

PROJECT PRESENTATION

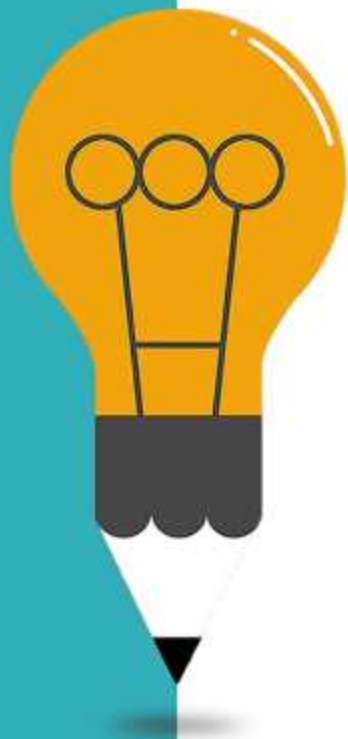
SAND DRAWING MACHINE

Instructor : 林家德老師

Team Leader : 連子揚

Team Member : 連儷芳、林暉恩、陳憬嶽

CONTENT



01

Team member

02

Motivation

03

Project introduction

04

Achievement display

05

Future prospects

06

Question & Suggestion



Team member

Team member



Lien Zi-Yang
Leader

- 1.PCB design
- 2.Hardware testing



Lien Li-Fang
Member

1. Software design
2. Appearance design
3. Written report
4. Brief making



Lin Hui-En
Member

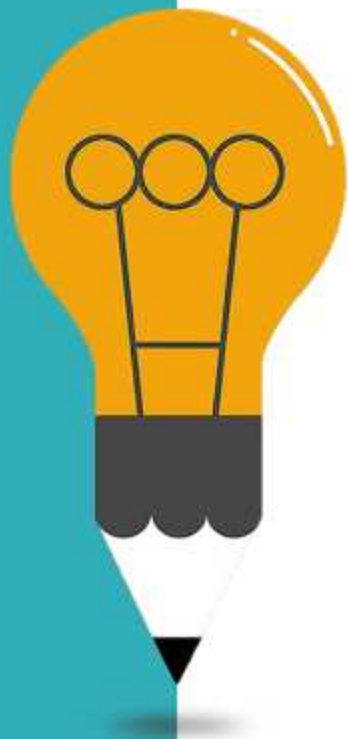
1. Software design
2. Hardware testing
3. Appearance design
4. Brief making



Chen Ching-Chin
Member

1. PCB design
2. Software design
3. Hardware testing

CONTENT



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02

Motivation

03

Project introduction

04

Achievement display

05

Future prospects

06

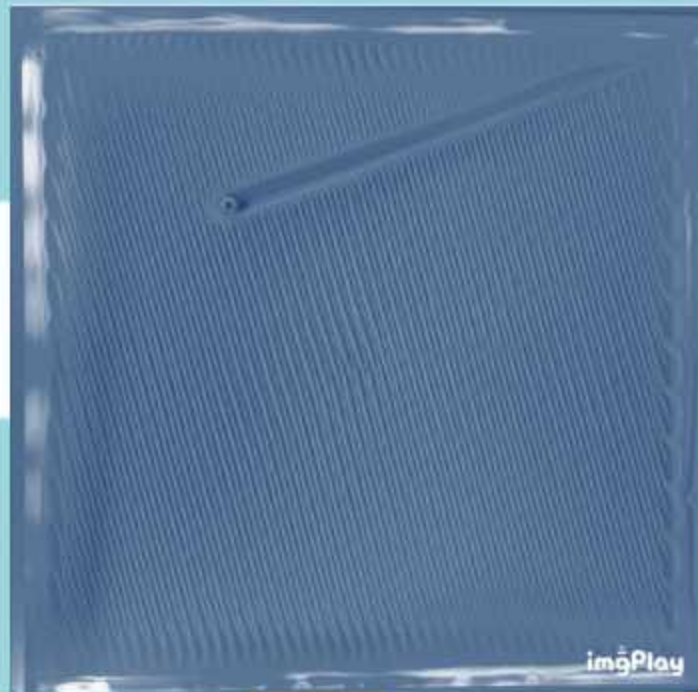
Question & Suggestion



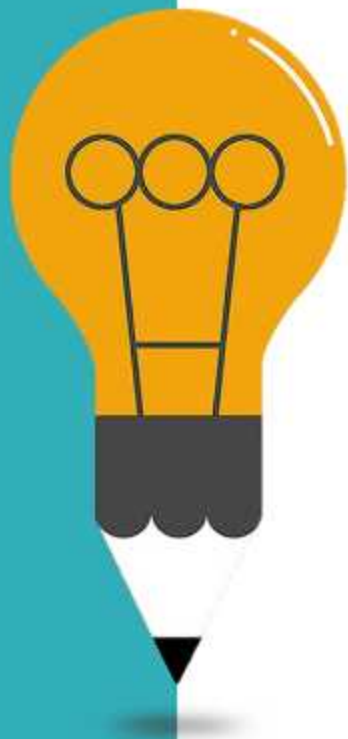
Motivation

Motivation

- Anxiety ?
- Stressed ?
- Mandala drawing !



CONTENT



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02

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03

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04

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05

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06

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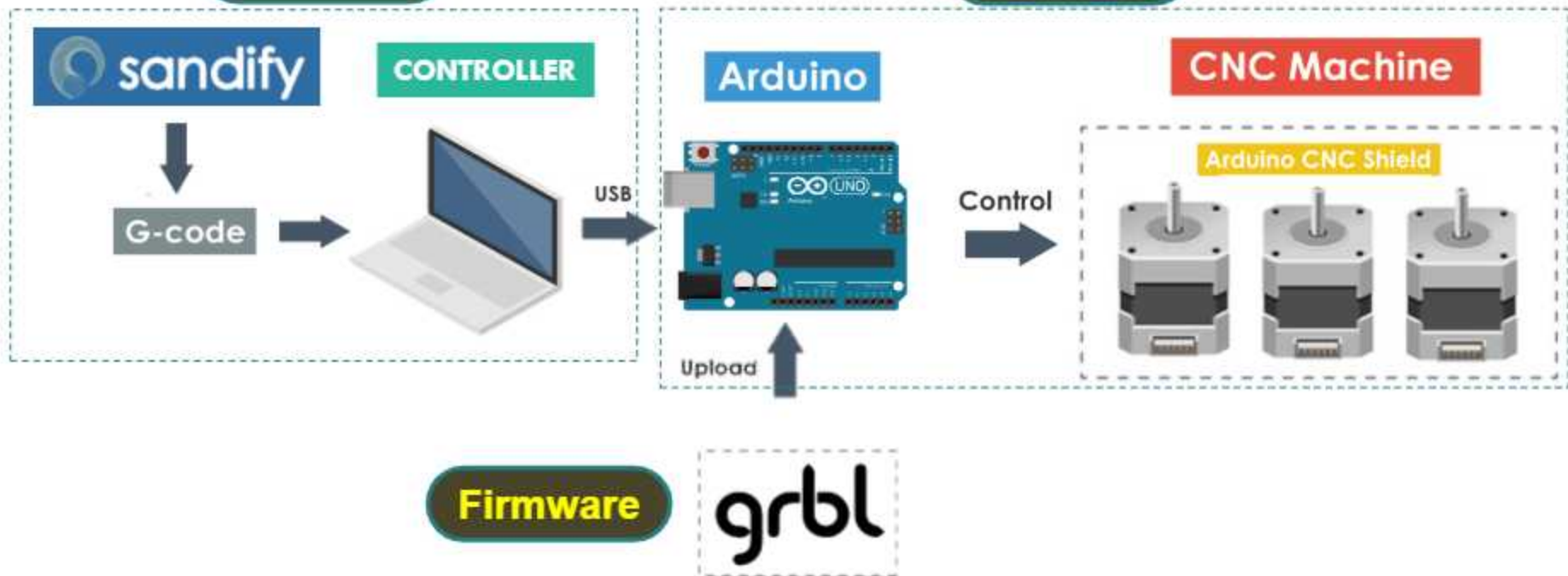


Project introduction

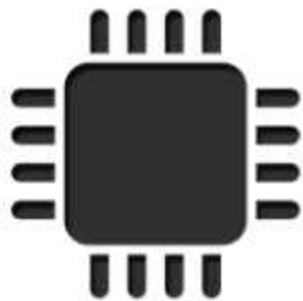
Structure overview

Software

Hardware



Function introductions



Hardware



Software

Hardware

01 XY axis rail

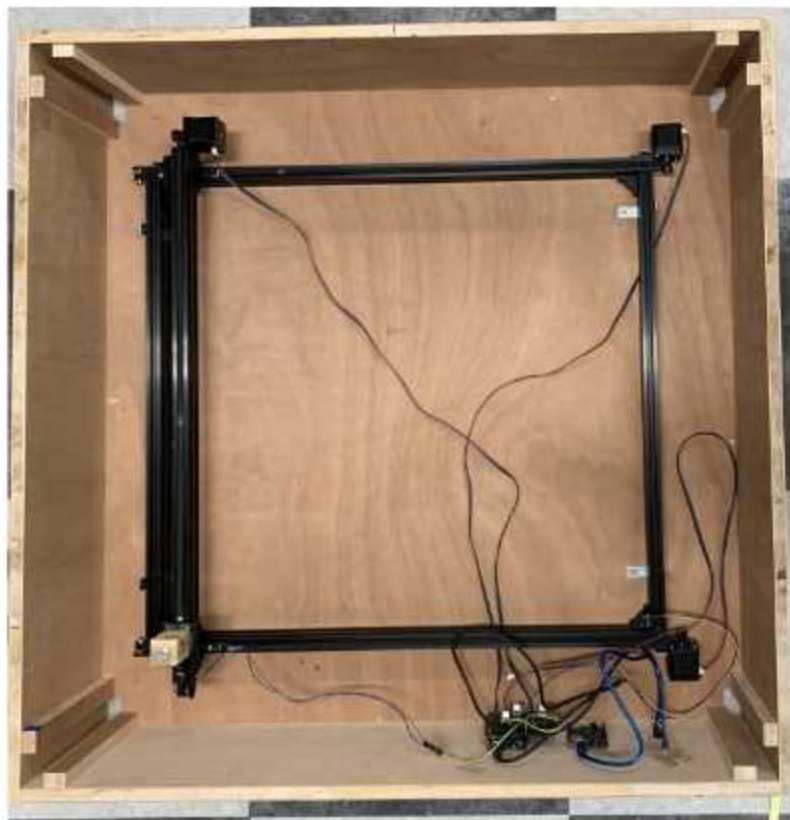
02 Stepper motor driver

03 Stepper motor

04 Circuit board

05 Sand table

XY axis rail



3D 總舖

MAKER
SHOP

Hardware

01 XY axis rail

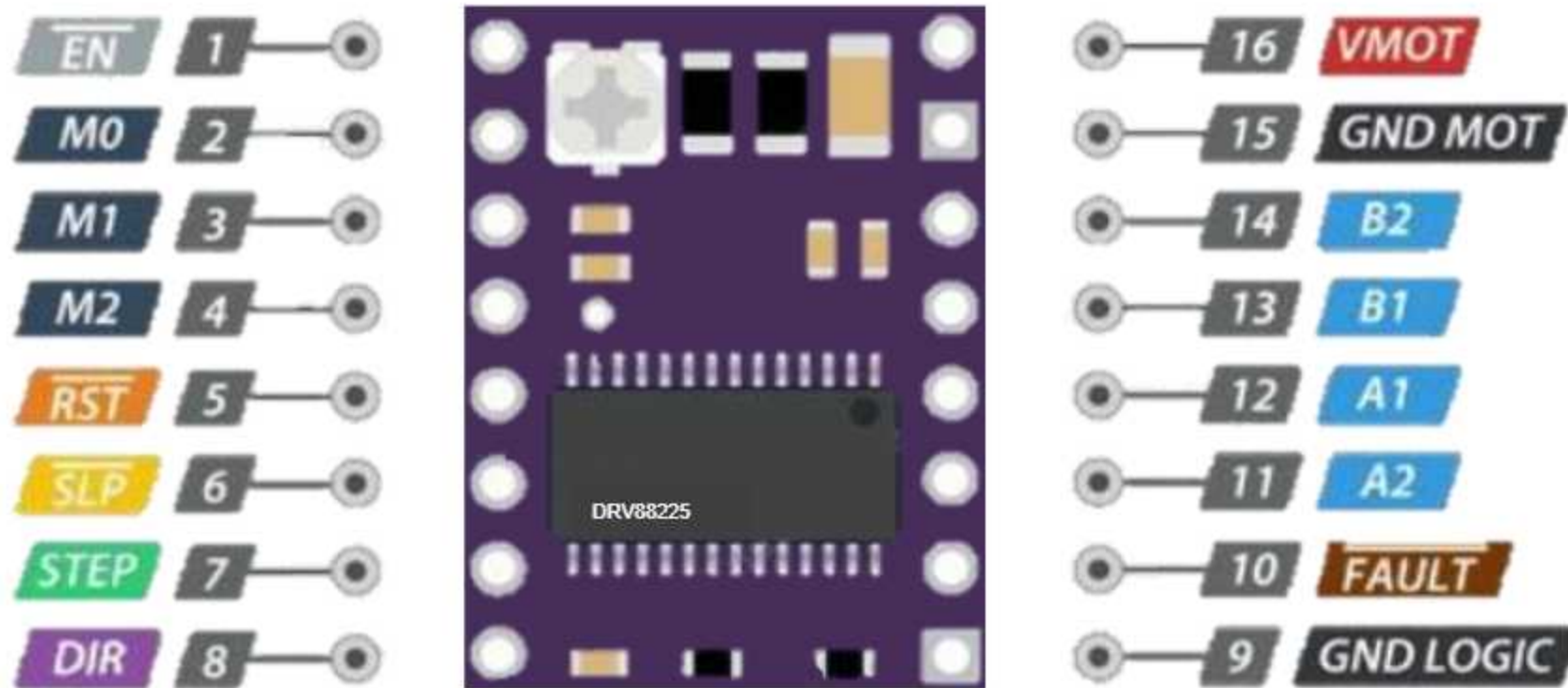
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03 Stepper motor

04 Circuit board

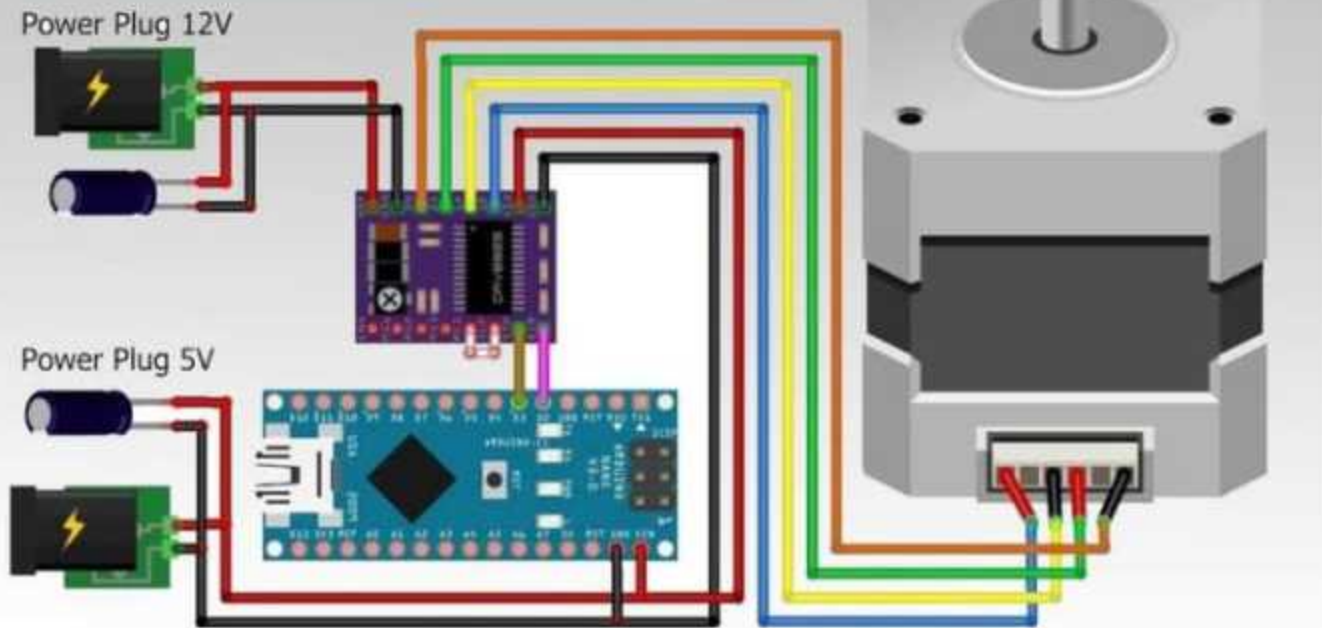
05 Sand table

Stepper motor driver

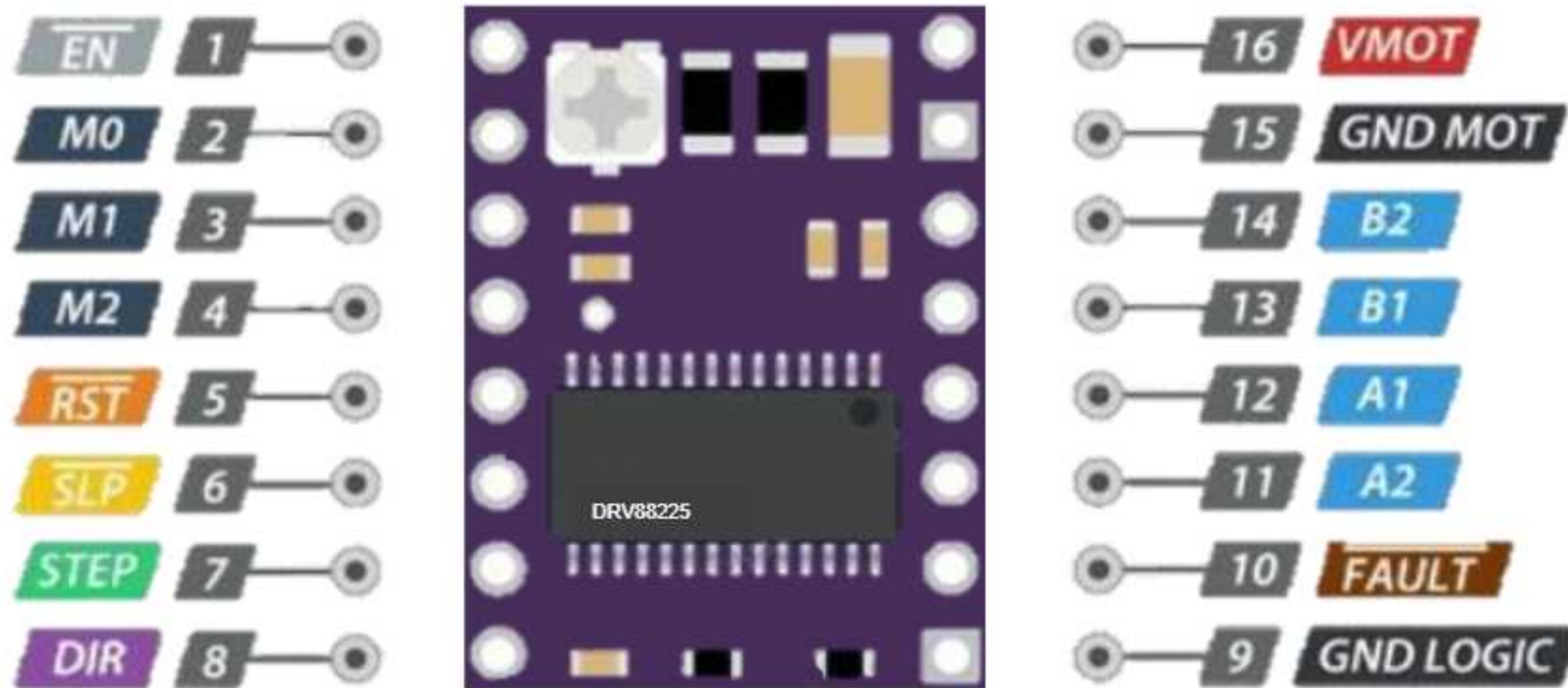


Stepper motor driver

DRV8825 Stepper Motor Driver



Stepper motor driver



Hardware

01 XY axis rail

02 Stepper motor driver

03 Stepper motor


04 Circuit board

05 Sand table

Stepper motor

- rotate, stop and approach **specific position** immediately
 - control stepper motors with **coils**
 - **open-loop control system**
 - **over speed** or **certain frequency** would lead to **overshot**
- 

Stepper motor v.s. Servo motor

	Stepper motor	Servo motor
conformity		close-loop control
whirl		turn to specific angle
deviation		much
over shot		0
temp variation		lower

Hardware

01 XY axis rail

02 Stepper motor driver

03 Stepper motor

04 Circuit board

05 Sand table

Circuit board

Exposuring

Etching

Welding



PCB design

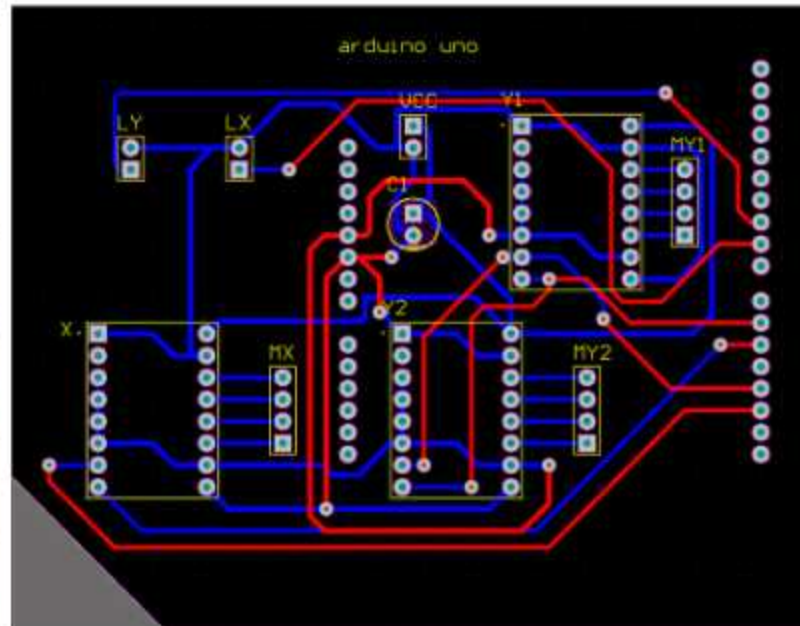
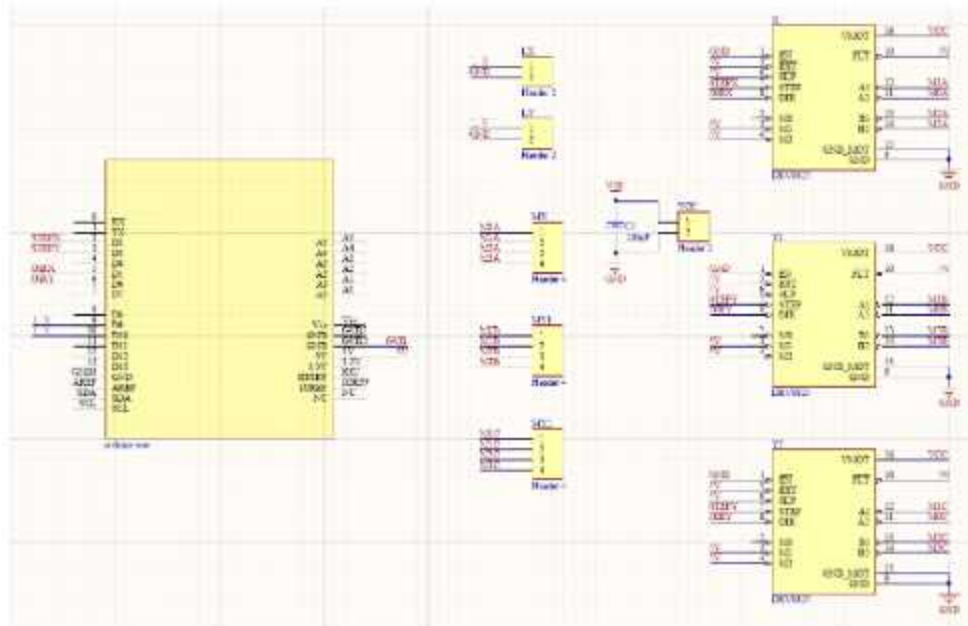
Developing

Hold drilling

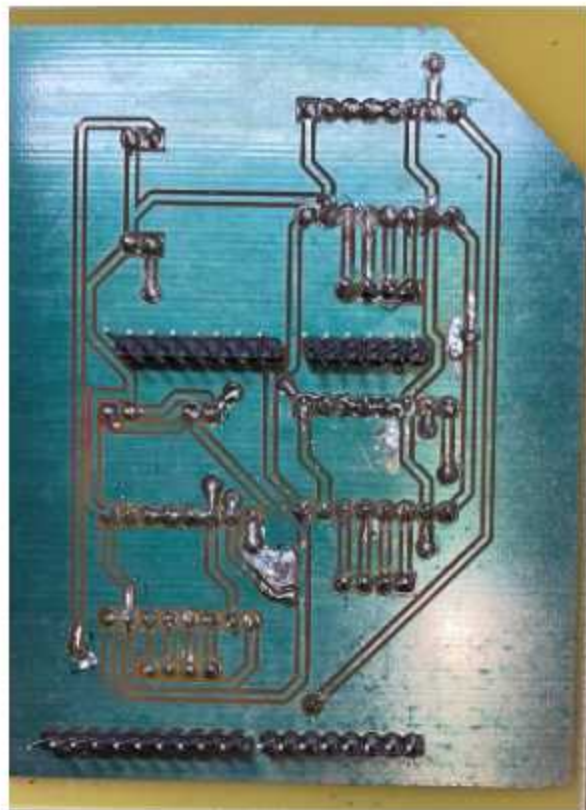
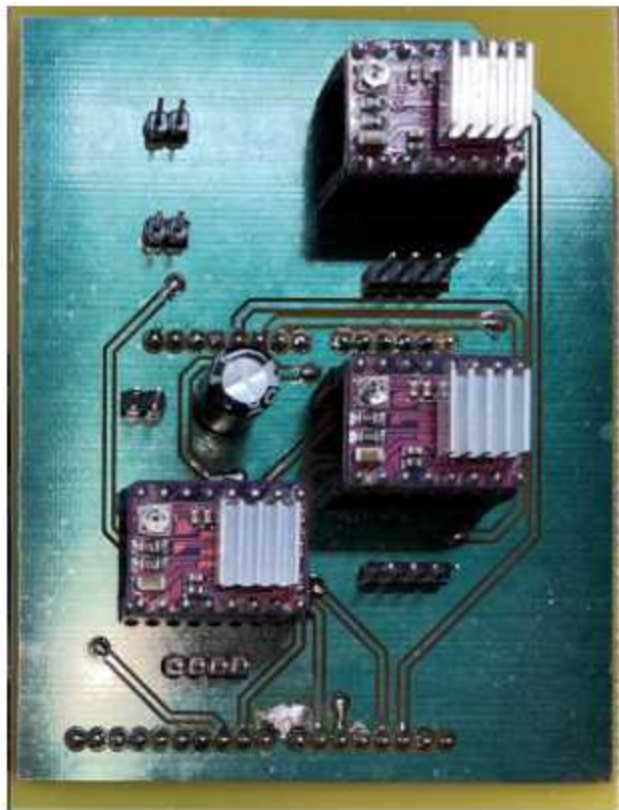
Testing



Circuit board



Circuit board



Hardware

01 XY axis rail

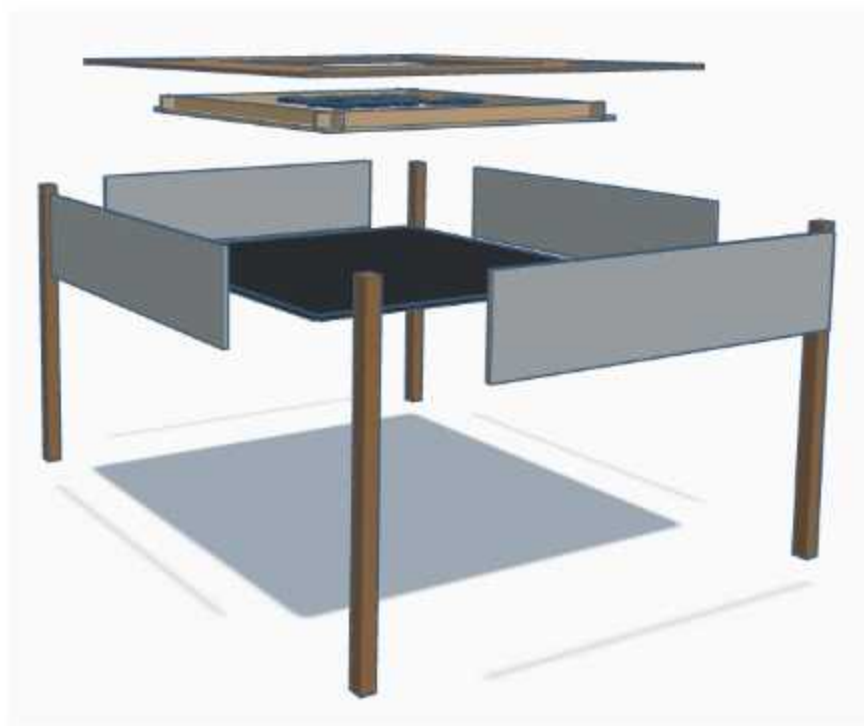
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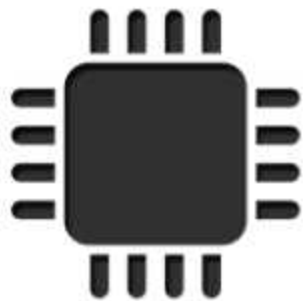
Sand table



Full color LED



Function introductions



Hardware



Software

Software



01 Sandify

02 G code

03 GRBL controller

Sandify



sandify

create patterns for robots that draw in sand with ball bearings

Draw

Machine

About

Layers (1)

star

New

Import

Name

star

Number of points

5

Size of points

0.5

Initial width

10

Initial height

10

X offset

0

Y offset

0

Points: 100, Distance: 3912

Export

Software



- 01 Sandify
- 02 **G code**
- 03 GRBL controller

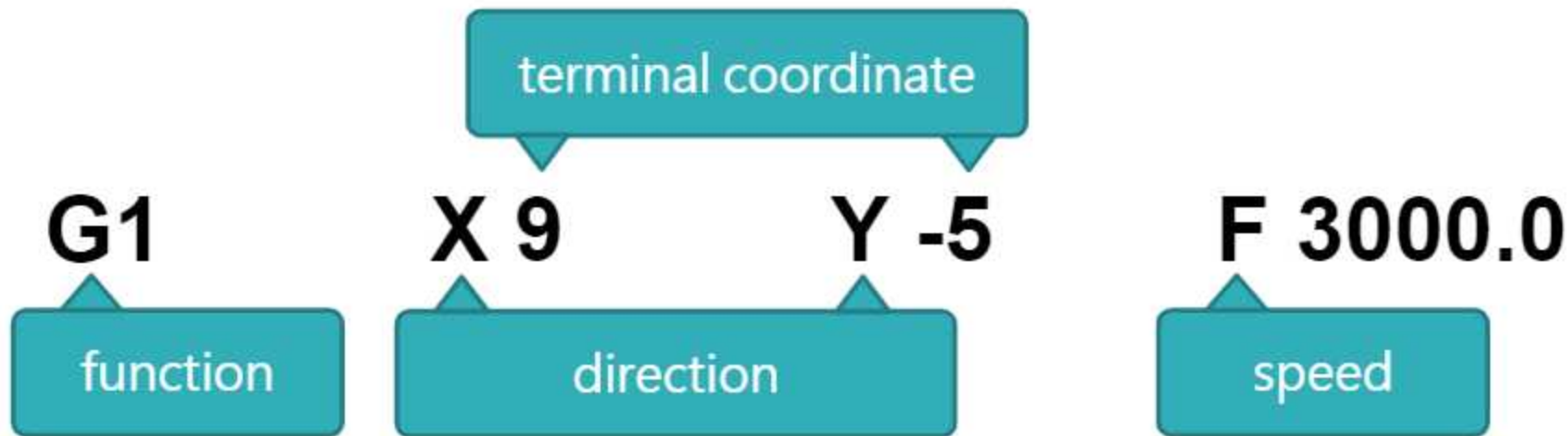
G code



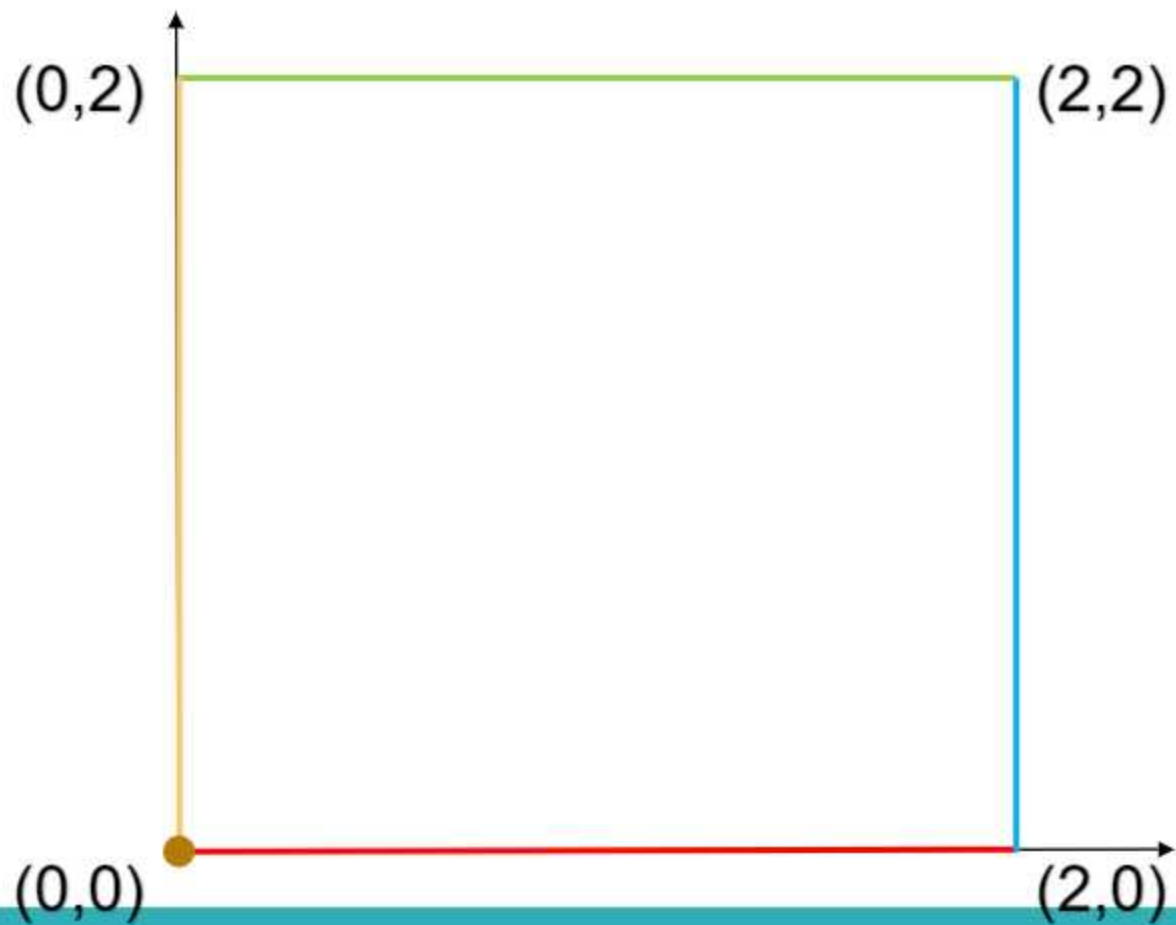
.gcode file

- Widely used CNC programming language
- To control speed and direction
- Easy to understand and to execute

G code



How G code operates



G0 X2

G0 Y2

G0 X-2

G0 Y-2

Software



01 Sandify

02 G code

03 **GRBL controller**

GRBL controller

Grbl Controller 1.8.1

File Tools Help

Port name: COM3

Send File: C:\Users\Tasem\Downloads\handify (2).gcode

Begin Stop

File progress: 0%

Queued Commands: 0

Runtime:

Command:

```
Grbl 1.1h [F$ for help]
> $G
[G0:G0 G54 G17 G21 G90 G94 M5 M9 10 F0 S0]
> $$
$0=10
$1=25
$2=0
$3=0
$4=0
$5=0
$6=0
$10=1
$11=0.010
$12=0.002
$13=0
$20=0
$21=0
$22=0
$23=0
$24=25.000
$25=500.000
$26=250
$27=1.000
$30=1000
```

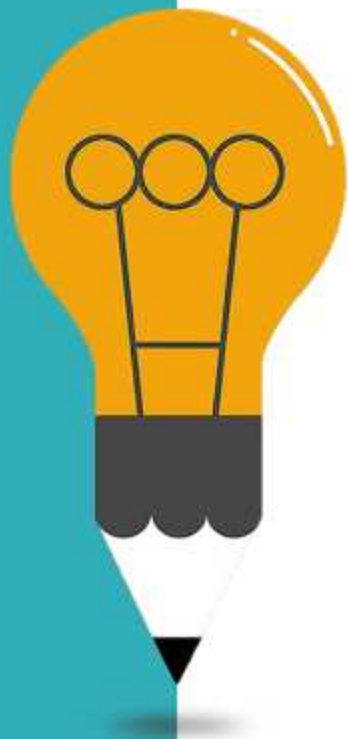
	Machine Coordinates (mm)	Work Coordinates (mm)
X		
Y		
Z		

Axis Control: Visualizer Advanced

600.75 mm (Width: X:600.430 Height: Y:600.75)

Send Path Go Home Refresh Pos

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04

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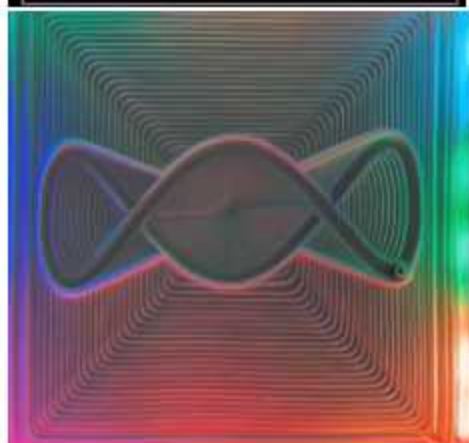
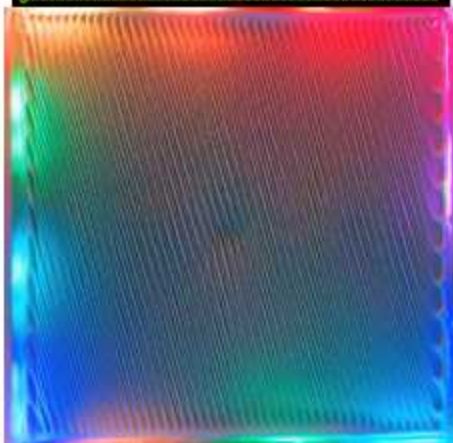
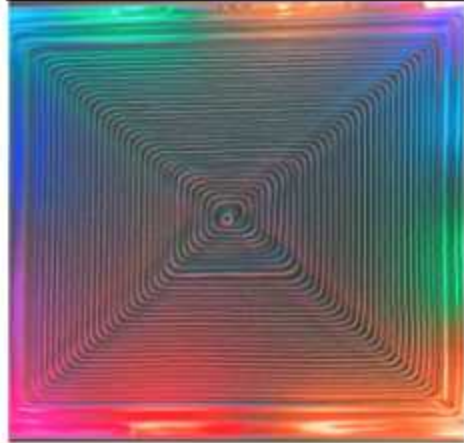
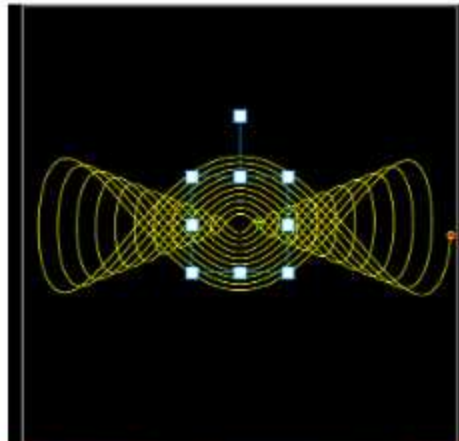
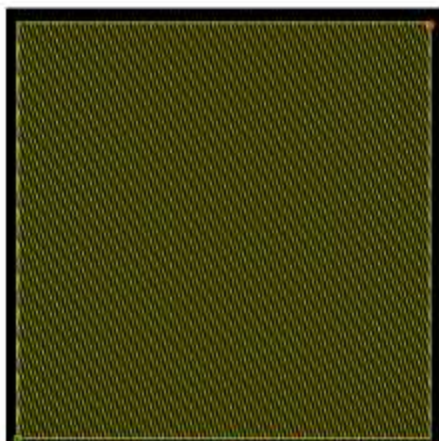
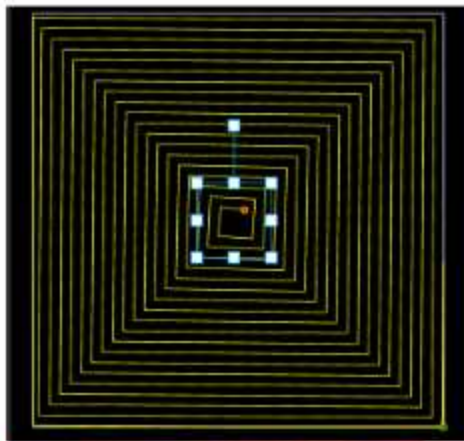


Achievement display

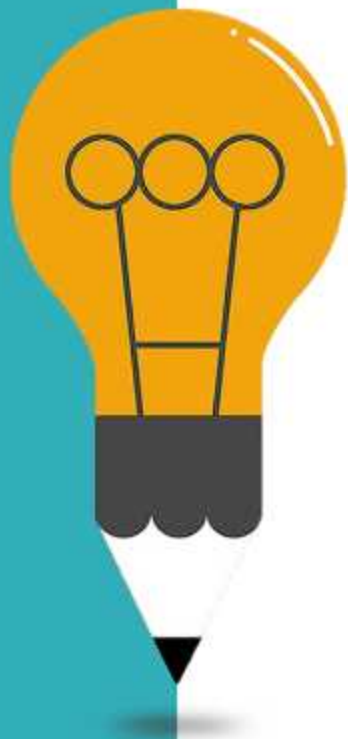
Achievement display



Achievement display



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03

Project introduction

04

Achievement display

05

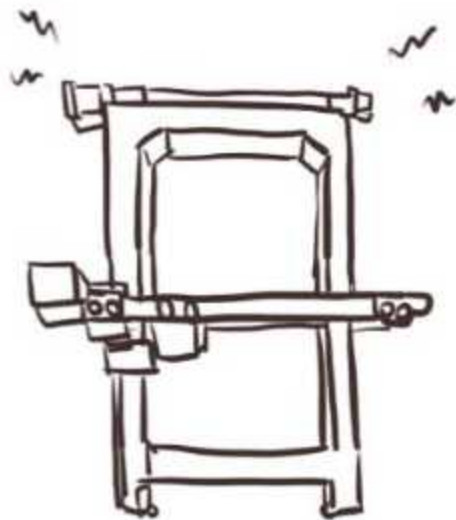
Future prospects

06

Question & Suggestion

Future prospects

- Noise problem
- Magnetic levitation
- Remote controlling



Particular thanks

盧昭伶老師

陳仲仕先生

子三乙同學



Particular thanks

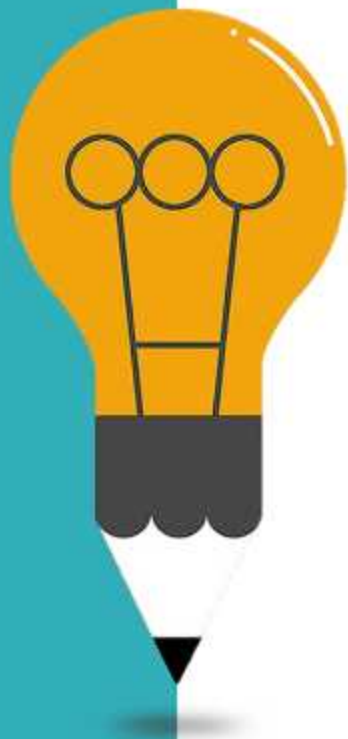
林家德老師

陳祈燕老師

陳晉村老師

Thanks for your listening

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03

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04

Achievement display

05

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06

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**Question &
Suggestion**