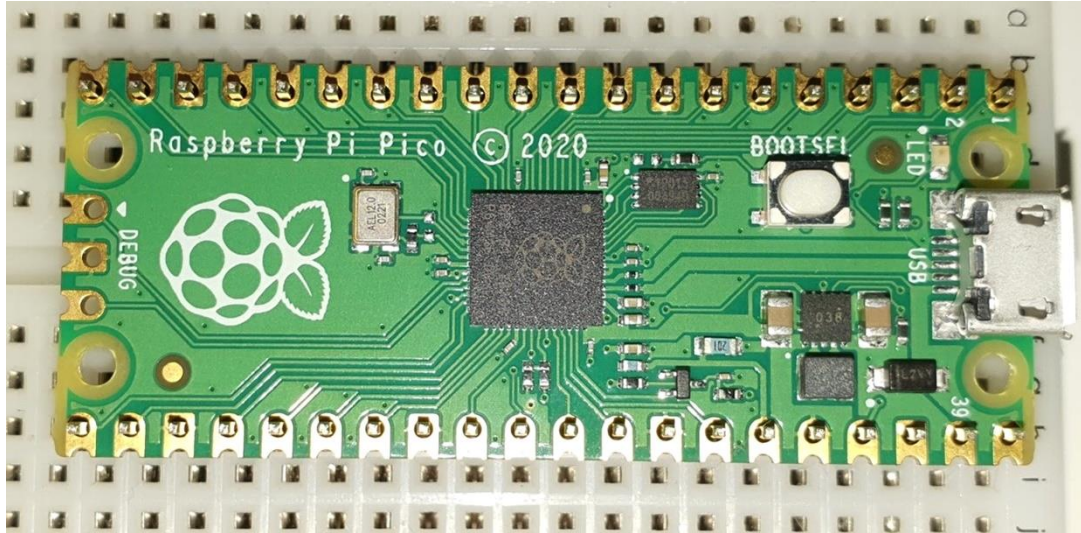
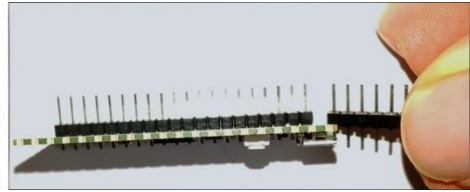
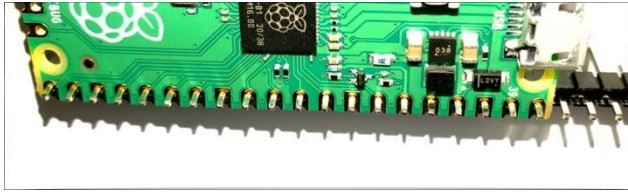
Chapter 2: Preparing Raspberry Pi Pico

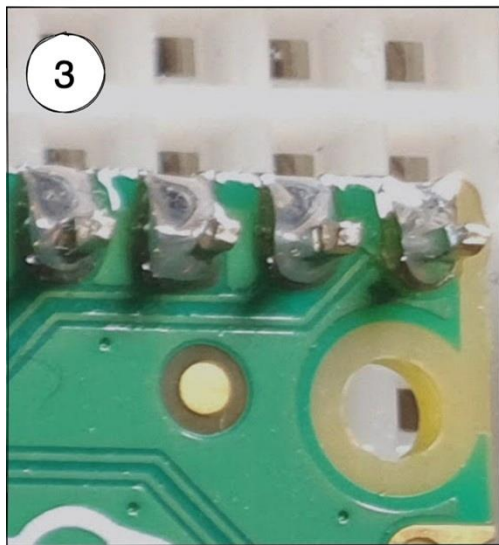
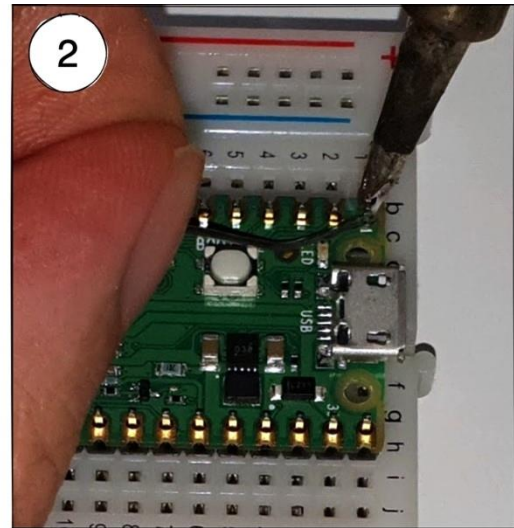
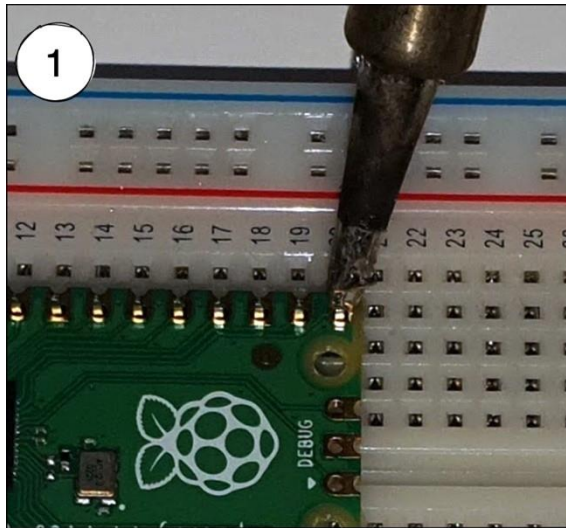




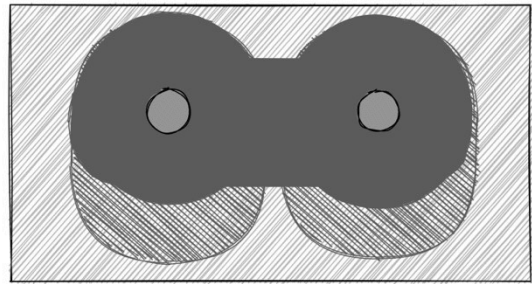
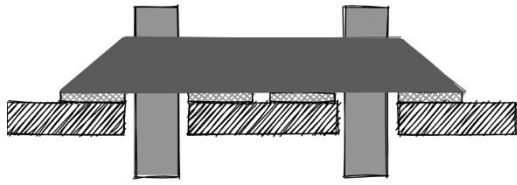
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untitled [red circle] [close icon]
1 # Write your code here :-)
```



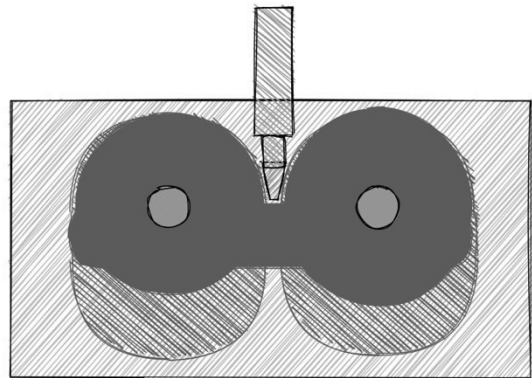
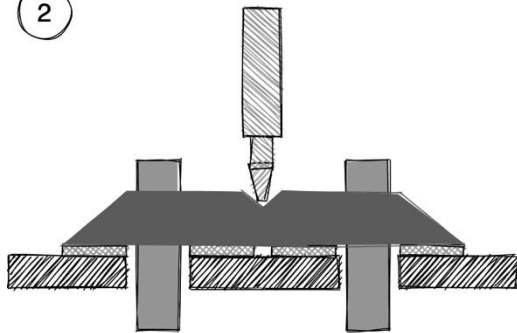




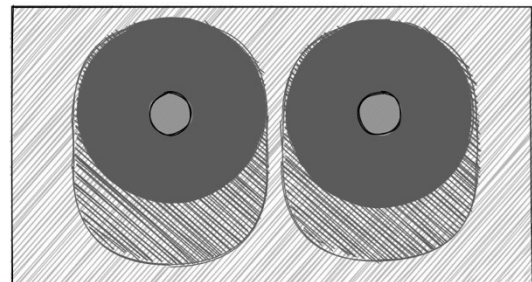
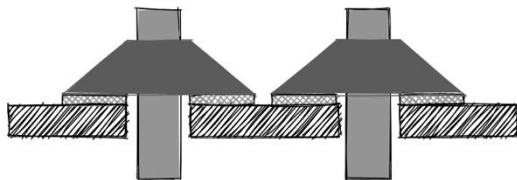
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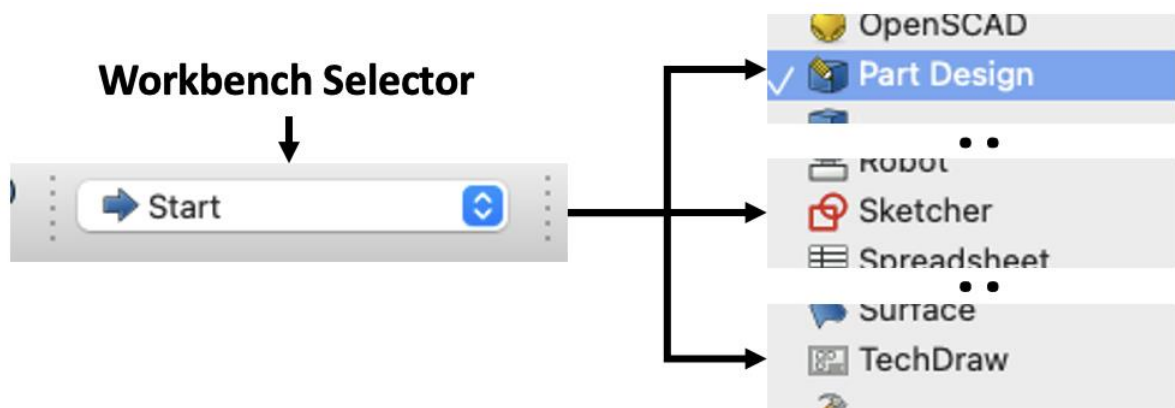
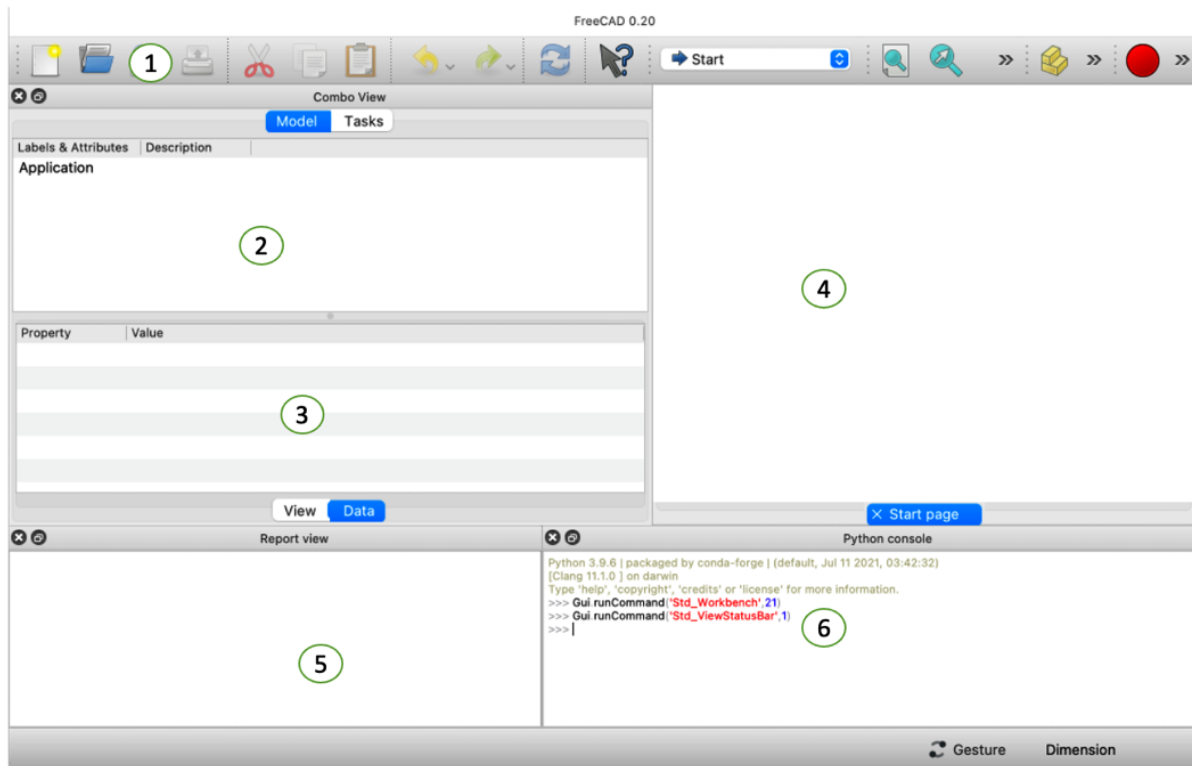
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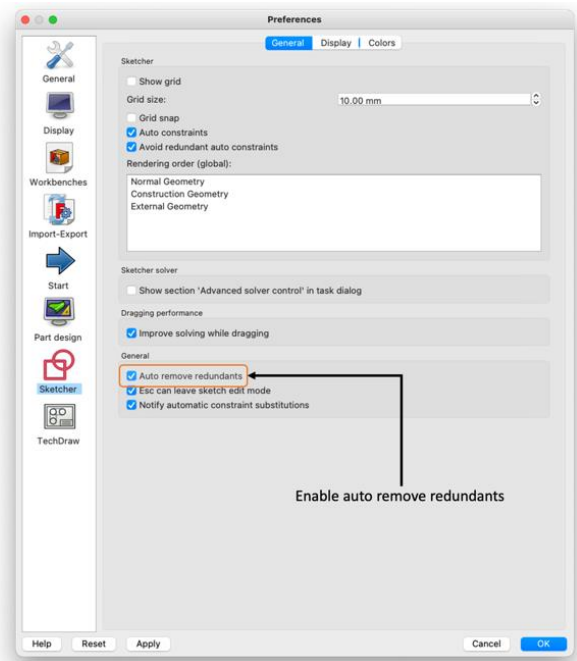
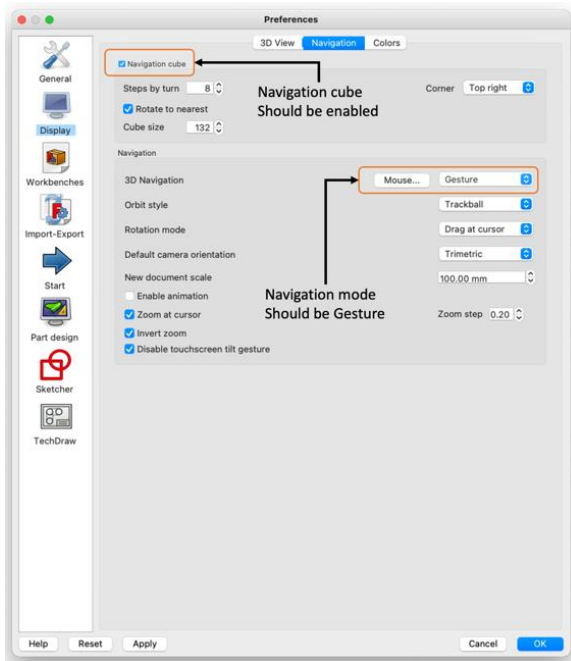
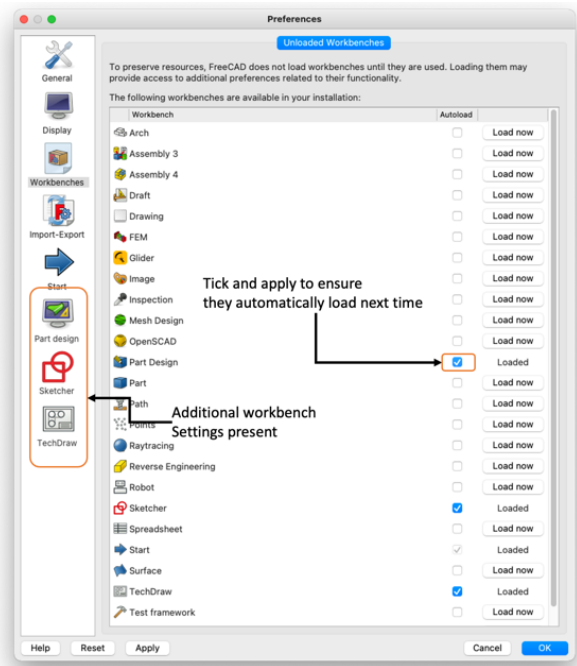
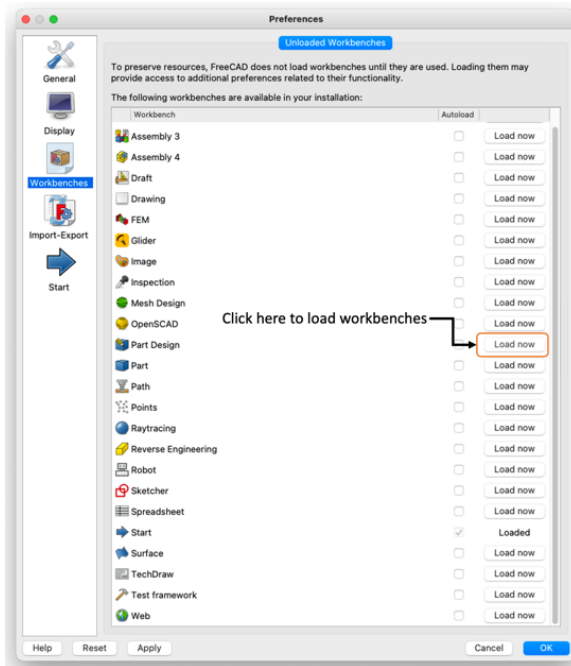


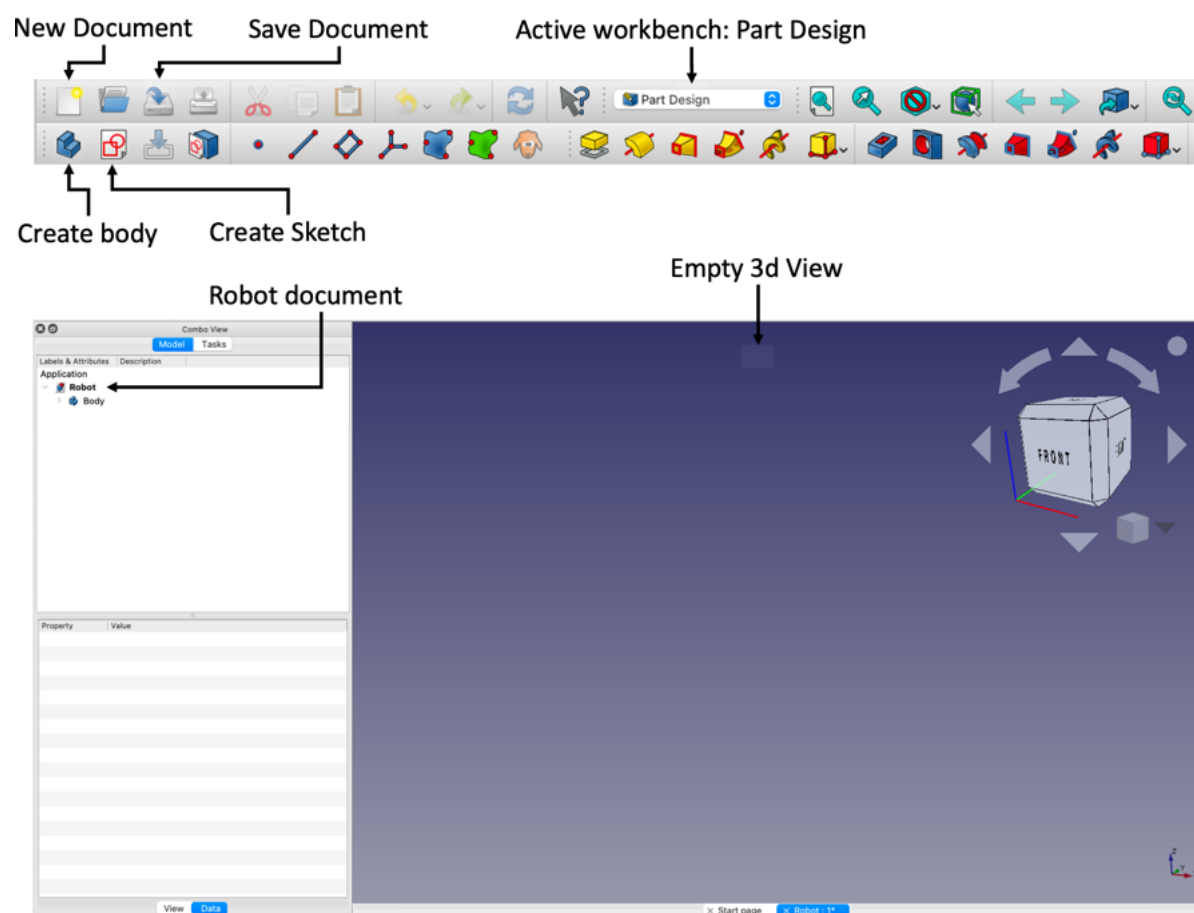
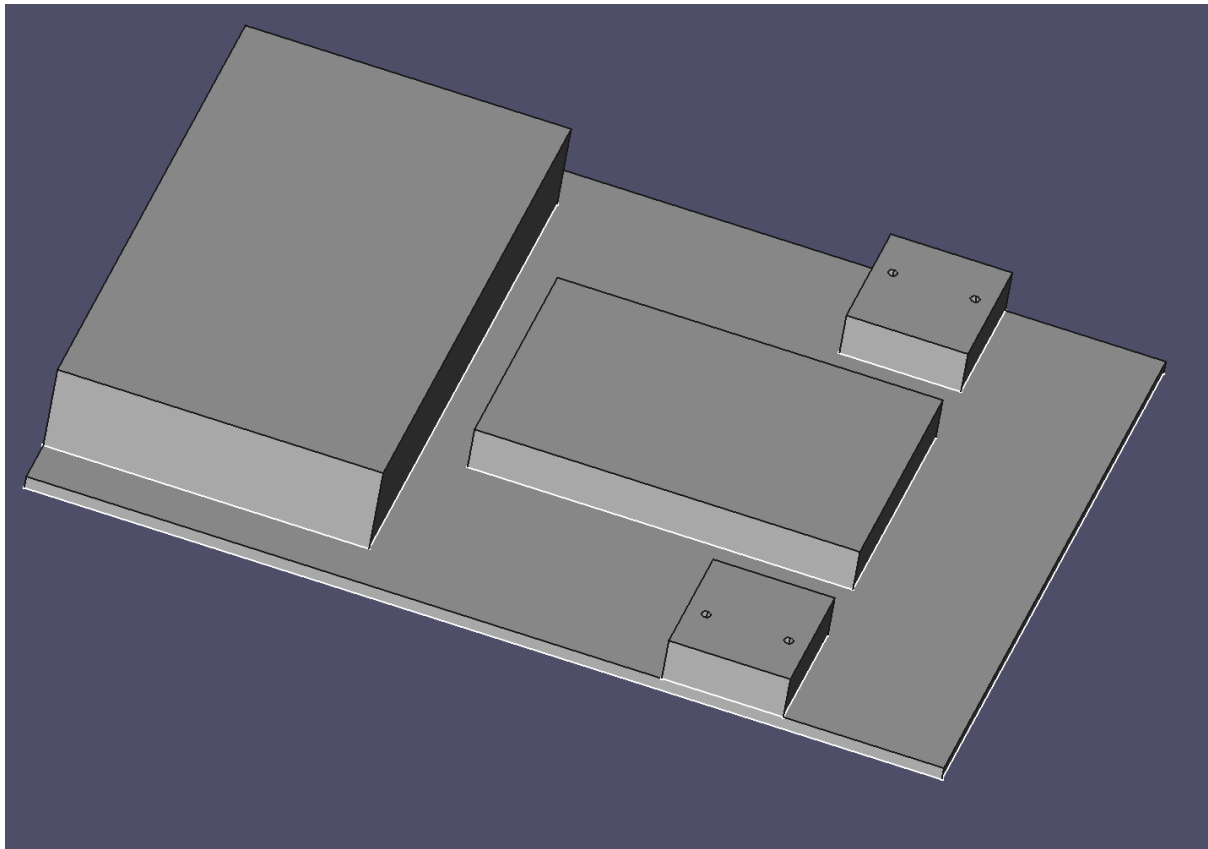
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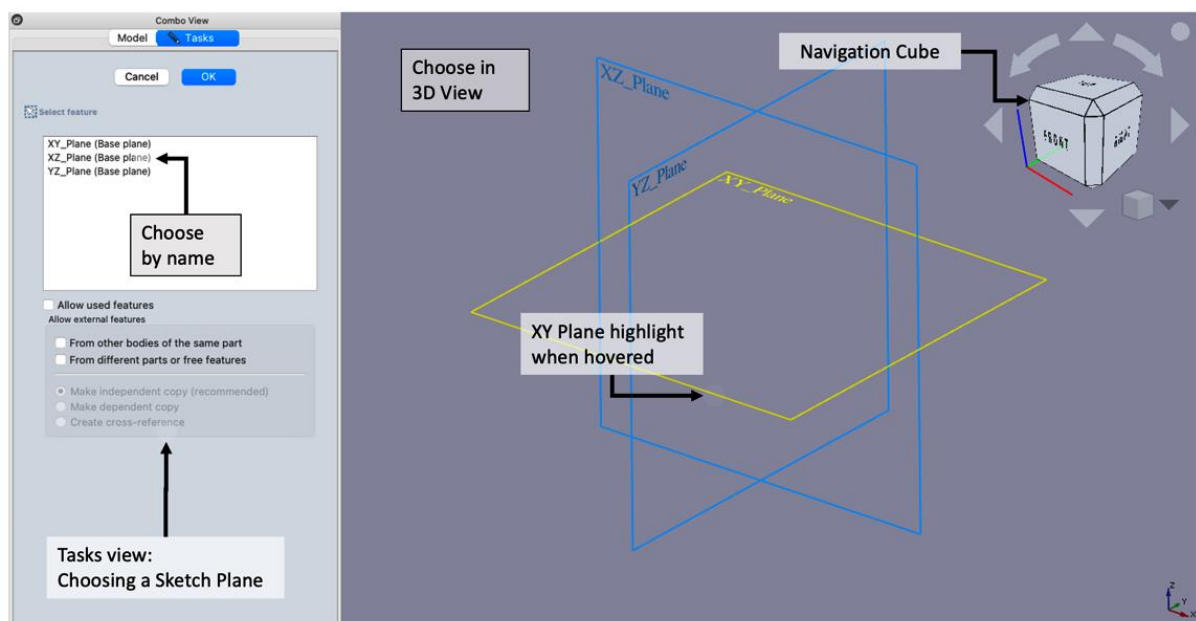
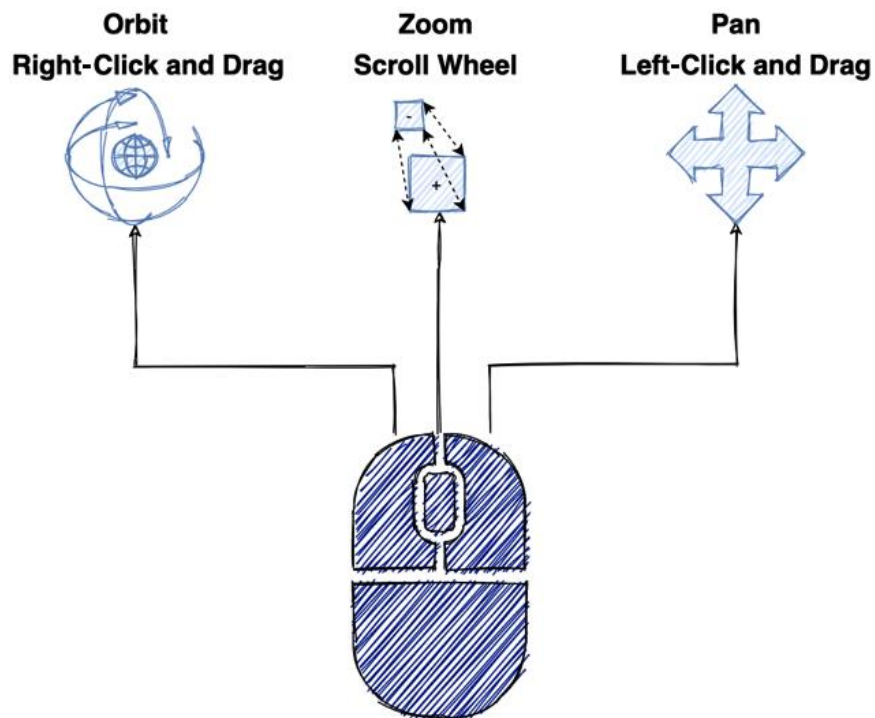


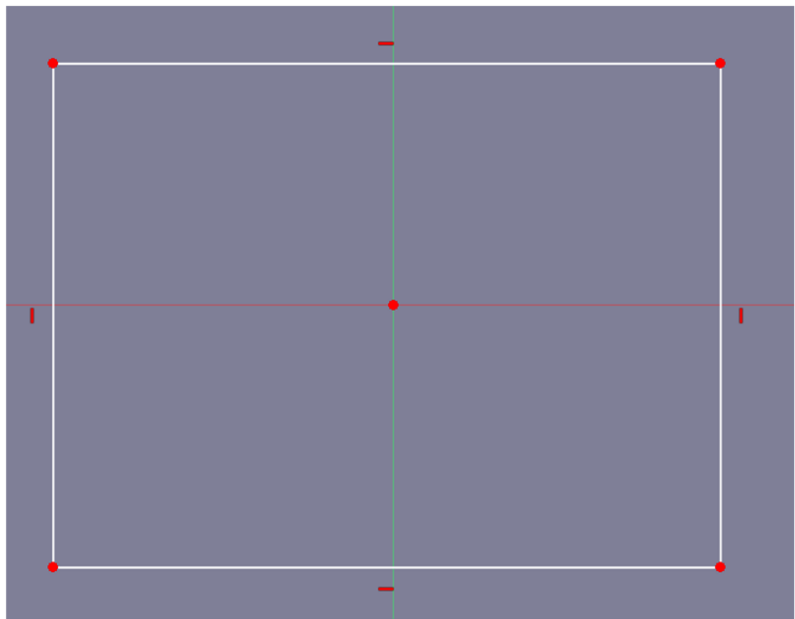
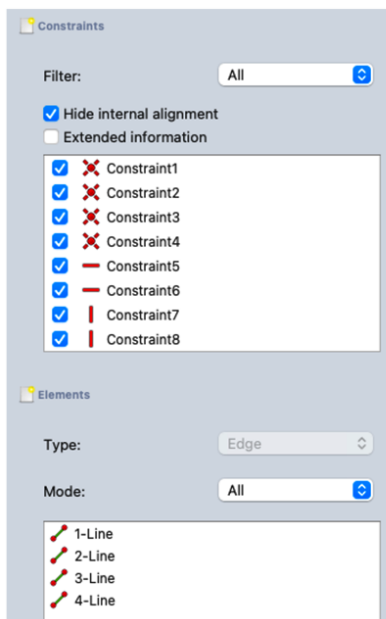
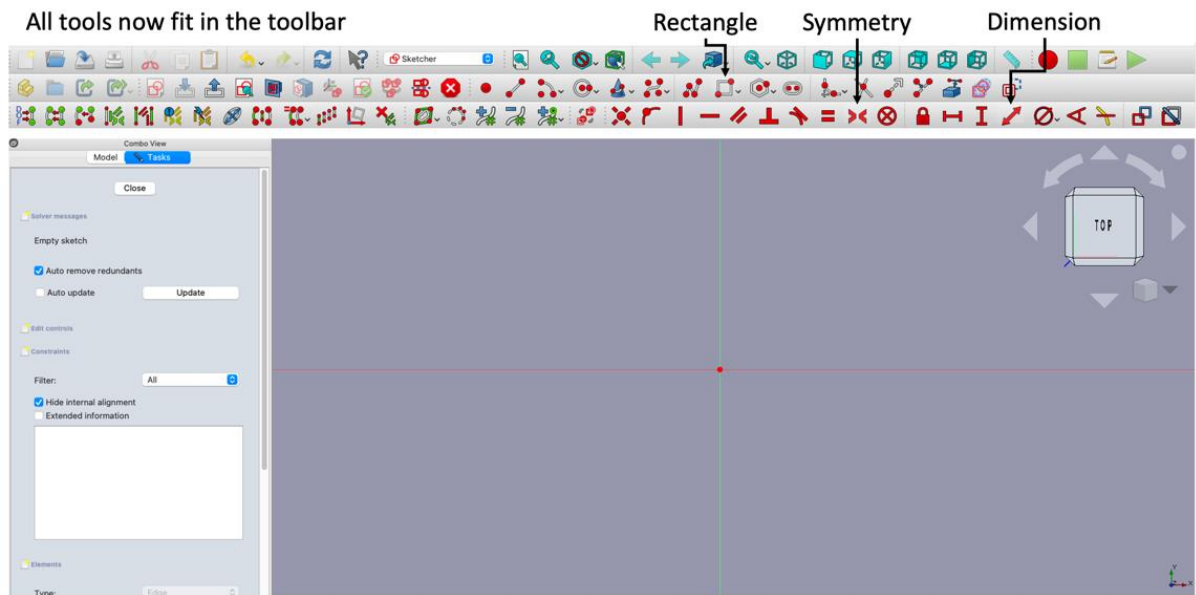
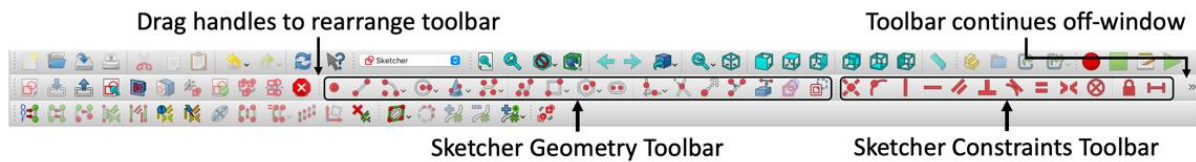
Chapter 3: Designing a Robot Chassis in FreeCAD



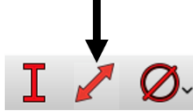




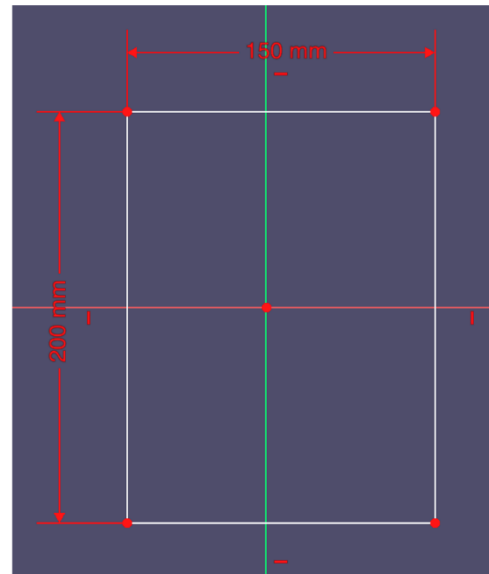
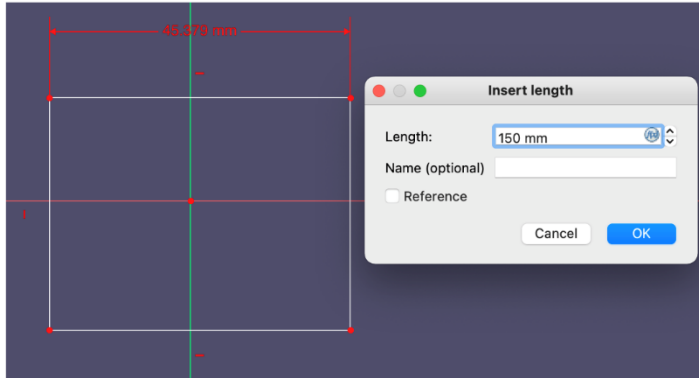




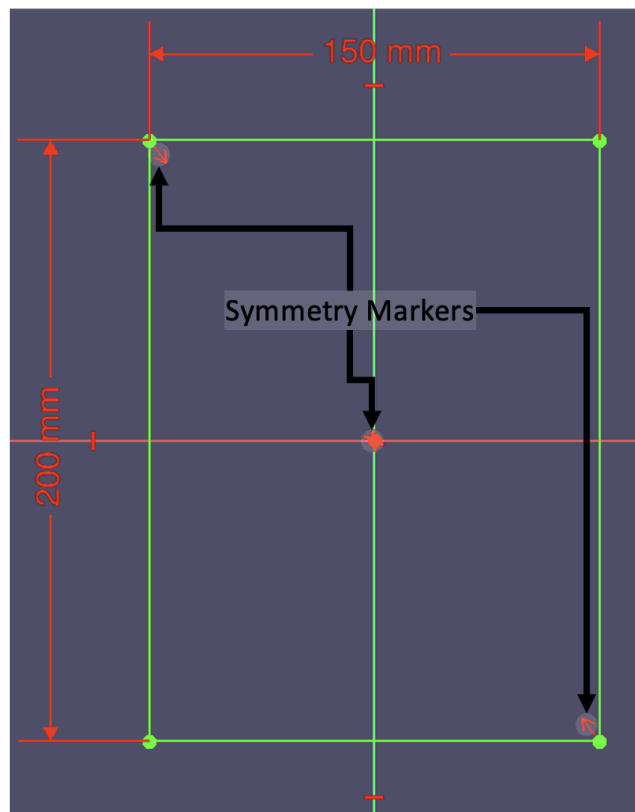
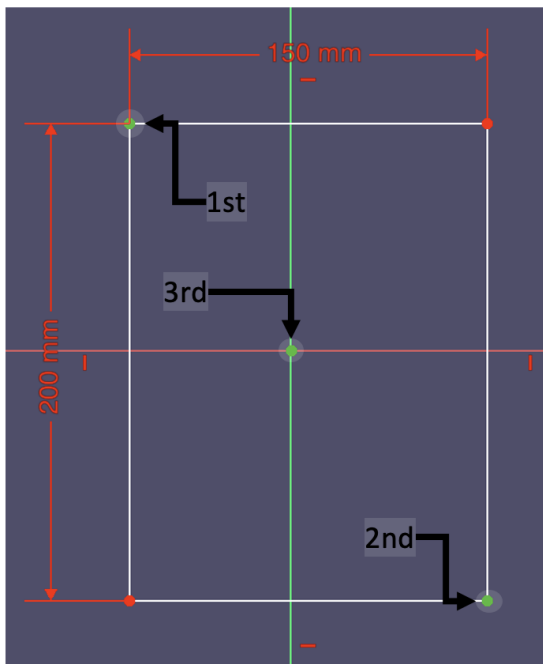
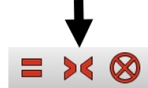
Dimension

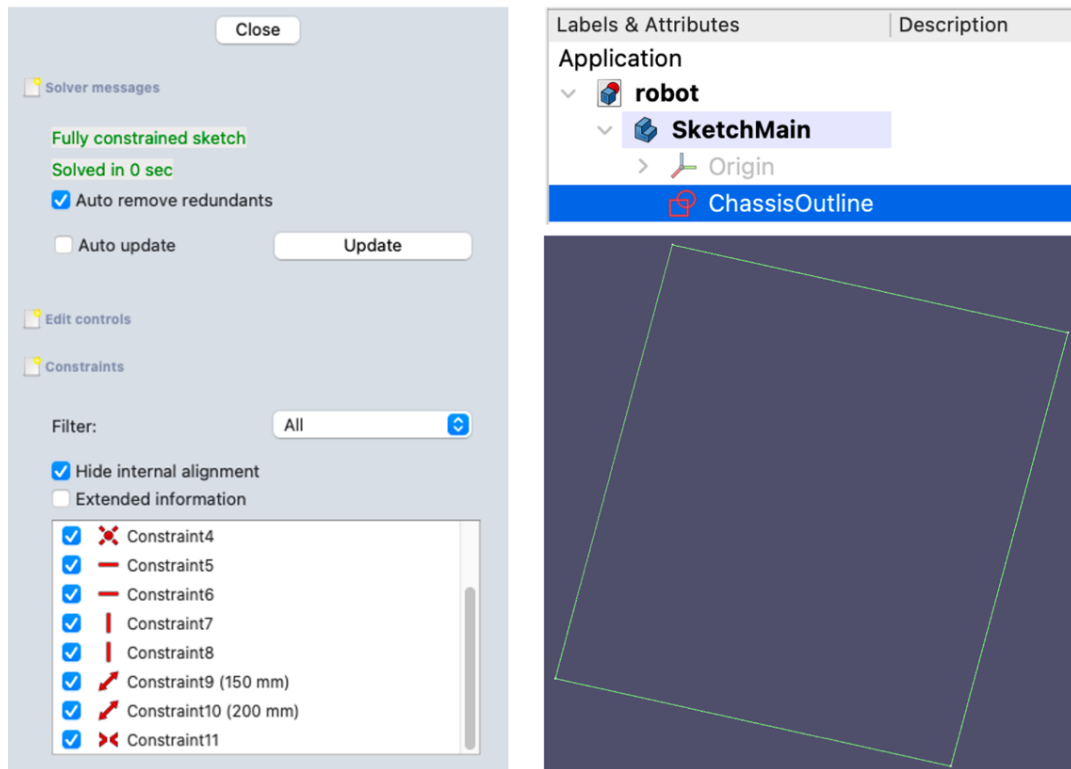


Fit content to screen

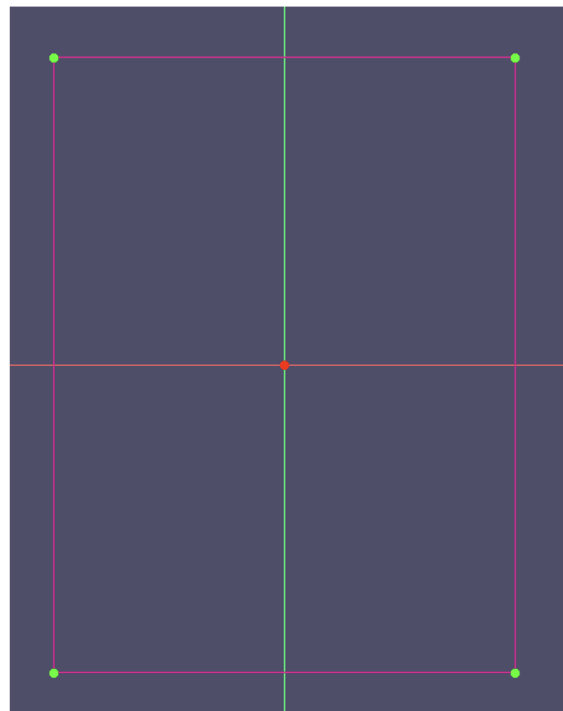


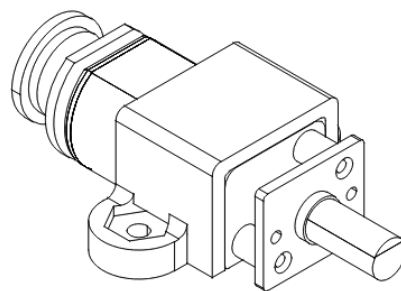
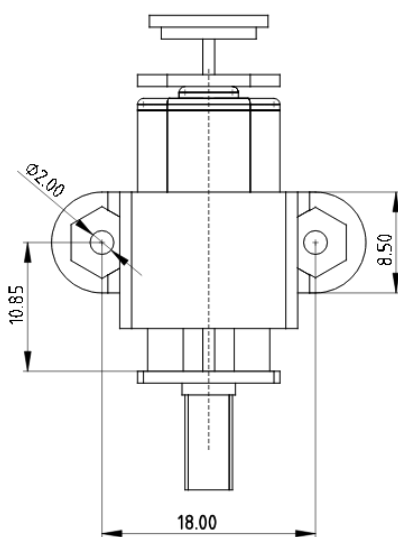
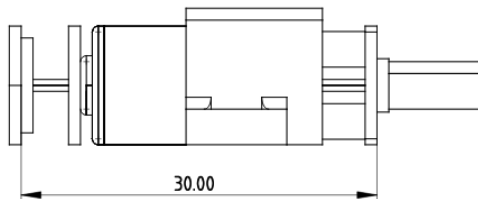
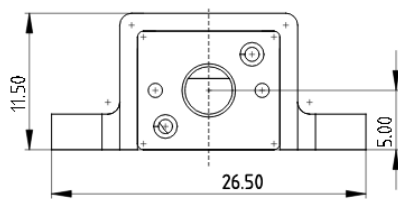
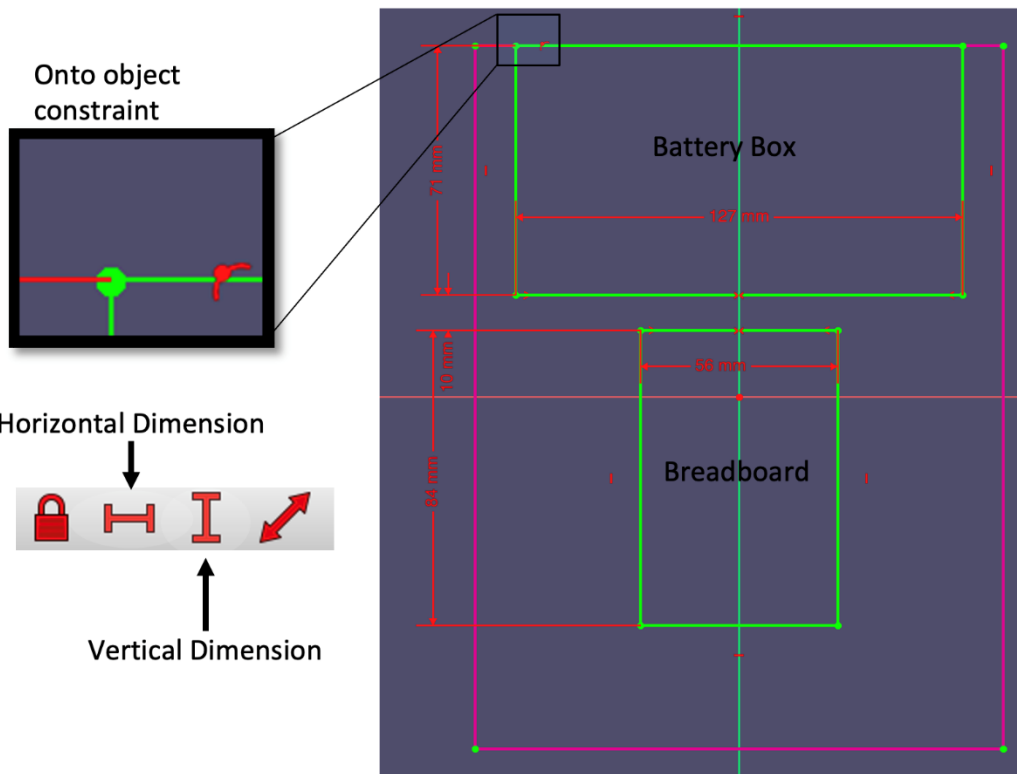
Symmetry

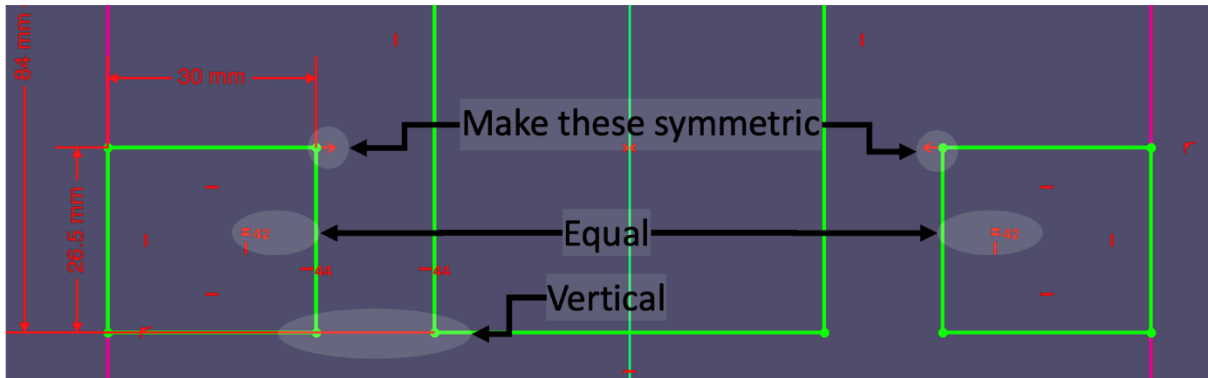
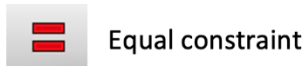




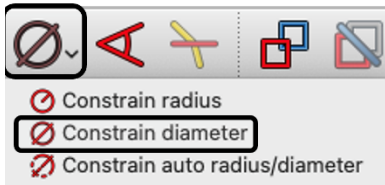
External geometry







Constraining diameter



Line tool



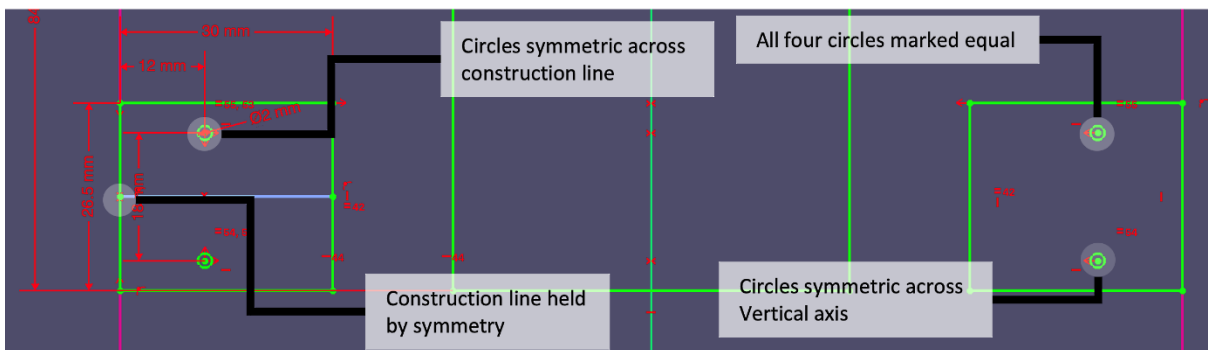
Toggle construction

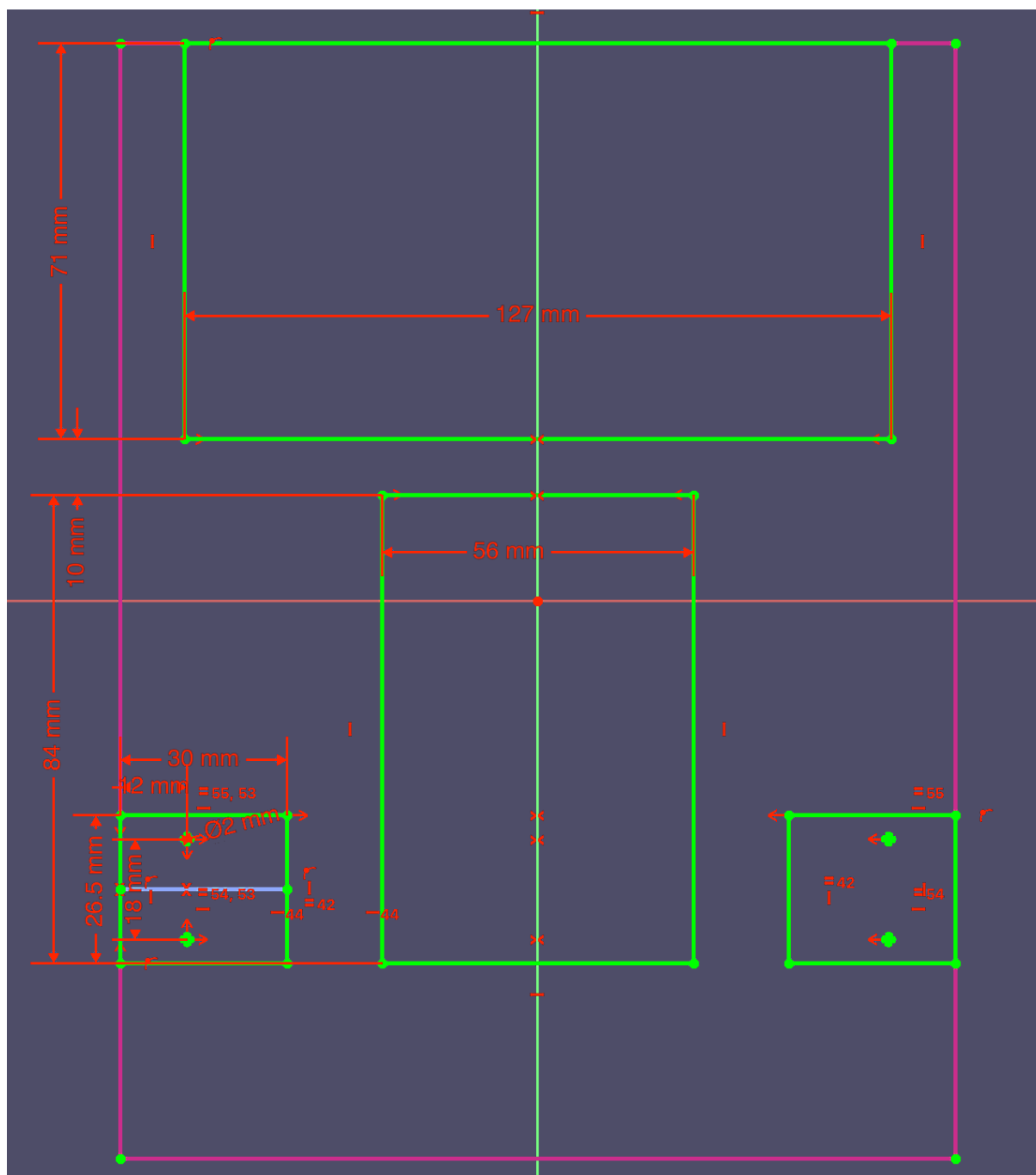


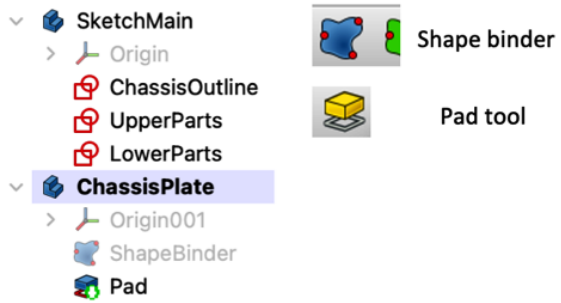
Circle tool



Equal constraint



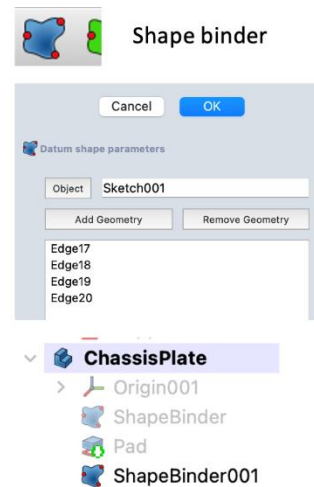
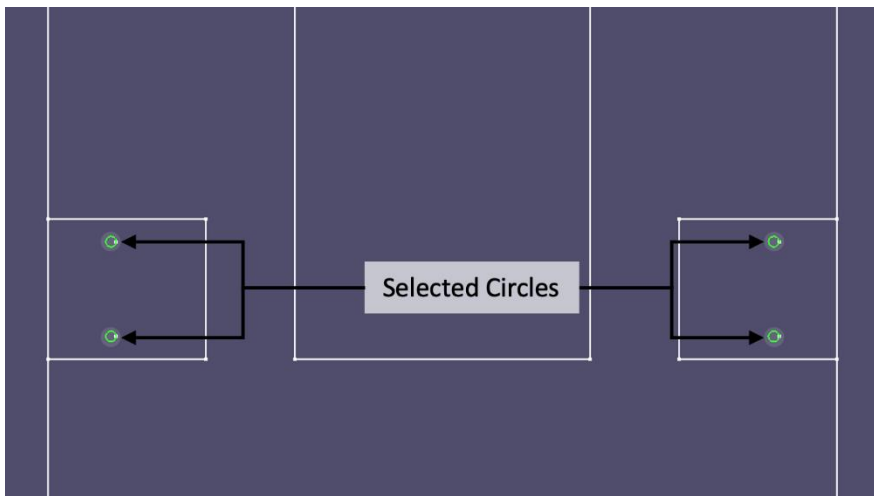
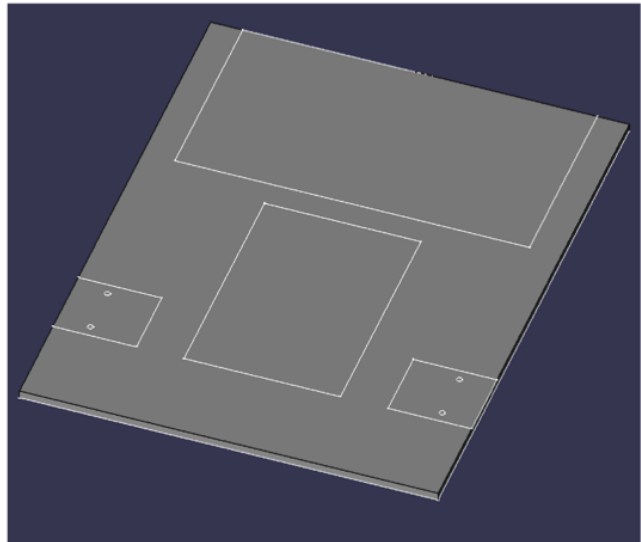
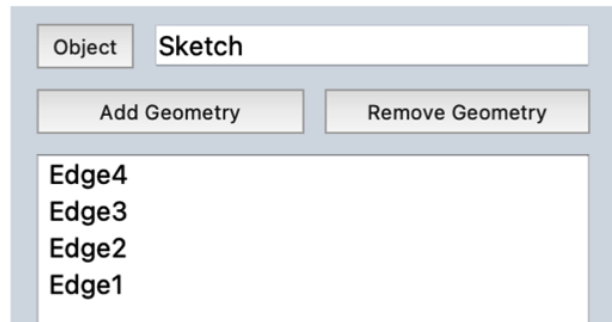




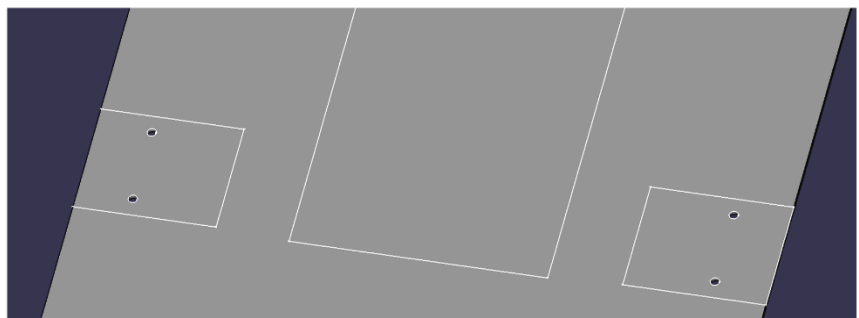
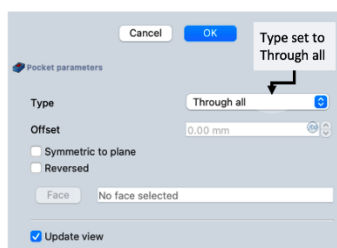
Shape binder

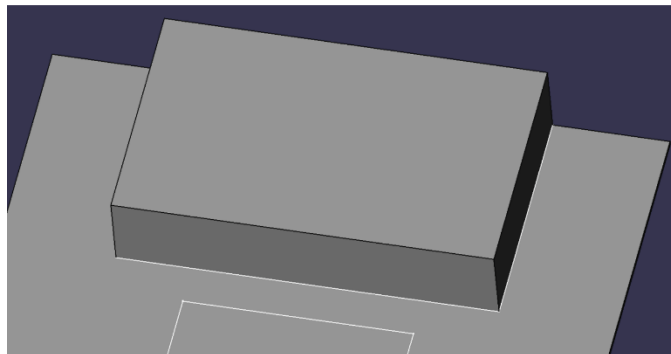
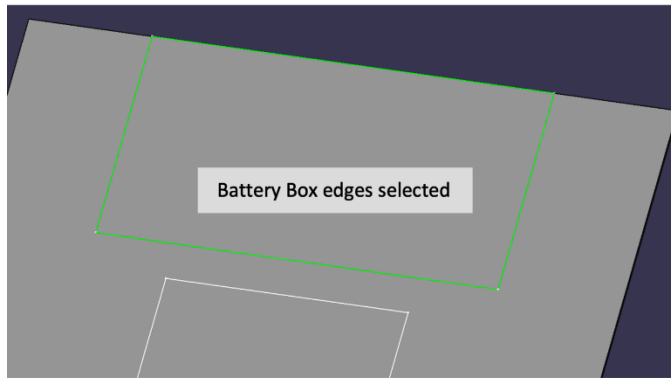





Pad tool



Pocket tool





-  New body
-  Shape Binder
-  Pad

Cancel OK

Pad parameters

Type Dimension

Length 20 mm

Direction

Direction/edge: Face normal

☐ Show direction

☒ Length along sketch normal















☐ Symmetric to plane

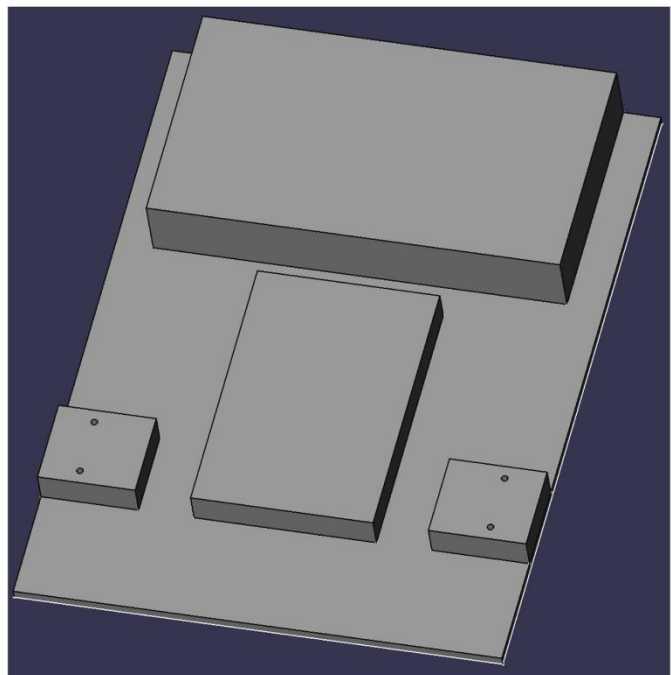
☐ Reversed

Taper angle 0.00 °

Face No face selected

☒ Update view

- ▼  **robot**
 - ▼  SketchMain
 - >  Origin
 -  ChassisOutline
 -  UpperParts
 -  LowerParts
 - >  ChassisPlate
 - >  BatteryBox
 - >  Breadboard
 - >  LeftMotor
 - ▼  **RightMotor**
 - >  Origin005
 -  ShapeBinder005
 -  Pad004



Cancel OK

Pocket parameters

Type: Through all

Offset to face: 0.00 mm

Direction

Direction/edge: Face normal

☐ Show direction

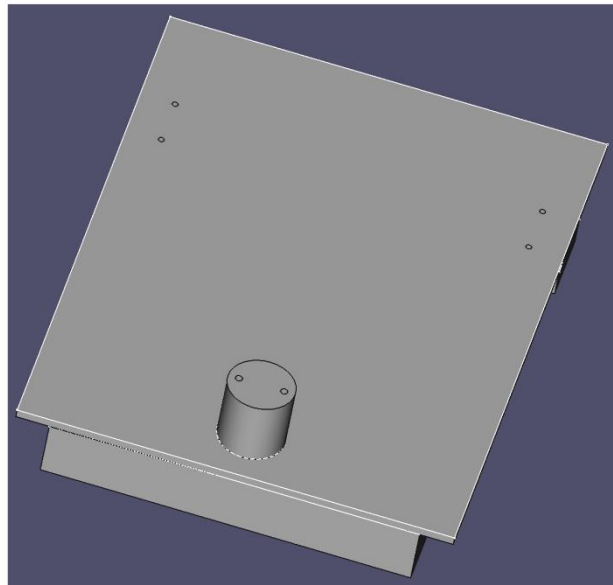
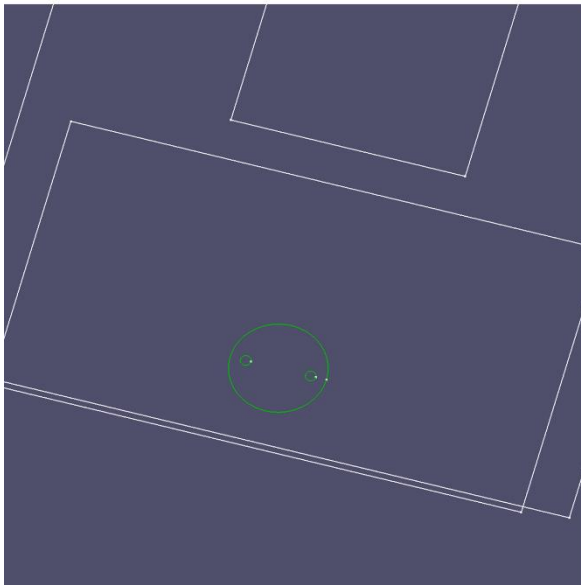
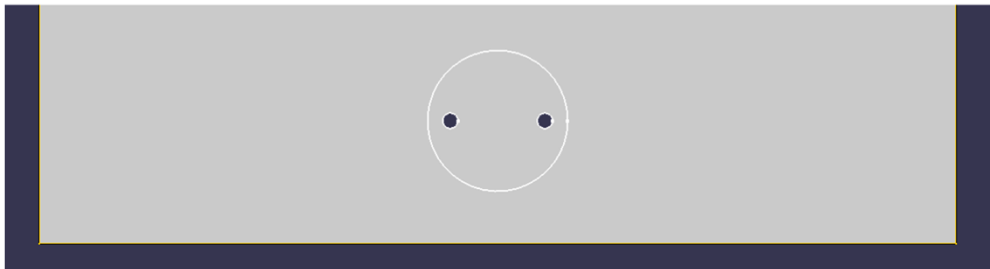
☐ Symmetric to plane

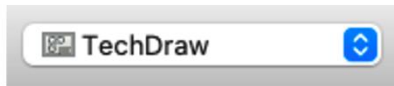
☐ Reversed

Select face: No face selected

☒ Update view

- SketchMain
 - Origin
 - ChassisOutline
 - UpperParts
 - LowerParts
- ChassisPlate
 - Origin01
 - ShapeBinder
 - Pad
 - ShapeBinder001
 - Pocket
 - ShapeBinder006
 - Pocket001
 - ShapeBinder007
 - Pocket002





Enter the TechDraw workbench



Create drawing from template

Application

- robot
 - SketchMain
 - ChassisPlate
 - BatteryBox
 - Breadboard
 - LeftMotor
 - RightMotor
 - Castor
 - CuttingDimensions

New drawing

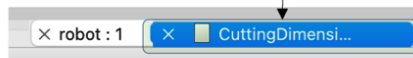
Select Chassis Plate

- Application
- robot
 - SketchMain
 - ChassisPlate
 - BatteryBox
 - Breadboard
 - LeftMotor
 - RightMotor
 - Castor
 - CuttingDimensions



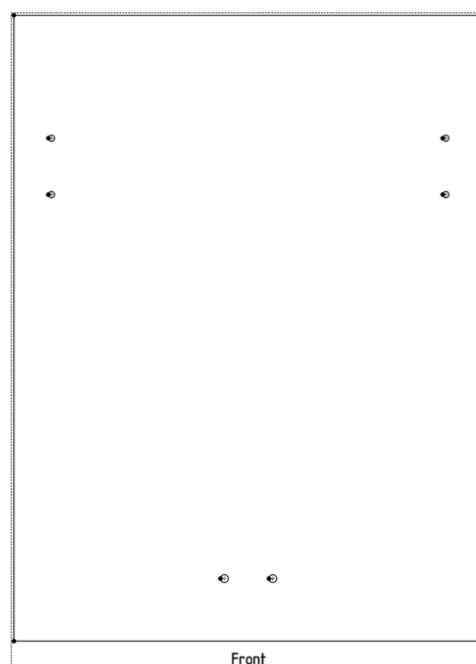
Bottom View

Drawing Tab



Insert projection group

View in TechDraw





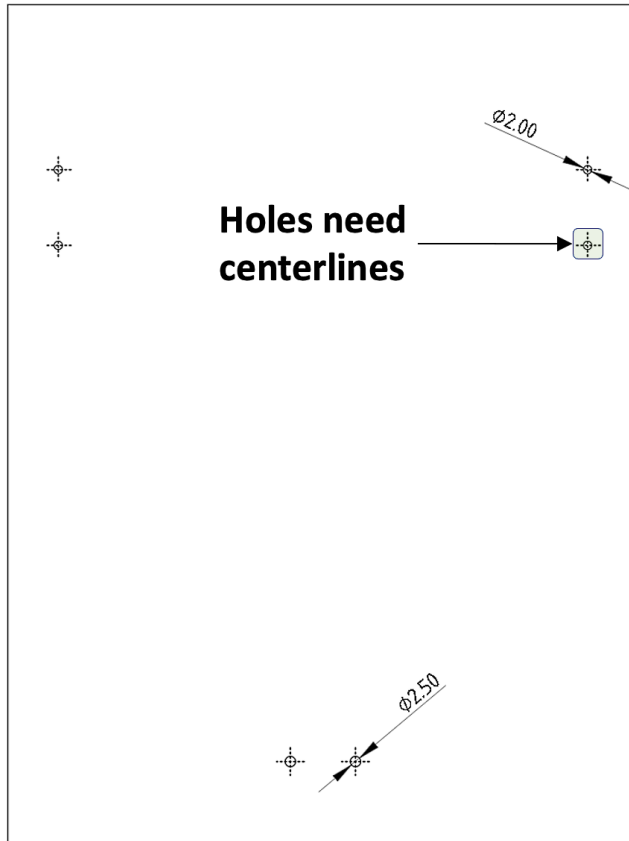
Toggle view frames



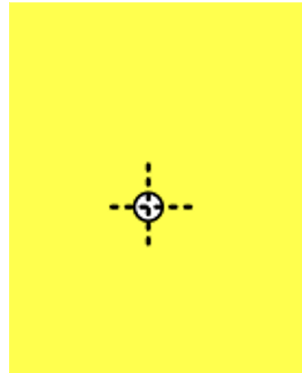
Insert diameter dimension



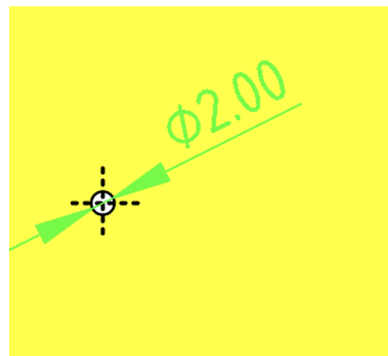
Draw circle centerlines

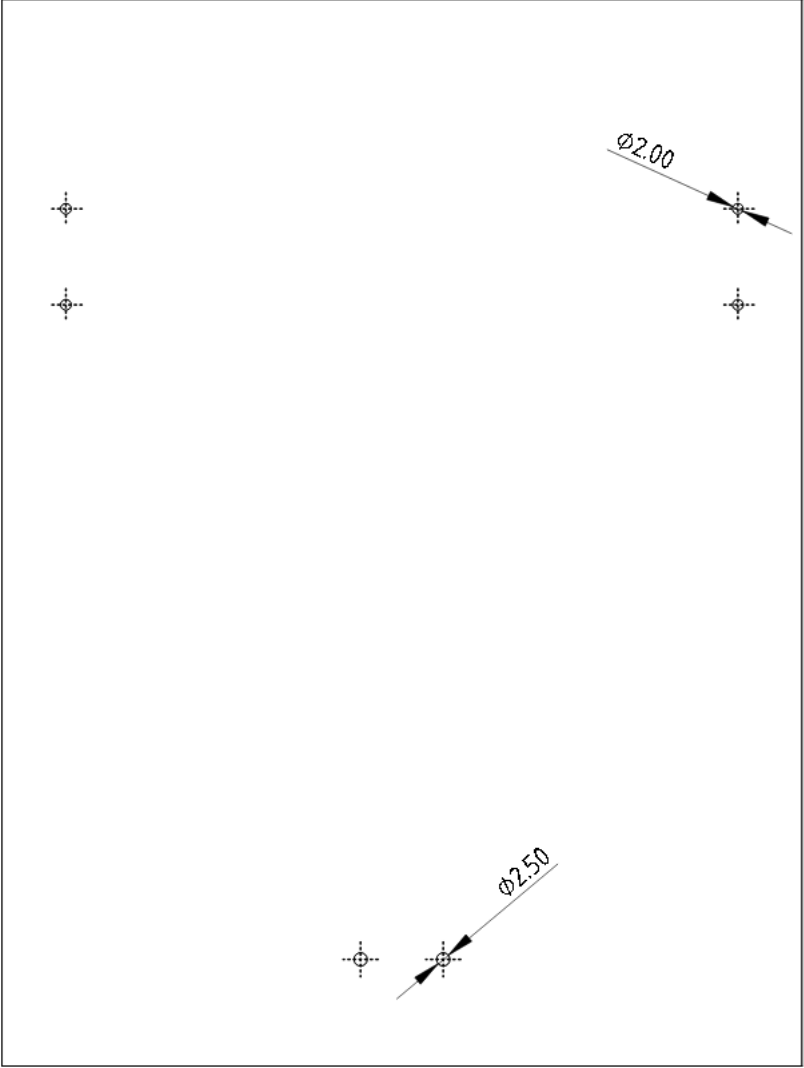


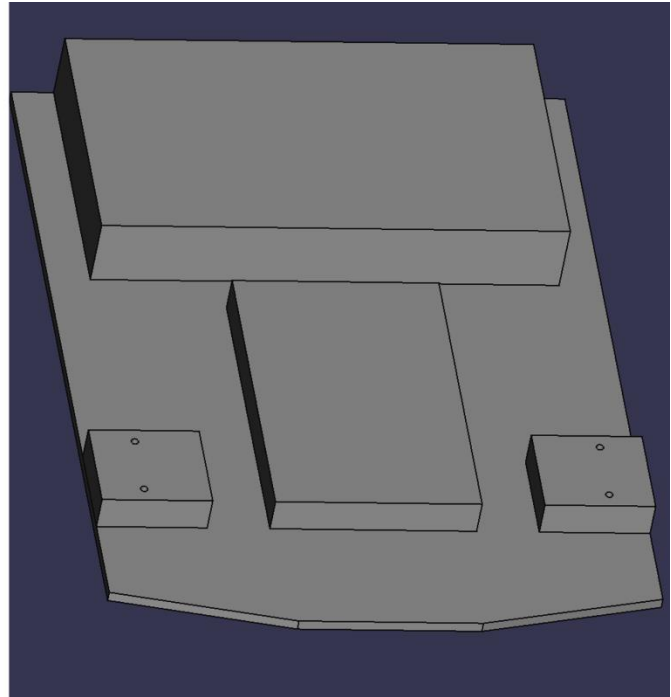
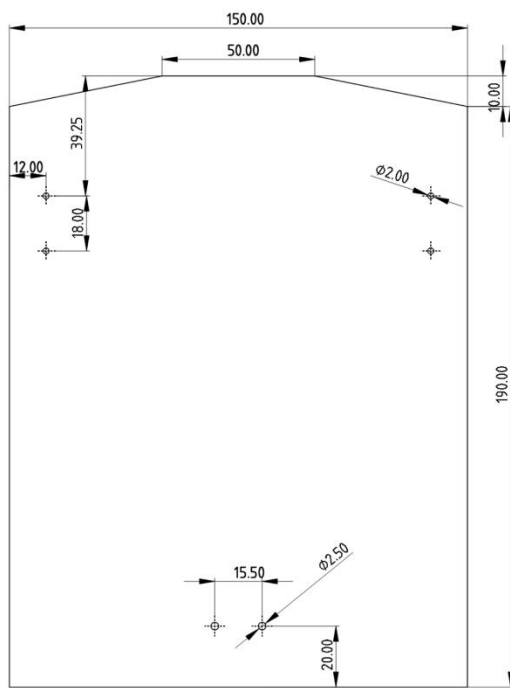
Centerline added



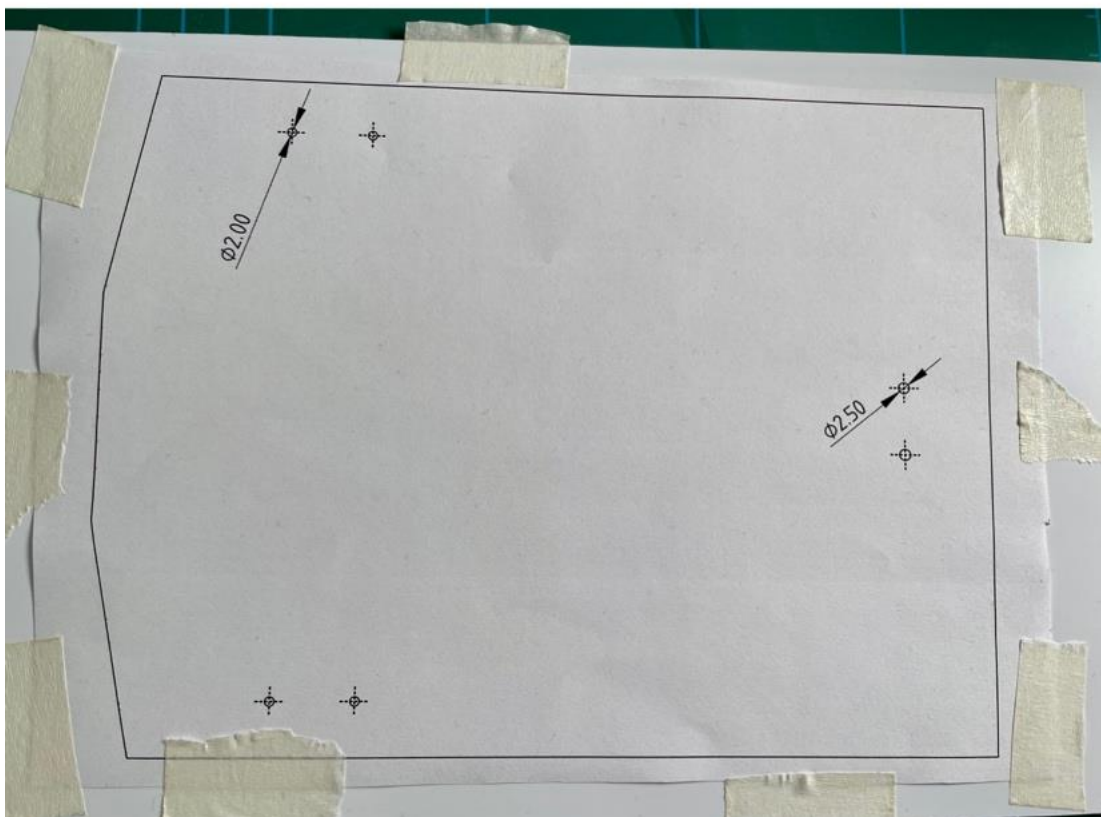
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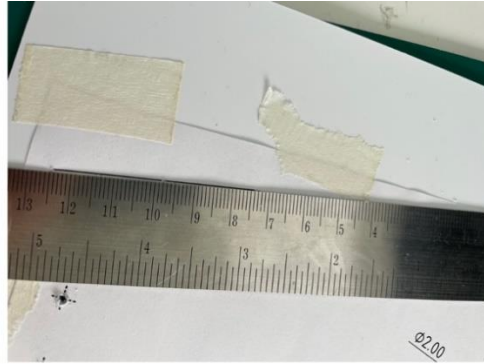


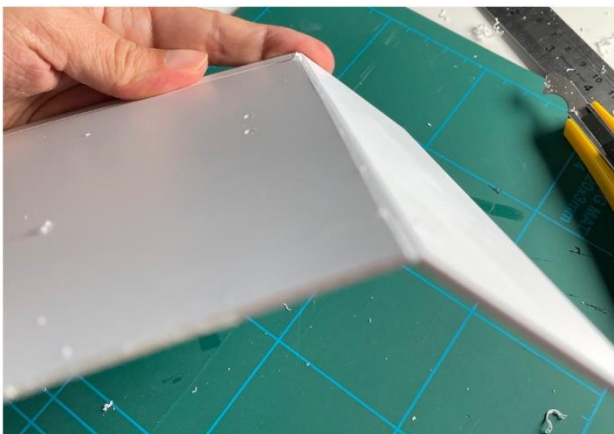
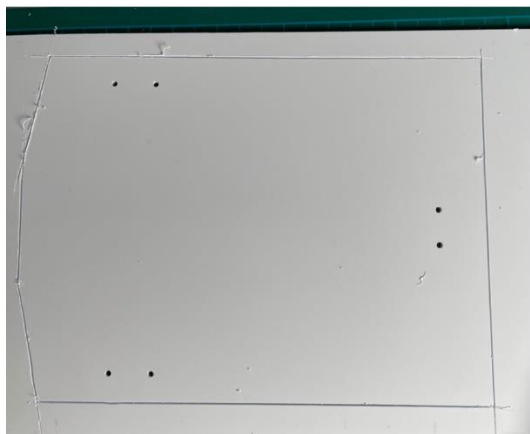
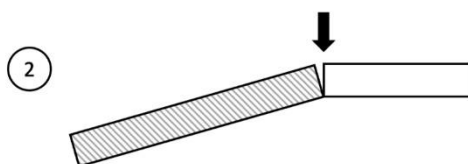
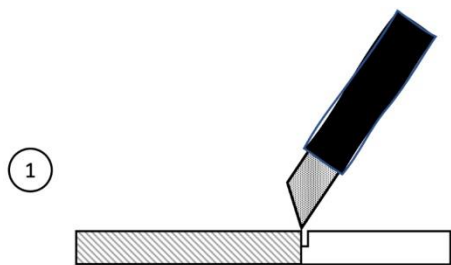


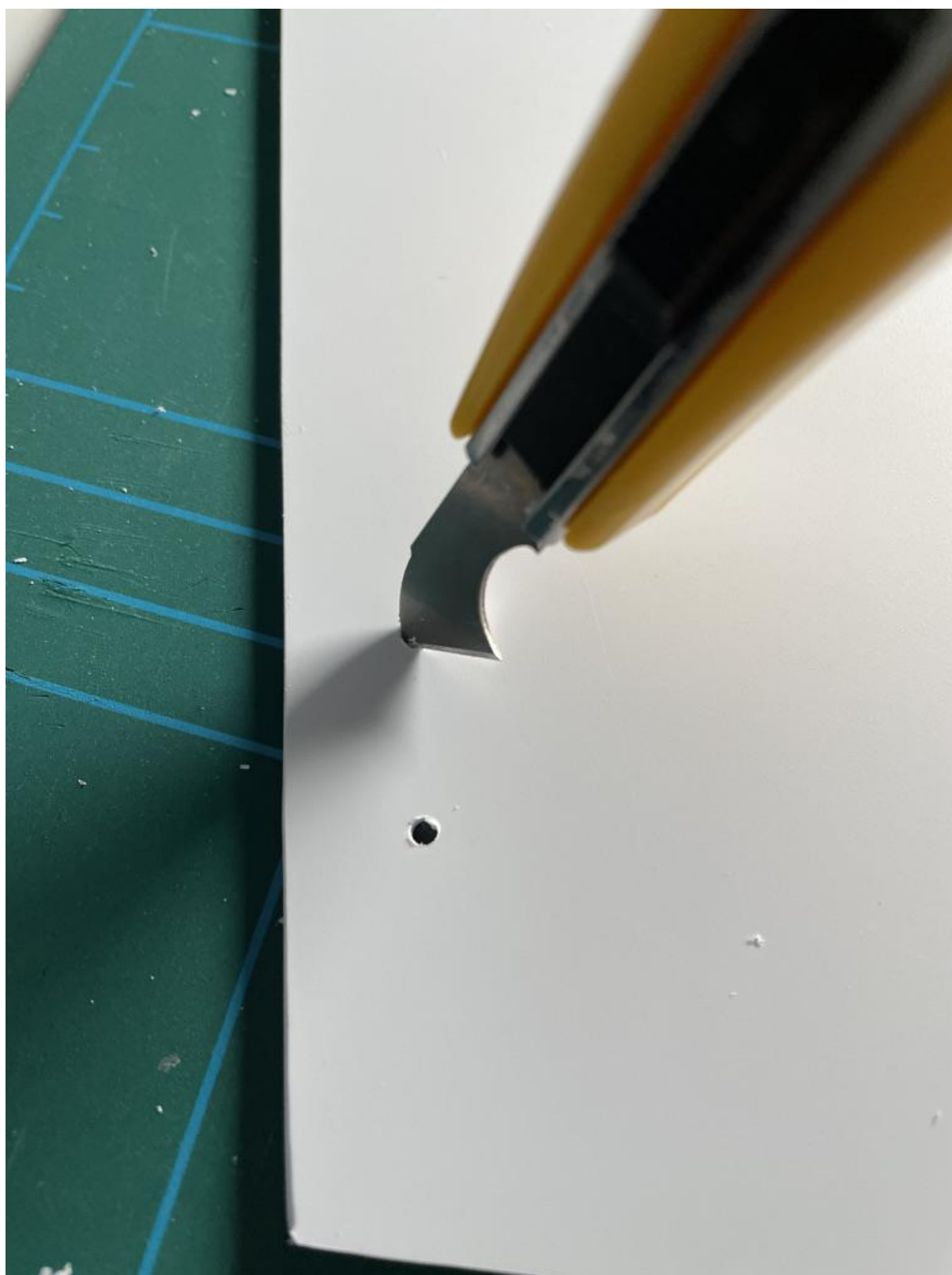


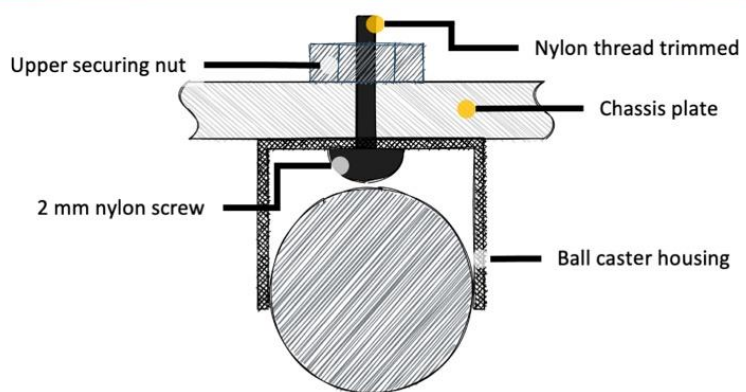
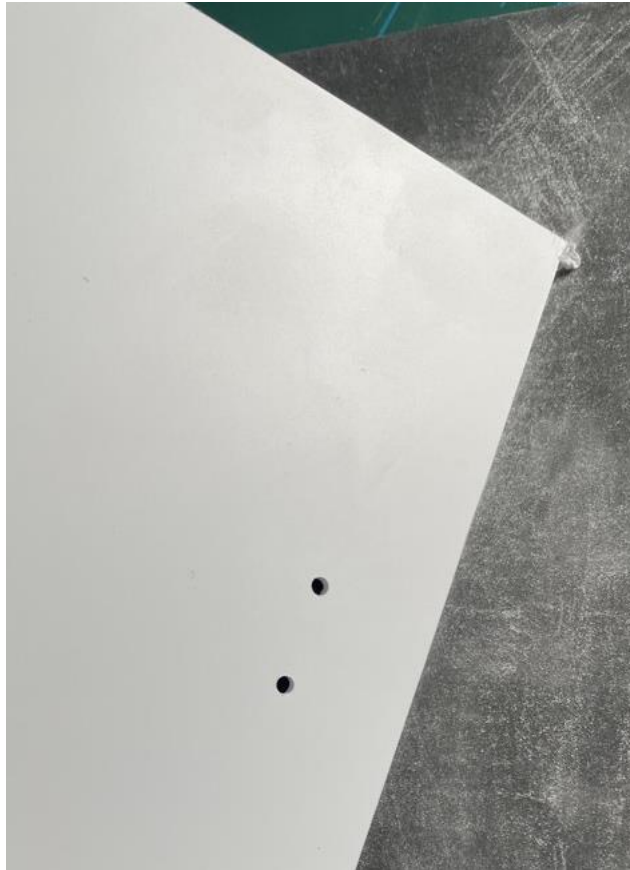
Chapter 4: Building a Robot around Pico

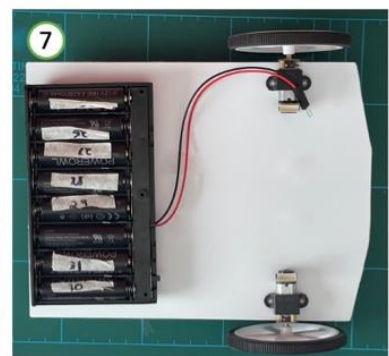
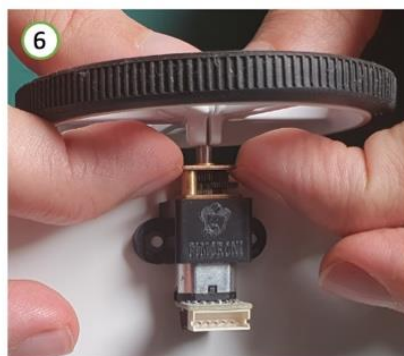
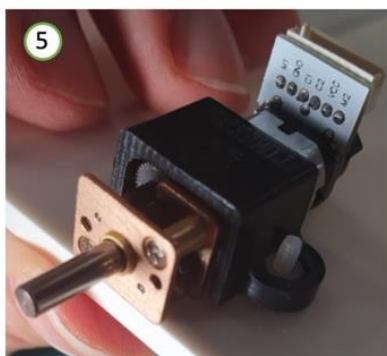
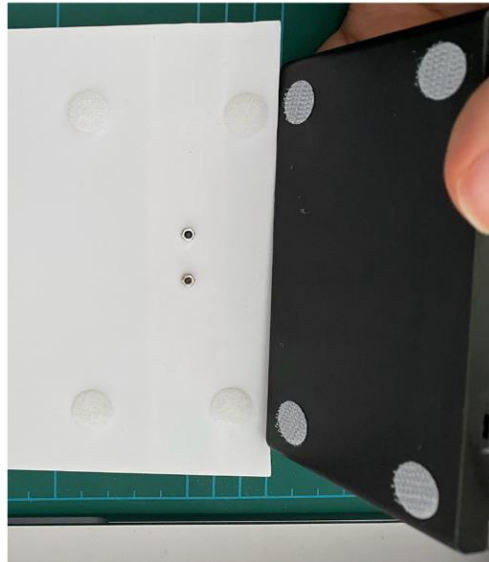
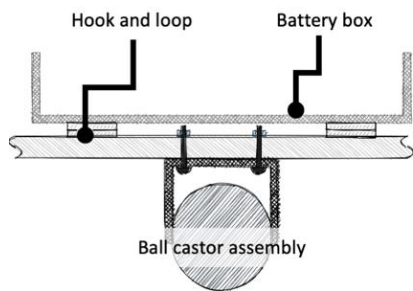
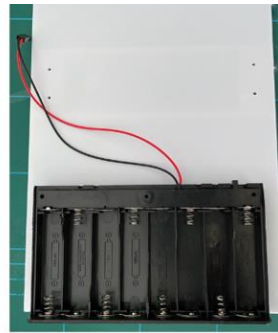
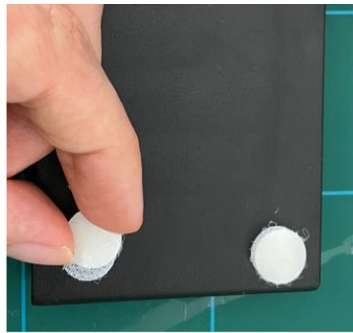
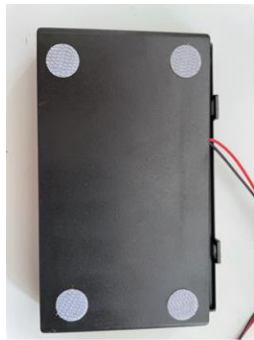


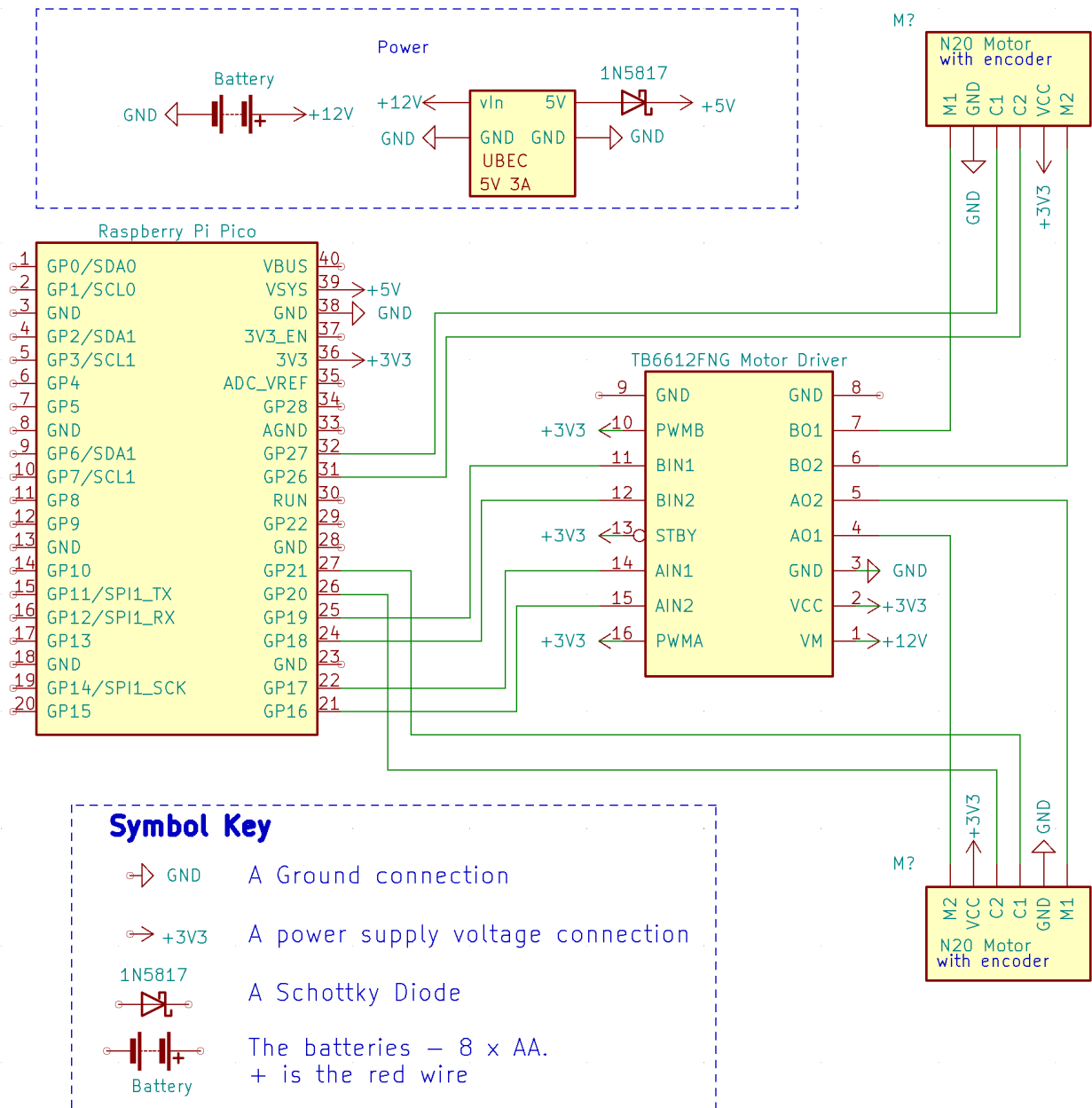


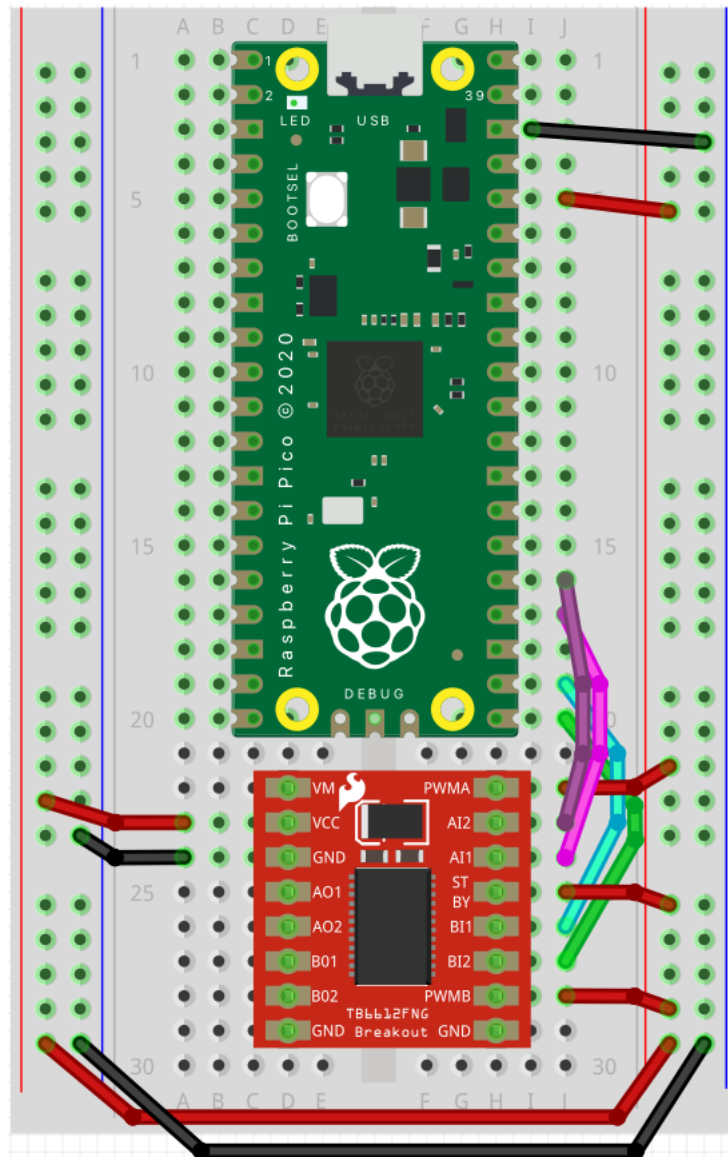


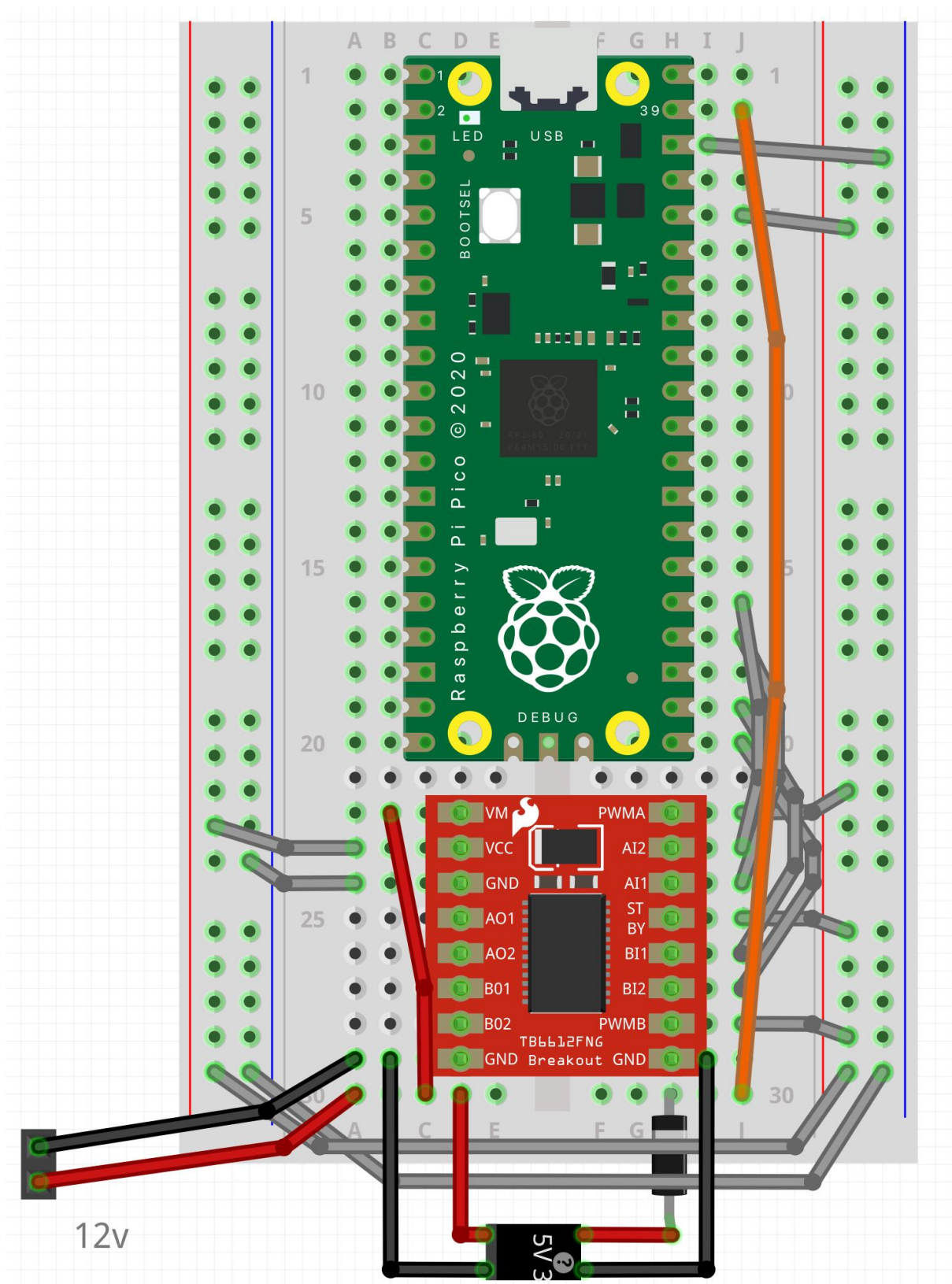


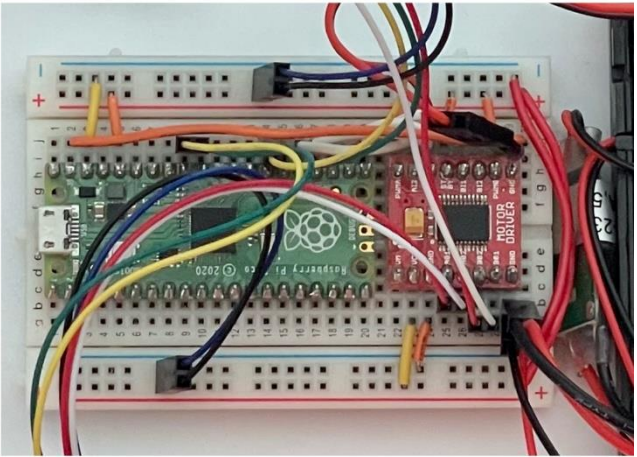
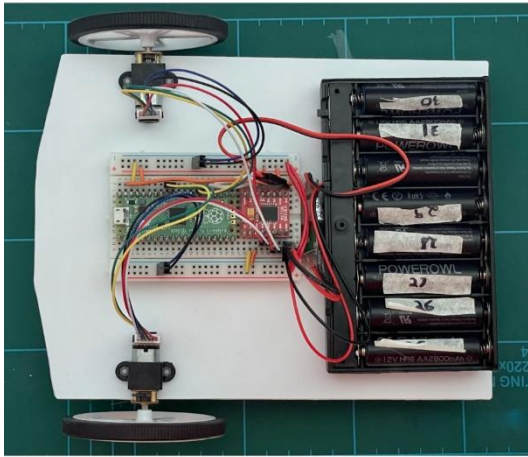
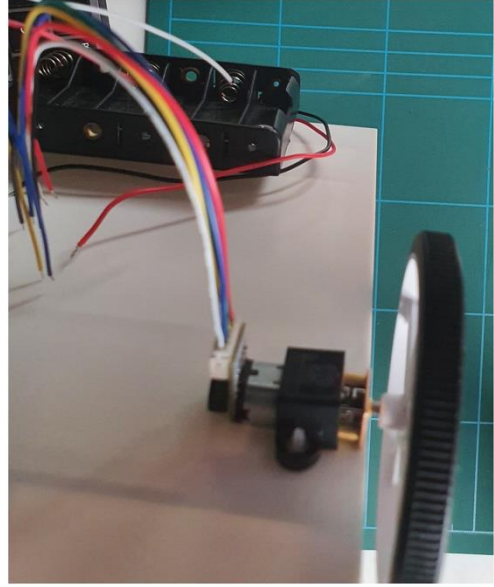
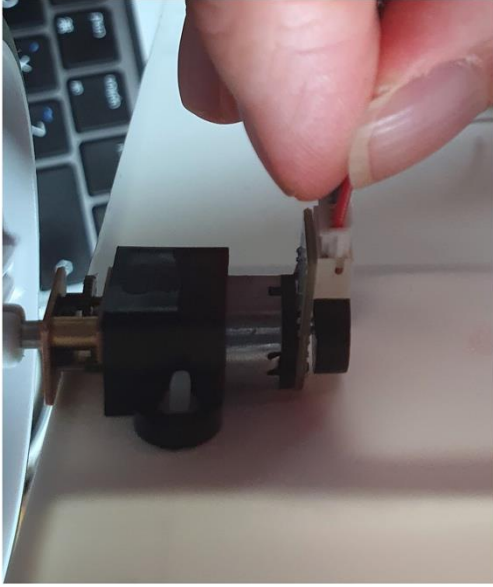




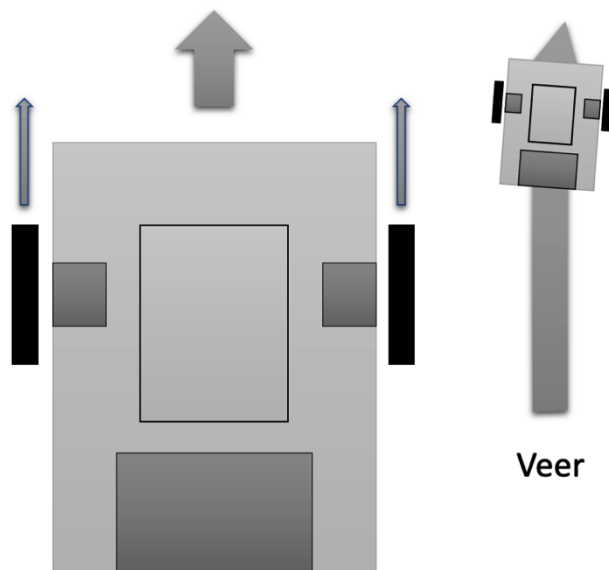
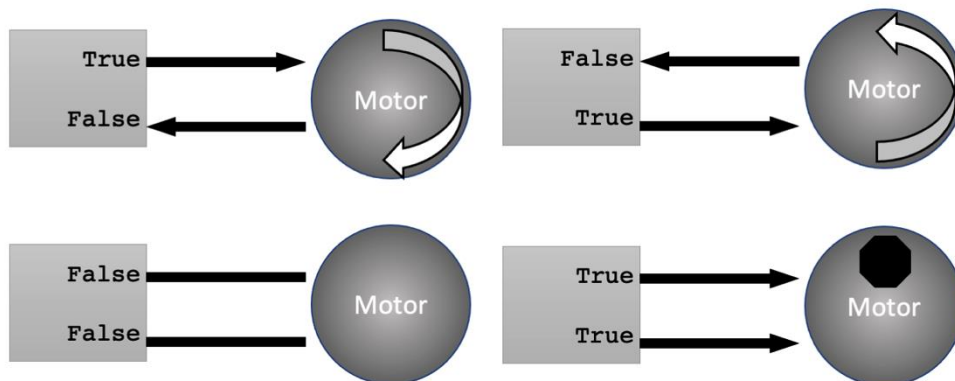
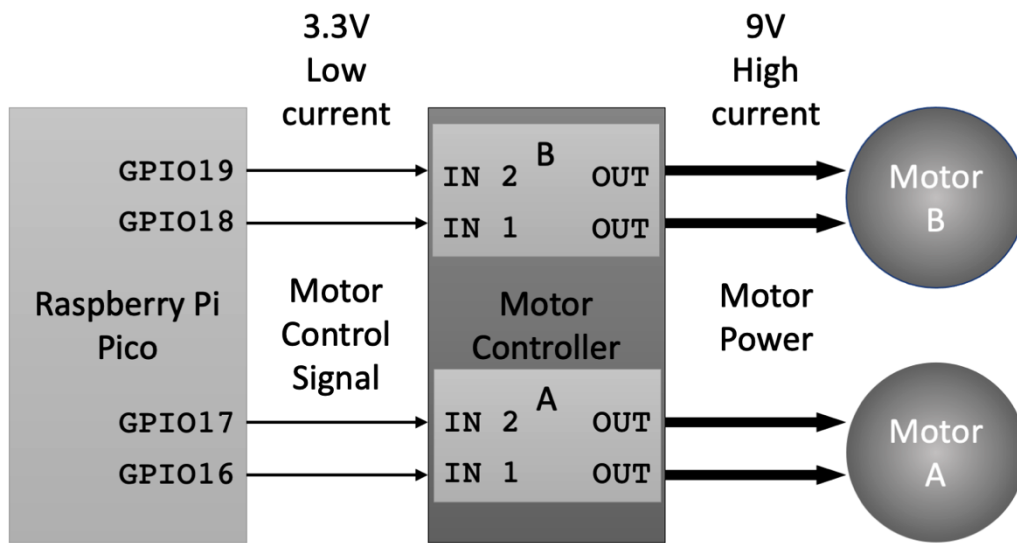


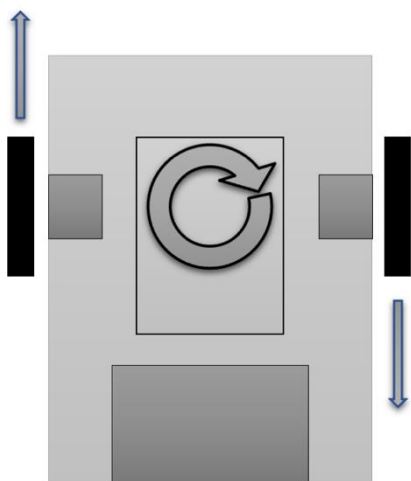
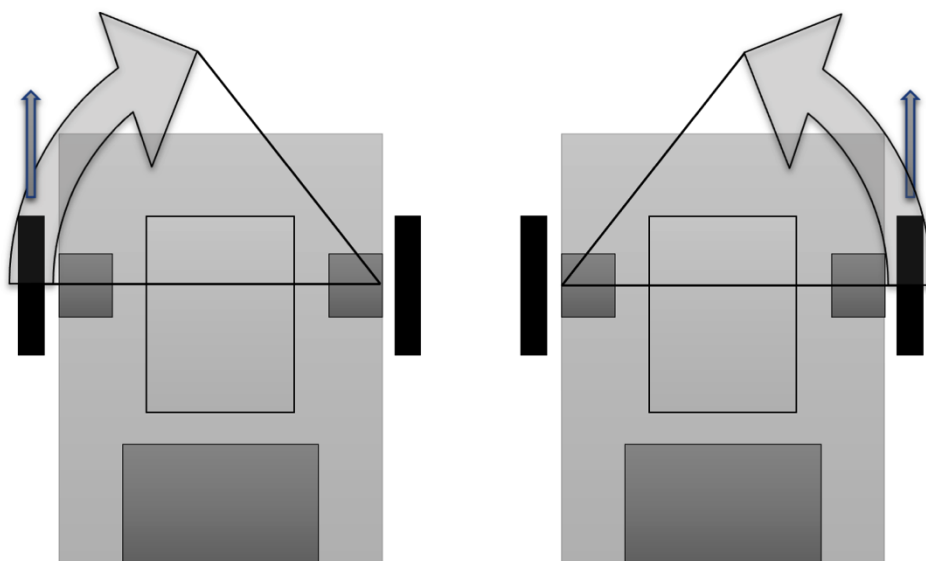


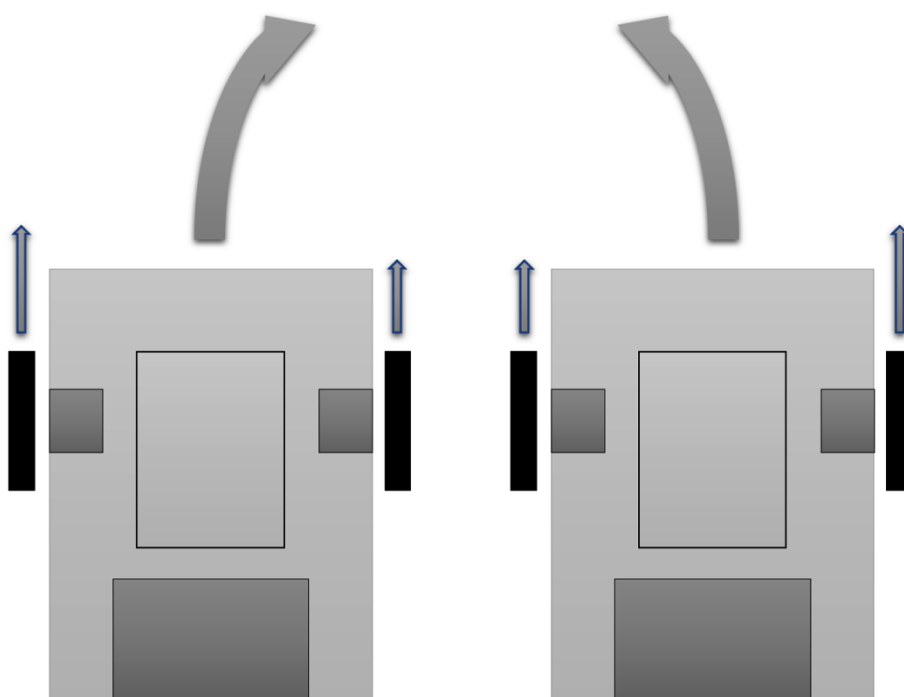
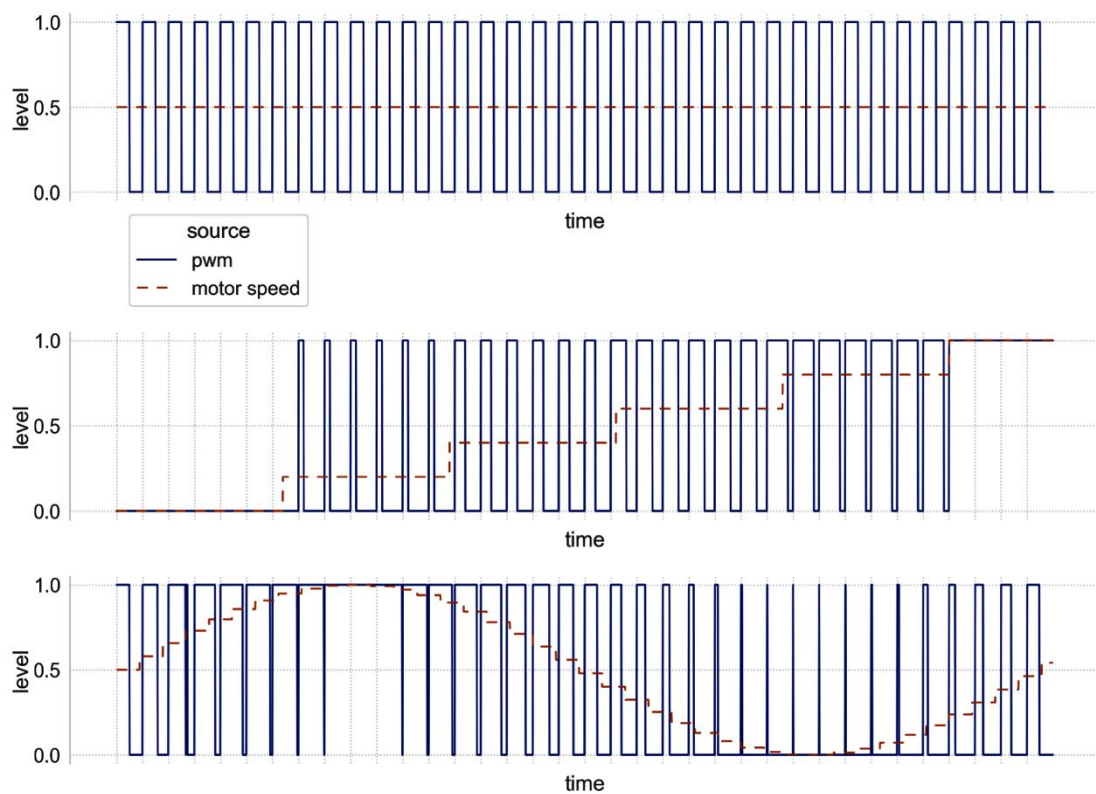


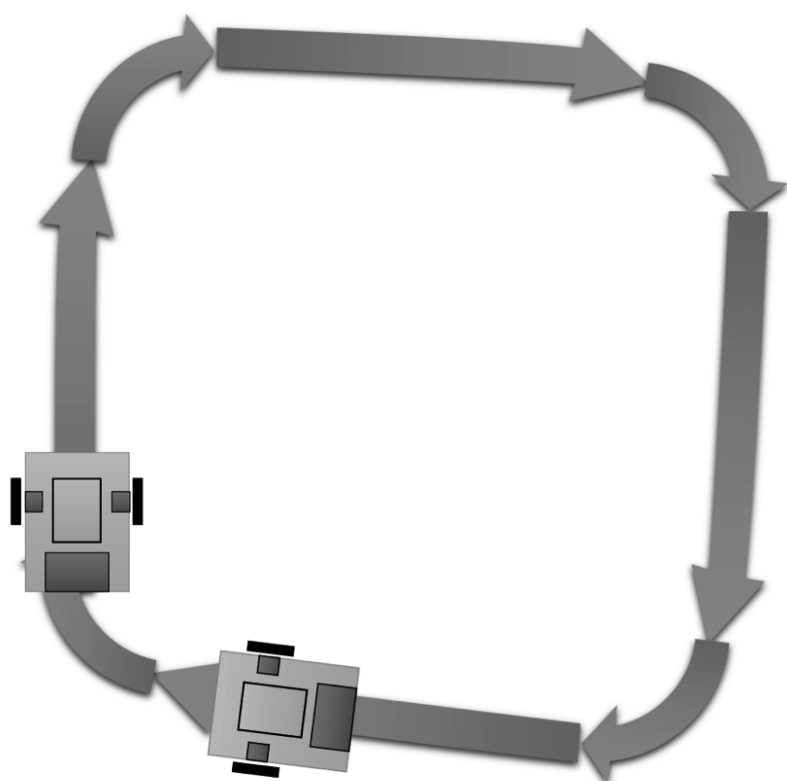
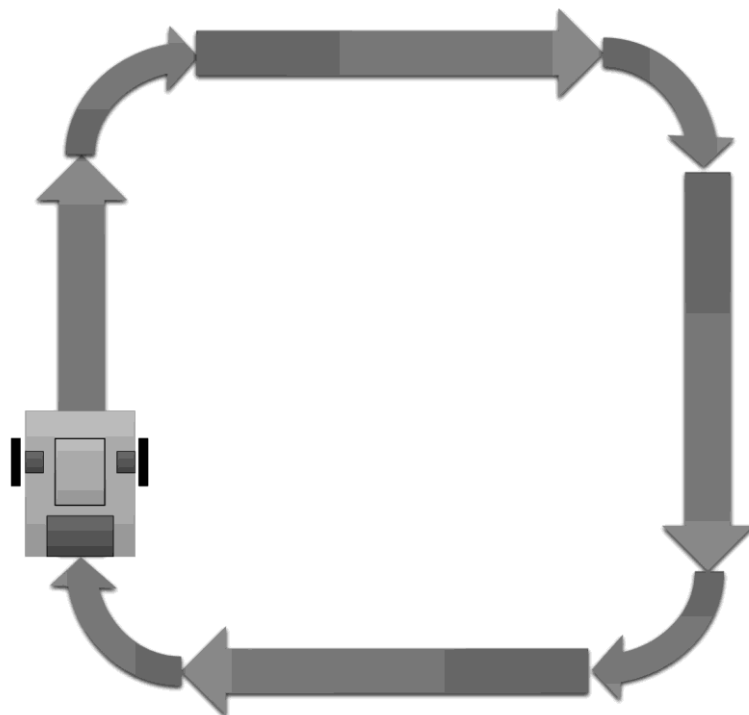


Chapter 5: Driving Motors with Raspberry Pi Pico

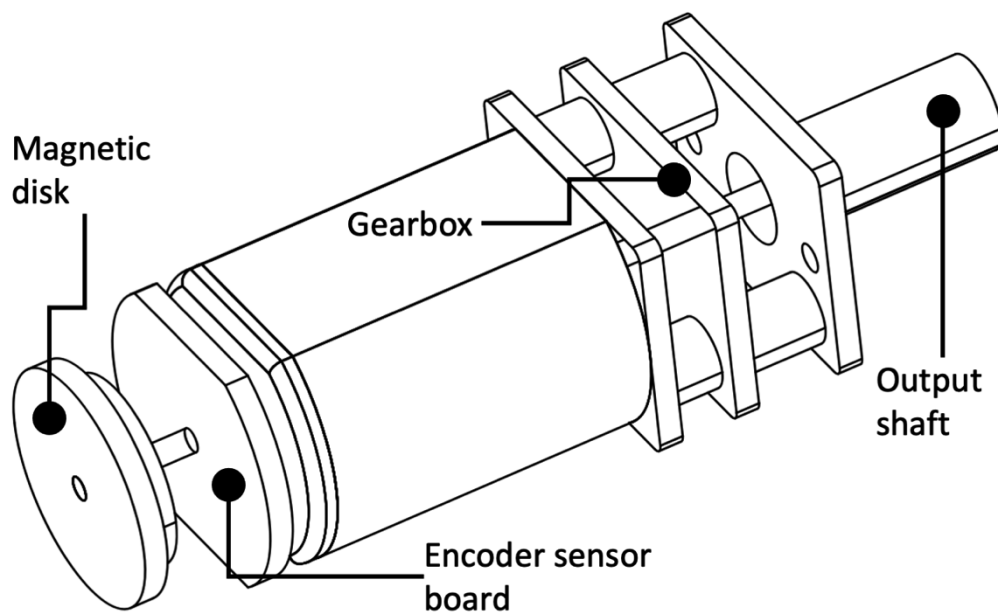
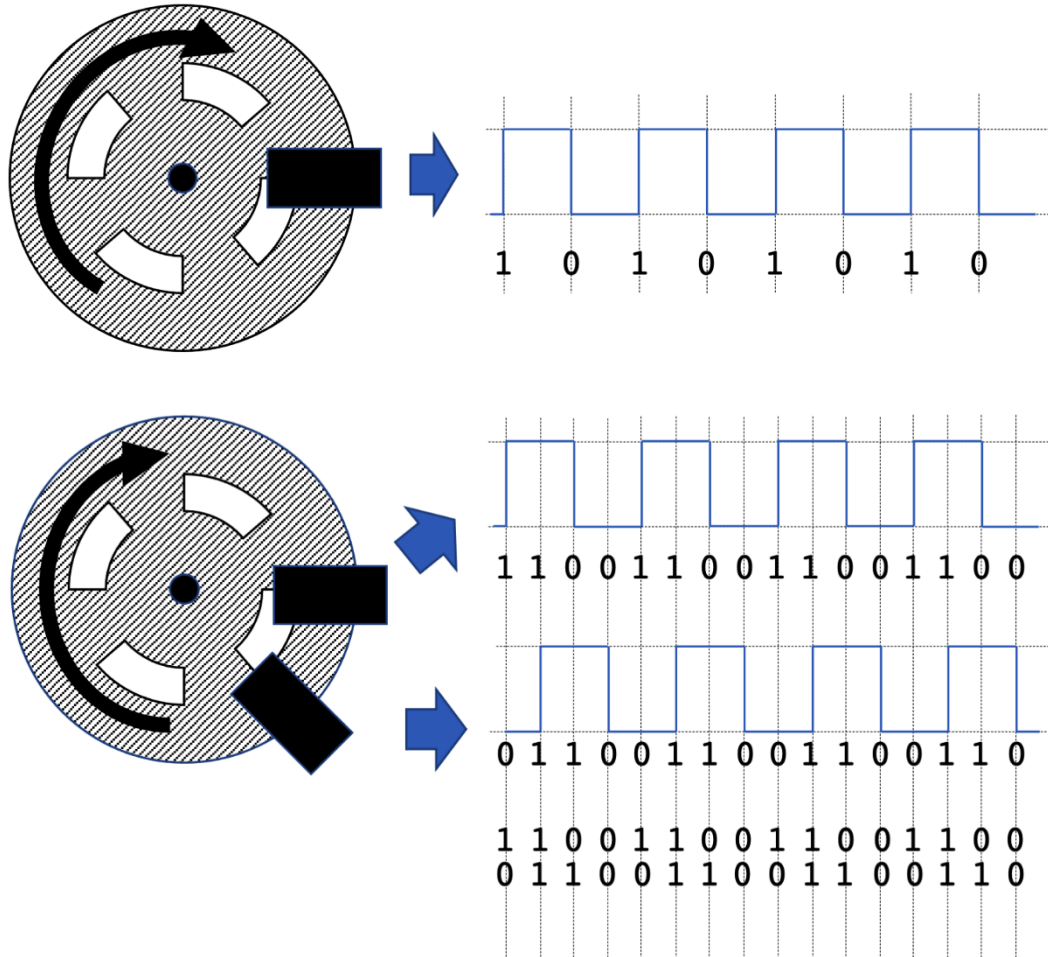


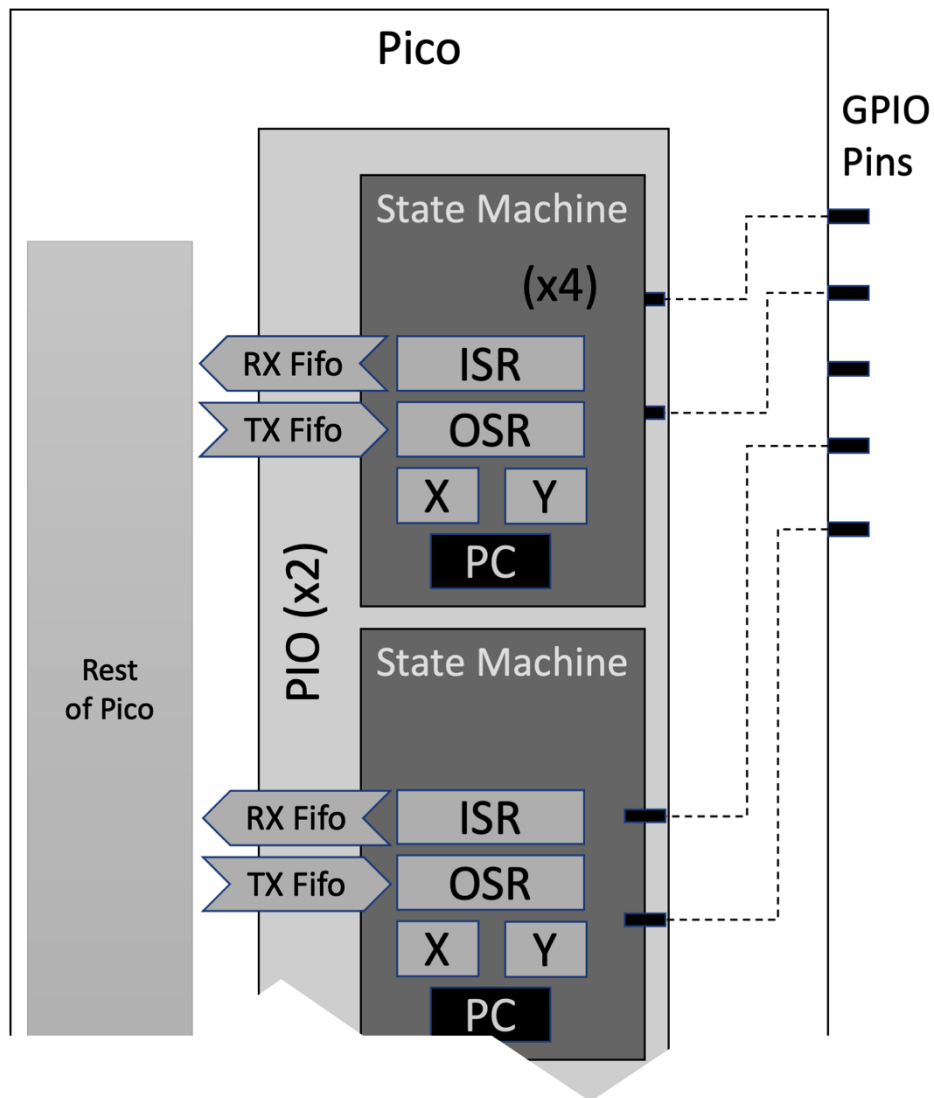
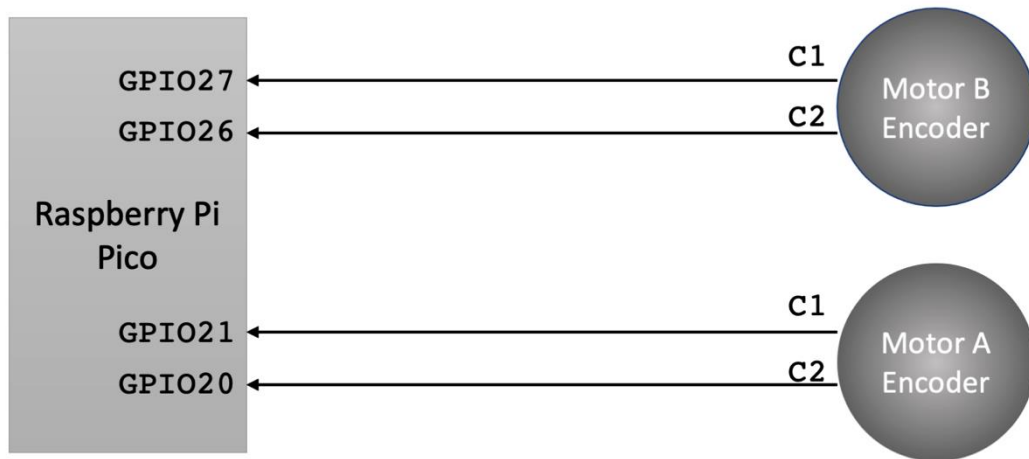






Chapter 6: Measuring Movement with Encoders on Raspberry Pi Pico

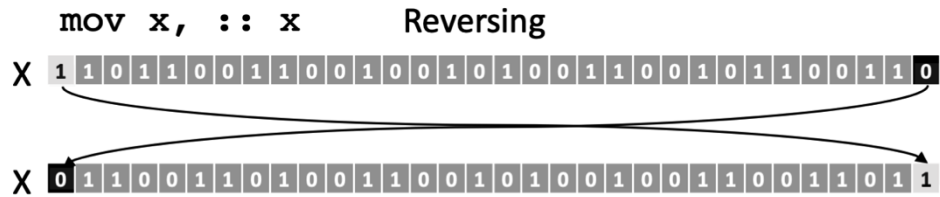




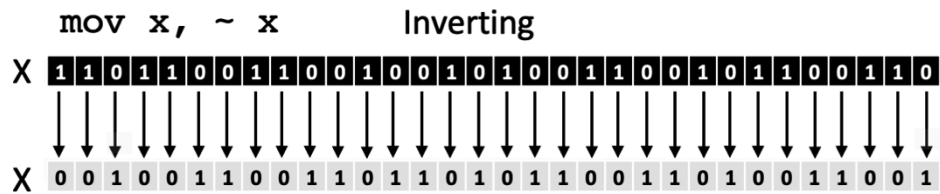
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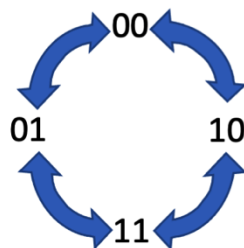
Reversing



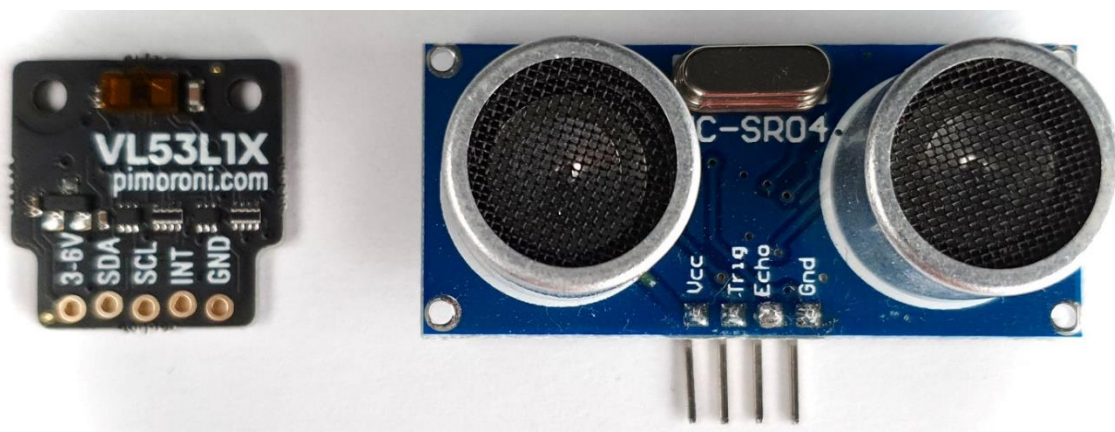
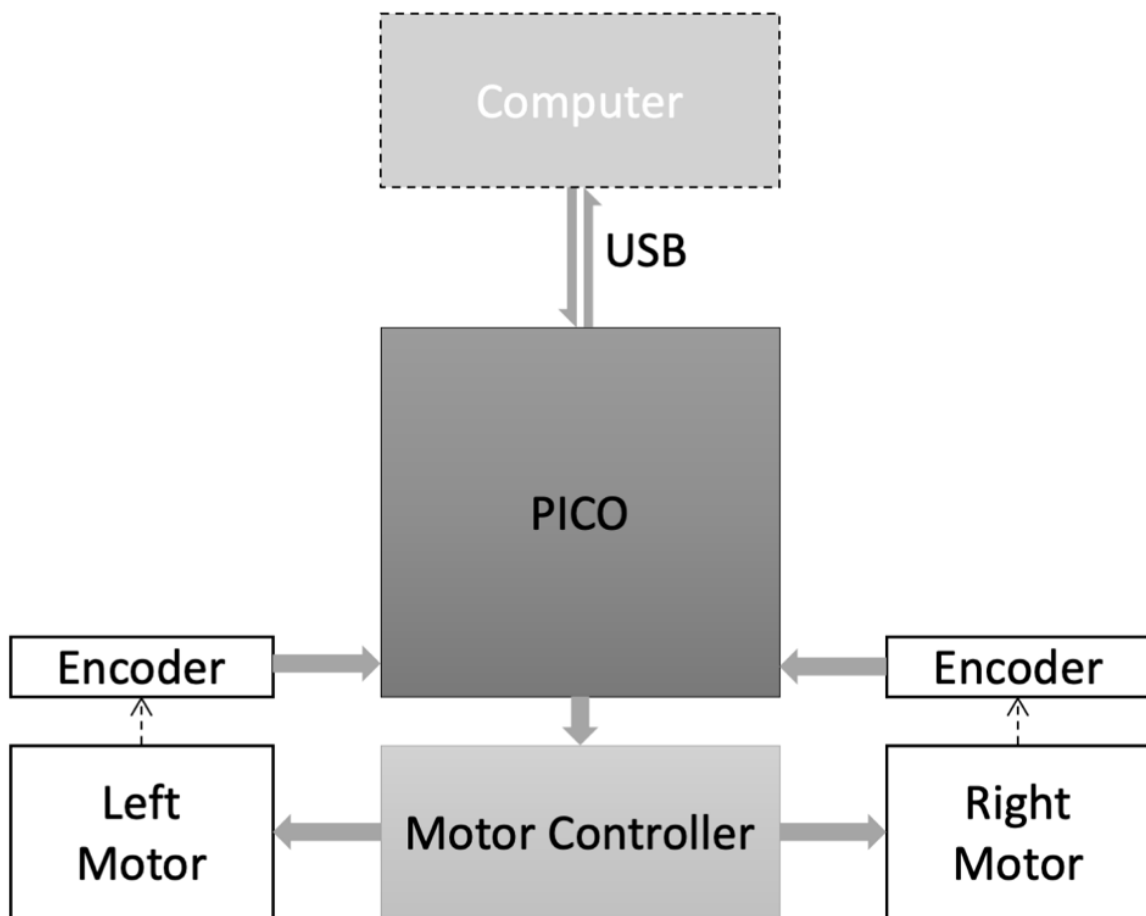
Inverting

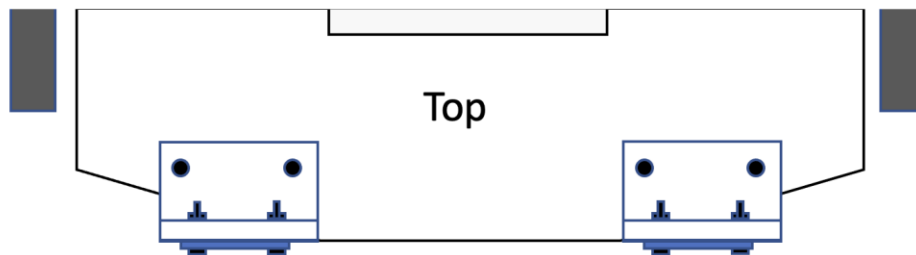
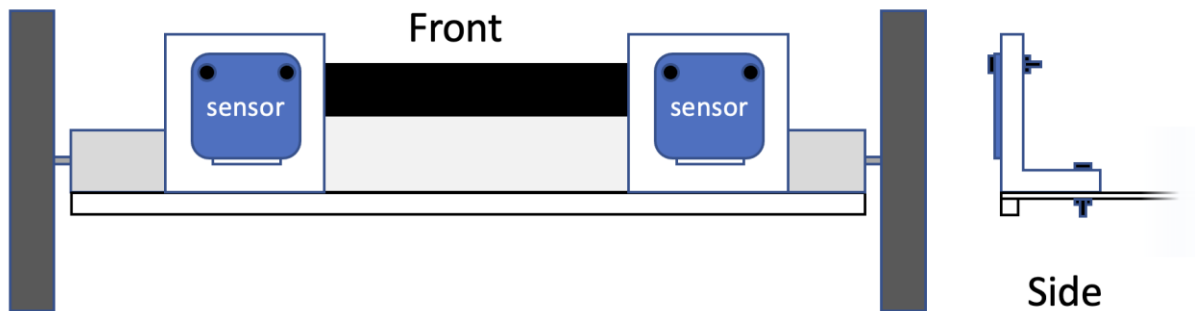
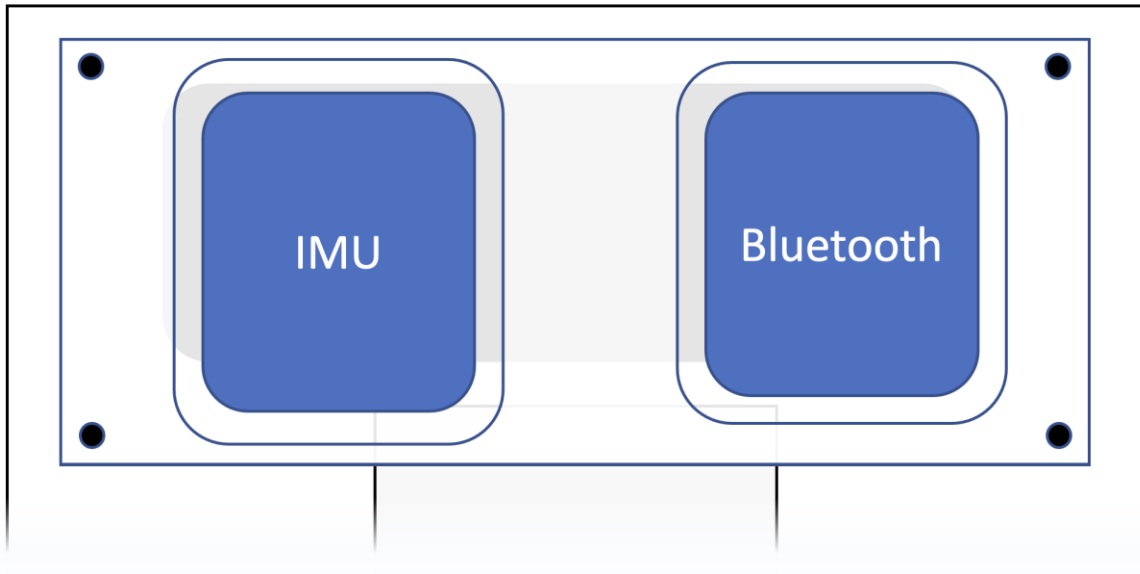


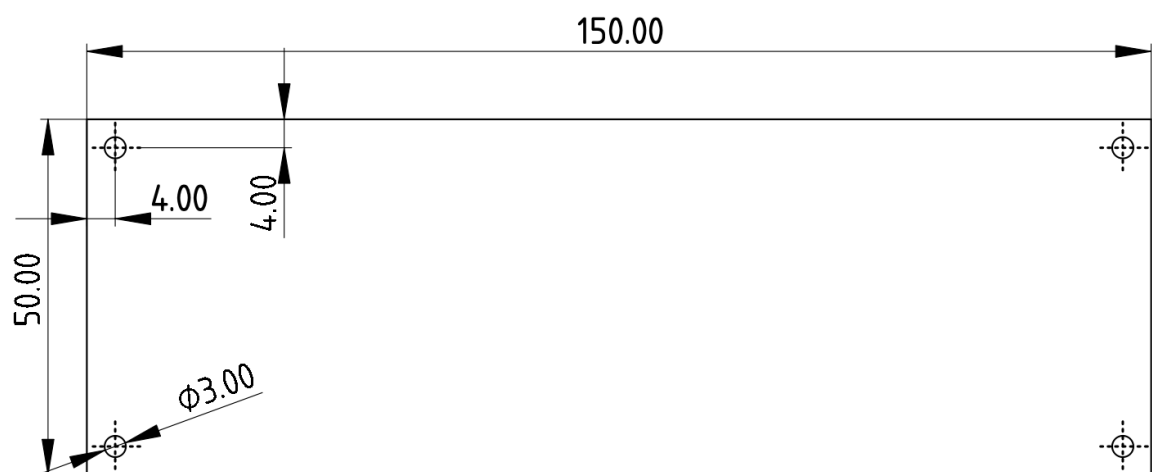
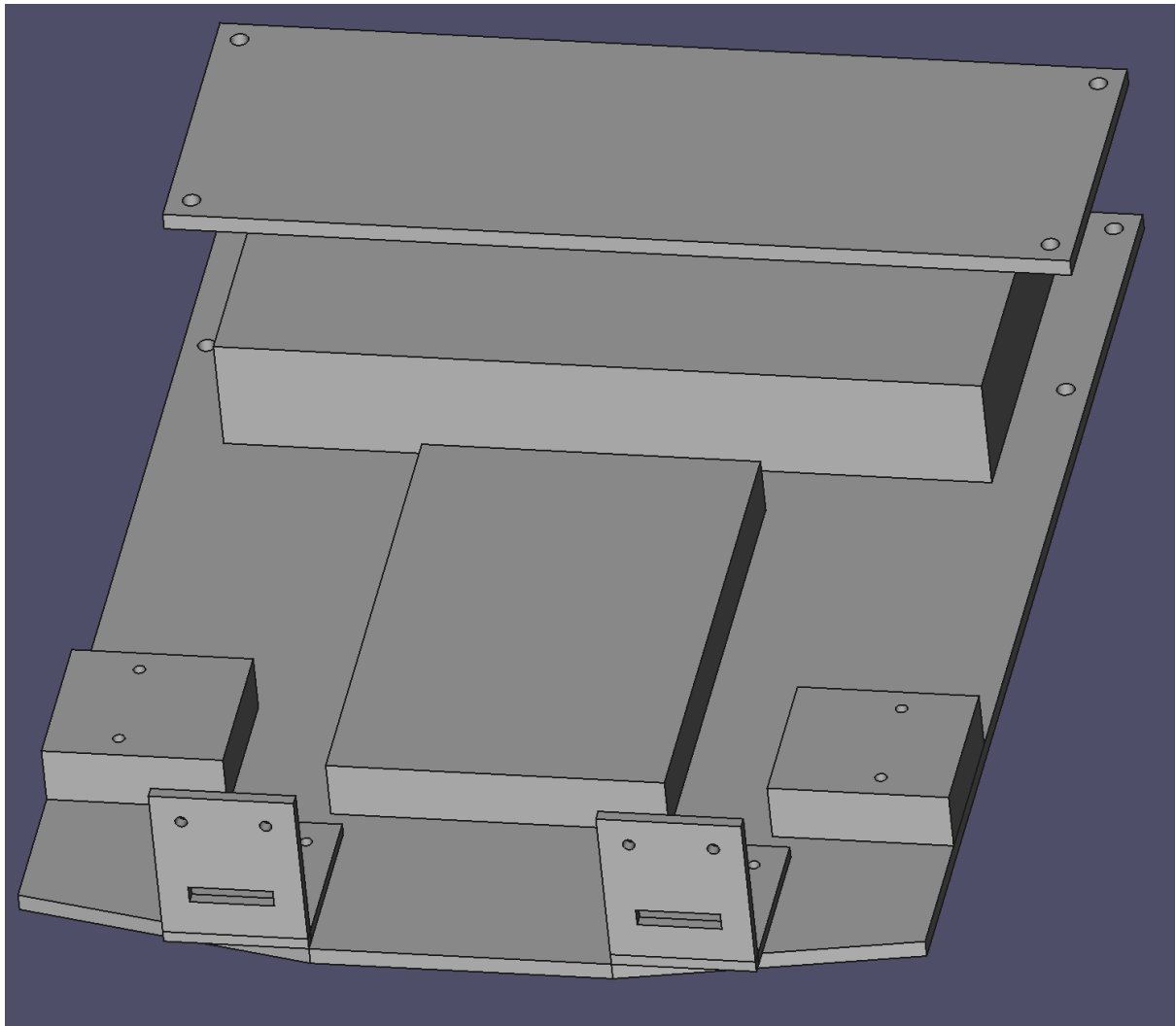
Extracting a bit

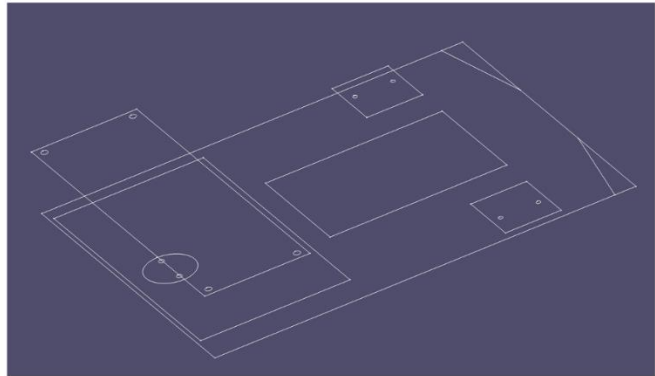
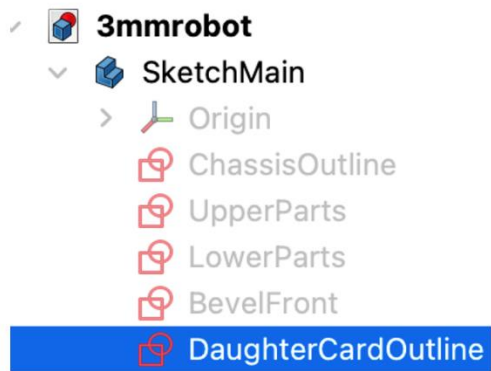


Chapter 7: Planning and Shopping for More Devices

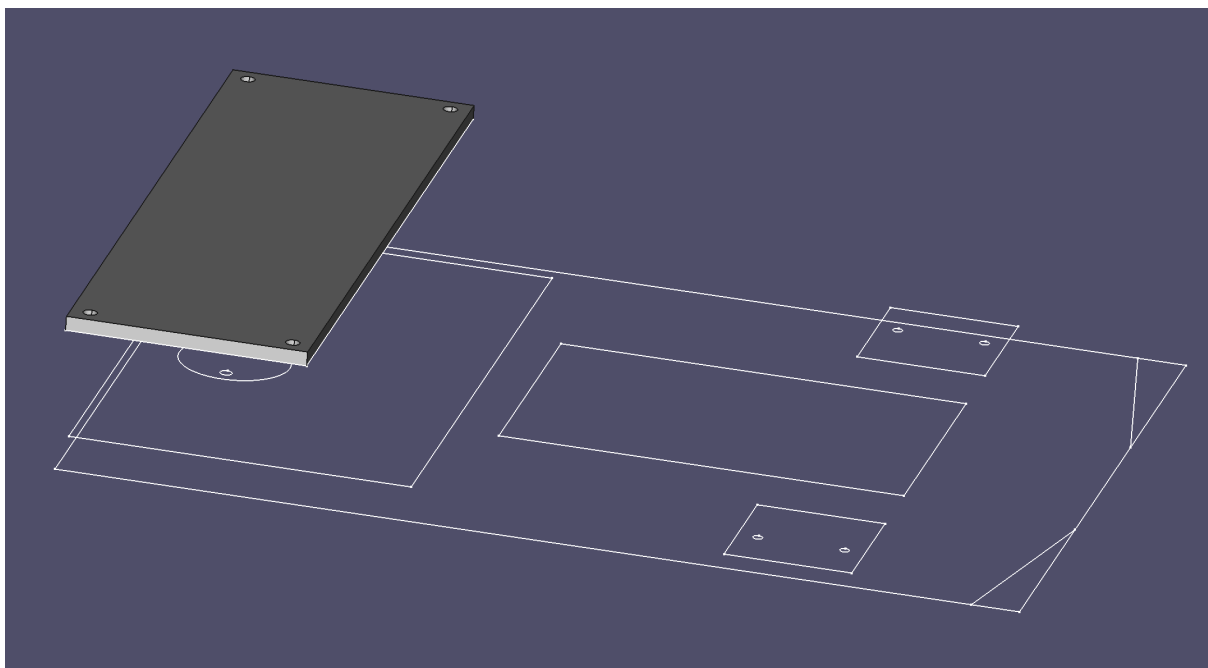


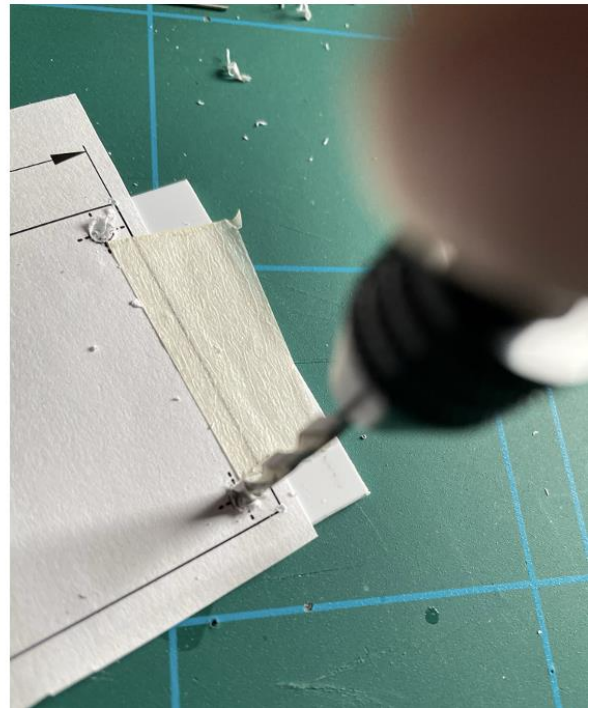
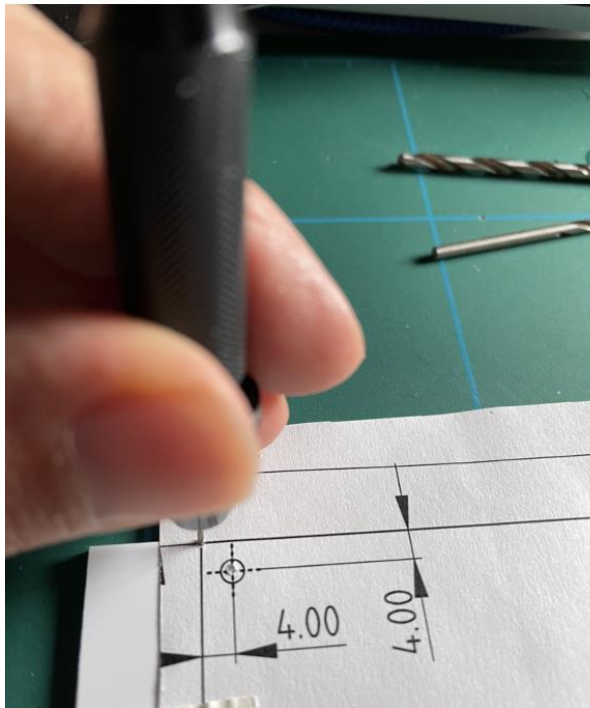
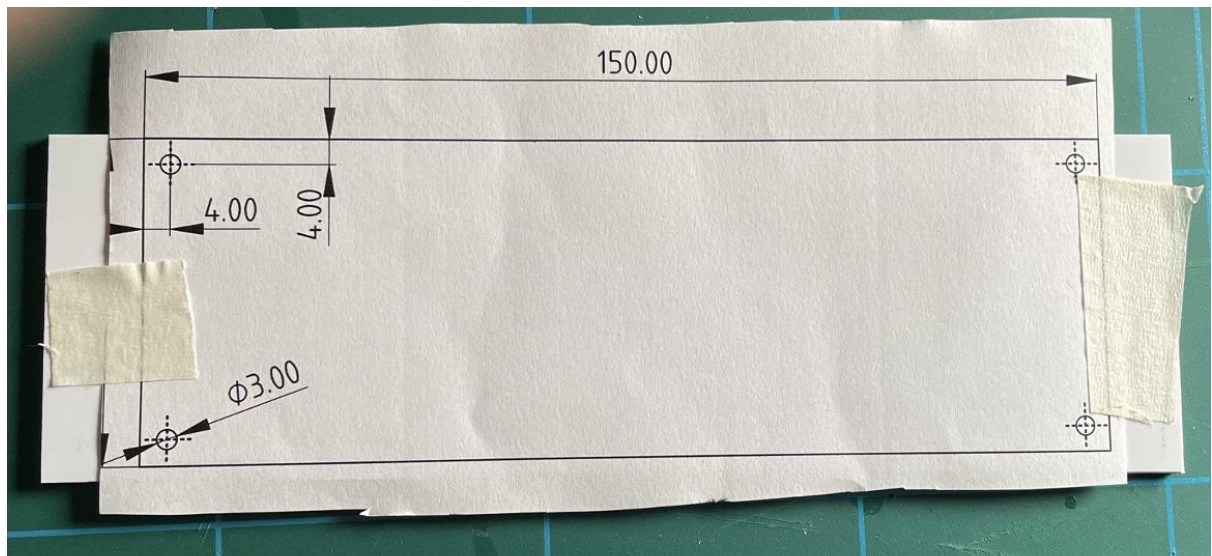


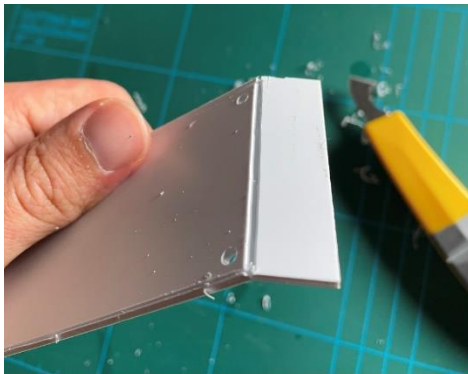
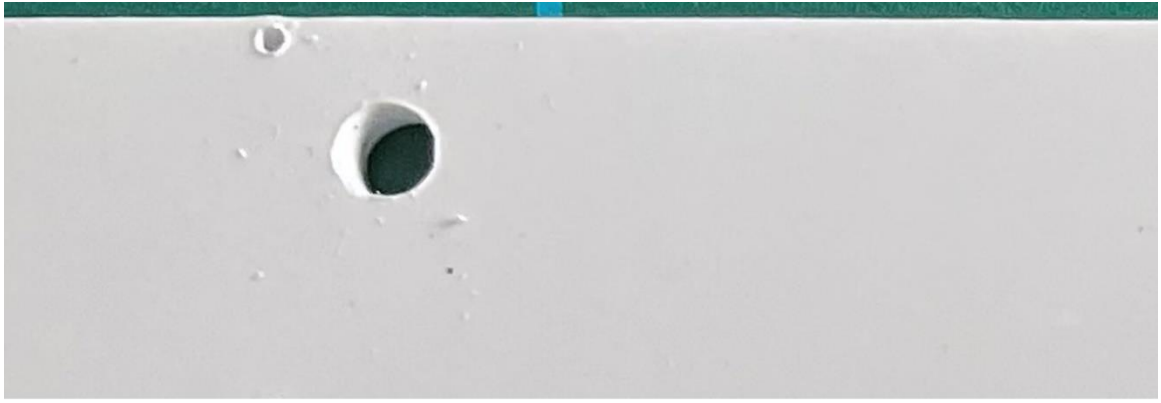


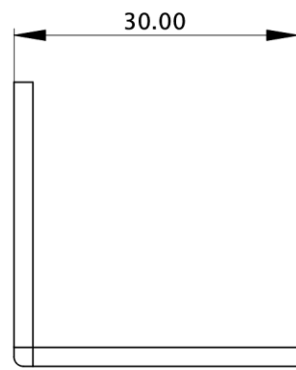


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Attachment	
Support	XY_Plane
Map Mode	FlatFace
Map Rev...	false
Attachme...	[(0.00 0.00 1.00); 0.00 °; (0.00 mm 0.00 mm 30.00 mm)]
Angle	0.00 °
Axis	[0.00 0.00 1.00]
Position	[0.00 mm 0.00 mm 30.00 mm]
x	0.00 mm
y	0.00 mm
z	30.00 mm

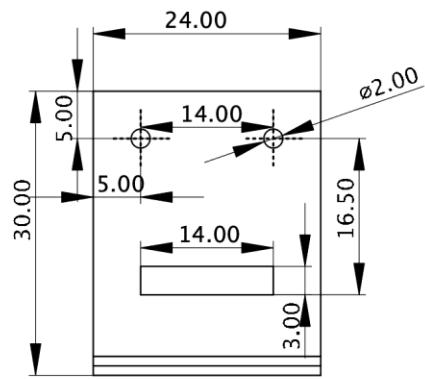




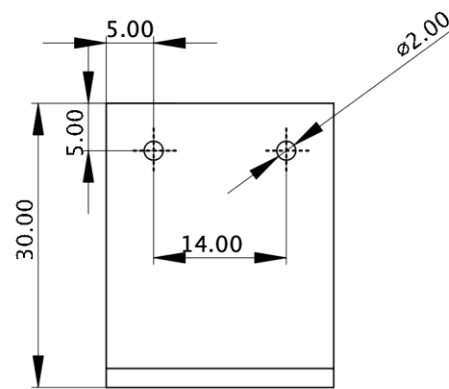
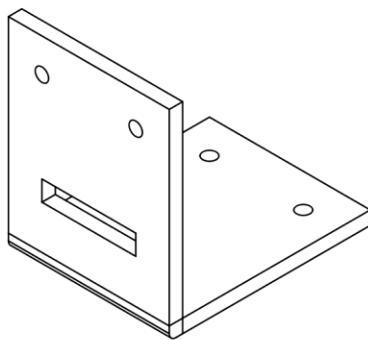




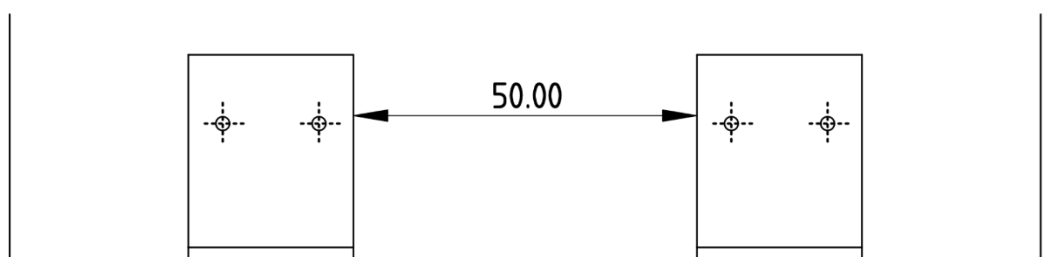
Right



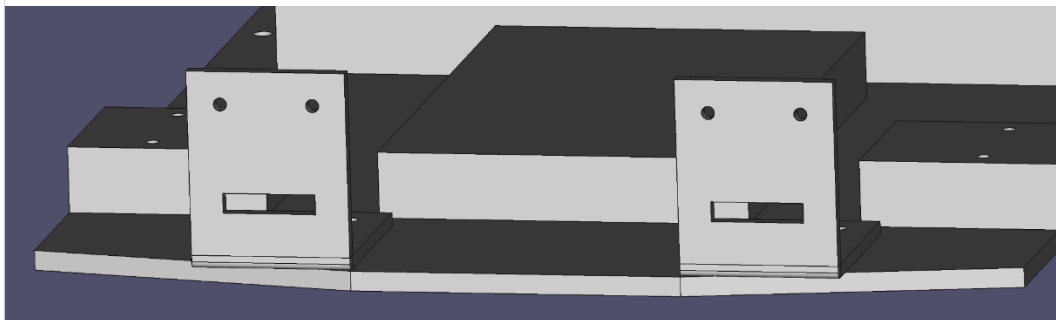
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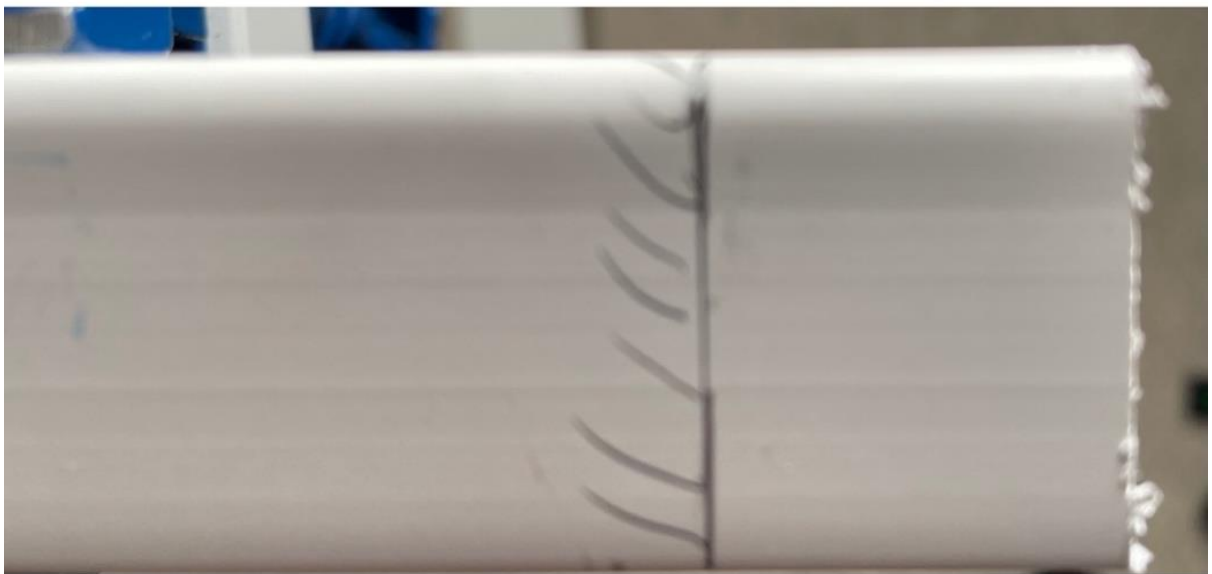
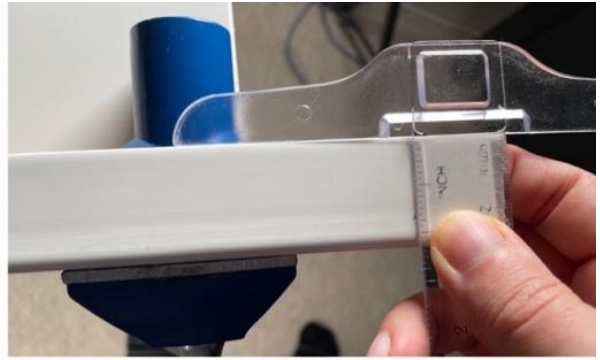


Top

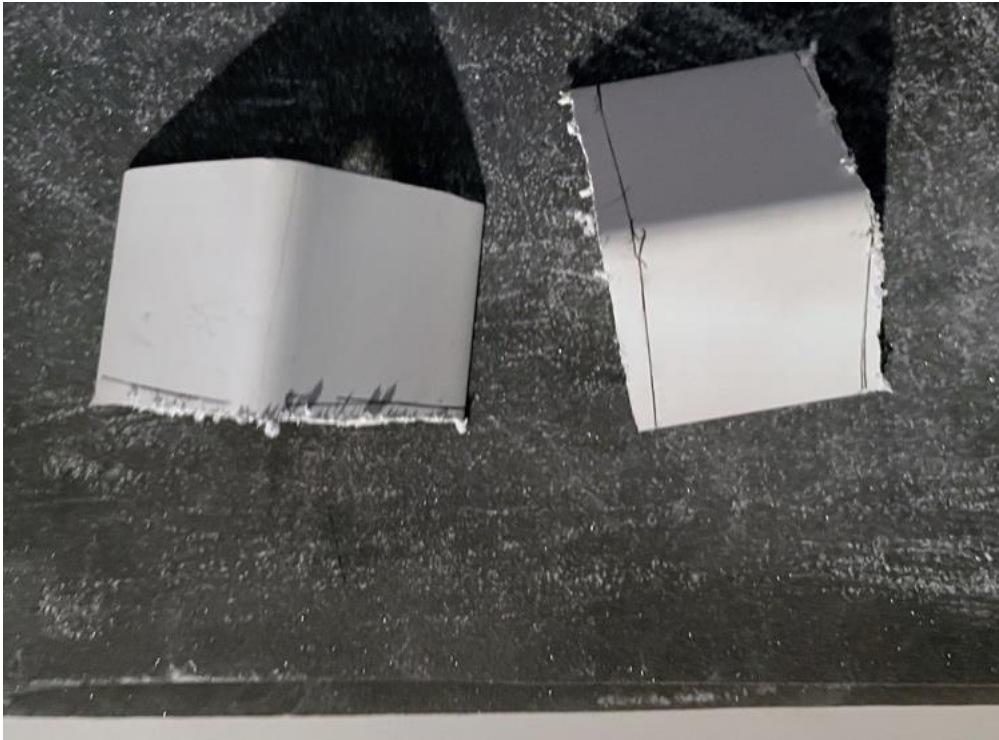


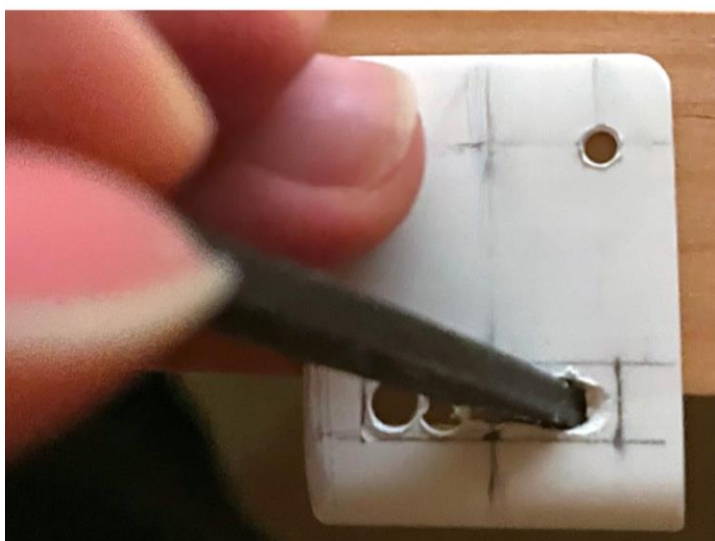
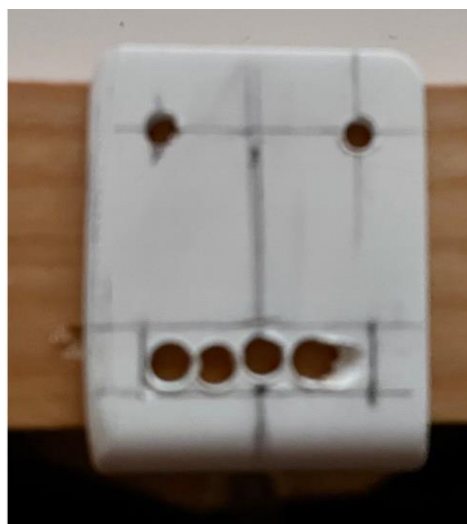
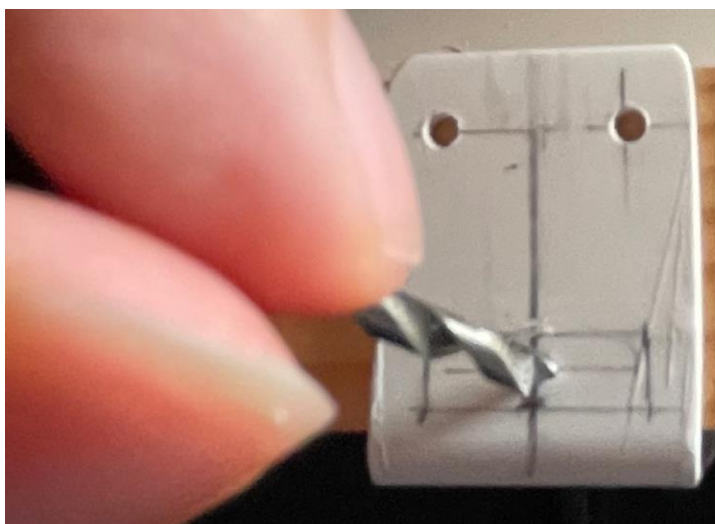
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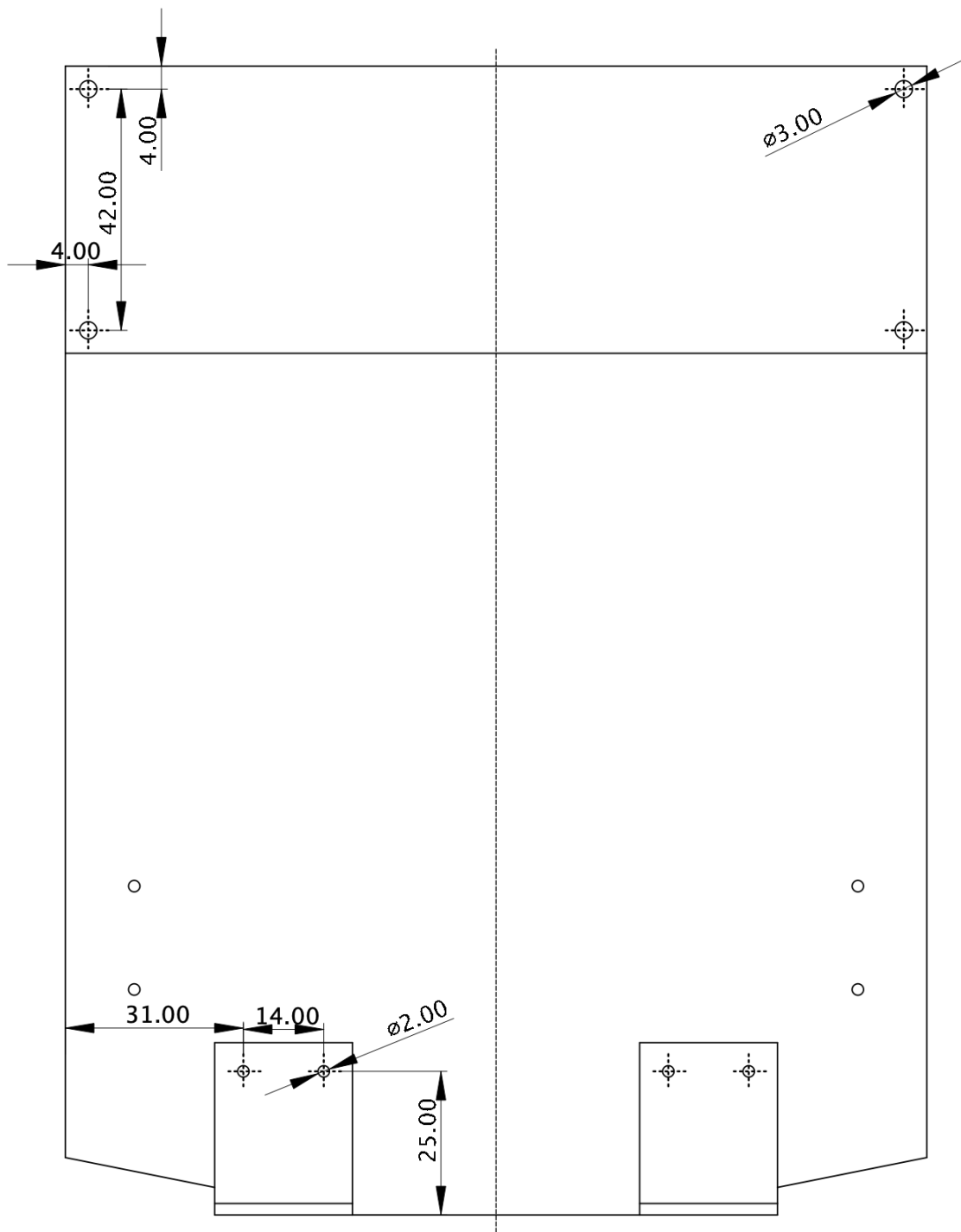


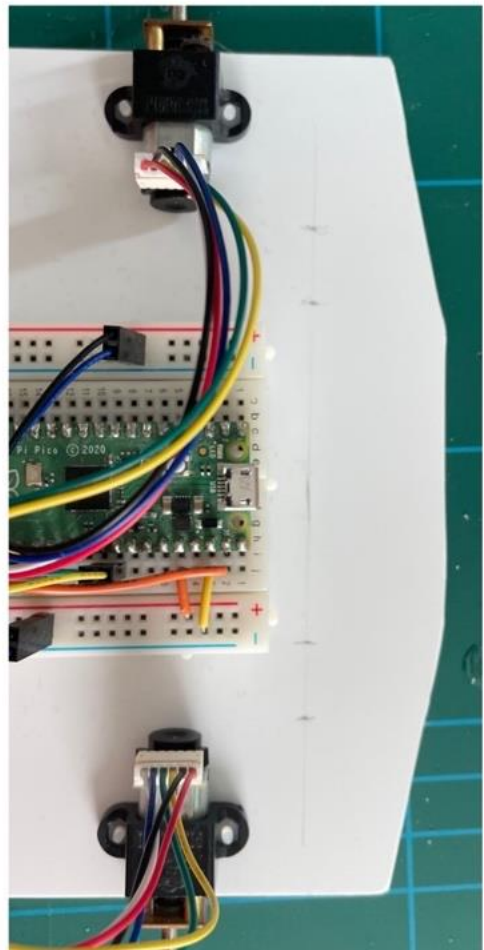
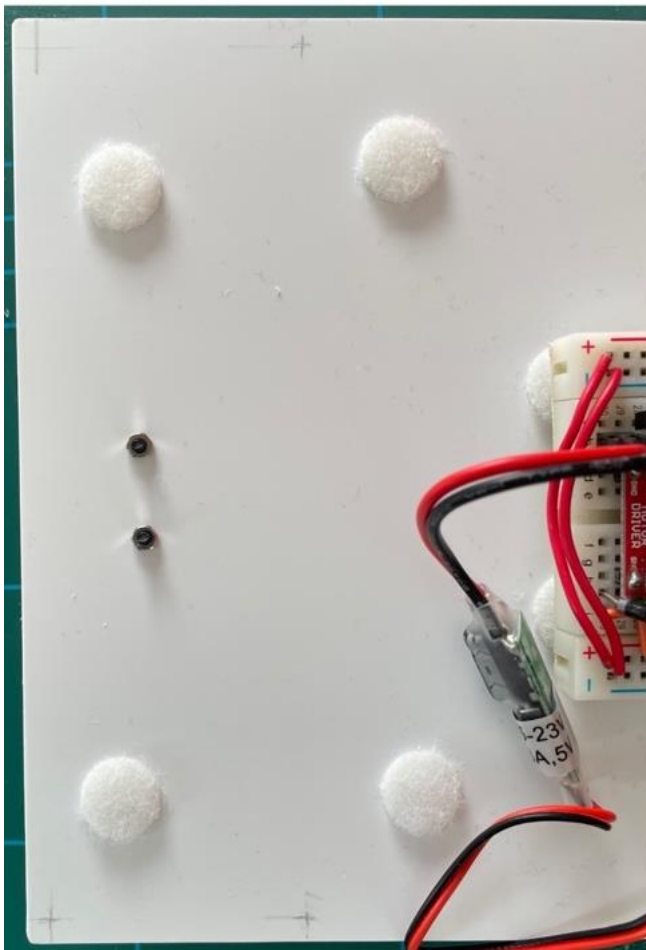
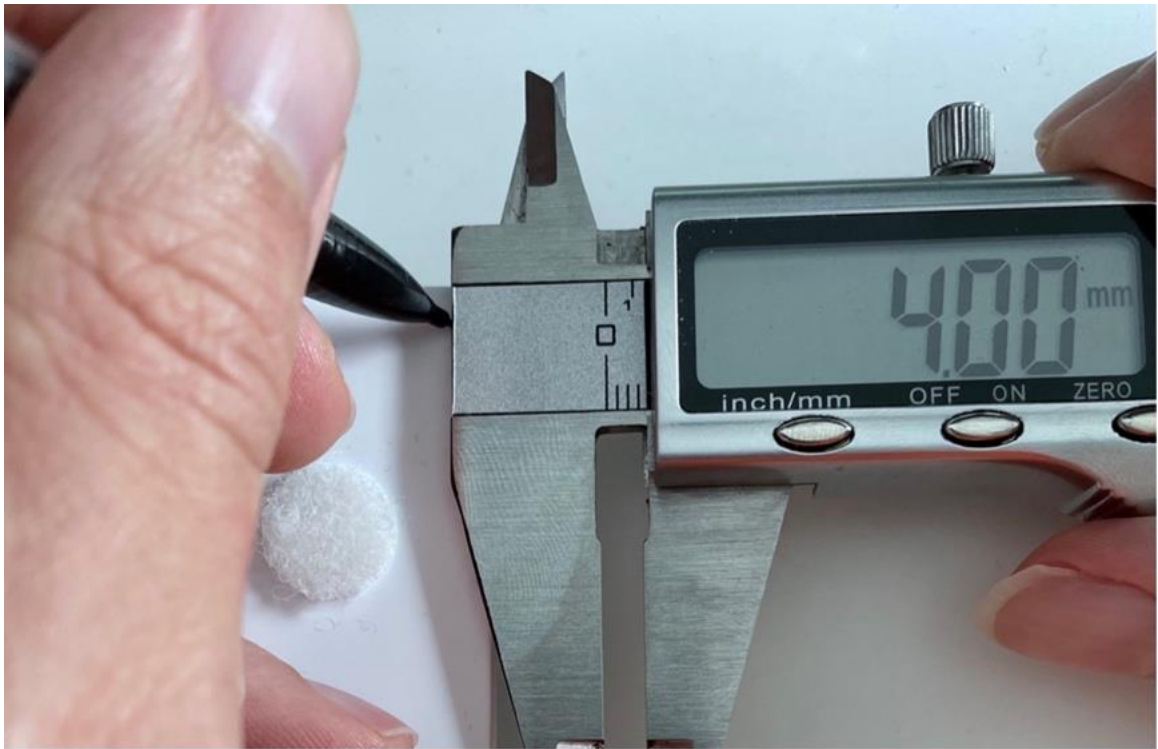


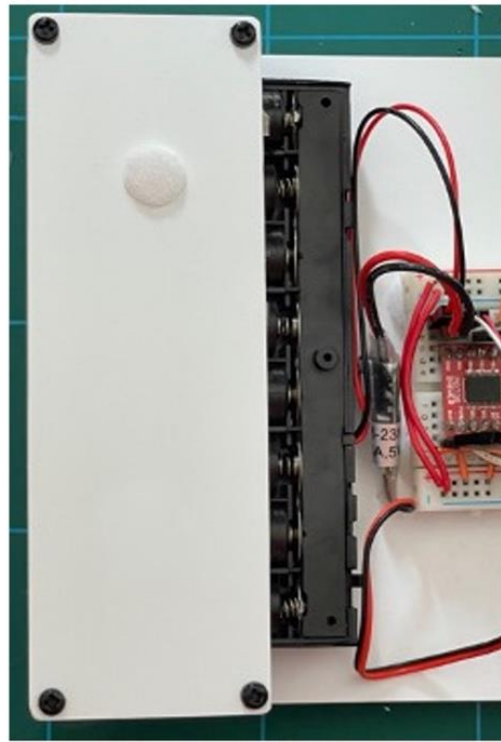
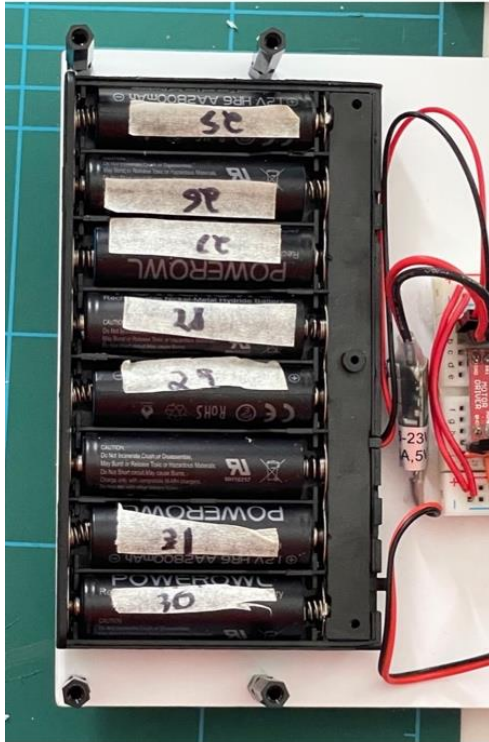


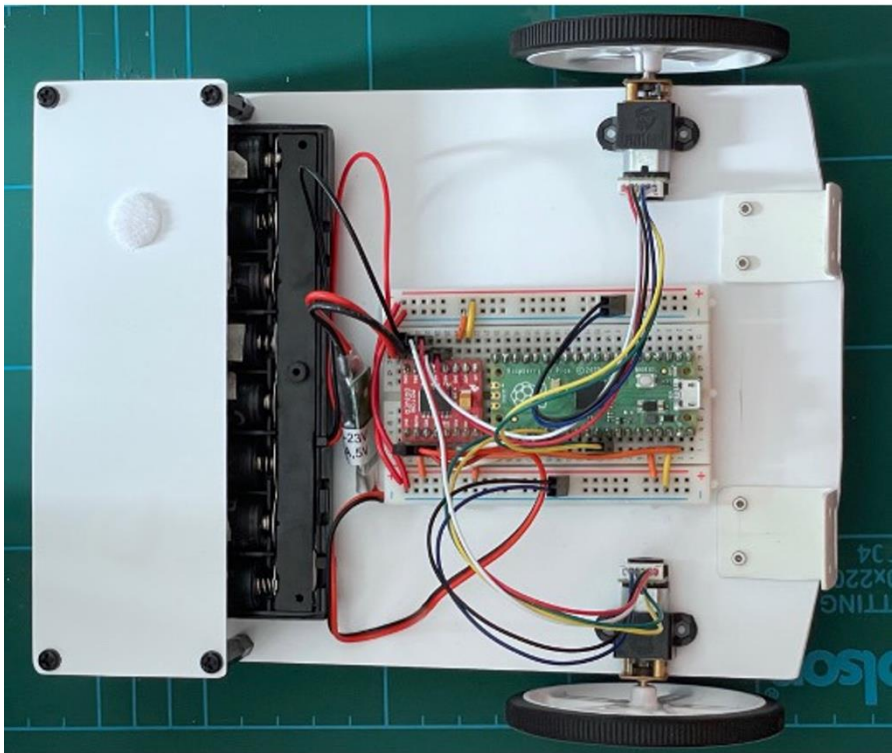




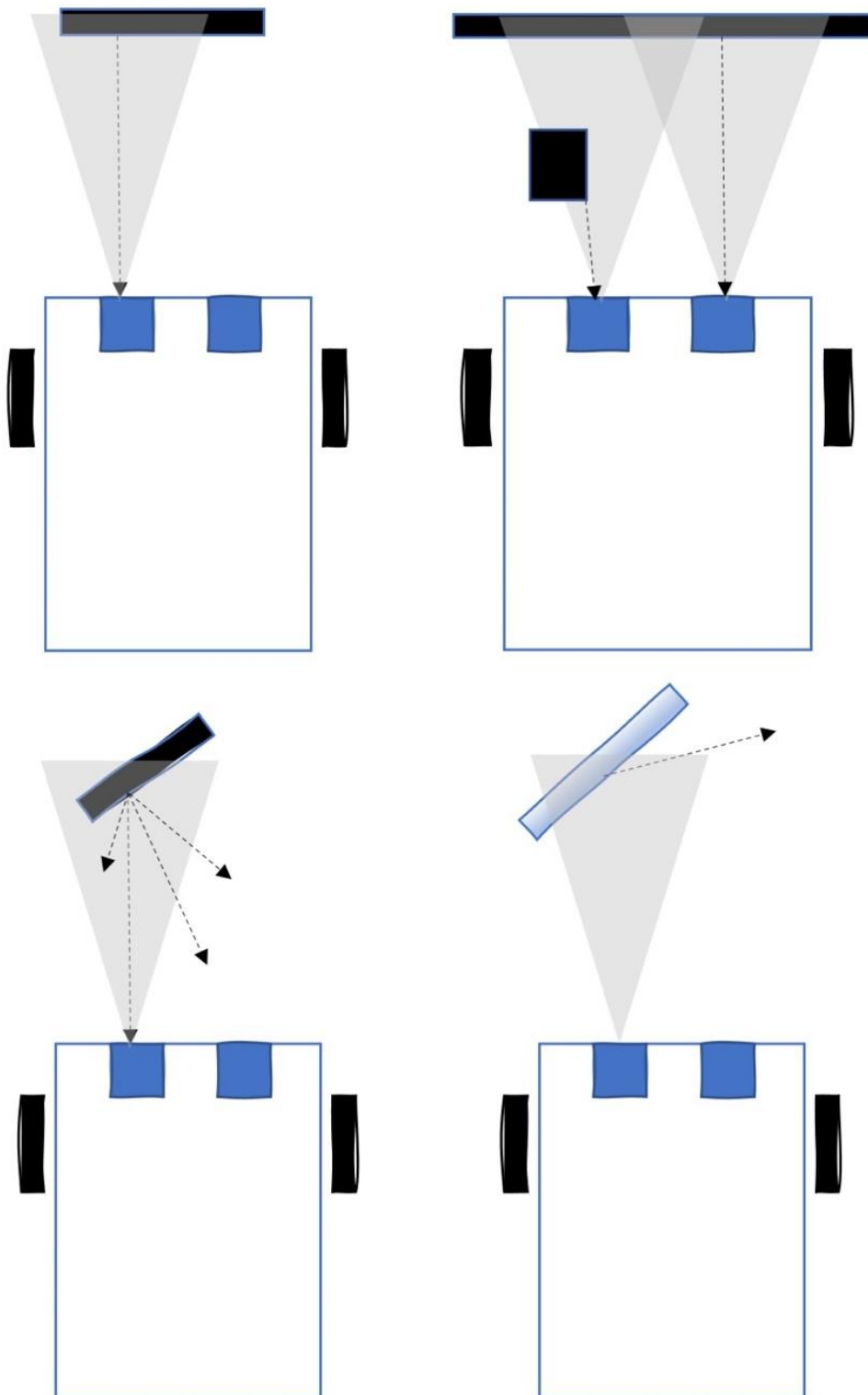


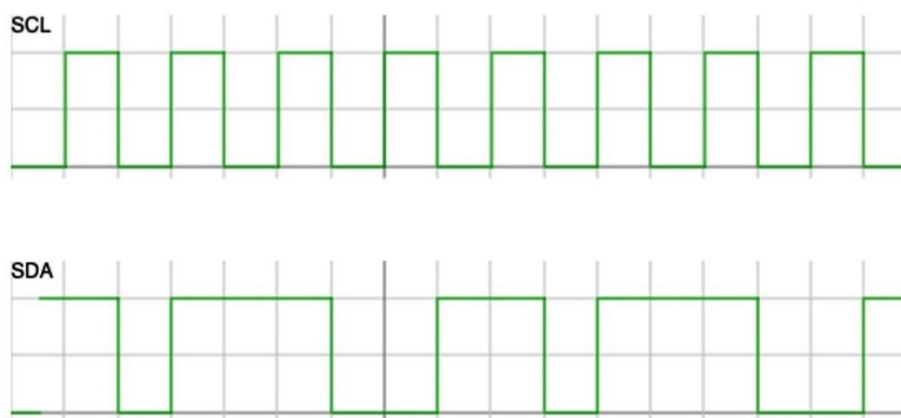
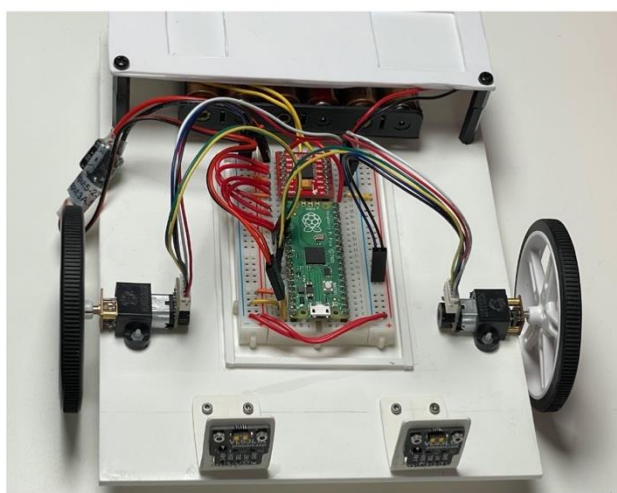
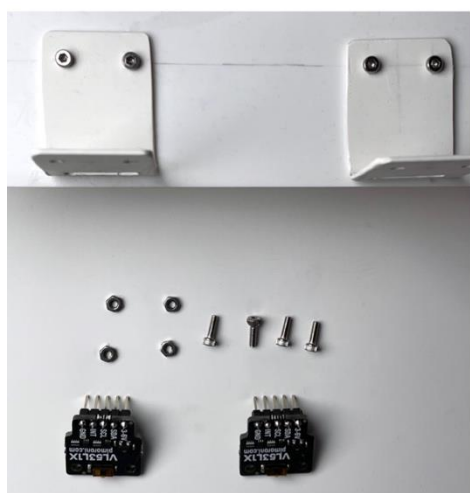
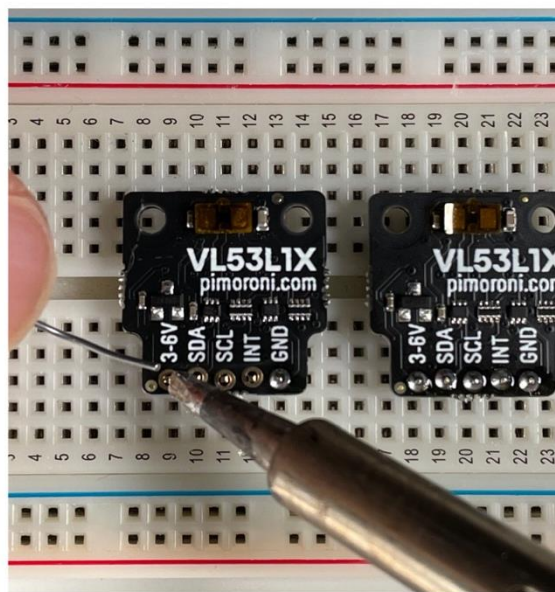
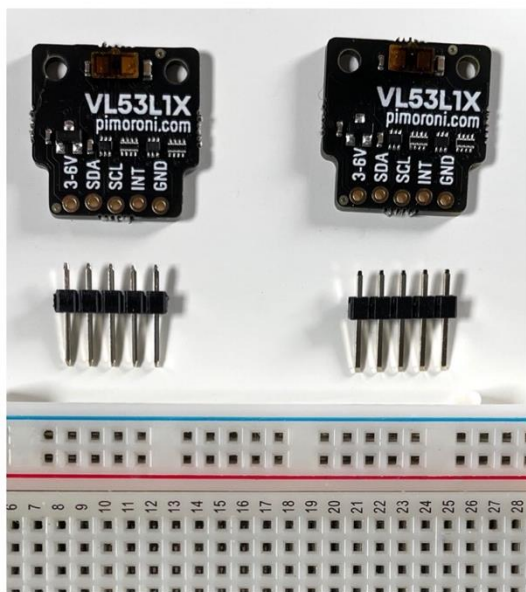


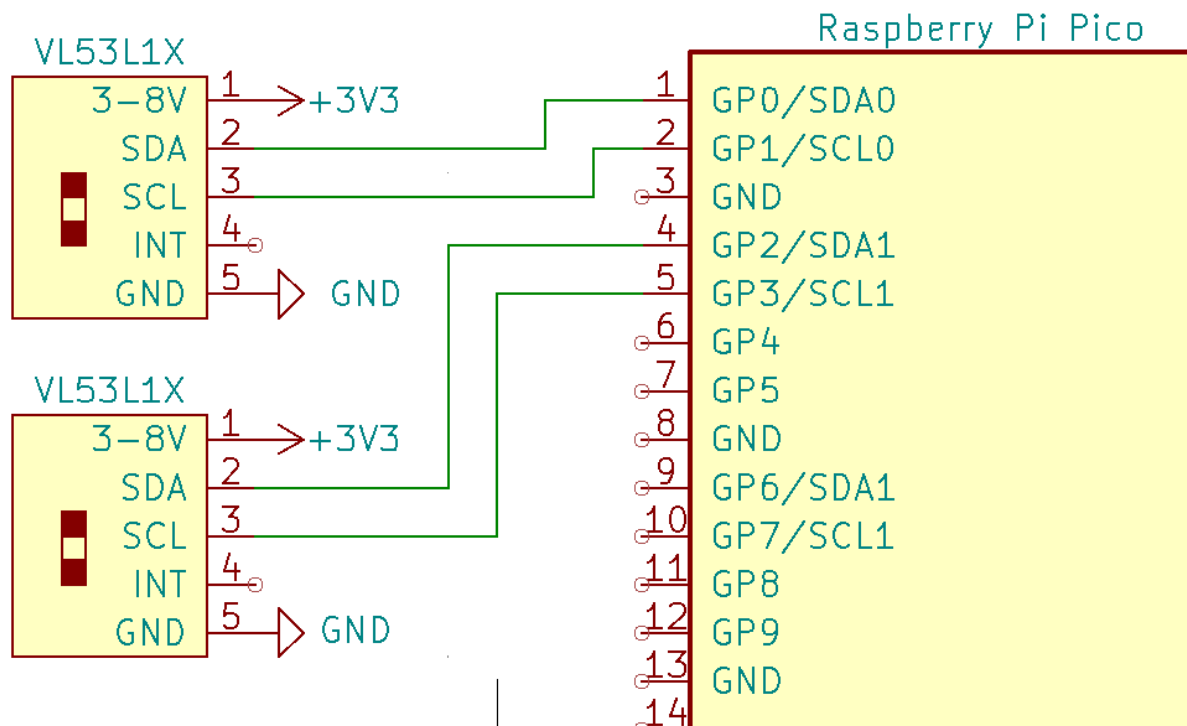
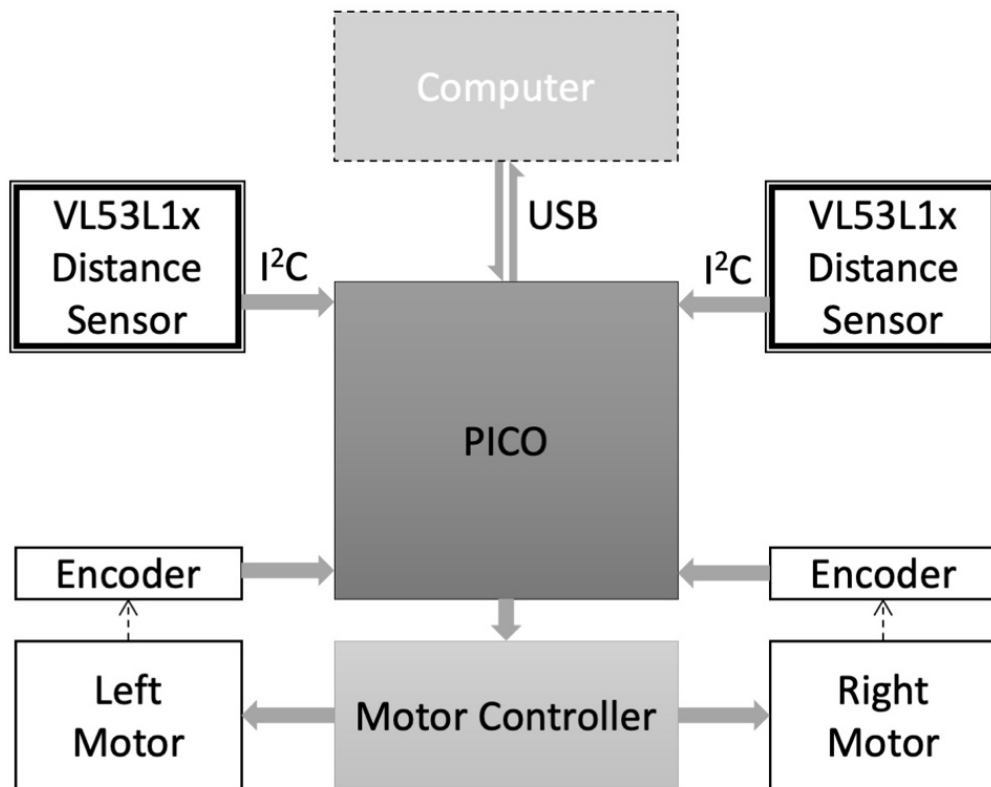


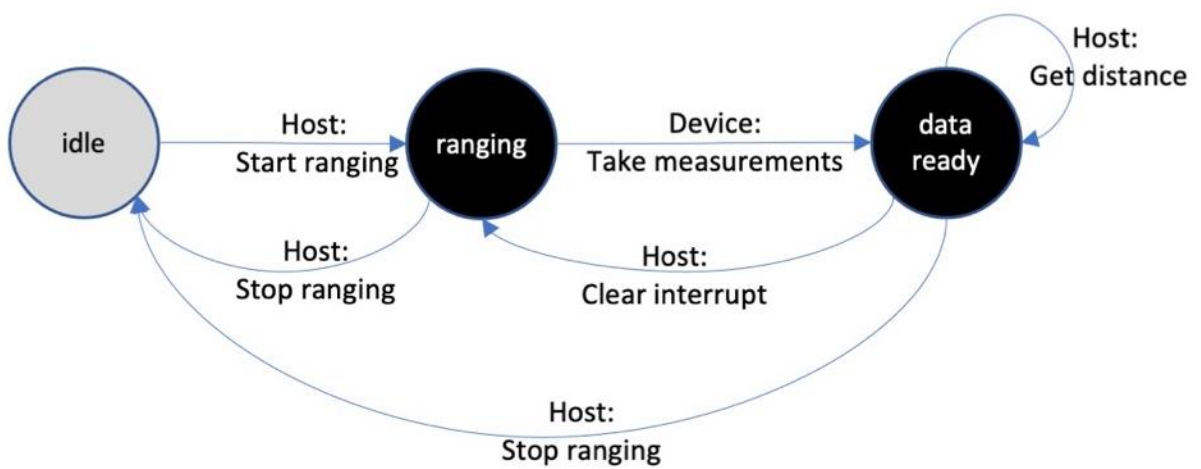
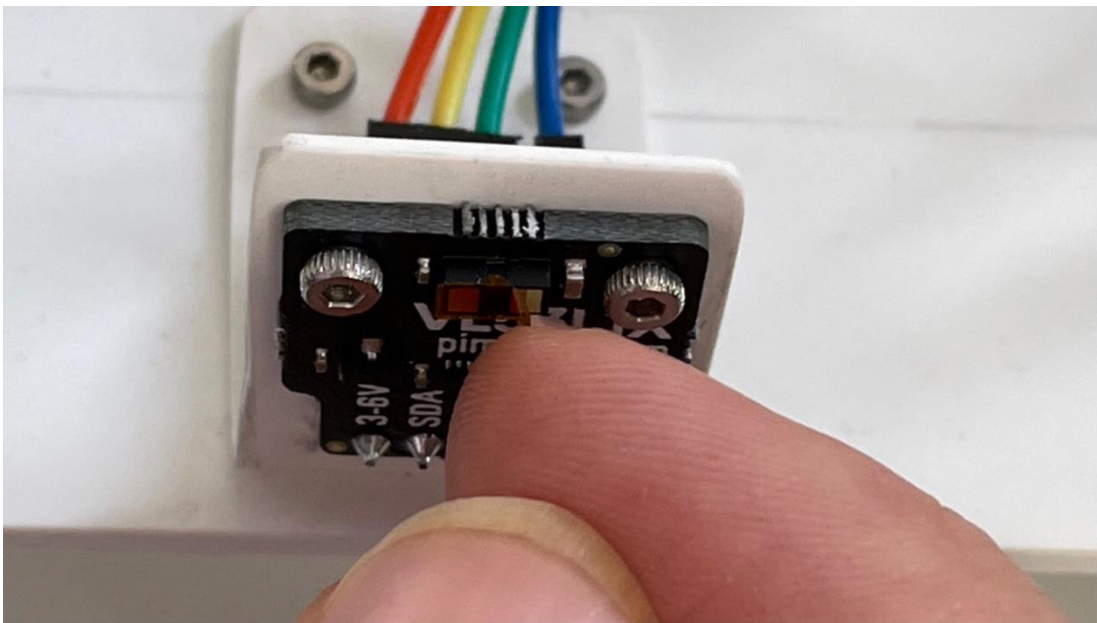
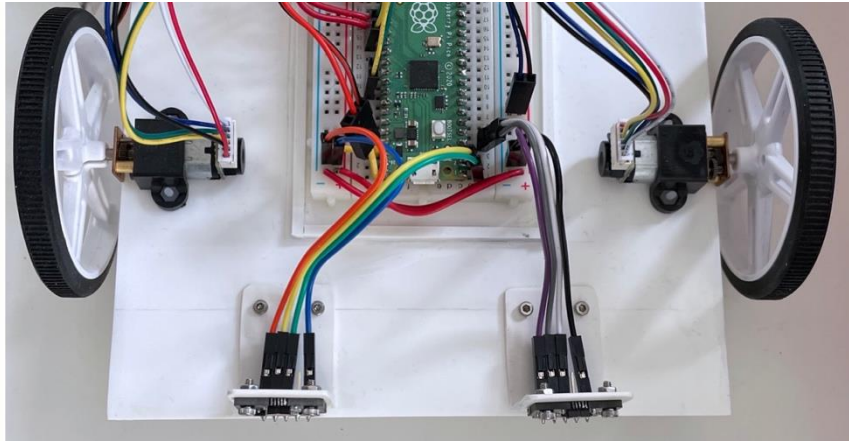


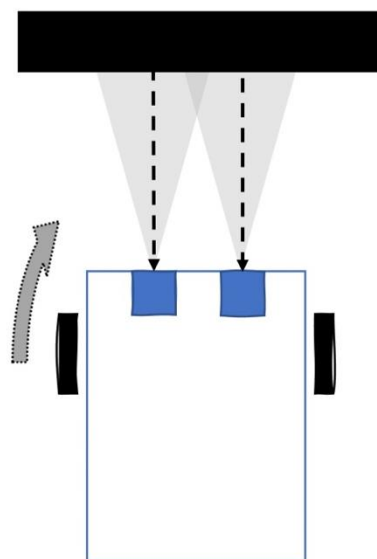
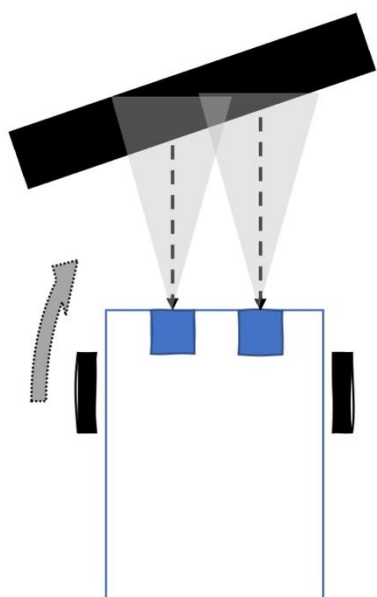
Chapter 8: Sensing Distances to Detect Objects with Pico



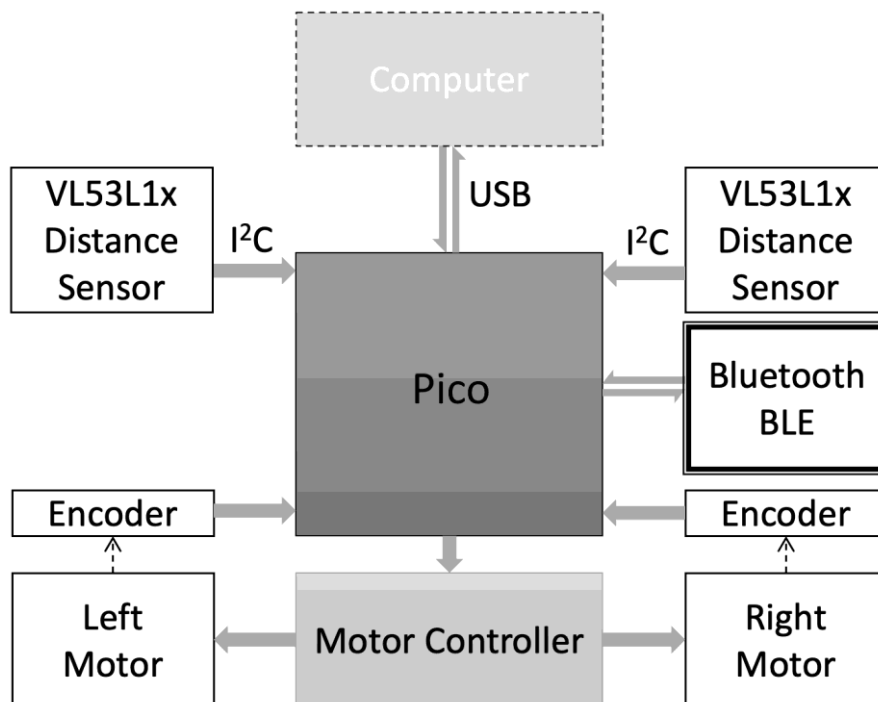
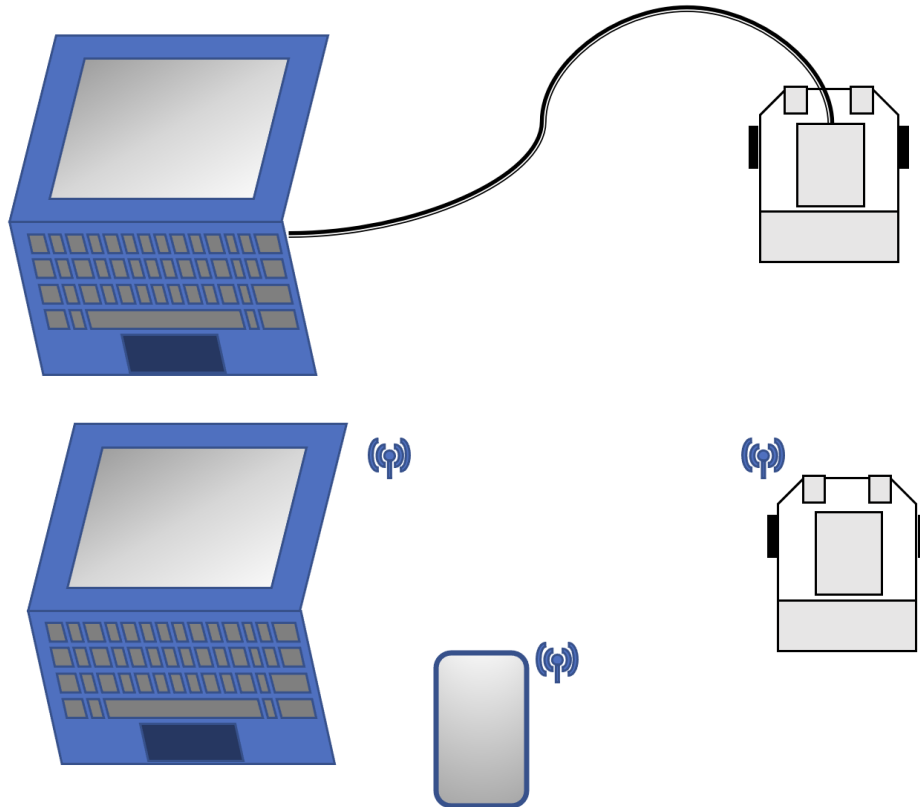


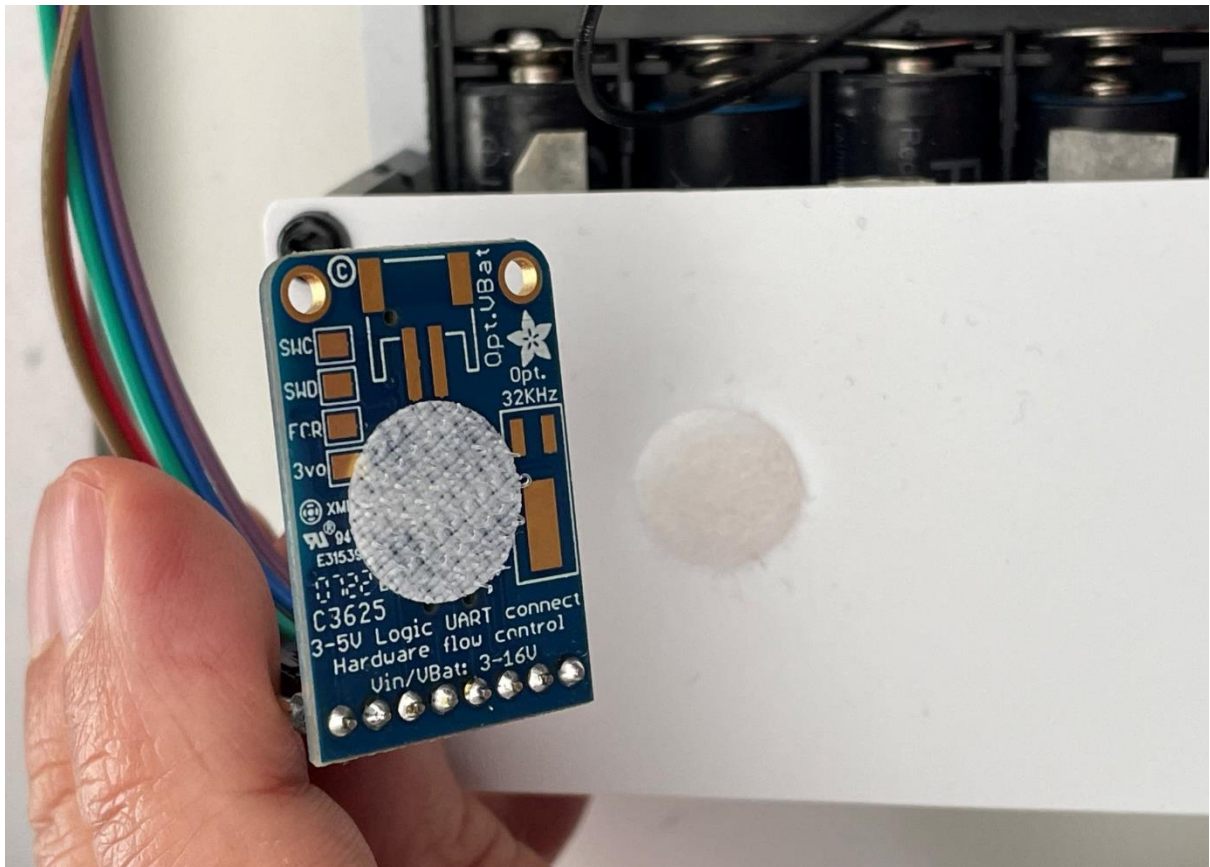
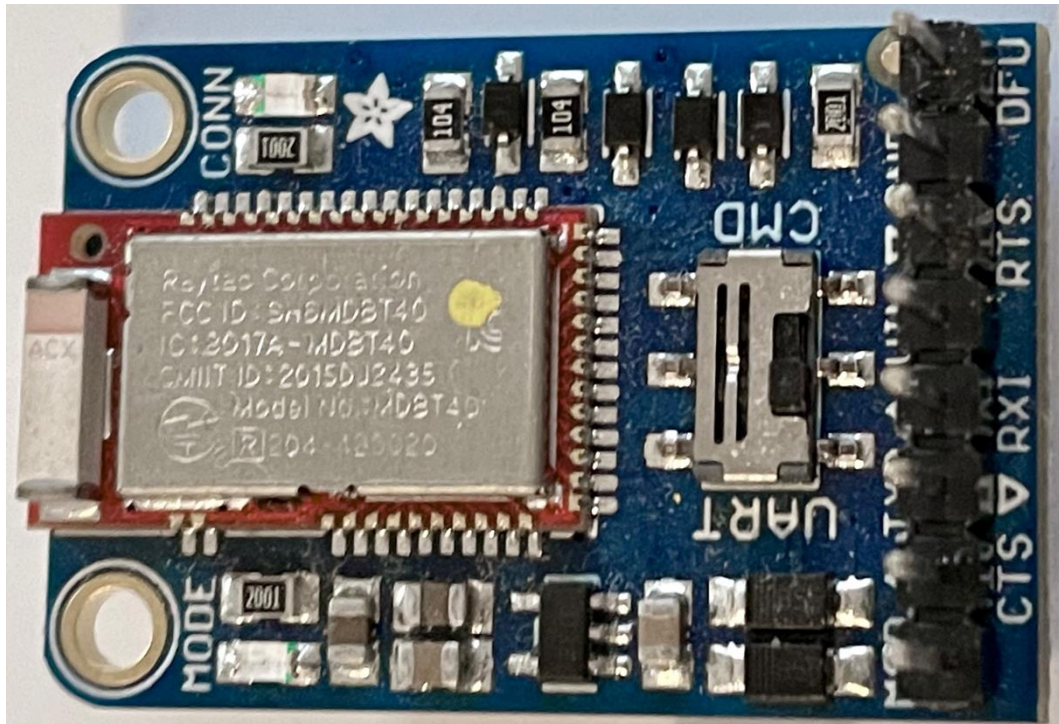


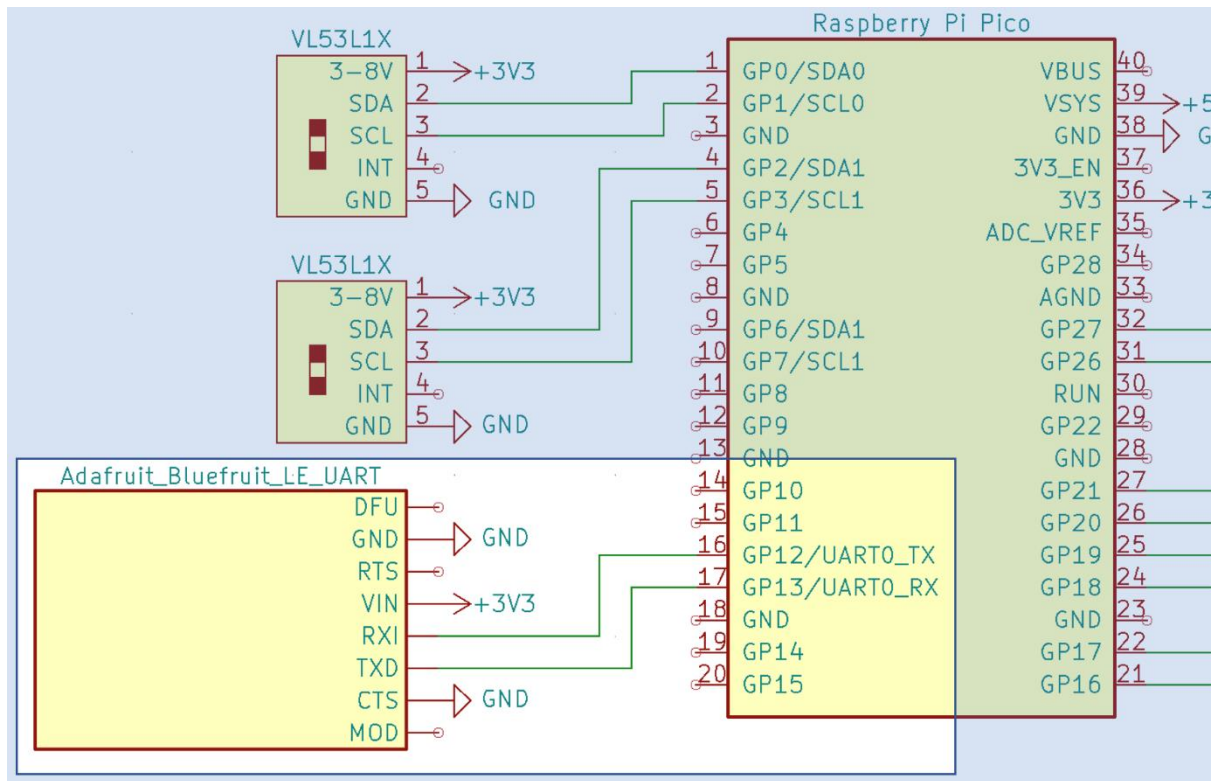




Chapter 9: Teleoperating a Raspberry Pi Pico Robot with Bluetooth LE



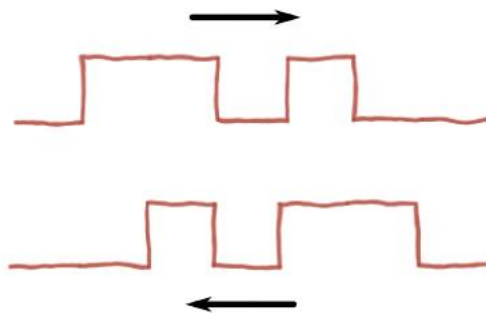




Device A

● TX

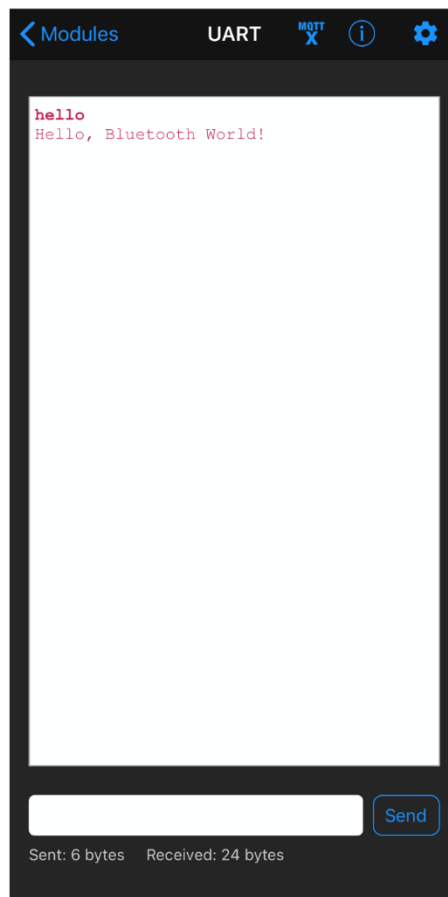
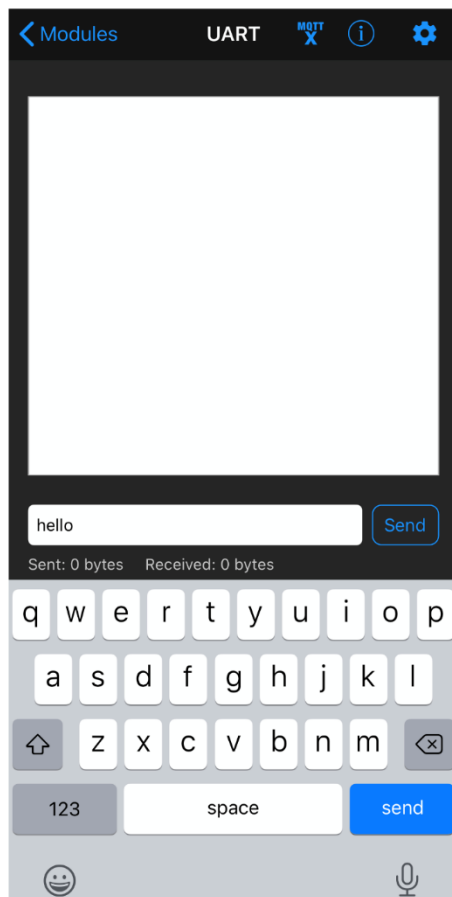
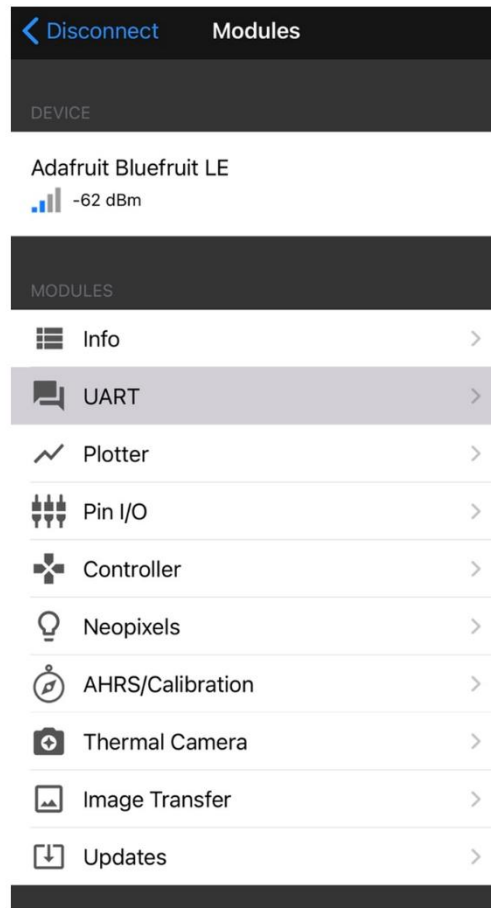
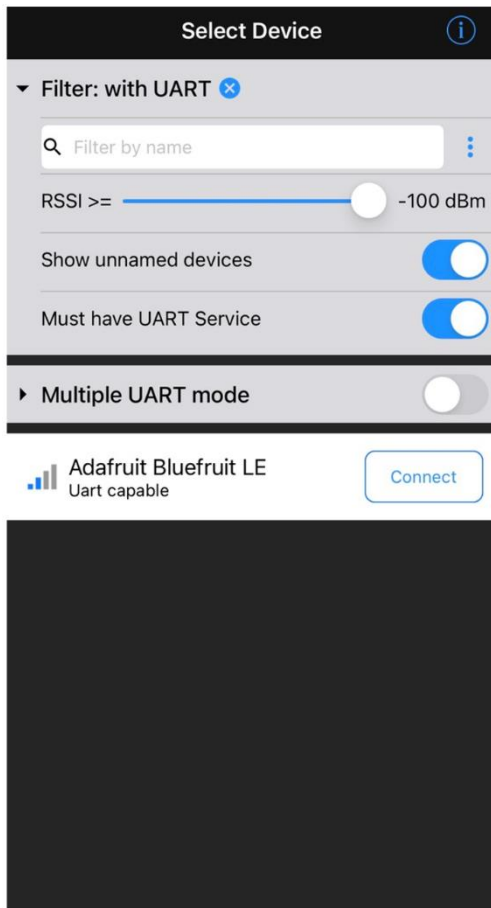
● RX



Device B

● RX

● TX



09:24

4G

< Modules

UART

MQTT
X



```
6.7,123.9
116.4,120.3
119.5,122.7
108.1,122.6
115.7,120.9
108.1,121.7
107.6,120.8
116.5,122.6
122.5,121.9
122.6,121.8
126.1,123.2
126.8,121.4
126.9,124.4
125.9,122.2
128.3,121.0
127.8,123.6
126.9,124.0
124.4,122.6
123.9,123.0
124.4,122.1
127.8,124.6
127.4,124.8
127.1,124.2
127.8,121.1
127.1,121.3
127.2,123.0
127.3,123.5
125.4,126.9
126.0,121.2
127.2,122.4
127.1,120.0
```

Send

Sent: 0 bytes Received: 406 bytes

<

Disconnect

Modules

DEVICE

Adafruit Bluefruit LE

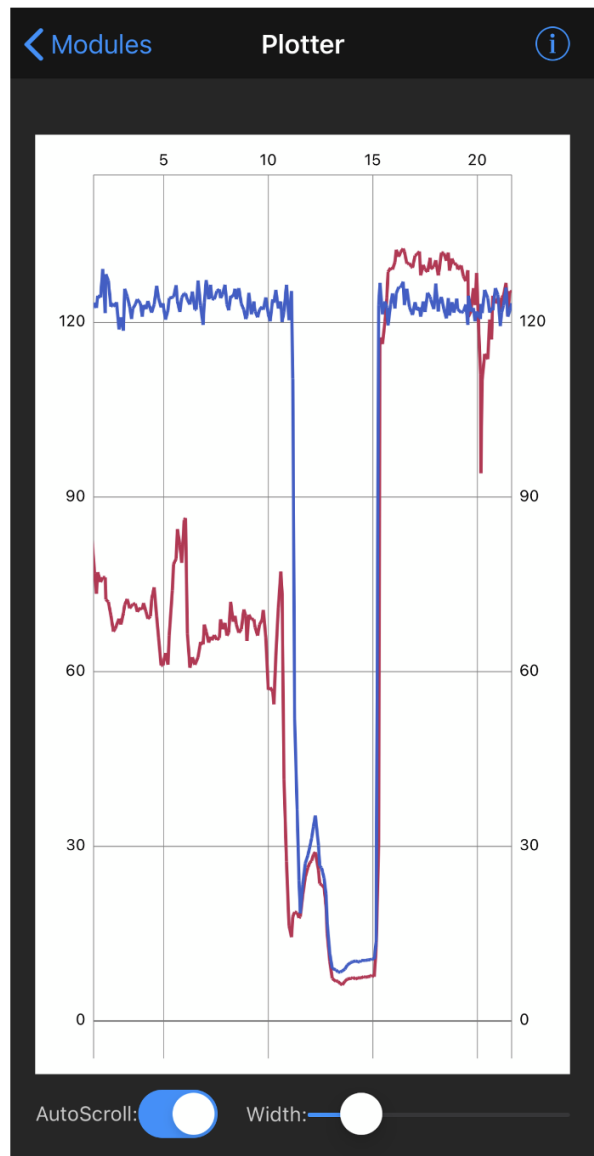
-61 dBm

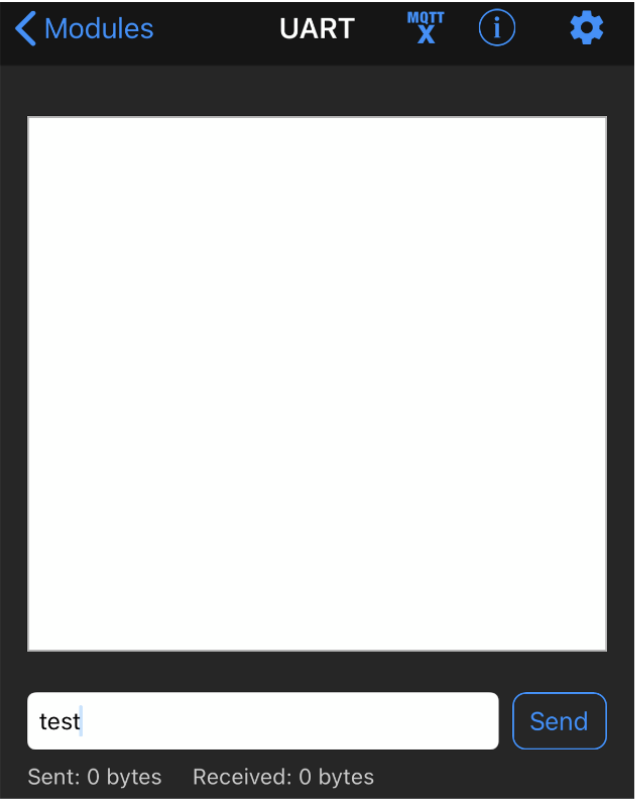
MODULES

Info

>

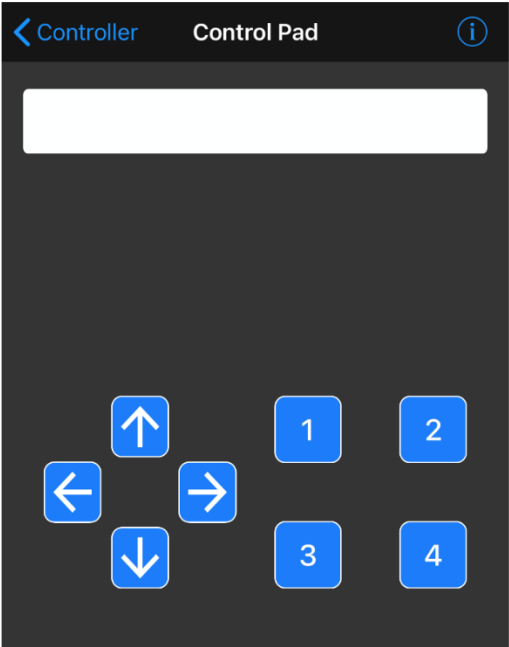
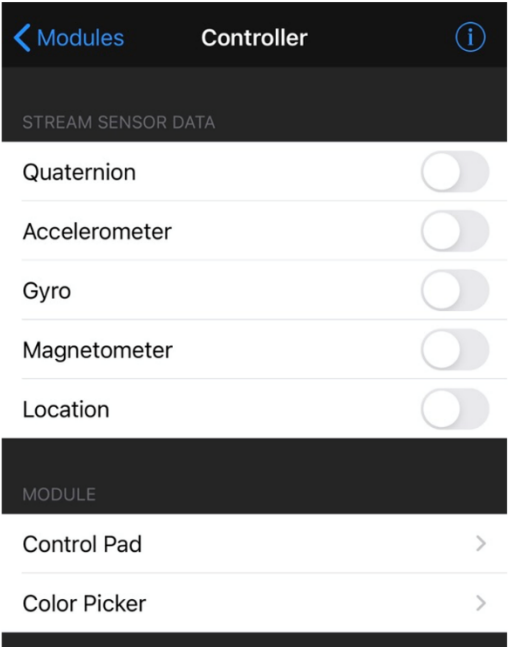
UART

>PlotterPin I/OControllerNeopixelsAHRS/CalibrationThermal CameraImage TransferUpdates



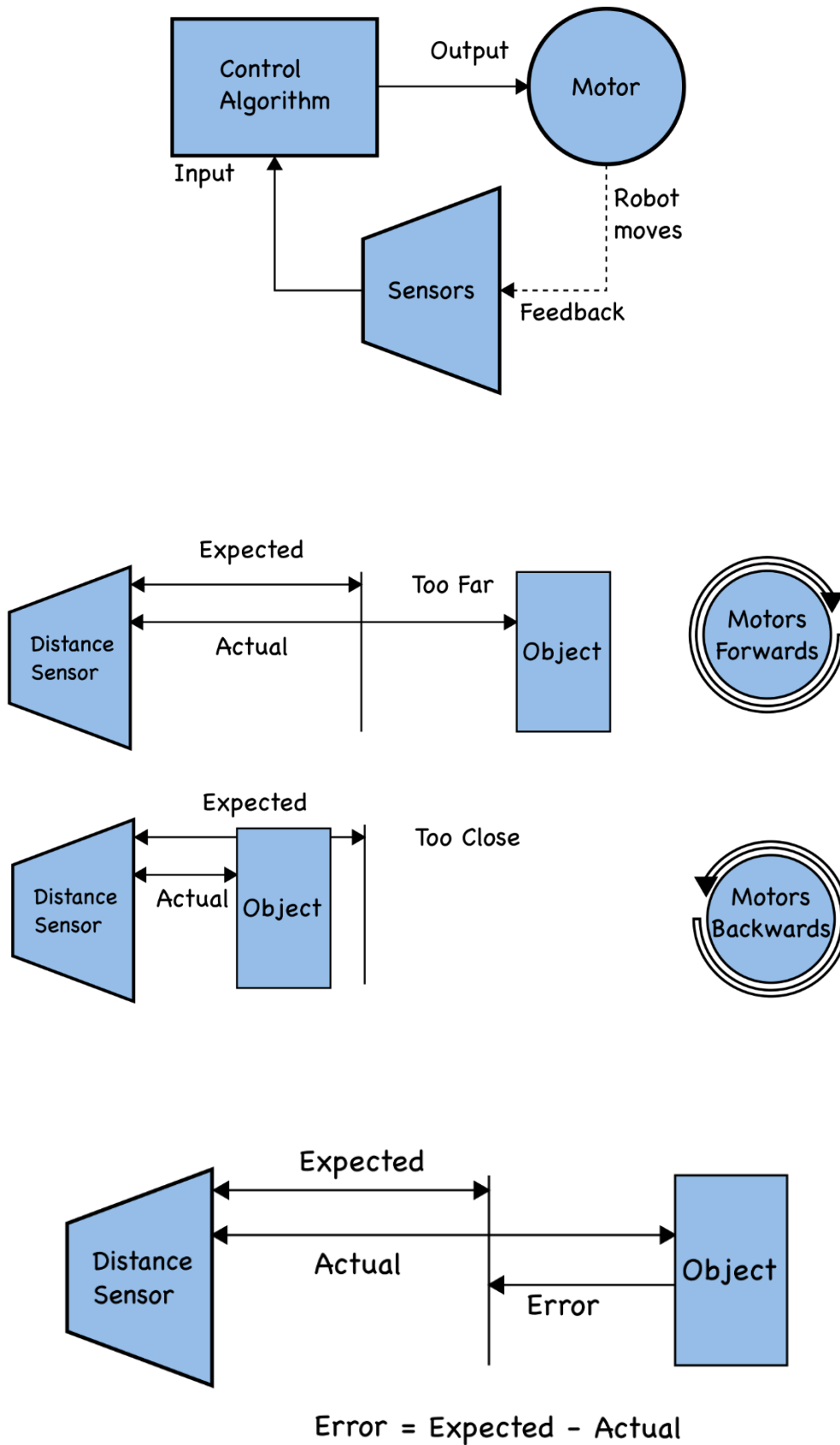
```
Adafruit CircuitPython 7.2.0
>>> %Run -c $EDITOR_CONTENT

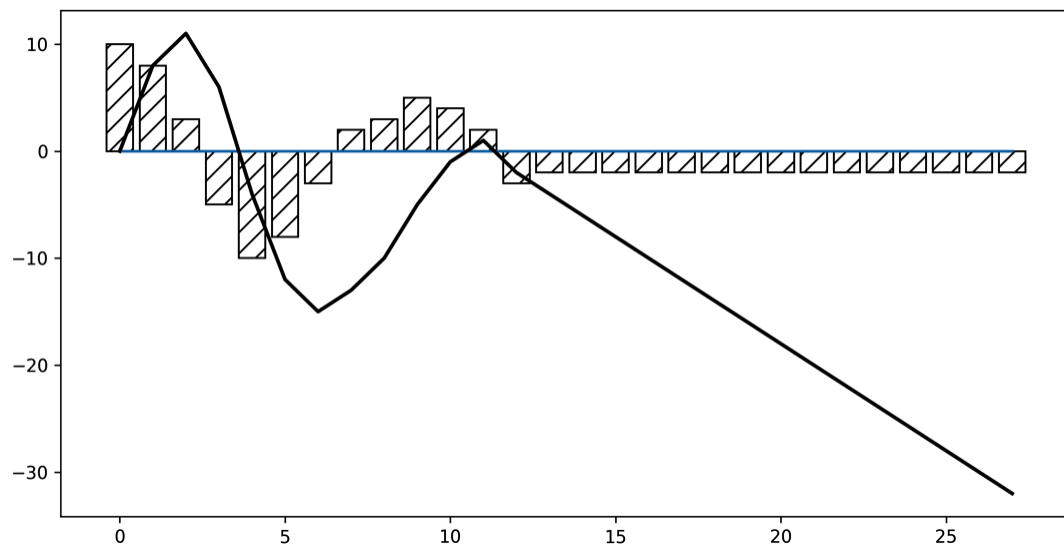
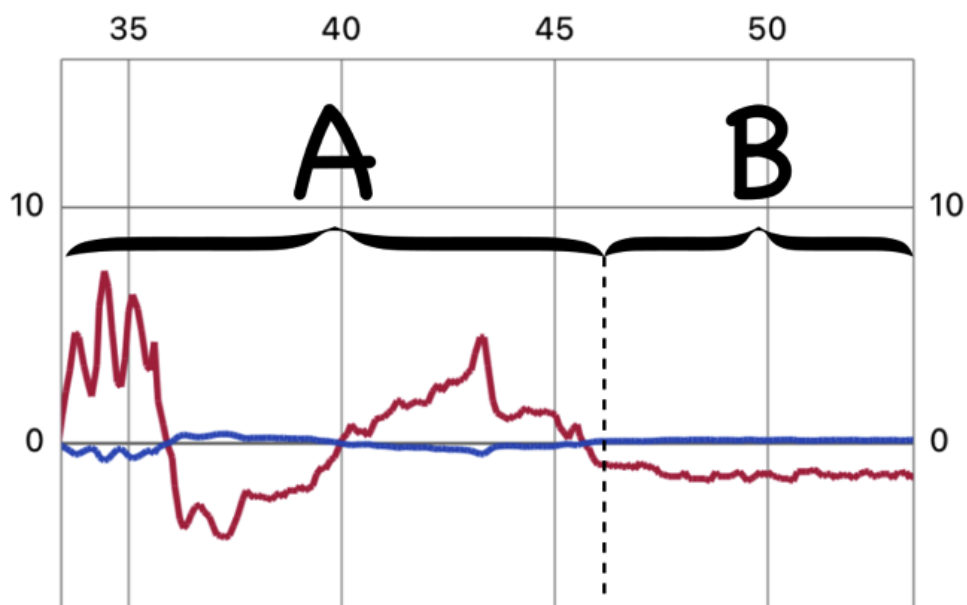
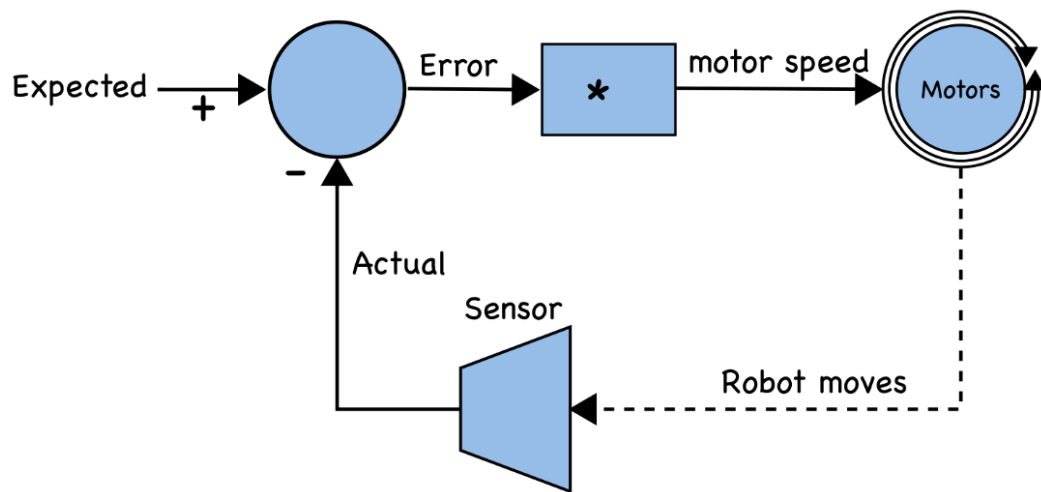
Waiting for bytes on UART...
b'test\n'
```

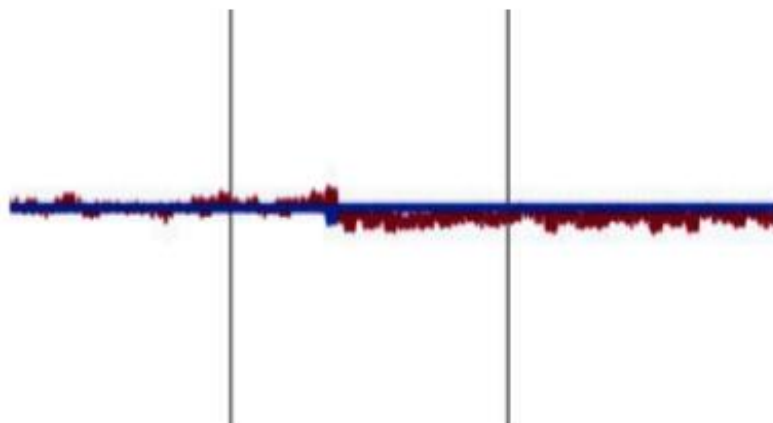
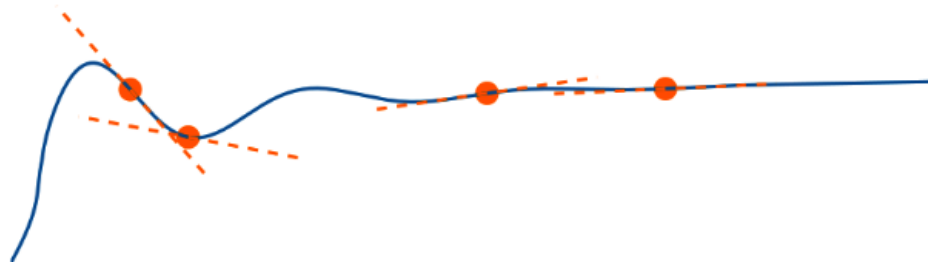
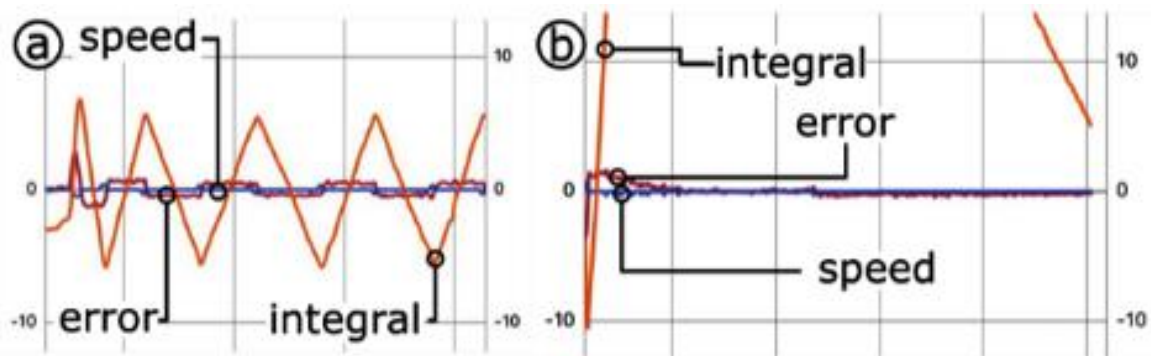
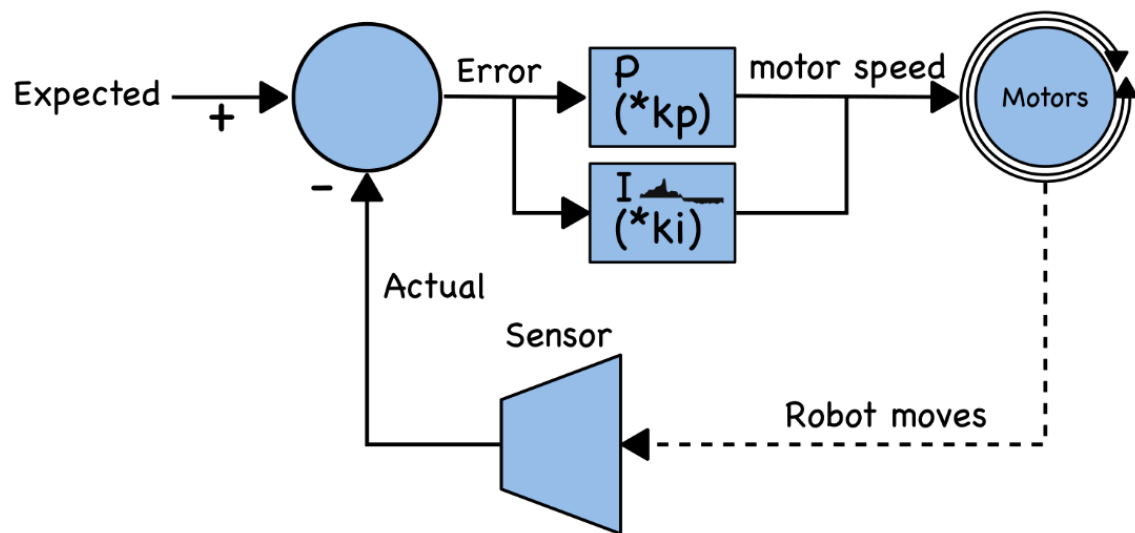


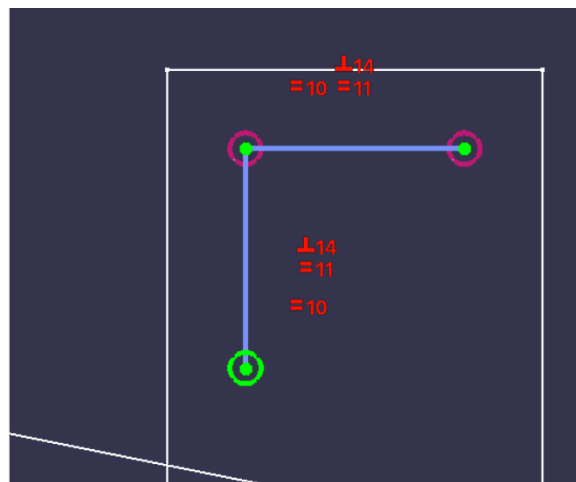
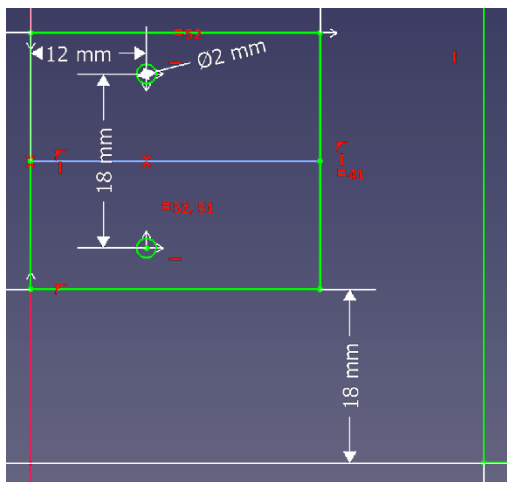
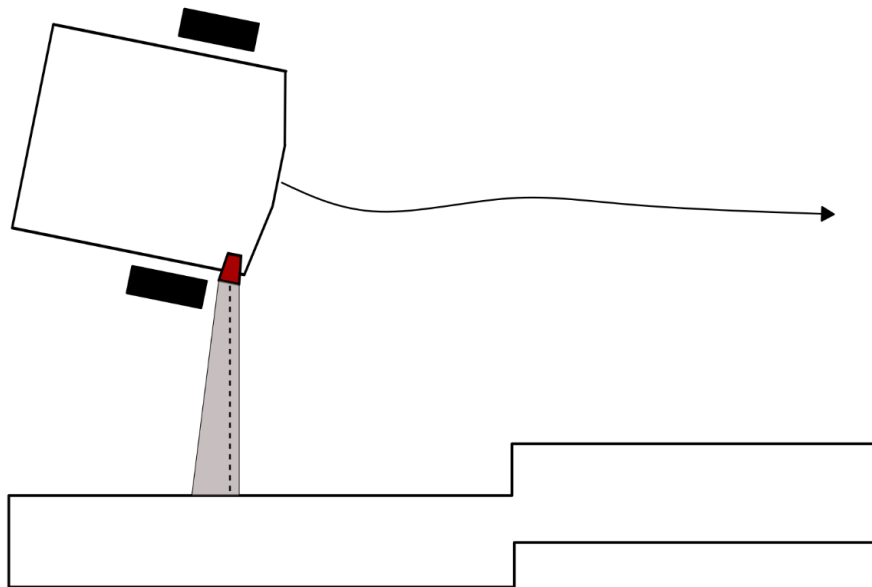
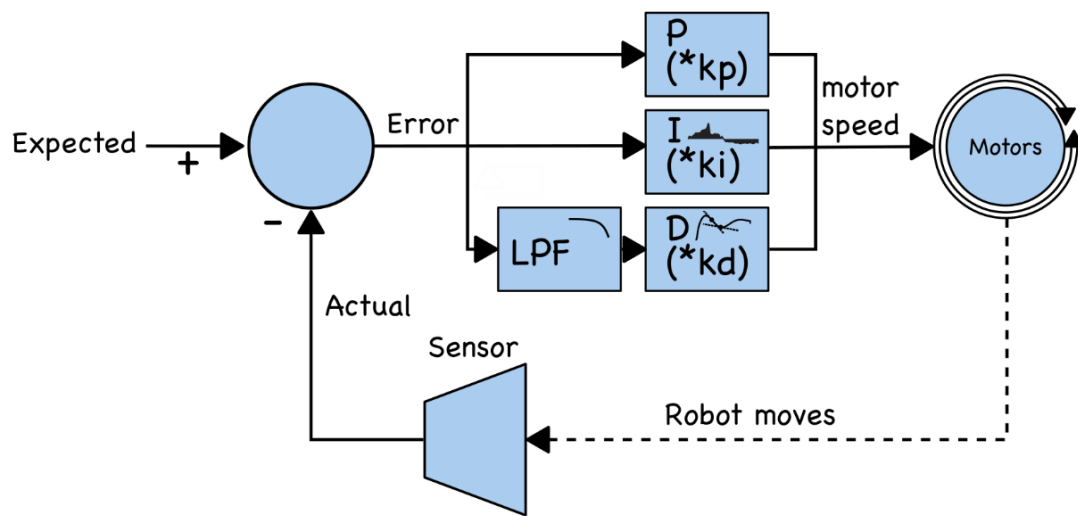
```
b'!B516'
b'!B507'
```

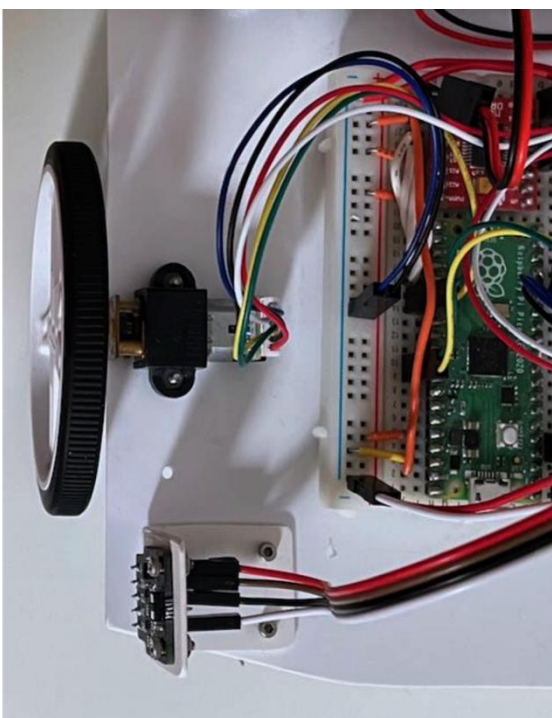
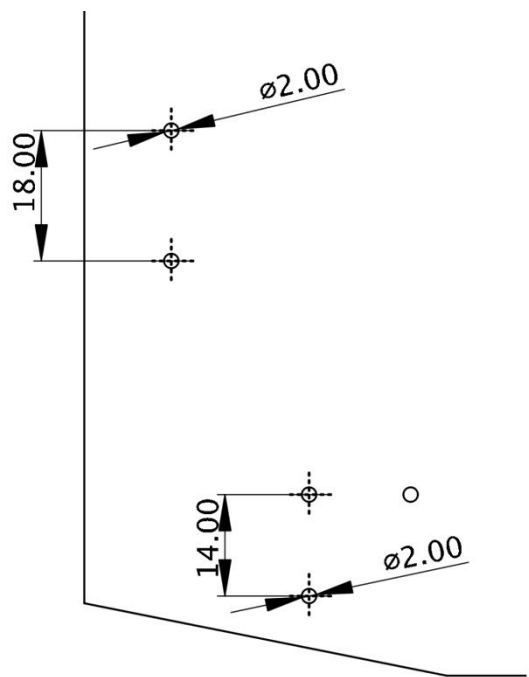
Chapter 10: Using the PID Algorithm to Follow Walls











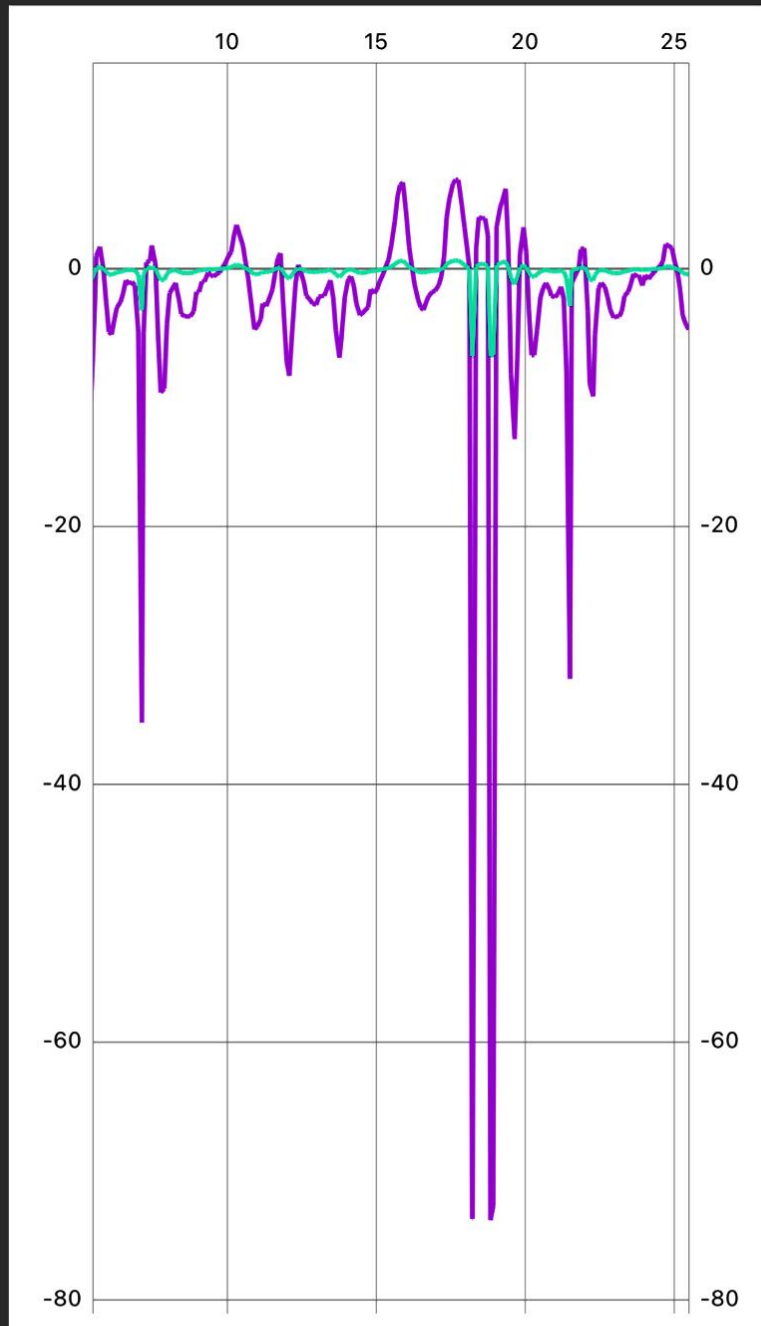
22:28 ↗



◀ Search

< Modules

Plotter



AutoScroll:



Width:

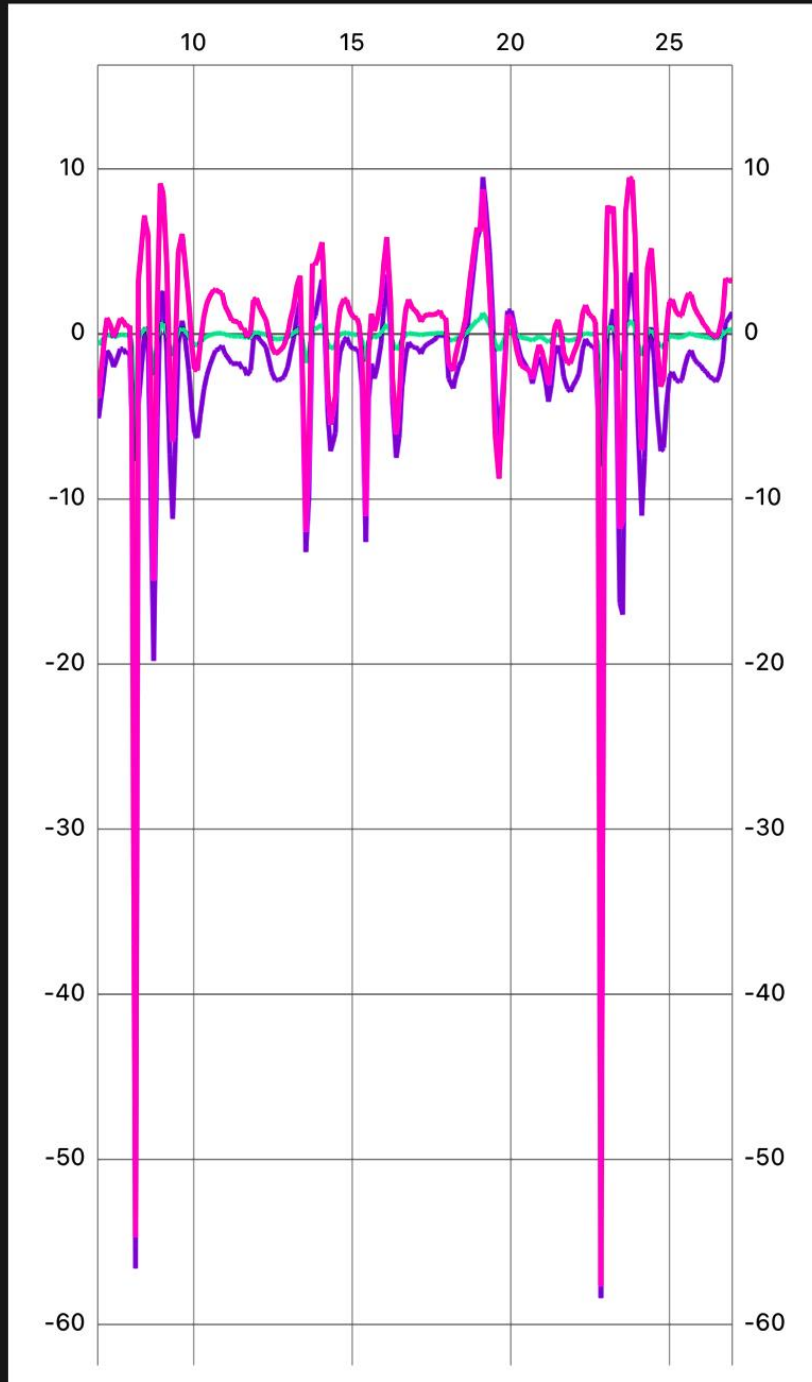


22:33 ↗



← Modules

Plotter



AutoScroll: ☒

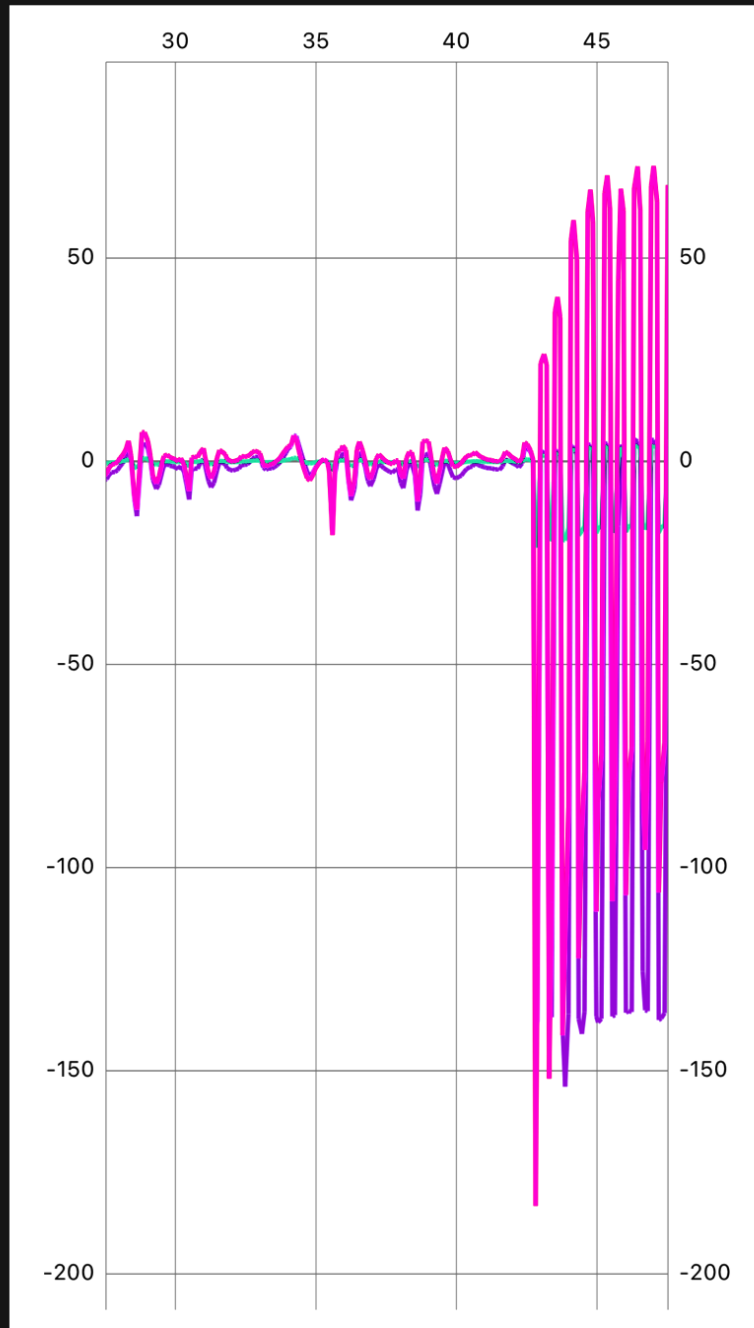
Width:

22:33



[Modules](#)

Plotter



AutoScroll:



Width:

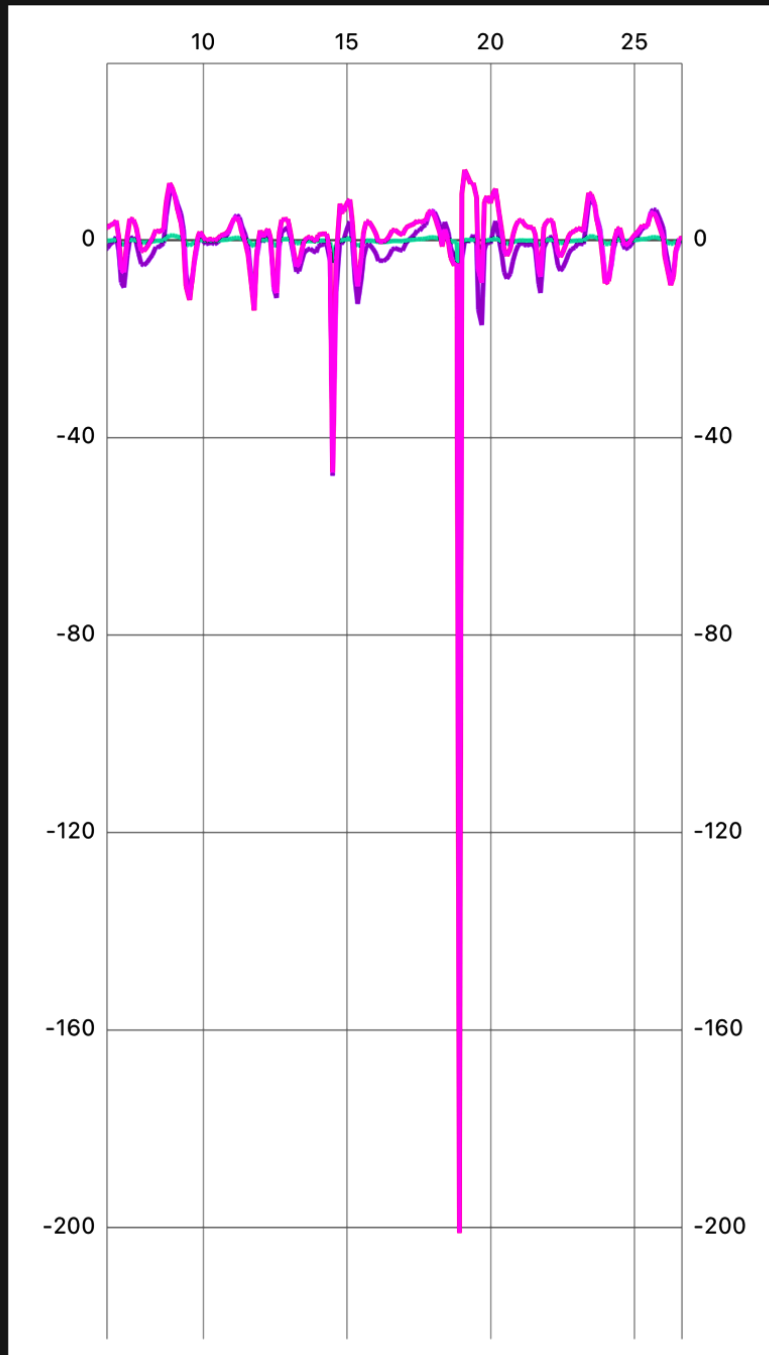


22:36



[Modules](#)

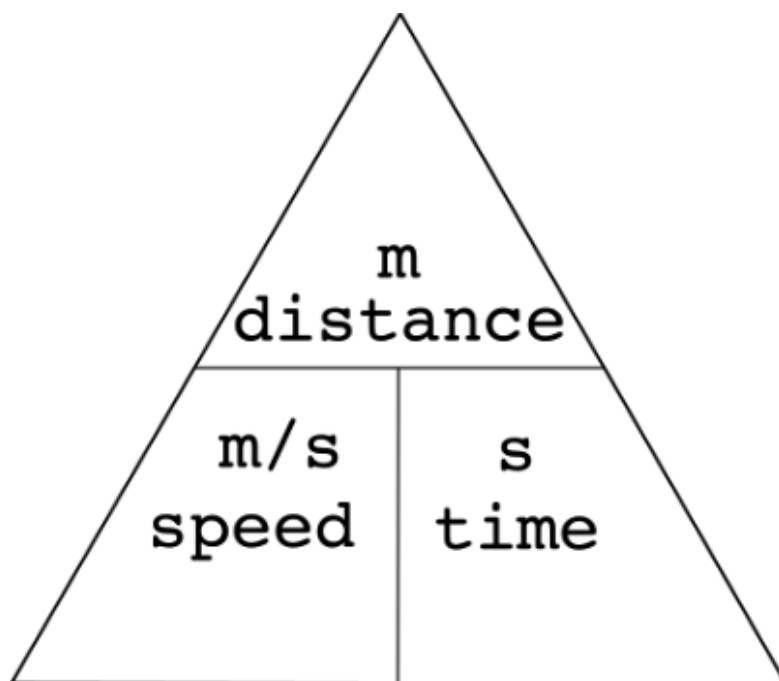
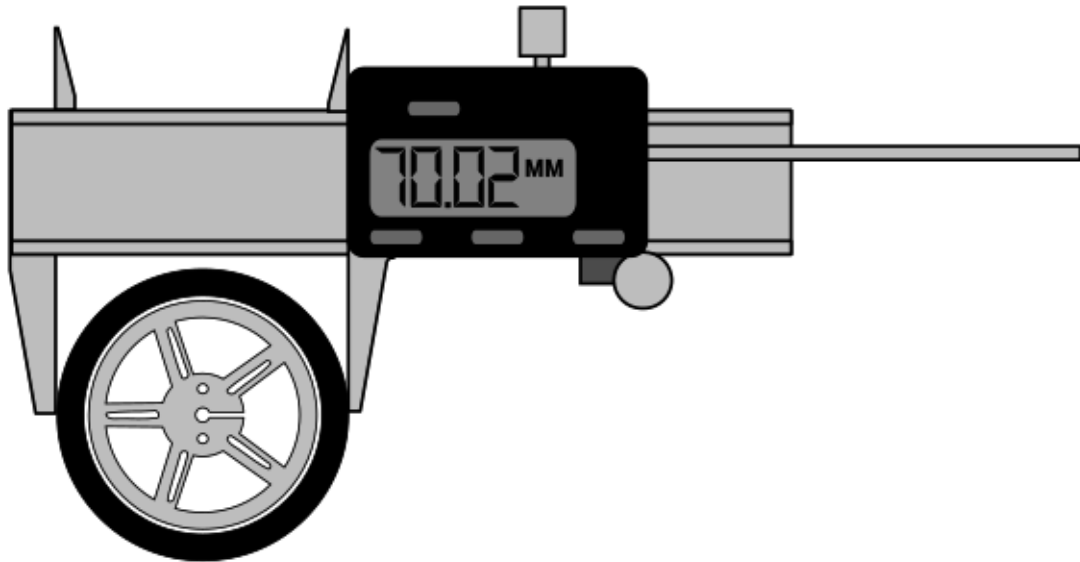
Plotter

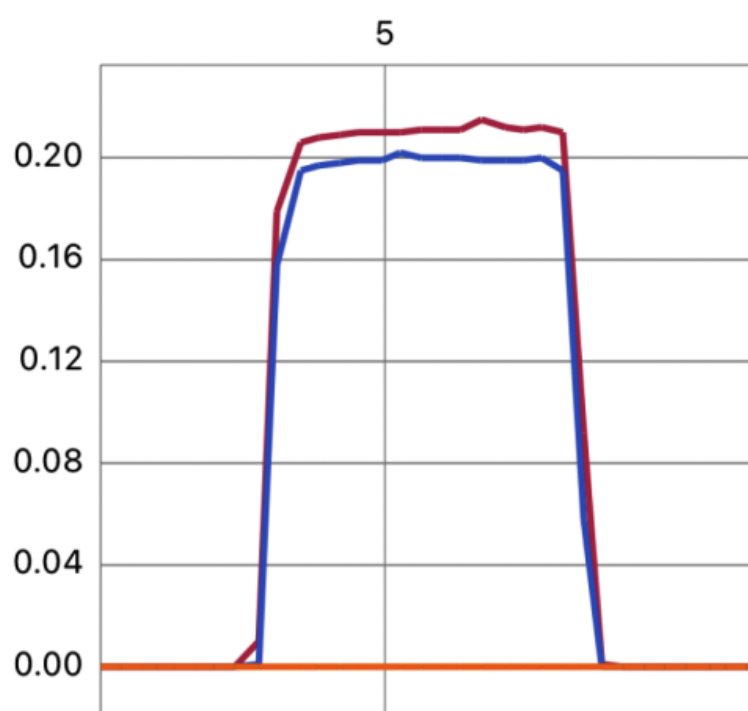
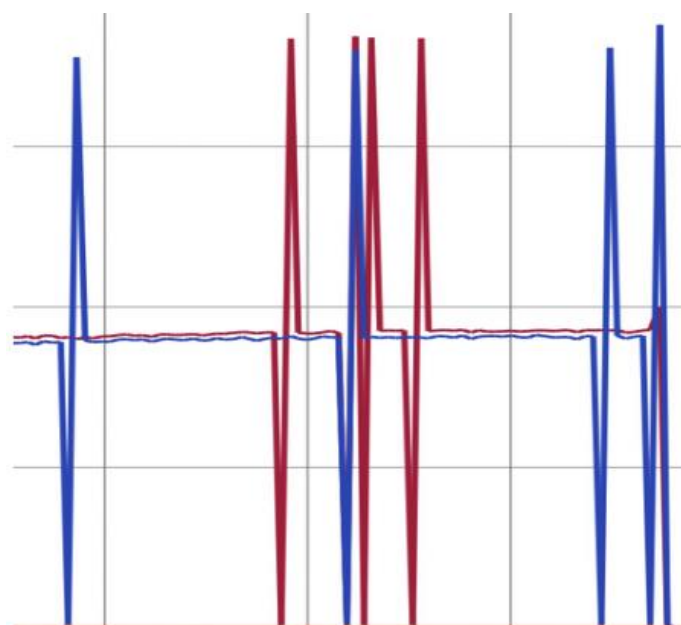


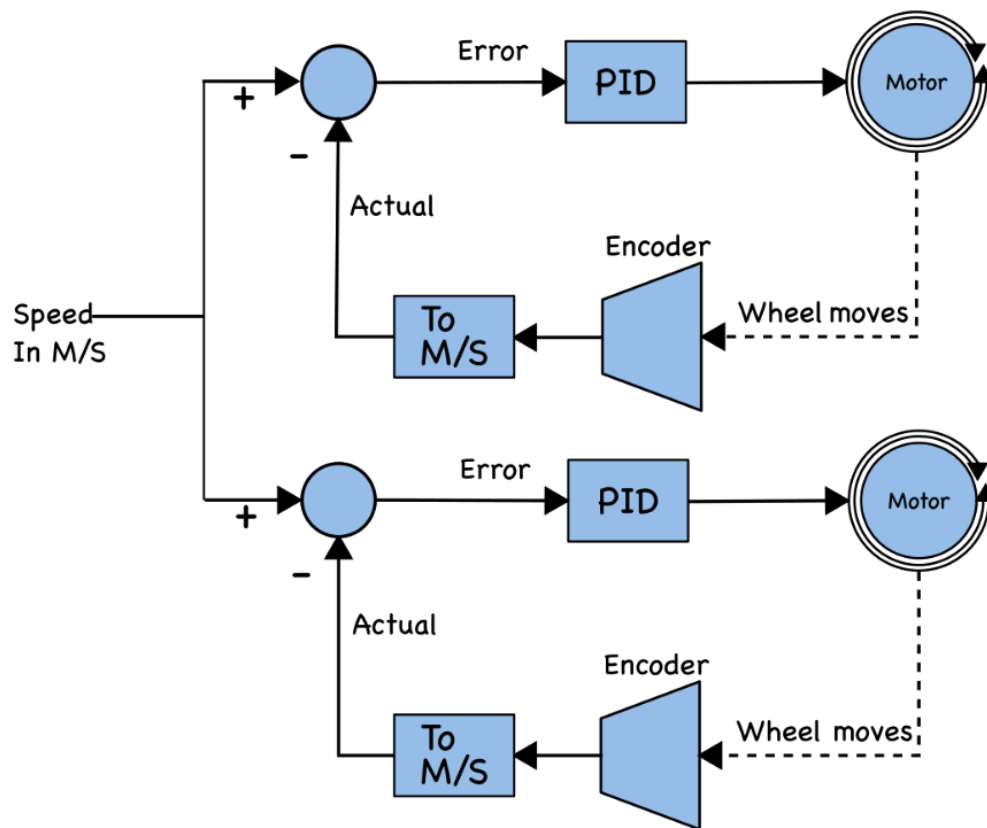
AutoScroll: ☒

Width:

Chapter 11: Controlling Motion with Encoders on Raspberry Pi Pico



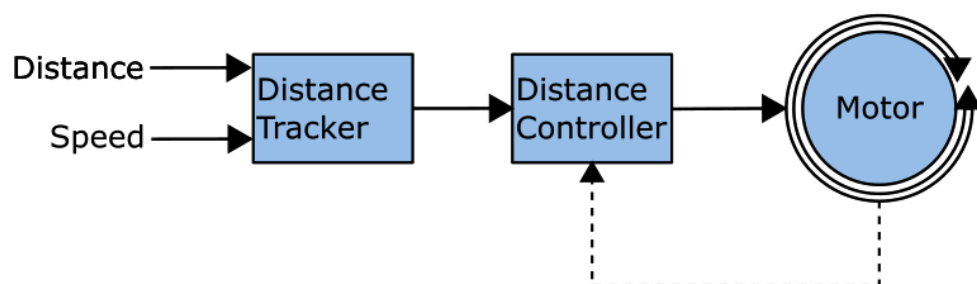
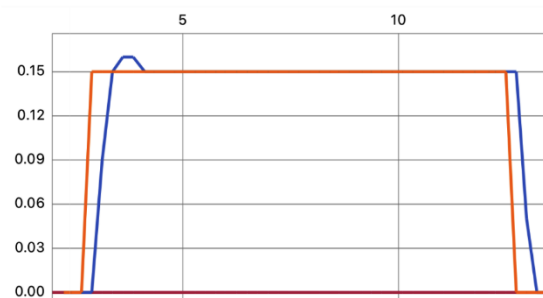


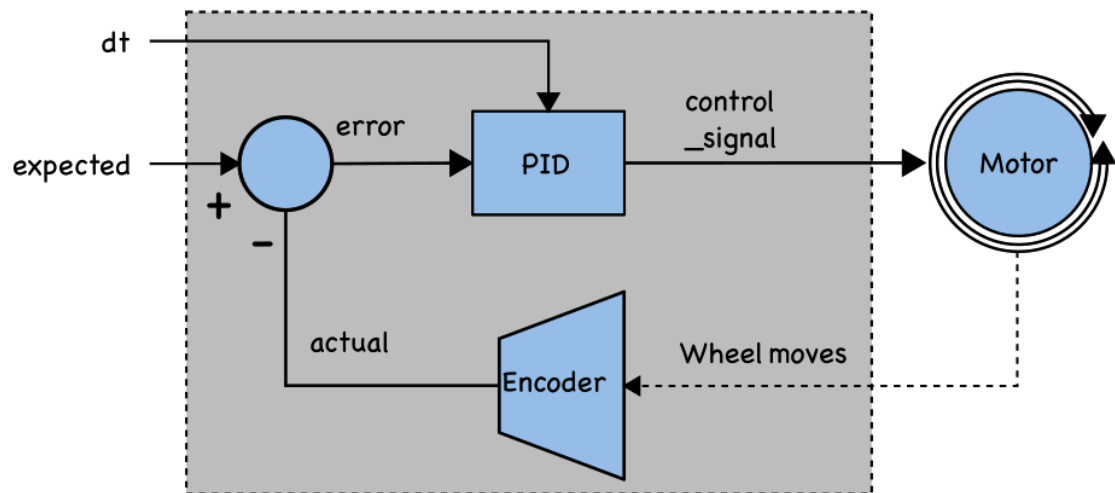
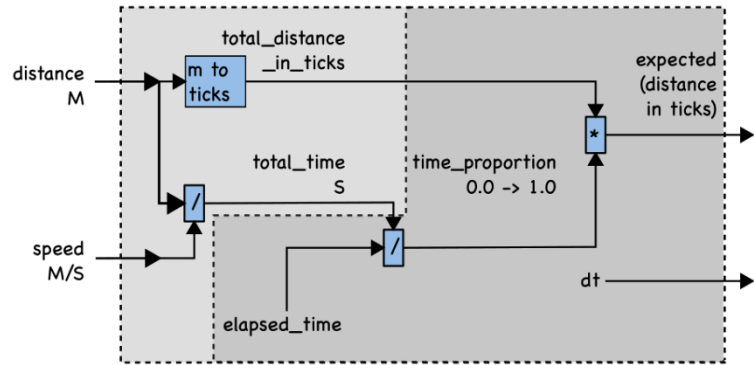
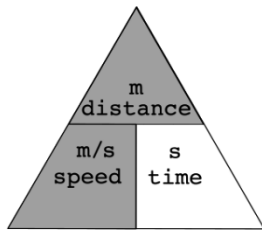


Propped up

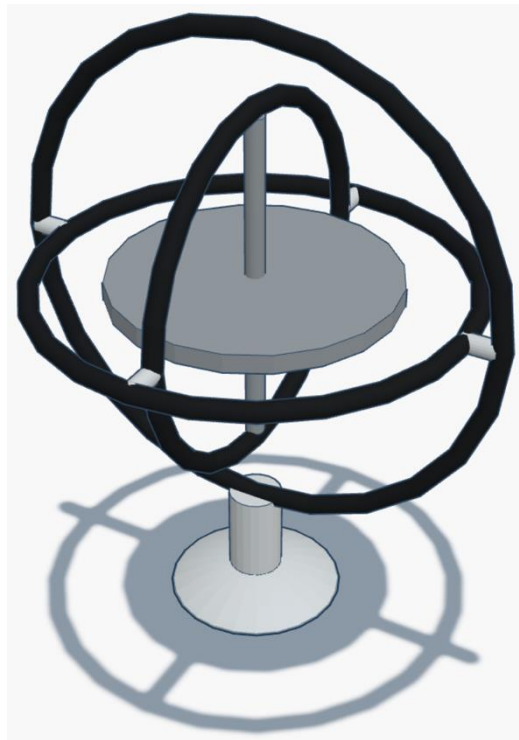
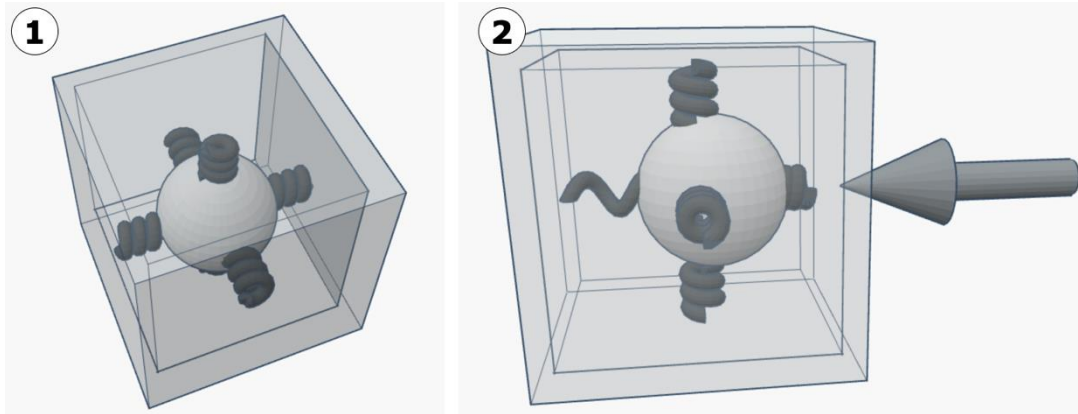


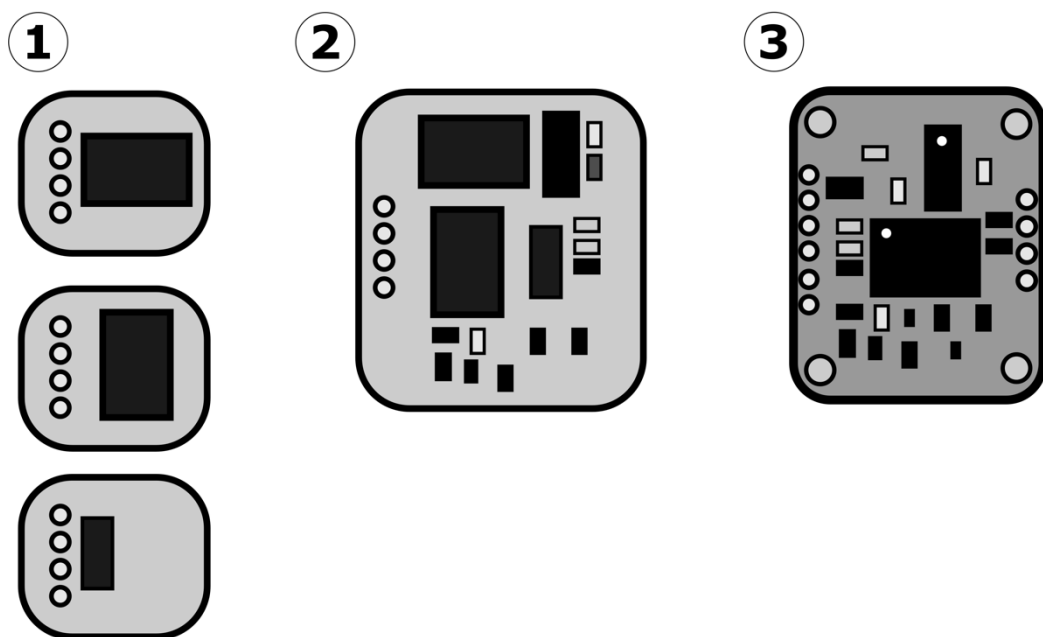
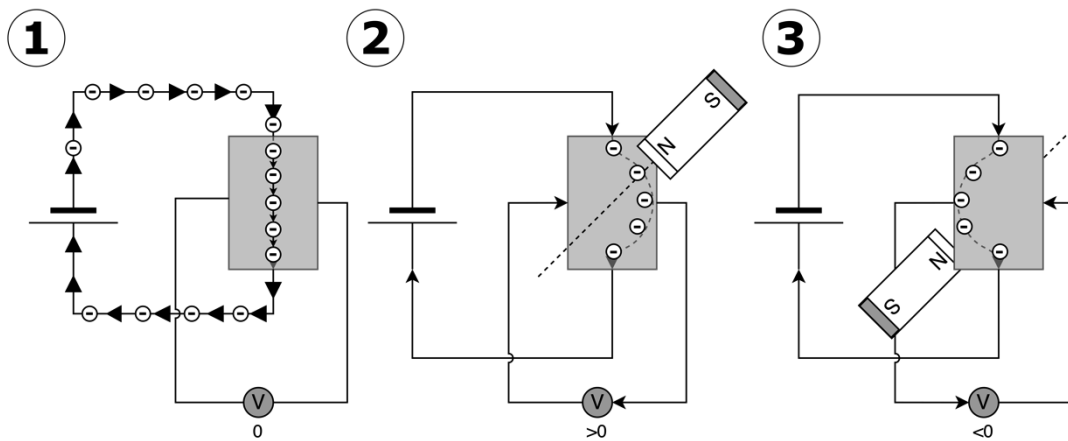
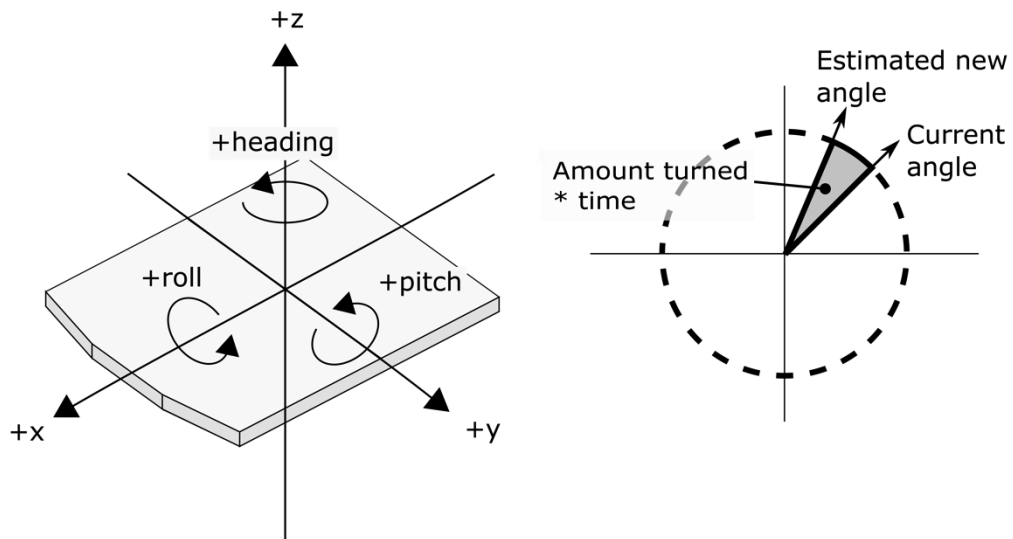
Floor

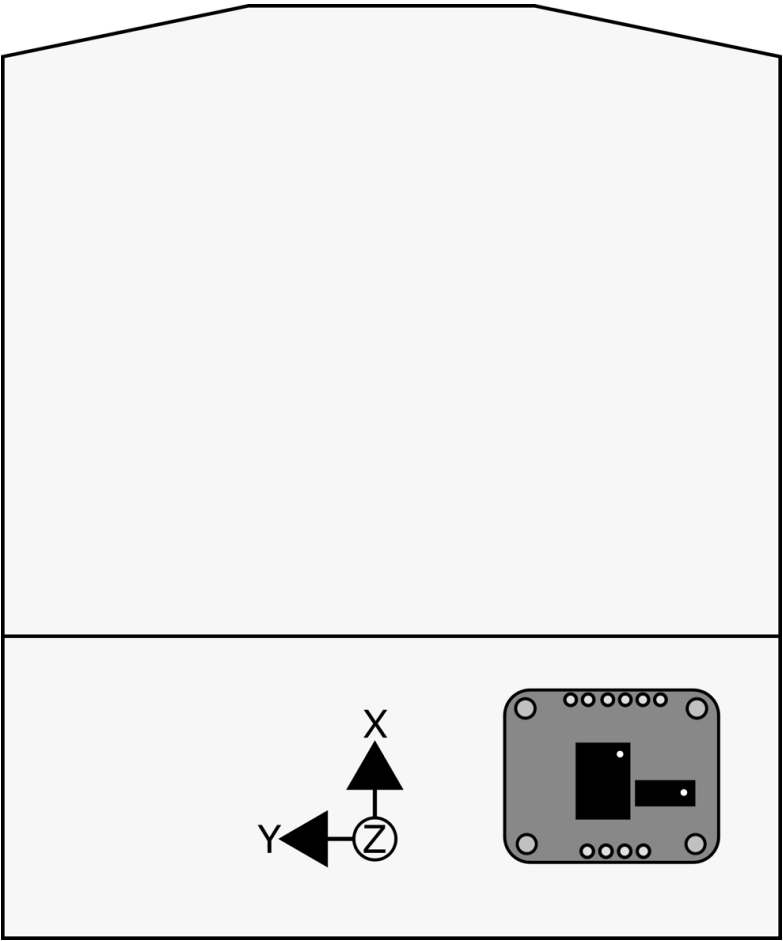
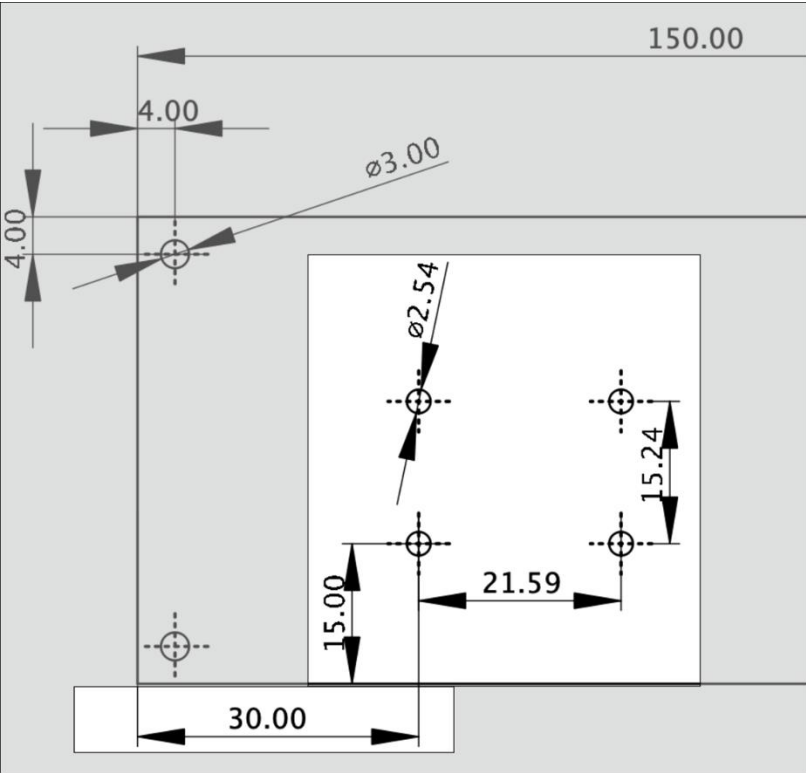


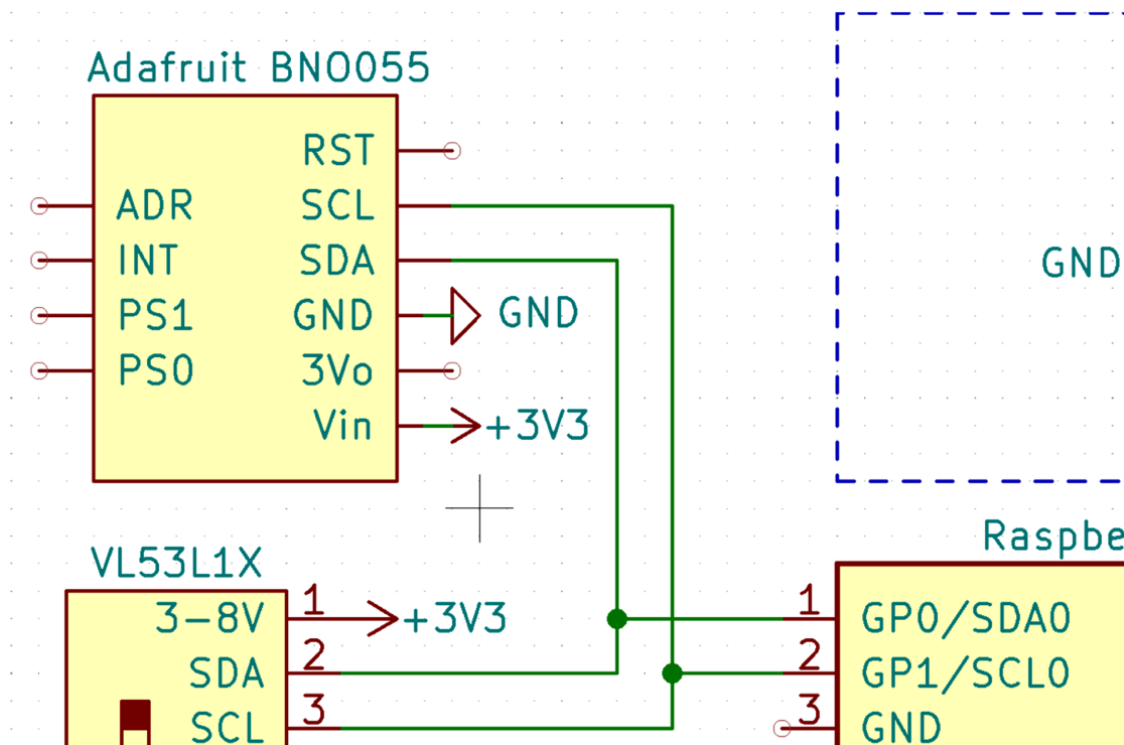
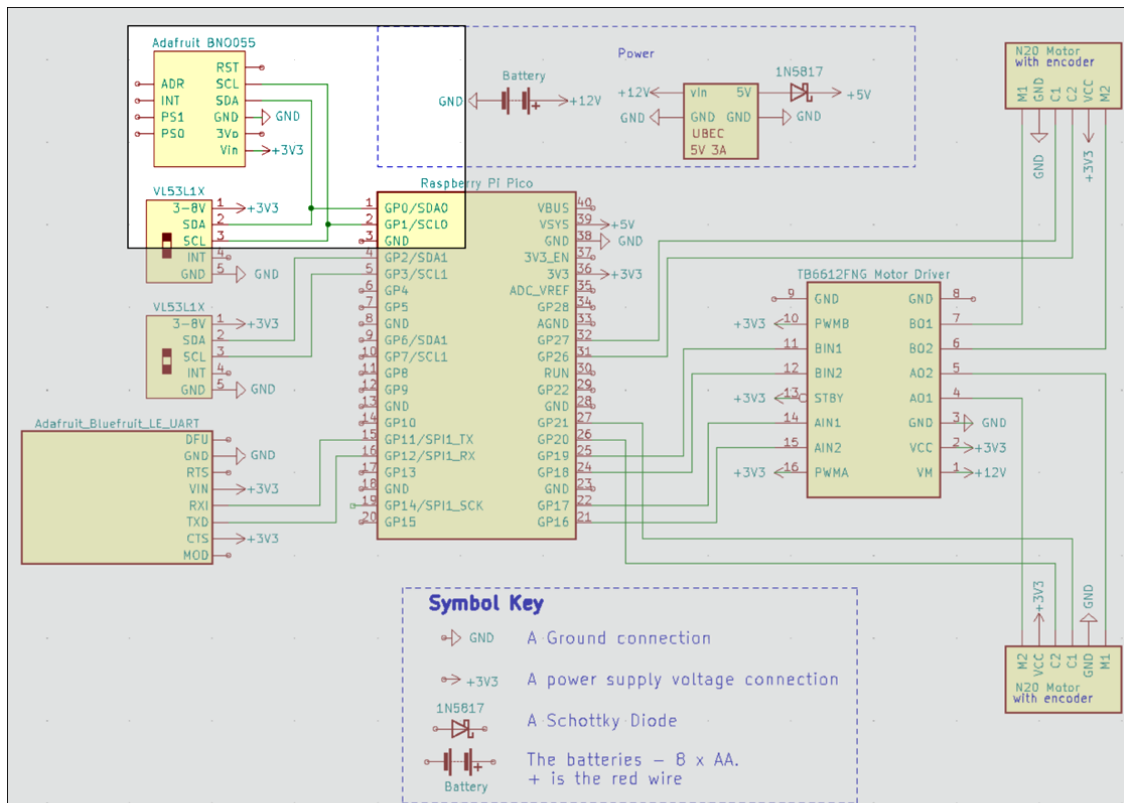


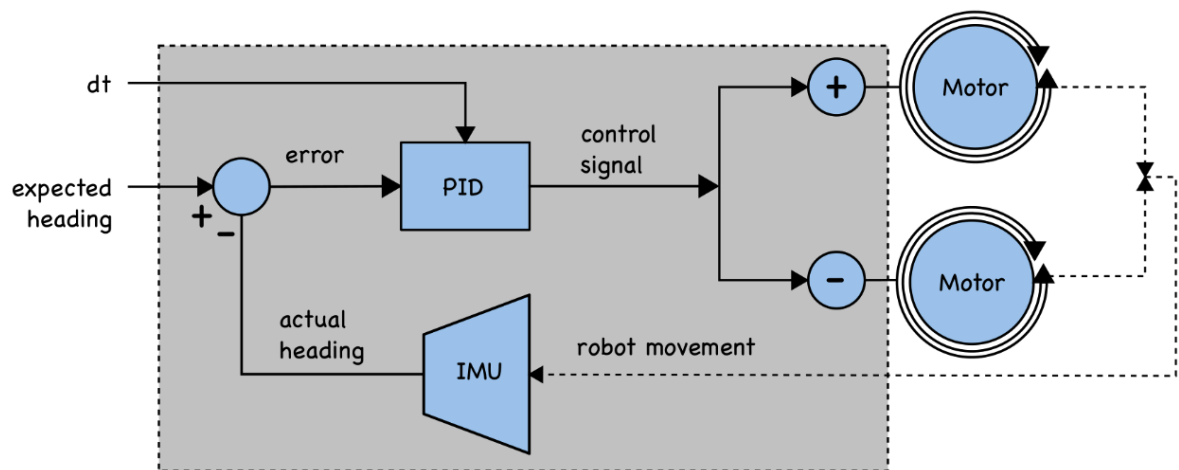
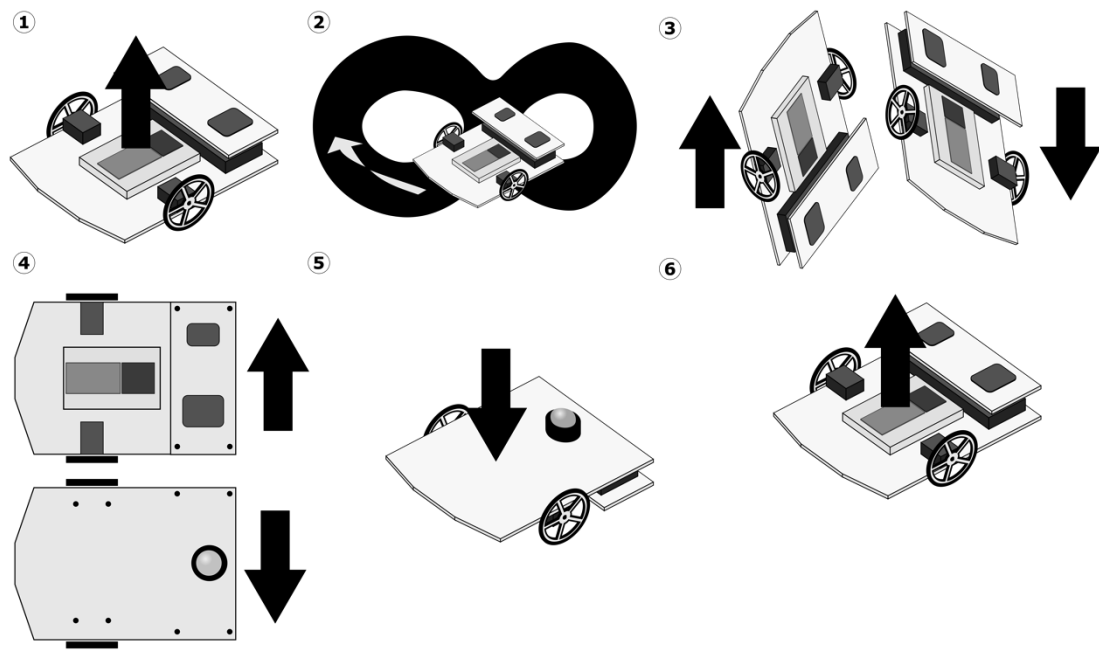
Chapter 12: Detecting Orientation with an IMU on Raspberry Pi Pico



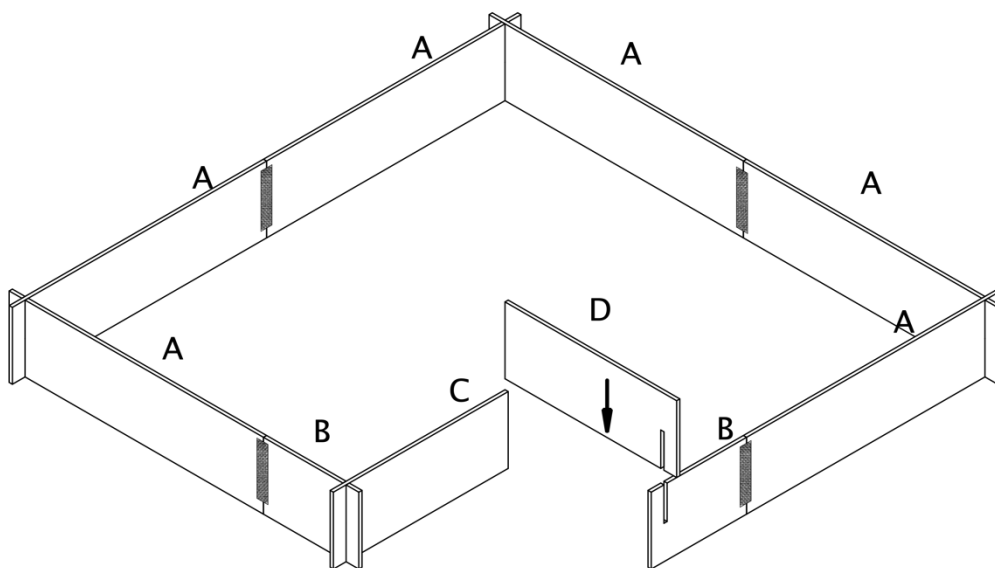
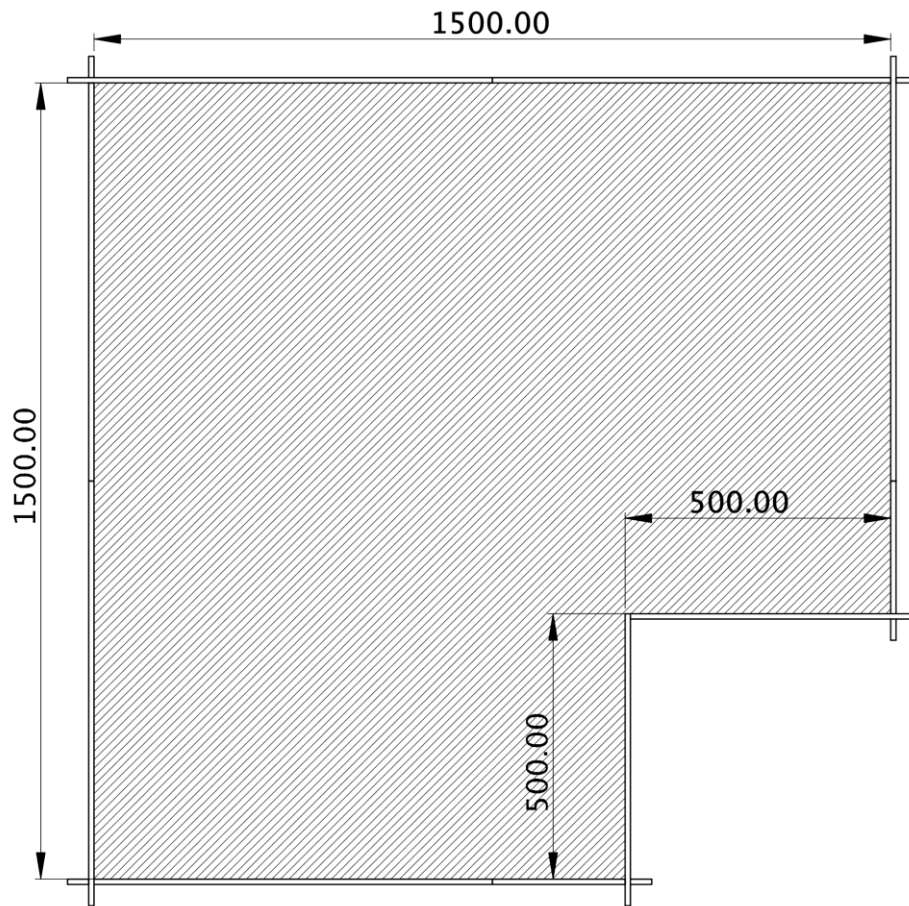


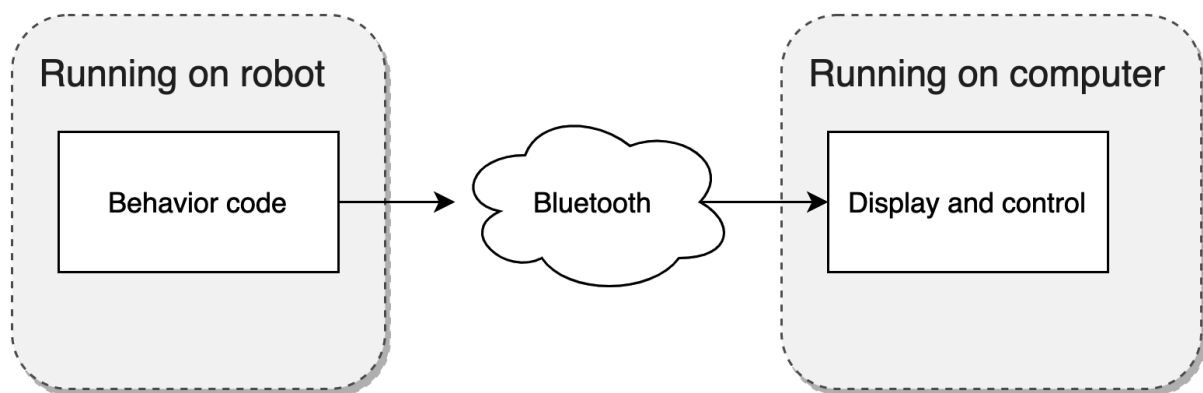
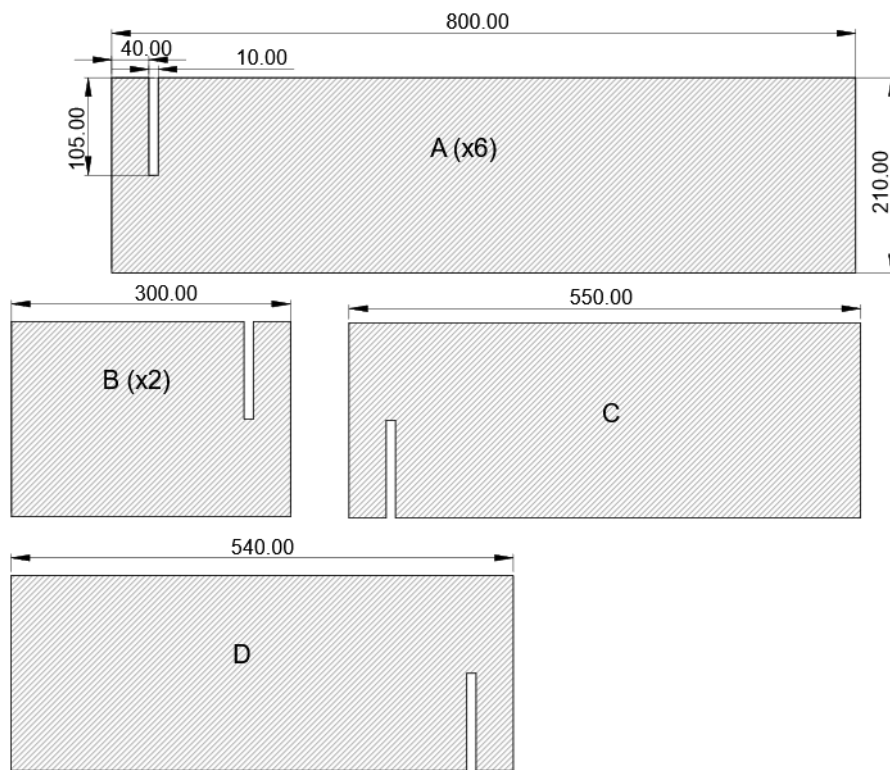






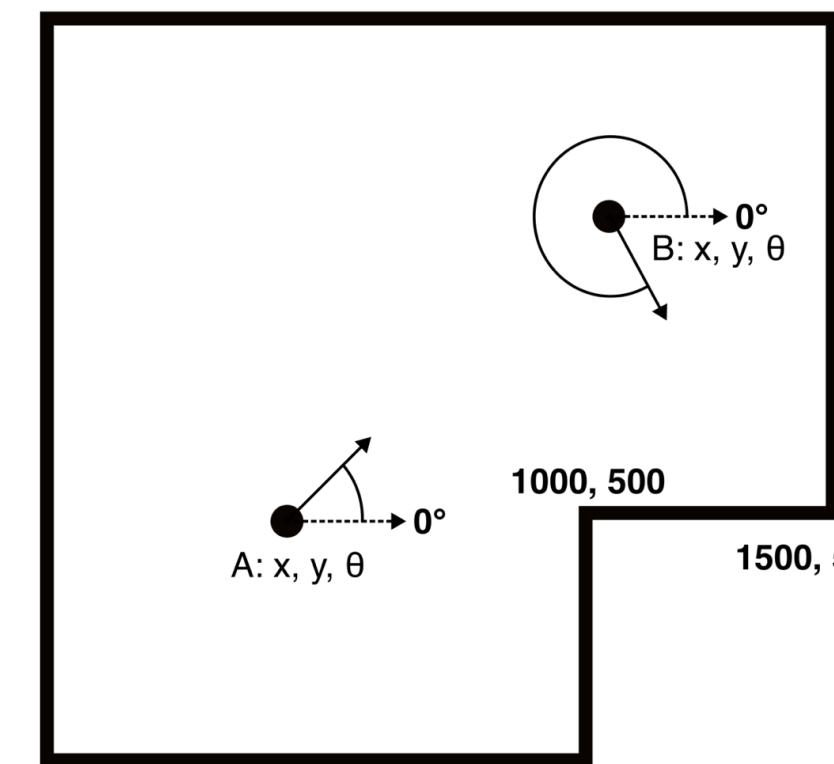
Chapter 13: Determining Position using Monte Carlo Localization





0, 1500

1500, 1500

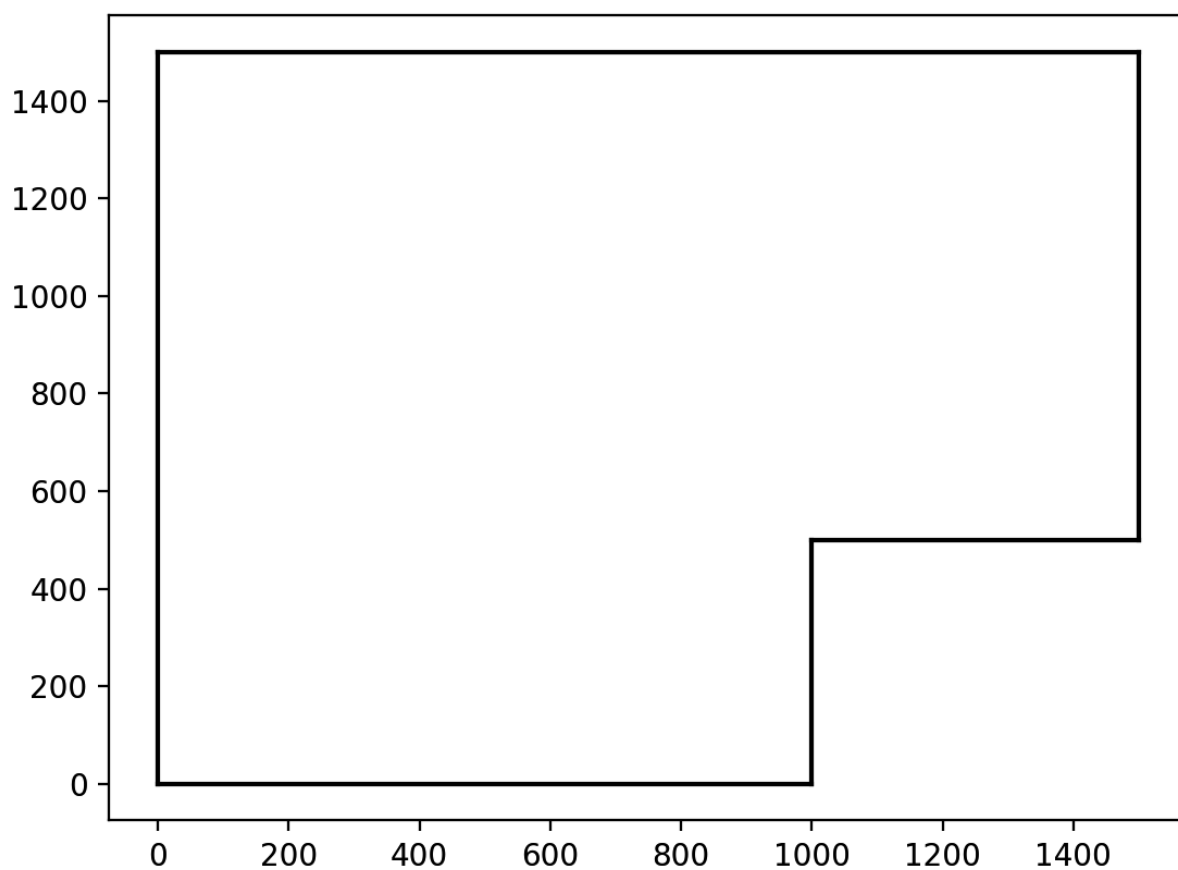


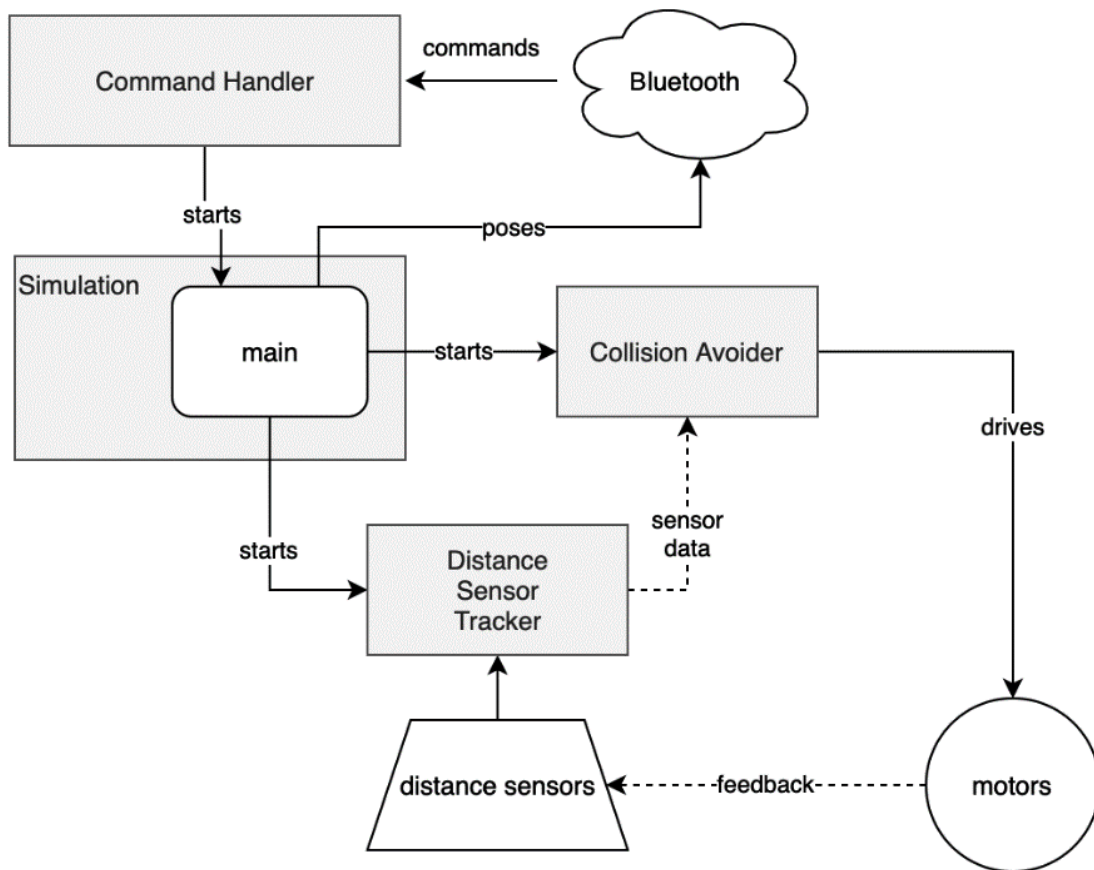
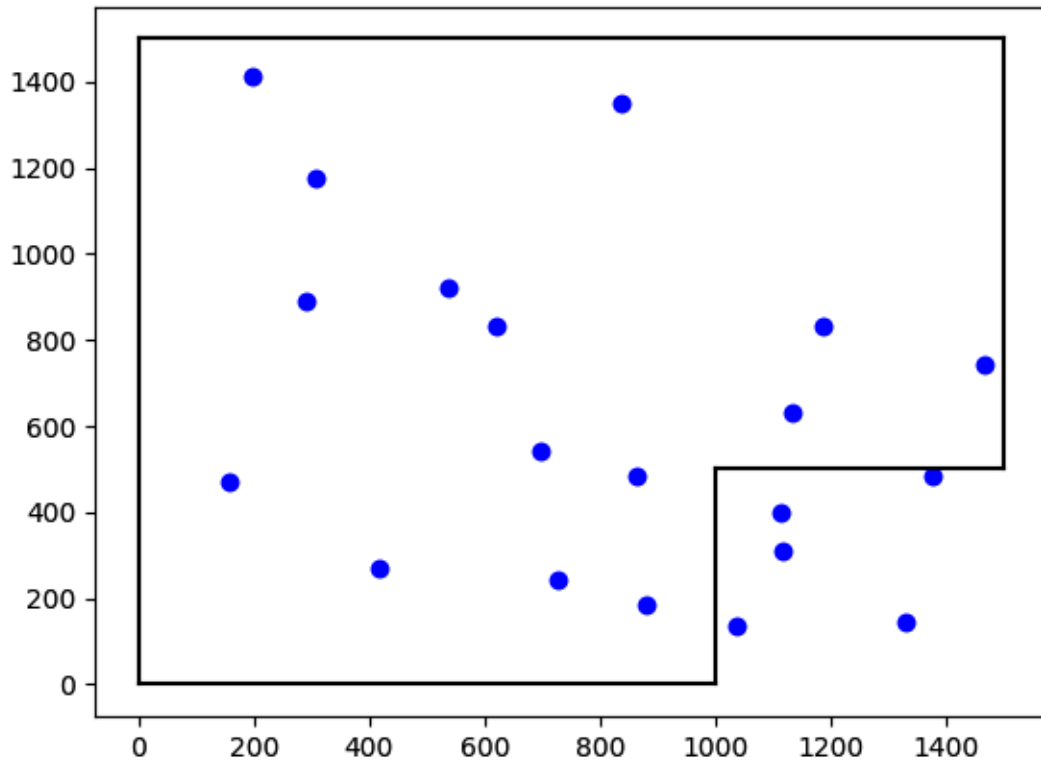
1000, 500

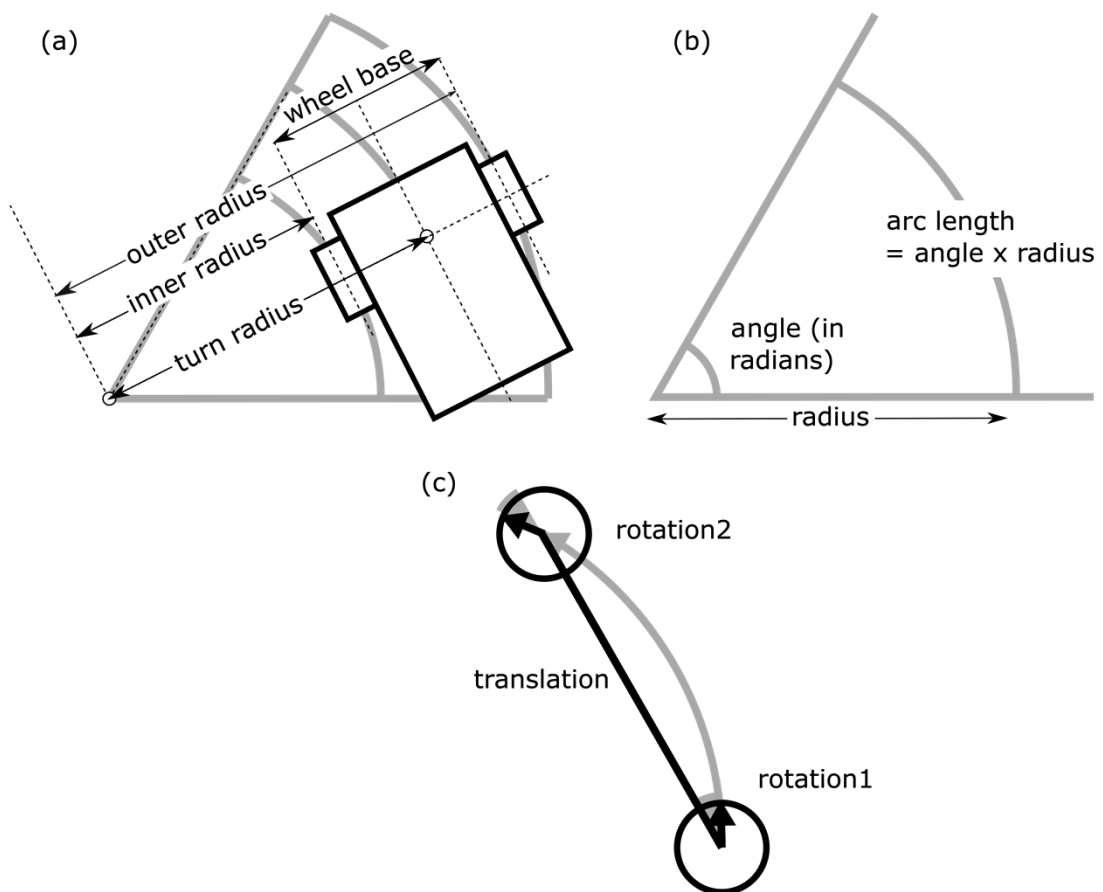
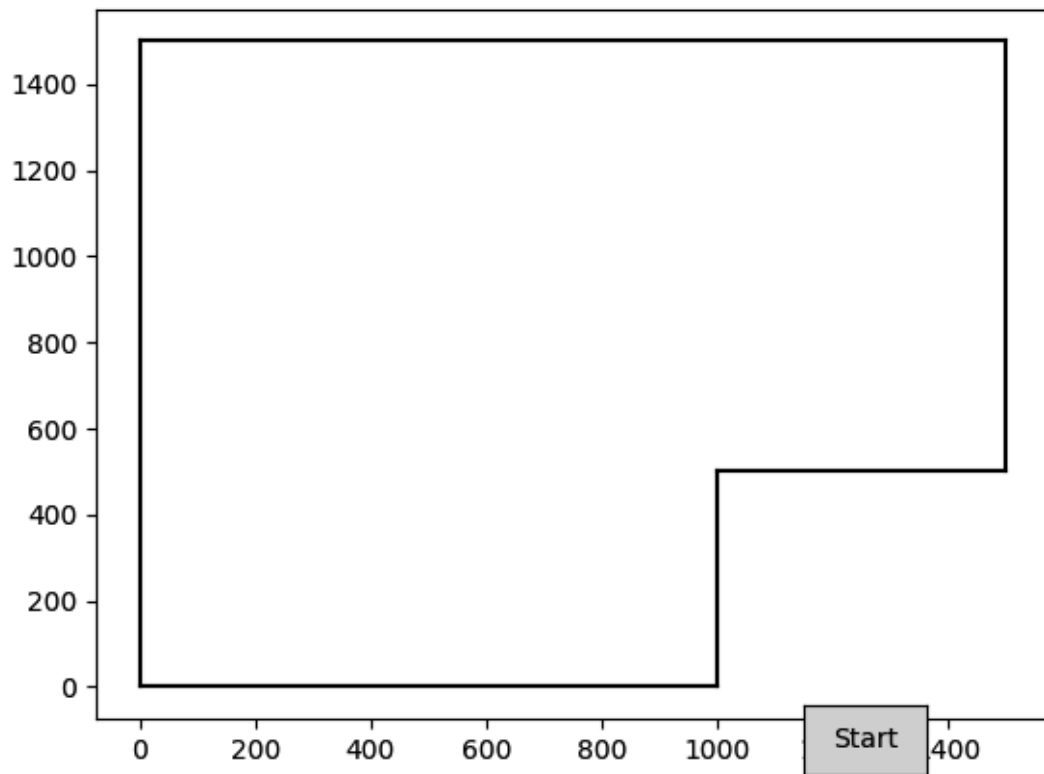
1500, 500

0, 0

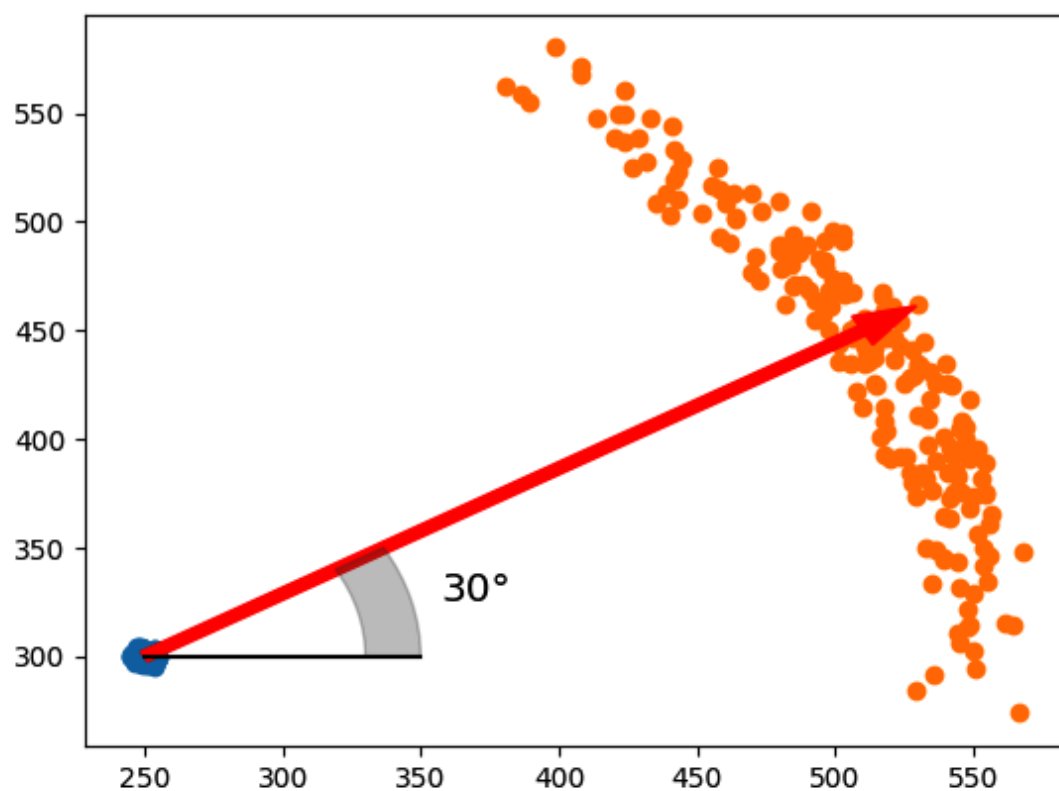
1000, 0



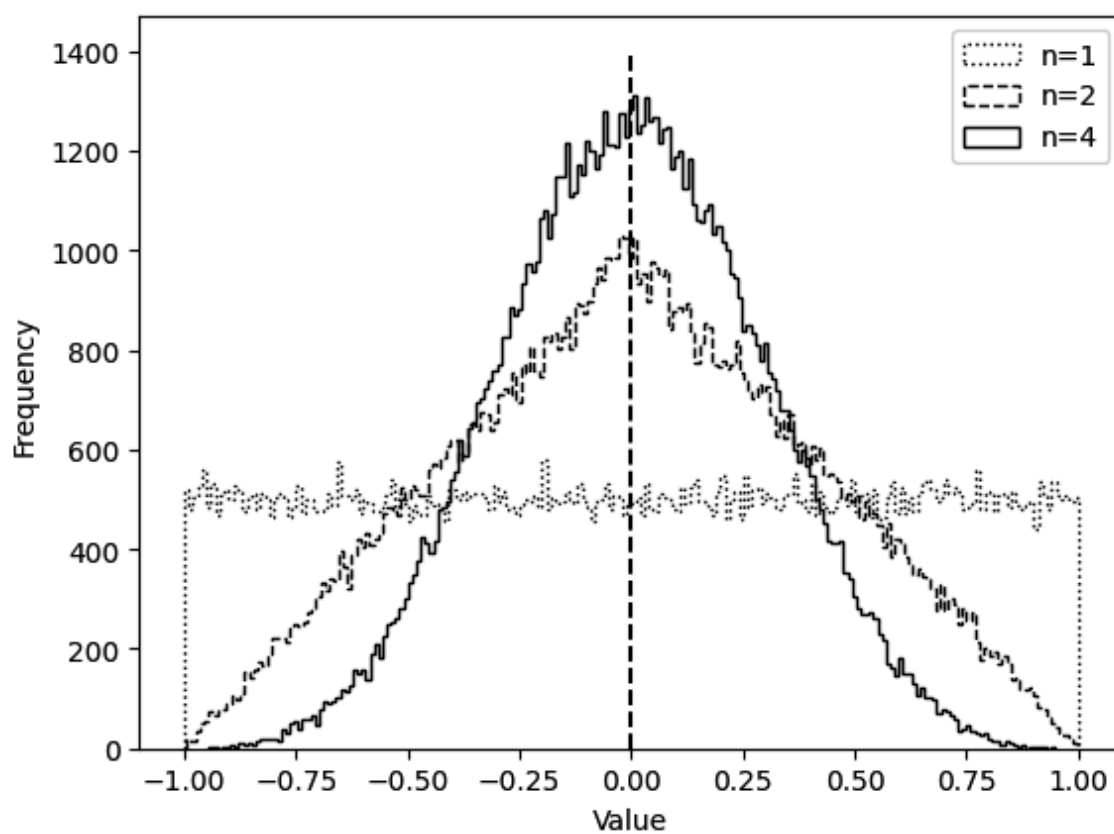


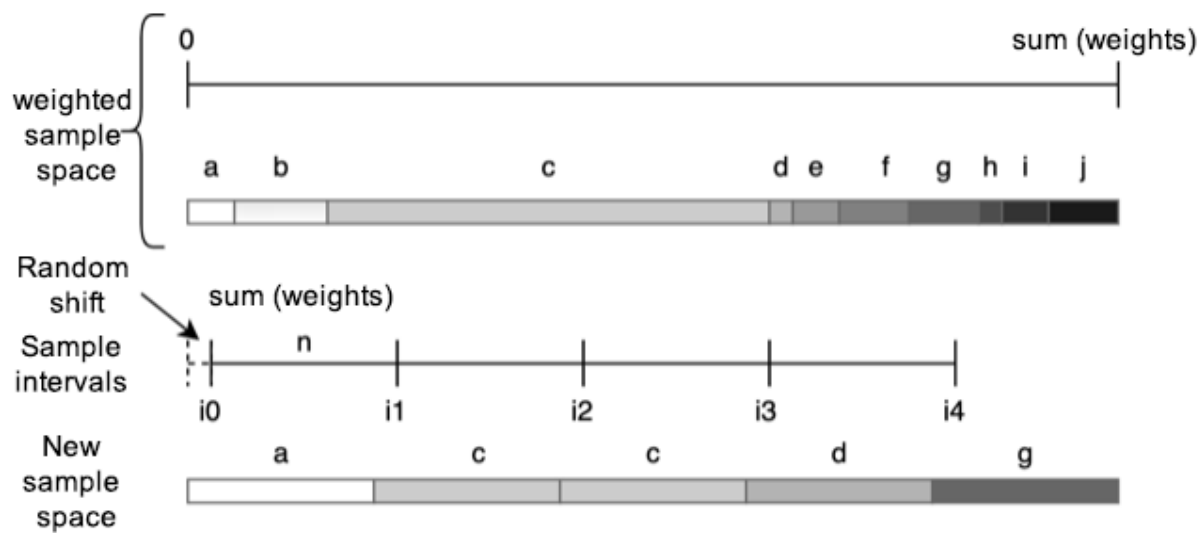


(a)



(b)

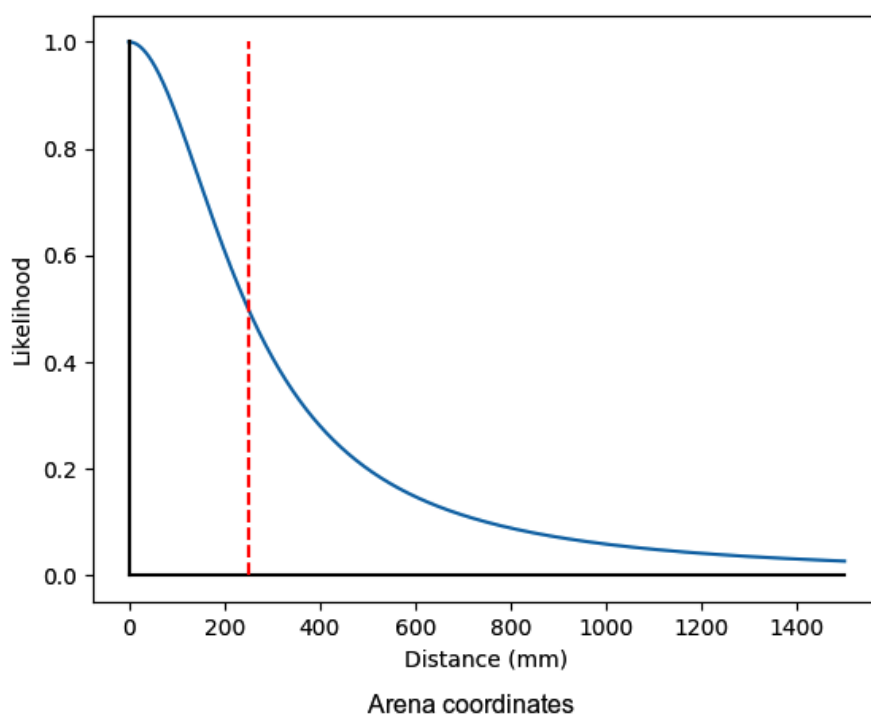


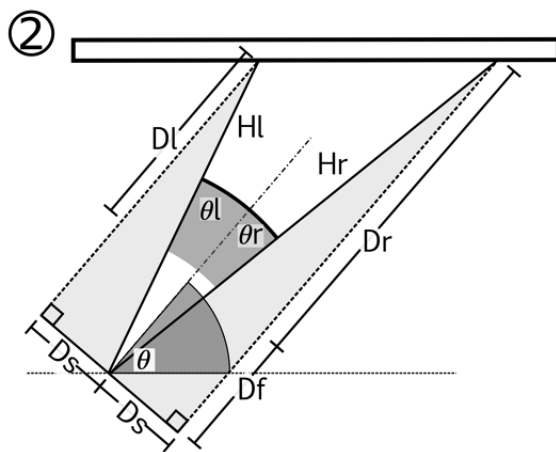
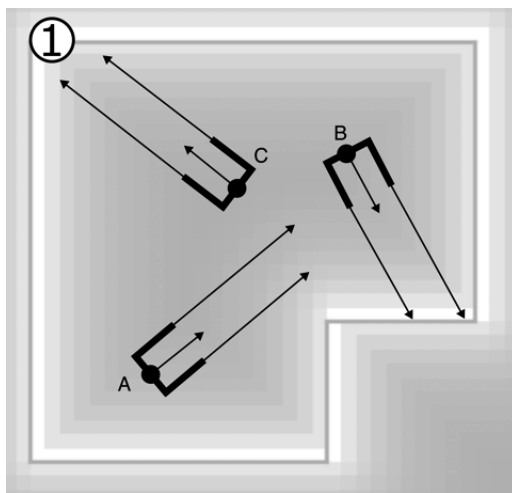
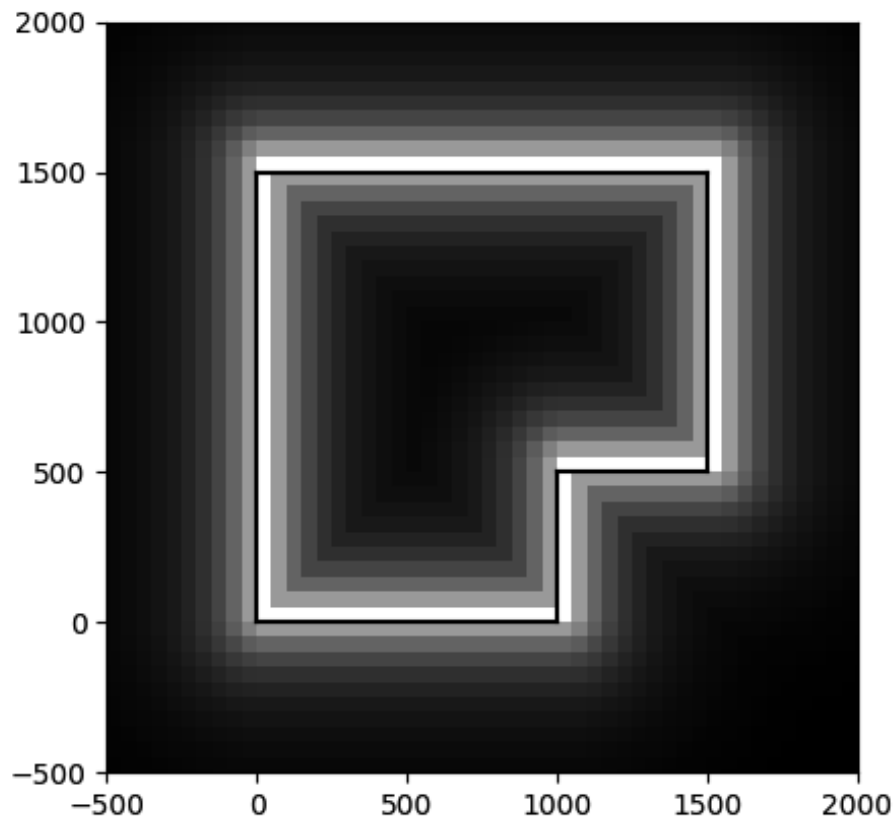


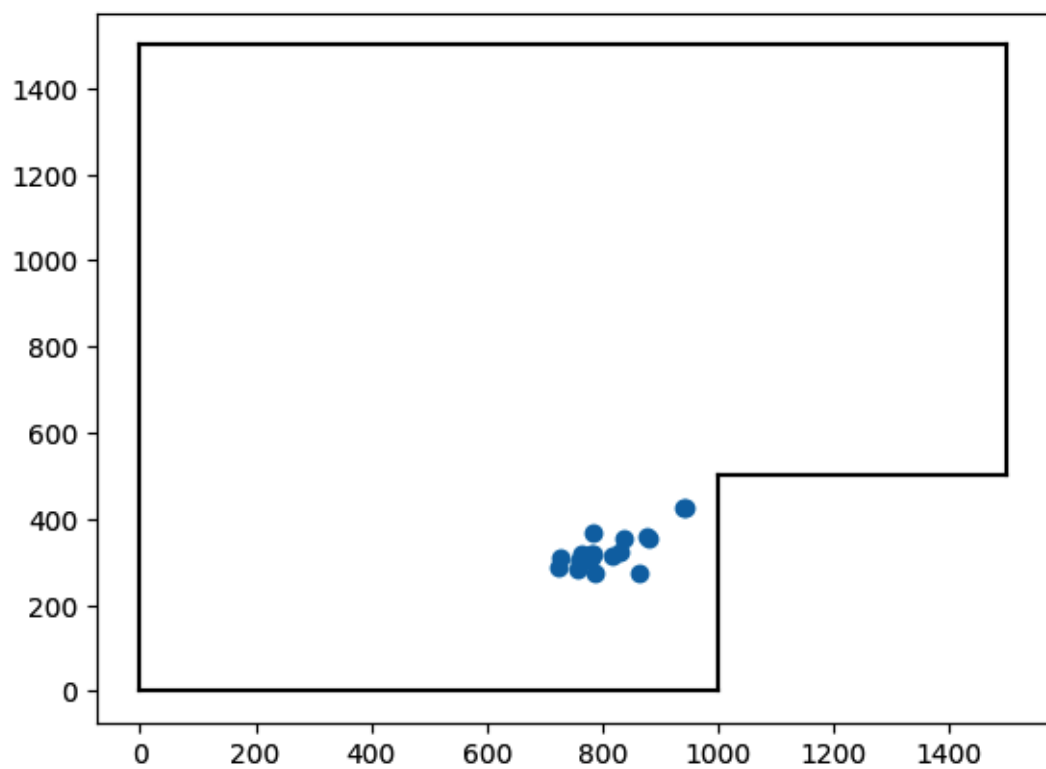
(a)



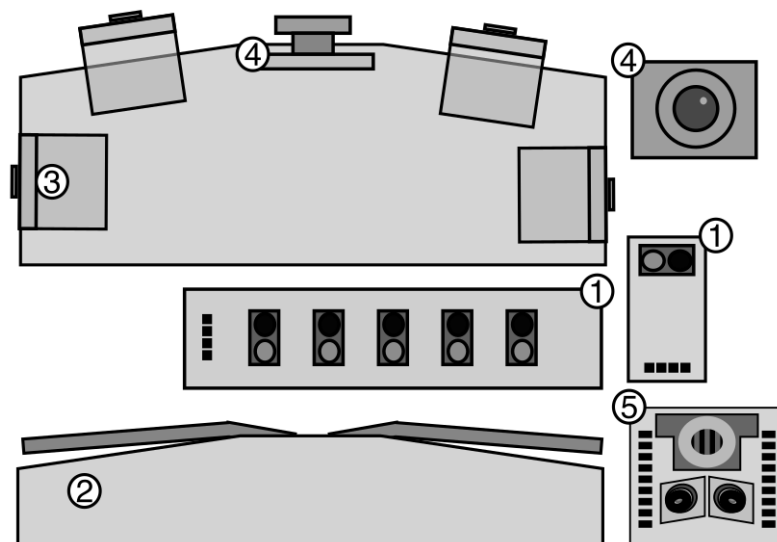
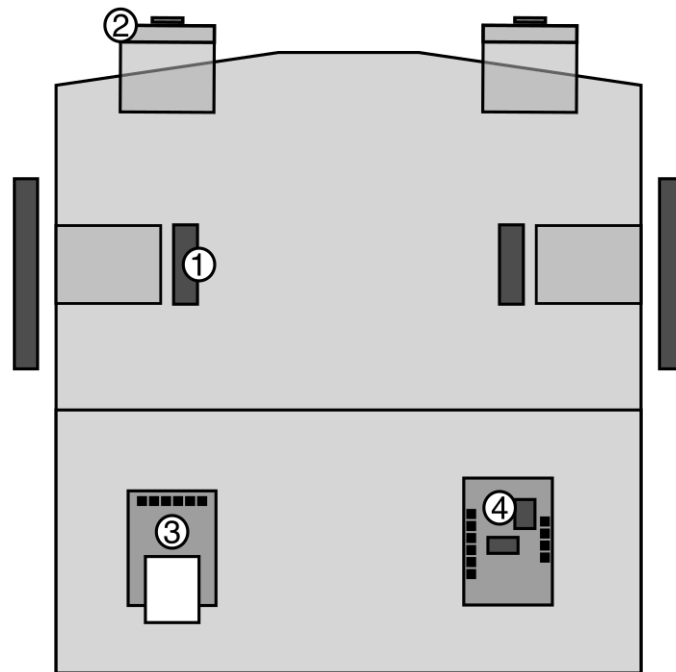
(b)

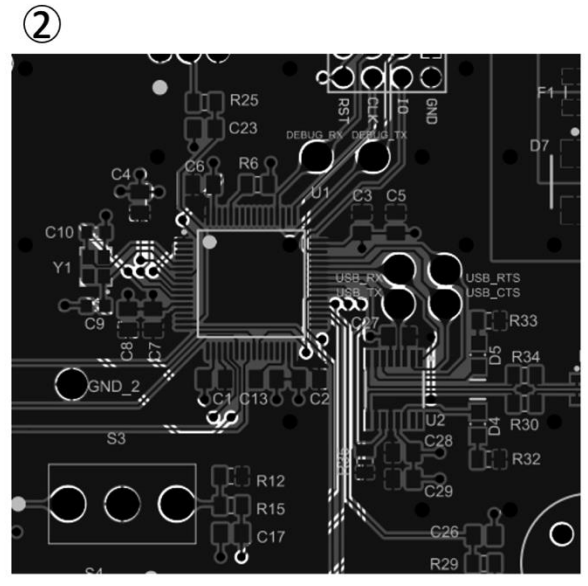
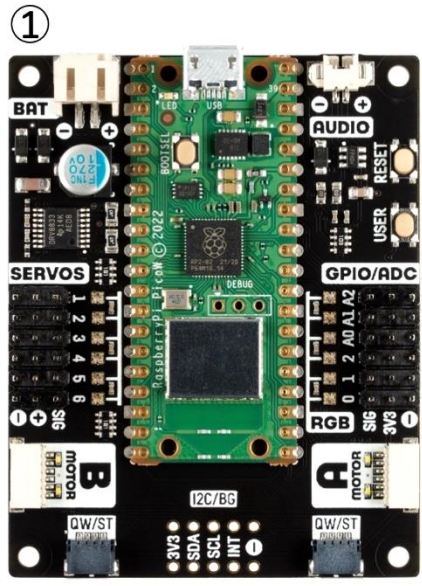
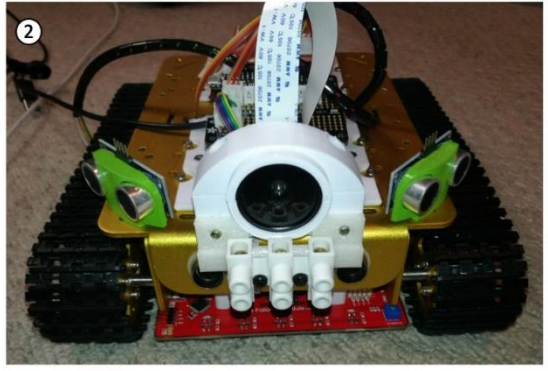
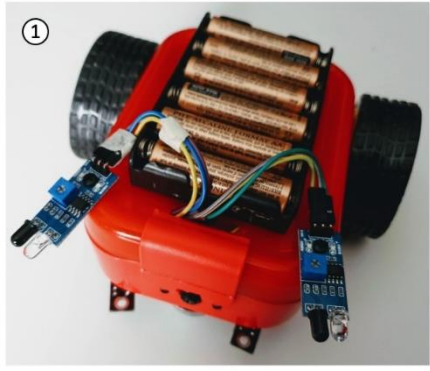
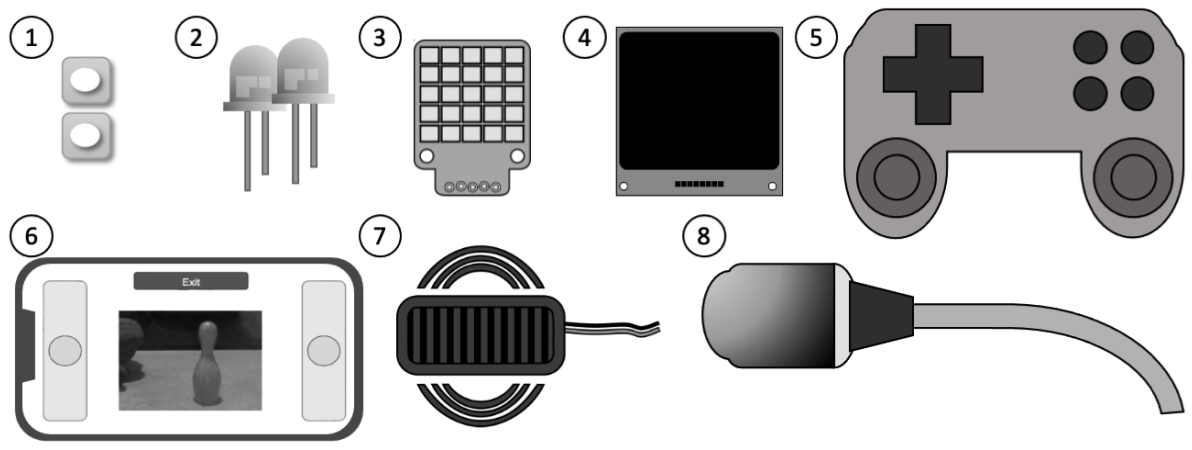






Chapter 14: Continuing Your Journey – Your Next Robot





③



④

