MOVACLOCK

活字时钟

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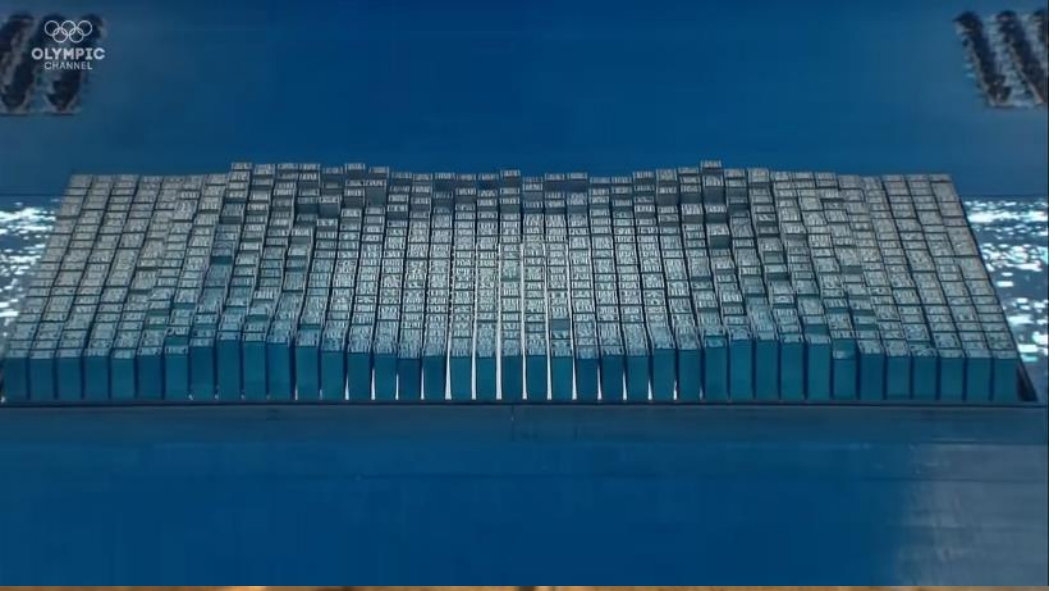
背景与目标 Background



1. Opening Ceremony - Beijing 2008 Summer Olympic Games
2. [传承第二季] 木活字印刷术 | CCTV中文国际 Wood Movable Types, CCTV 4

背景与意义 Culture Interpretation

将 文化传承 带入 日常生活
透过结合当代文创元素融合生活，设计与科技结合可以使传统工艺吸引更多大眾關注与了解

创新 结合 传统工艺
活字印刷作为非物质文化遗产，结合3D打印和装置艺术，在实现创新的同时，有助于保护和传承传统工艺

Bringing Cultural Heritage to Daily
Through the integration of cultural elements into daily life, the combination of design and technology can make traditional craftsmanship attract more public understanding

Technology and Craftsmanship
As an intangible cultural heritage, movable type combined with 3D printing and installation art can help convey traditional craftsmanship

目标与内容 Objective

活字 + 时钟 + 灯饰 Movable Type + Clock + Light

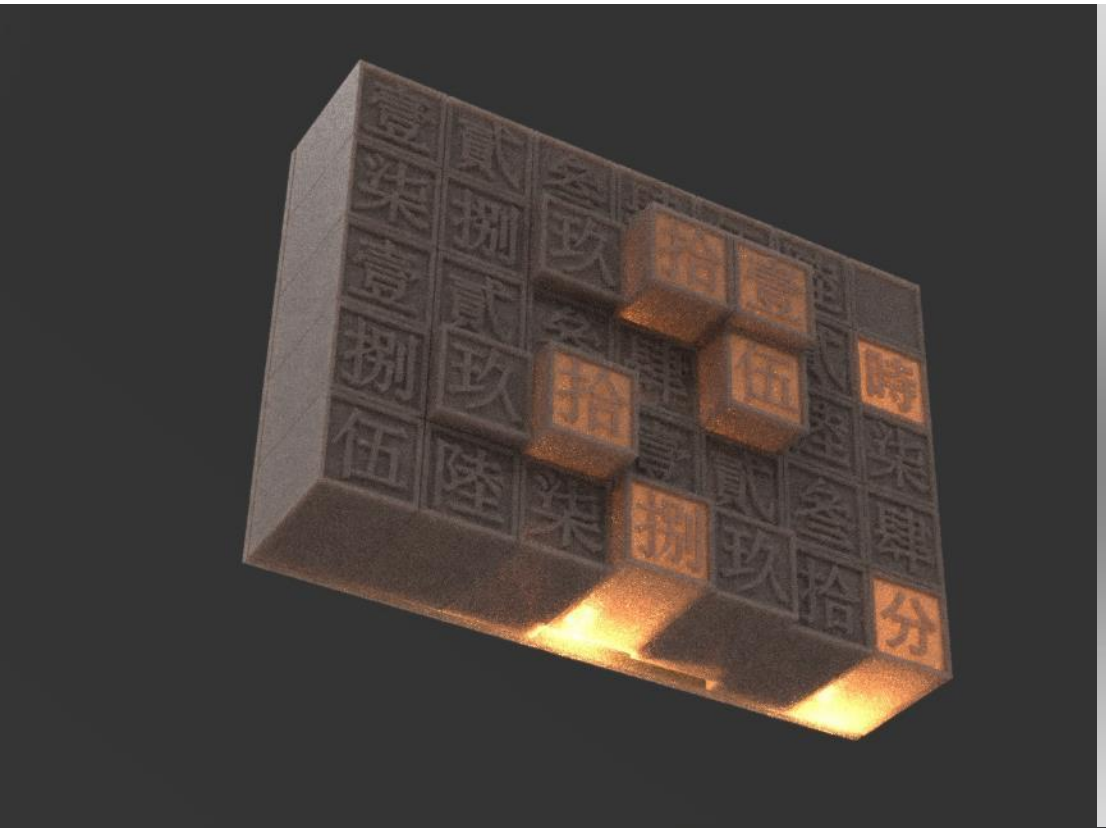
启发自活字印刷术与2008年北京奥运开幕式的活字升降动态，而时间则成为文字内容，包括「零、壹、貳、叁、肆、伍、陸、柒、捌、玖、拾」和「时、分」；配合灯光和可活动字块的升降，提升时间的可读性

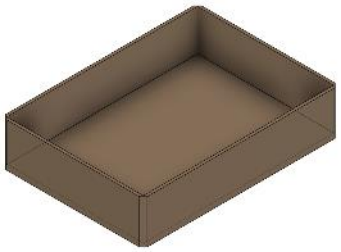
Living Word + Clock + Lighting
Inspired by the movable type printing system and the opening ceremony of the 2008 Beijing Olympics, the movable type was developed with controlled movements, while the time becomes the content of the text, including "zero, one, two, two, four, five, six, seven, eight, nine, nine, ten" and "hour, minute“. With the lighting and the up and down of movable types, the readability of time is enhanced.

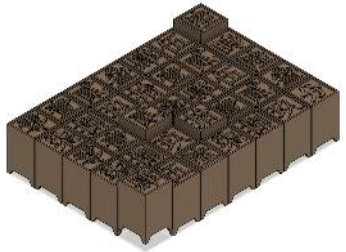
方案 Proposal

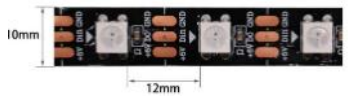
從文化傳承 到實用文创

From Cultural Inheritance to Functional Design





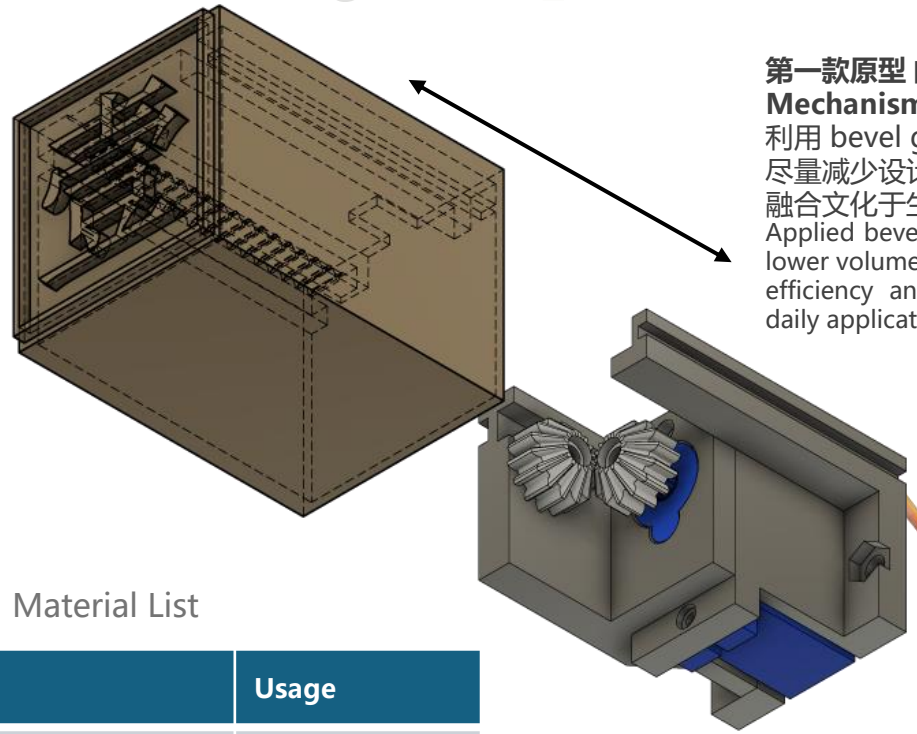




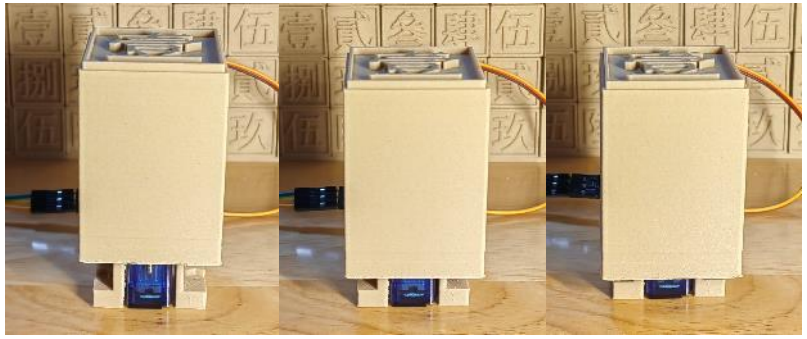
配合电子元件与开发板，利用3D打印并组装设计零件，组成活字时钟Movaclock。

Integrating electronic components and micro-controller, We developed Movaclock: Clock with Movable Type System with 3D design, printing and coding。

设计与实验 Design Implementation



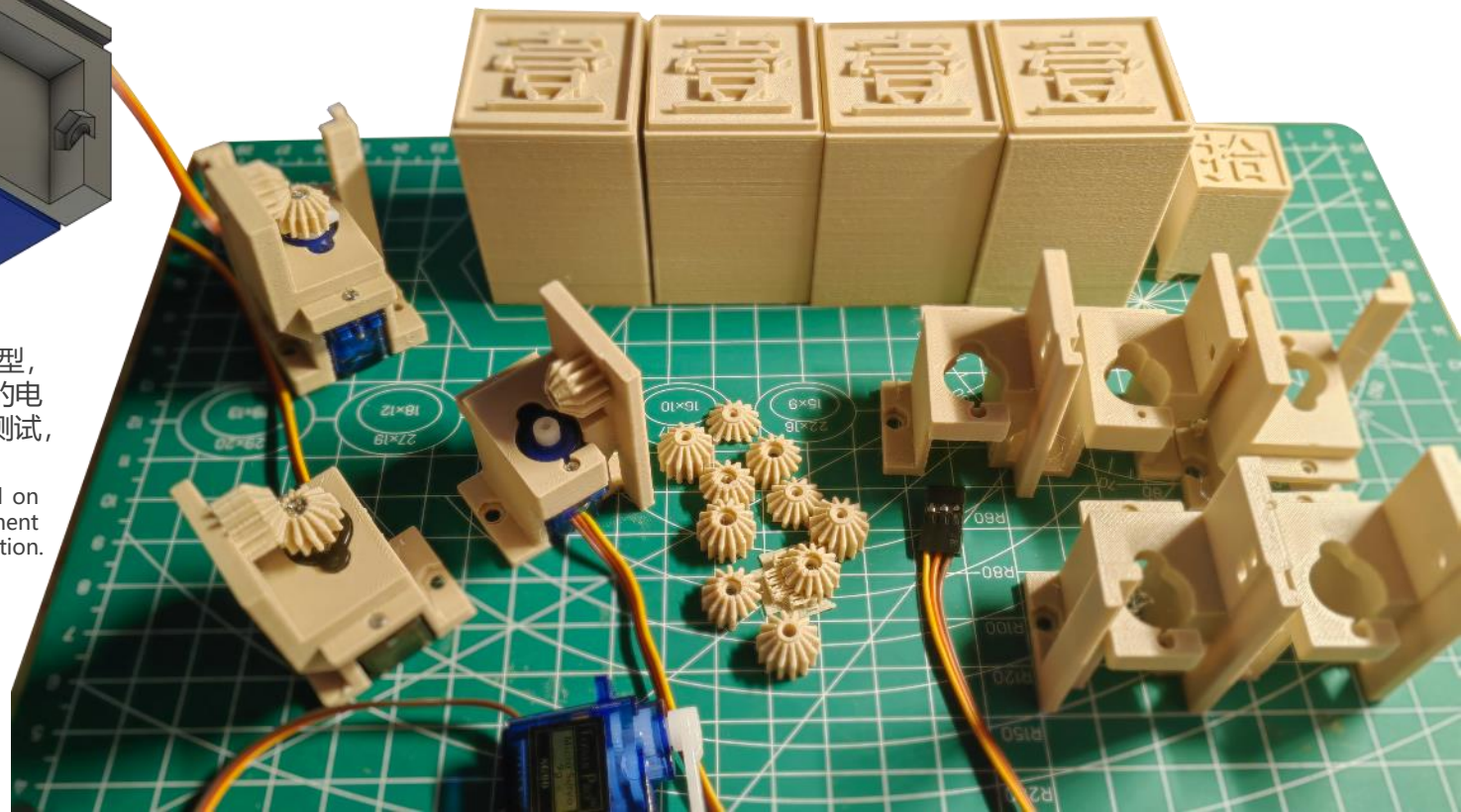
第一款原型 的 升降设计
Mechanisms of 1
利用 bevel gear 和 gear rack
尽量减少设计体积 节省耗材
融合文化于生活场景
Applied bevel gear and gear rack to lower volumes of design for material efficiency and compactness in the daily application as a clock



材 料 列 表 Material List

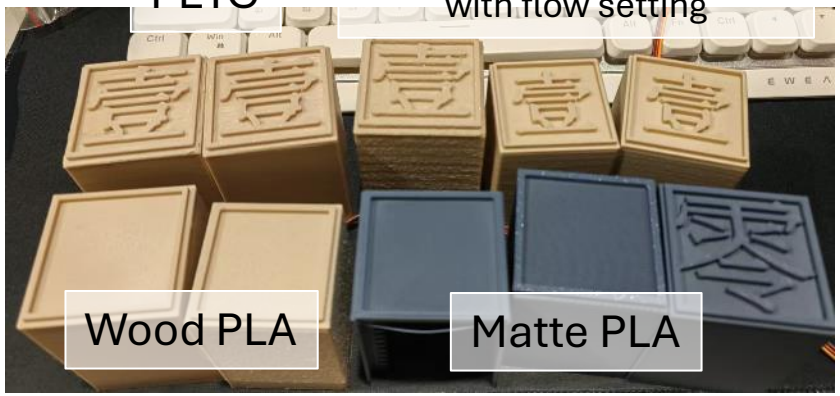
Material	Usage
Servo motor * 35	Type Movement
WS2812 LED Strip *35	Programmable Light
PCA9685 Servo shield *3	Servo Control
9V Power supply	Power
Arduino UNO	Micro-controller
Filaments (PLA, wood PLA, etc.)	3D Printing

原型测试 Prototypes
利用3D打印制作不同原型，打印并安装于不同款式的电机和配合其他元件进行测试，优化设计。
Used 3D printing and install on types of motors to experiment with prototypes for optimization.



机器使用 Machine
BambuLab A1 Mini
BambuLab P1S

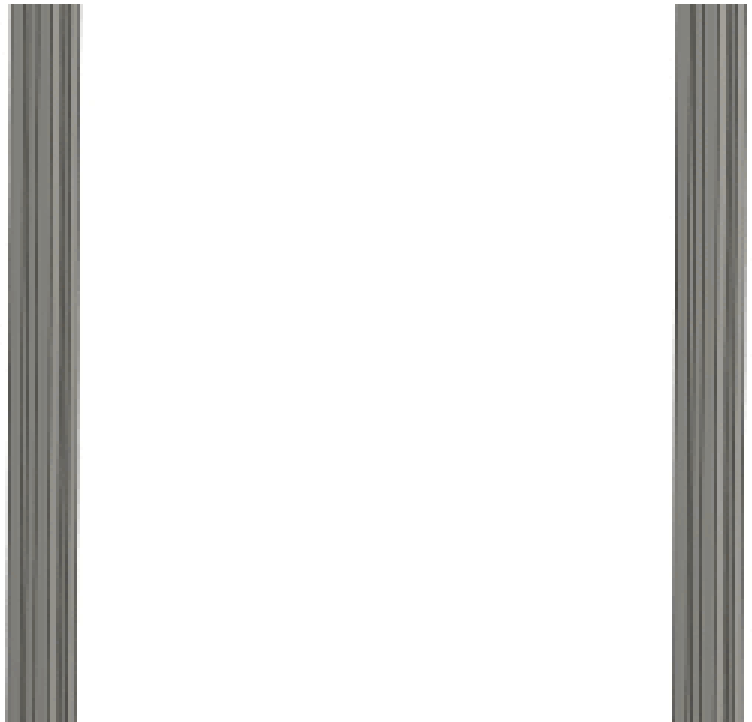
设计与实验 Design Implementation



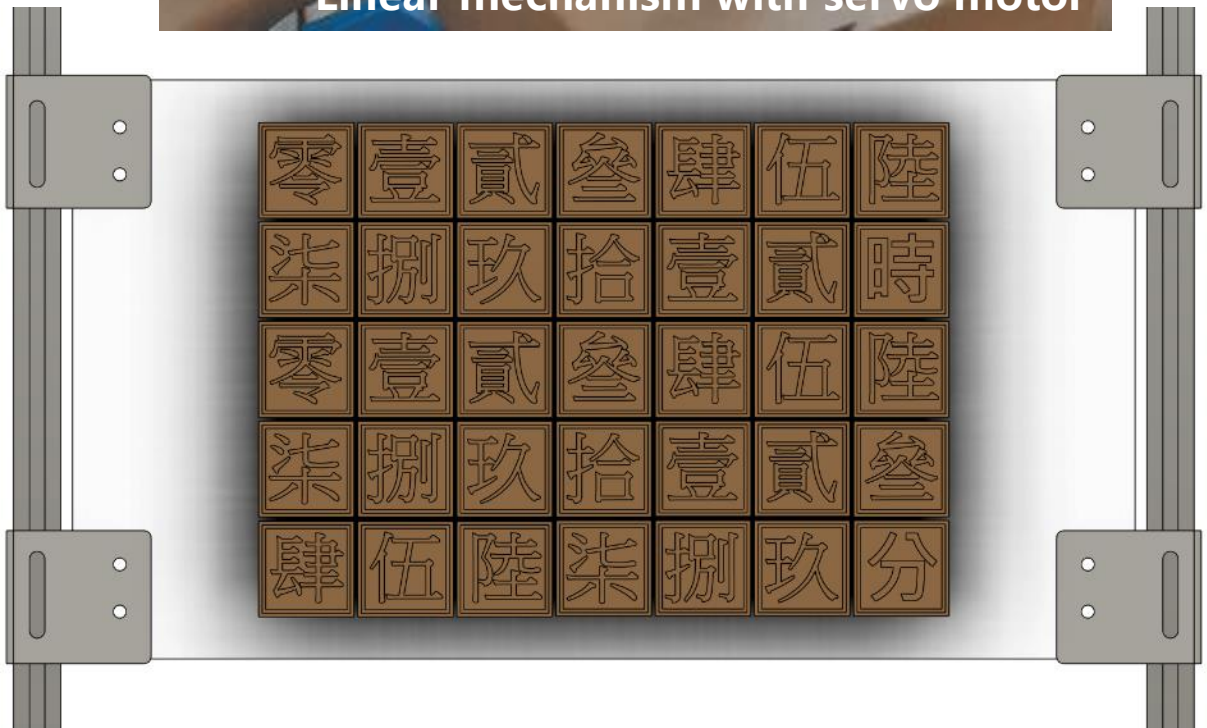
原型测试 Prototyping

平衡打印质量和耗材数量
测试多个版本的原型
Iterate design and print settings with types of filaments for quality and times

- 测试升降设计 linear mechanisms
- 减少体积（less filament/support）
- 耗材选择（PLA, PETG, wood PLA）
- 打印设定（imitate textures ）



Assembling Design

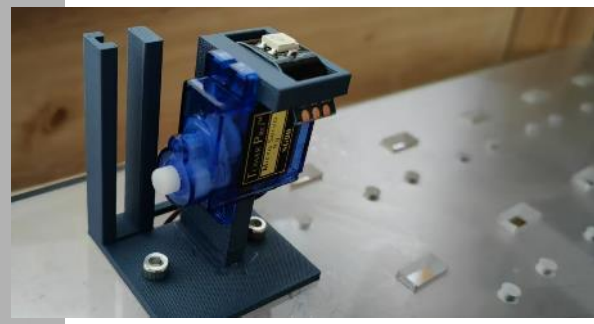


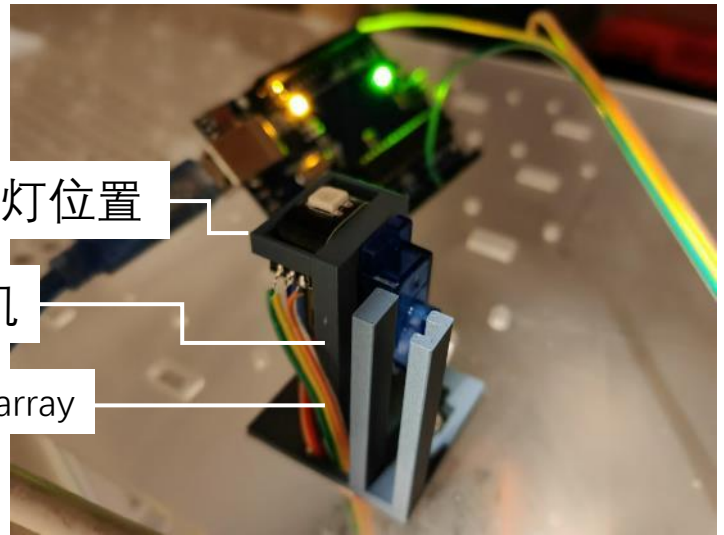
设计与实验 Design Implementation

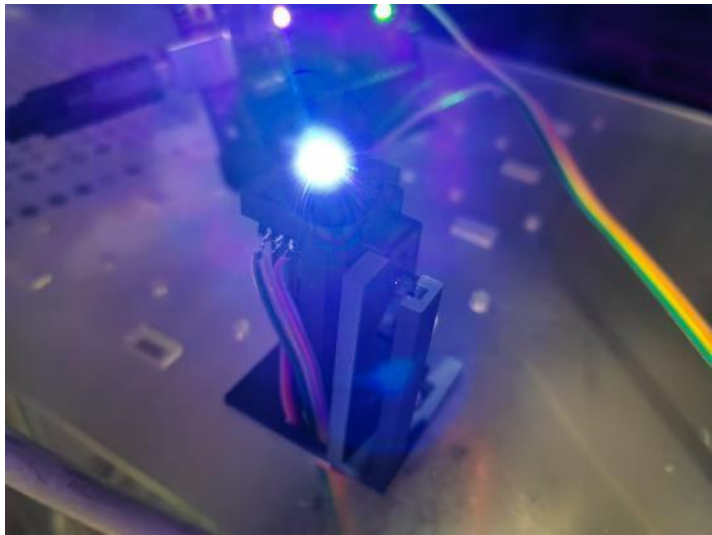
Arduino controls LEDs and motors to change the movements and effects according to time

原型制作成本 Prototype Product Cost

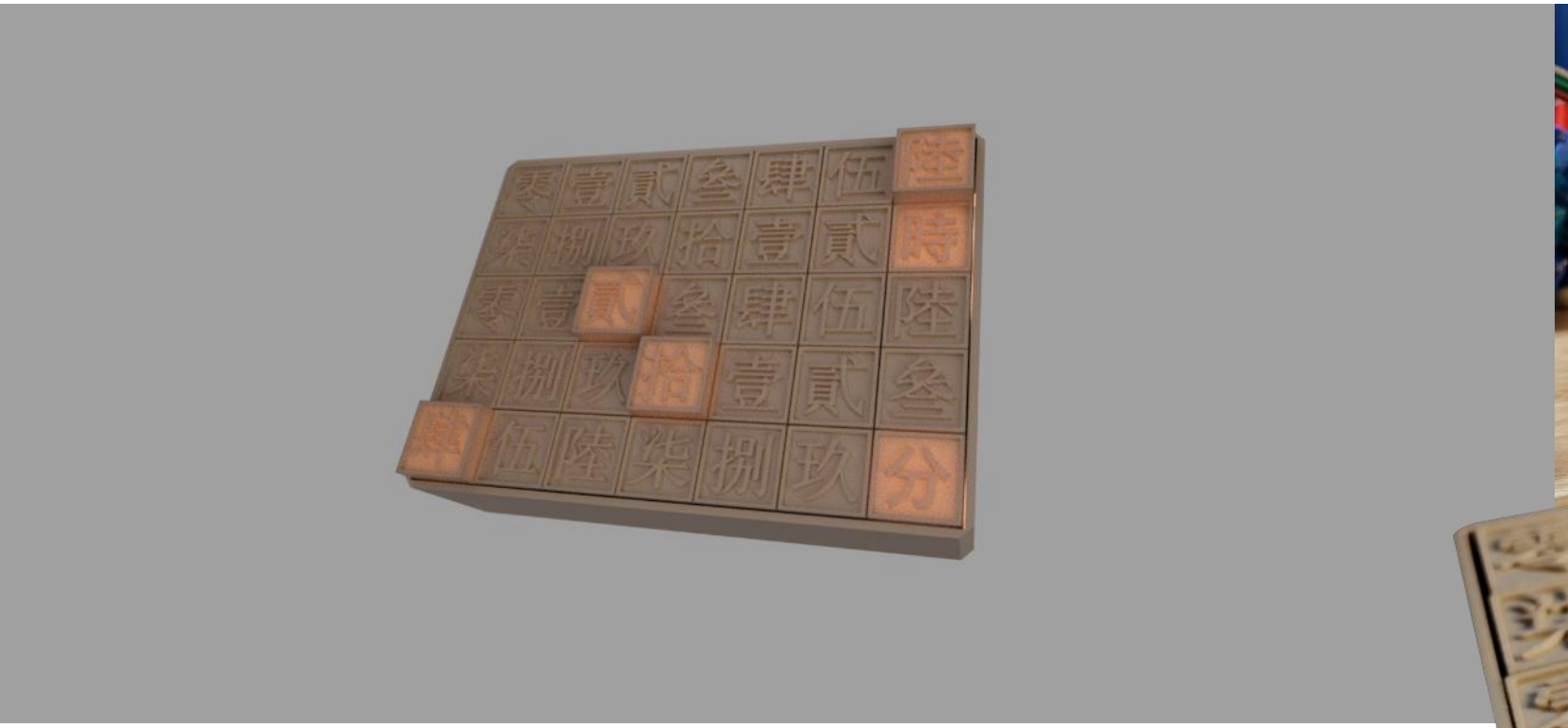
Material	Usage	Price (RMB)
Servo motor * 35	Movement	250
WS2812 LED Strip *35	Programmable Light	75
PCA9685 Servo shield *3	Motor Control	38
M2 M3 M5 screw and nut	Installation	30
5V Power supply	Power	60
Arduino UNO	Micro-controller	80
Filaments (around 6)	3D Printing	240
Acrylic sheet 5MM customized	installation	60
Aluminum Profiles	installation	200
	总 TOTAL	**1033**

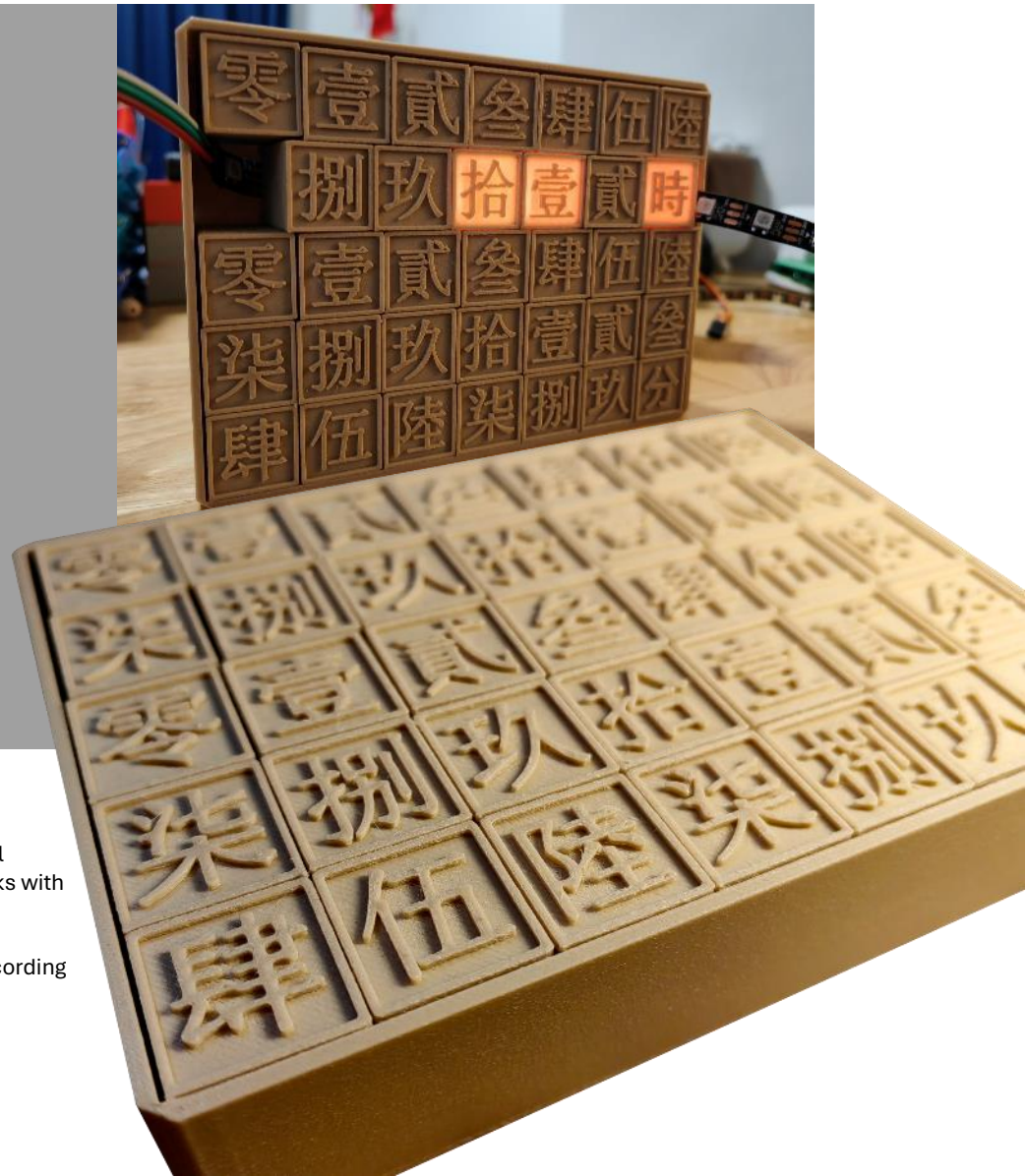






应用与前景 Application & Development





在红鸟空间装置以外 配合传统工艺的文化传承

活字工艺多使用木雕或金属字块，文创发展可利用真实工艺的字块，配合3D打印建造组装工具，以DIY文化结合文创；

实现个性化定制，消费者可以根据自己的需求和喜好定制活字，提高产品的设计个性化程度;

利用更多不同的材料打印，可结合文化推广

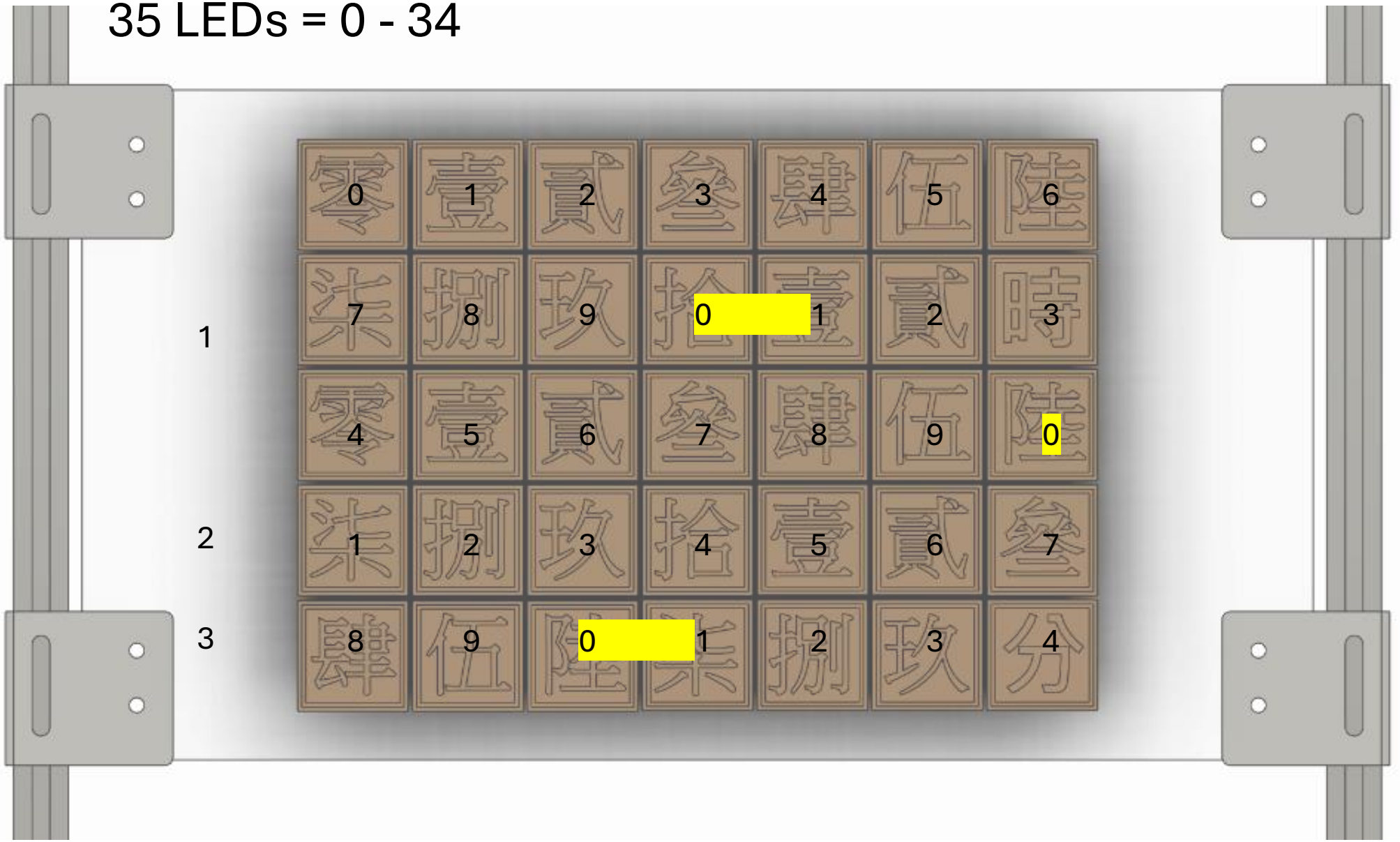
Cultural heritage with traditional crafts

Movable type mostly uses wood carving or metal character blocks, we can use the real craft blocks with 3D printing construction to DIY culture

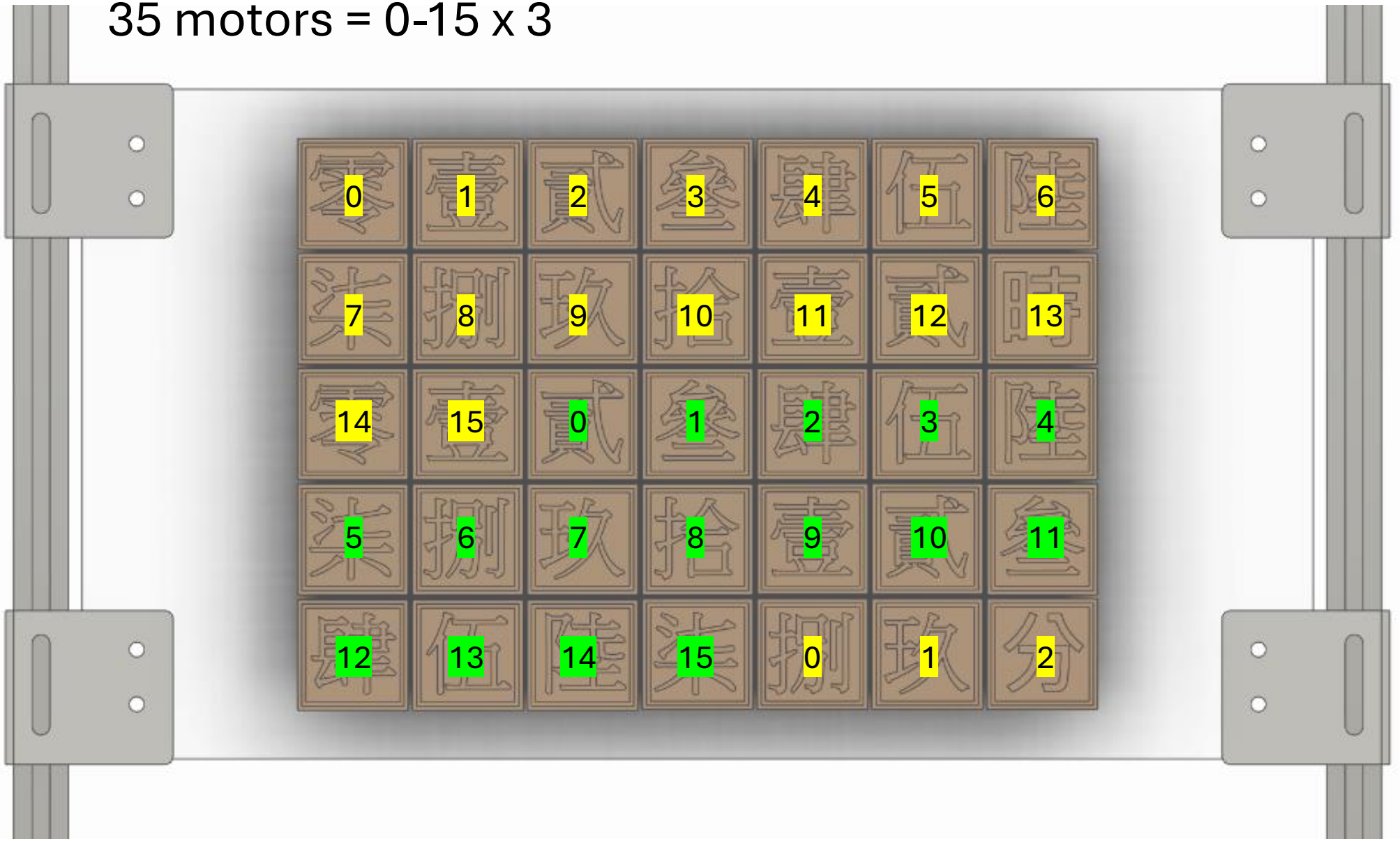
consumers can customize the movable type according to their preferences, and improve the degree of personalization of product design

Utilizing more different printing materials can be combined with cultural promotion

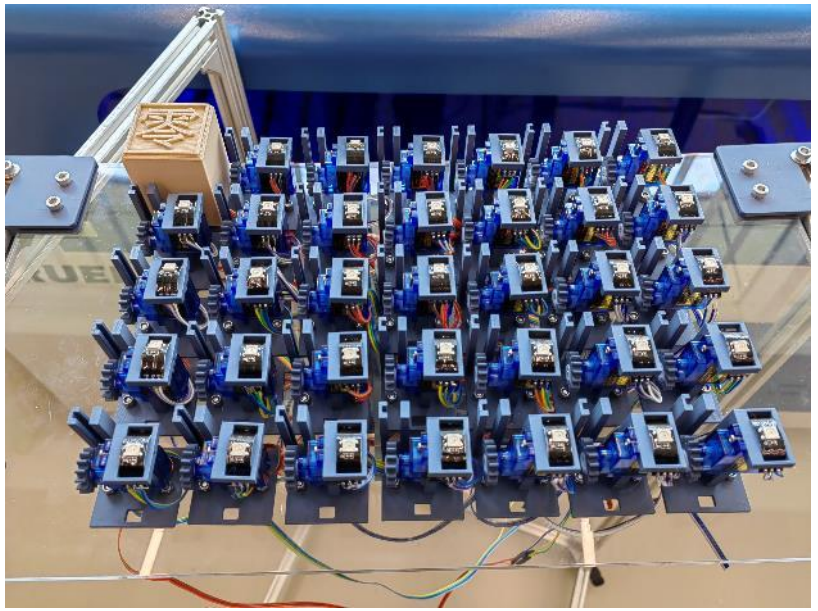
35 LEDs = 0 - 34



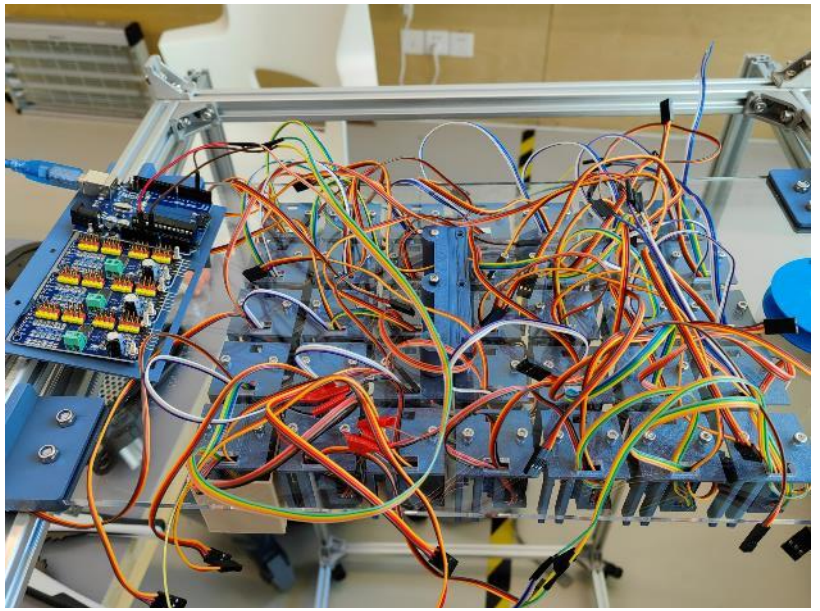
35 motors = 0-15 x 3

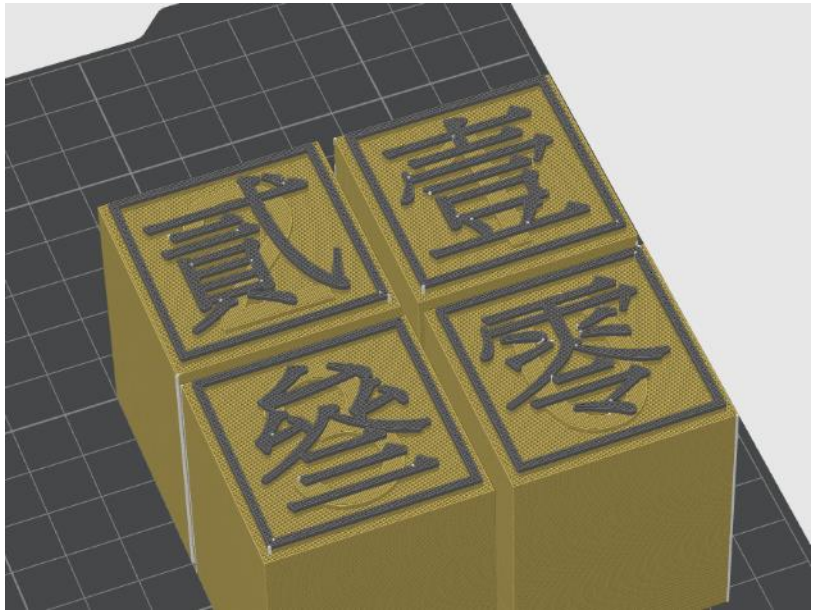


編程燈帶和馬達 Program LEDs and motors



整理線路和支架 Organize wires and framework for maintenance



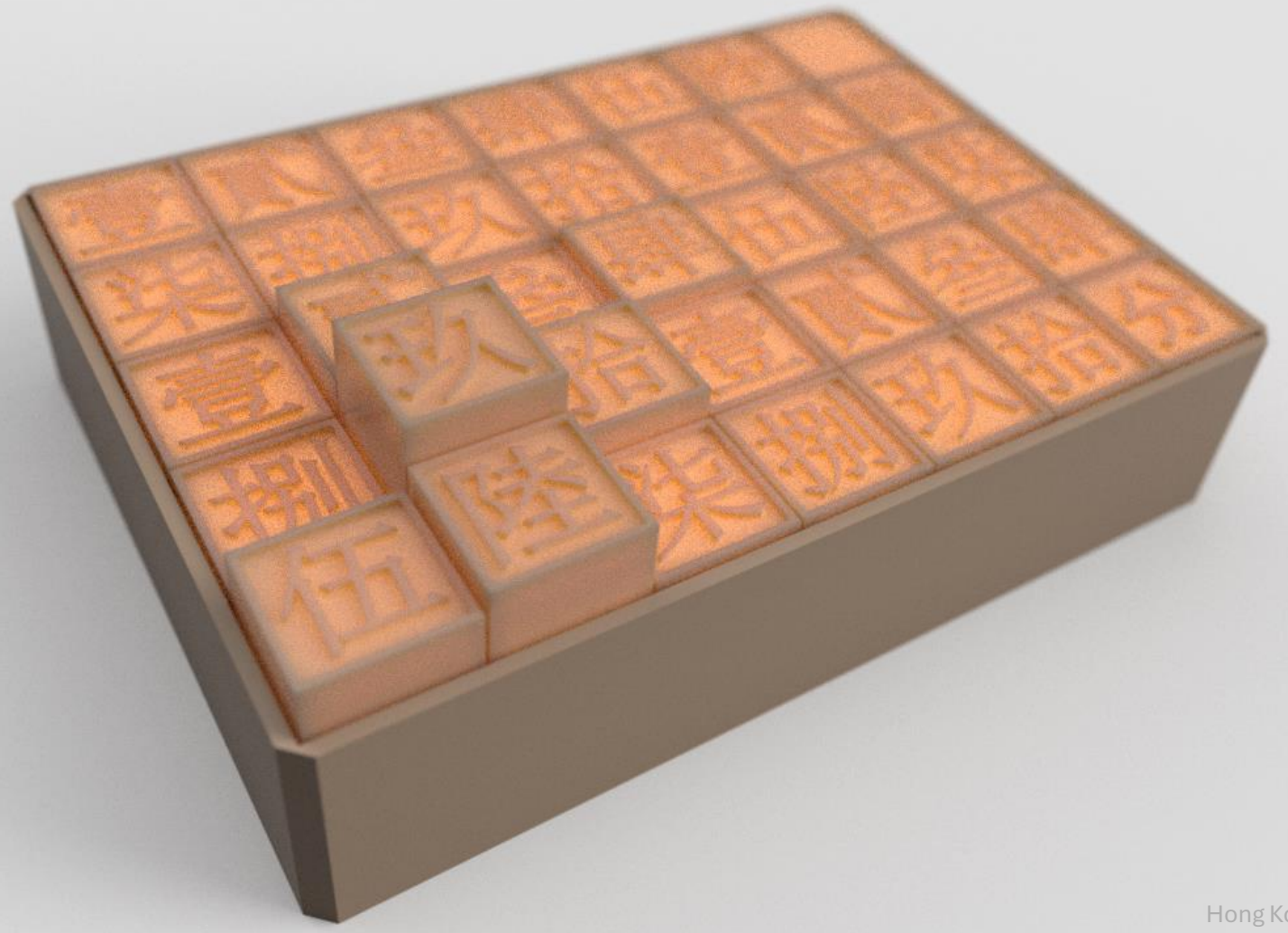


更新中國數字和阿拉伯數字 方便大眾閱讀

Optimize with Chinese text with numbers to enhance readability

多材料打印 亮燈效果

Multi-material print for both Chinese and number with light



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