Make a Custom 2048 Game Using Raspberry Pi

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1. Make a Custom 2048 Game using Raspberry Pi

1.1 Brief

2048 is a single-player sliding block puzzle game by Italian web developer Gabriele Cirulli. 2048 was originally written in JavaScript and CSS during a weekend, and released on March 9, 2014, as free and open-source software subject to the MIT license.

In this project, I rewritten the Game in python on Raspberry Pi, and when you win the game, your picture can be listed on the Ranklist as well as the Photo printer can print the photo out.

When you finished this tutorial, you can acquire the following knowledge:
- Be familiar with Raspberry Pi
- Understand python programming using pyside
- The skills of dealing with pictures using Pi Camera
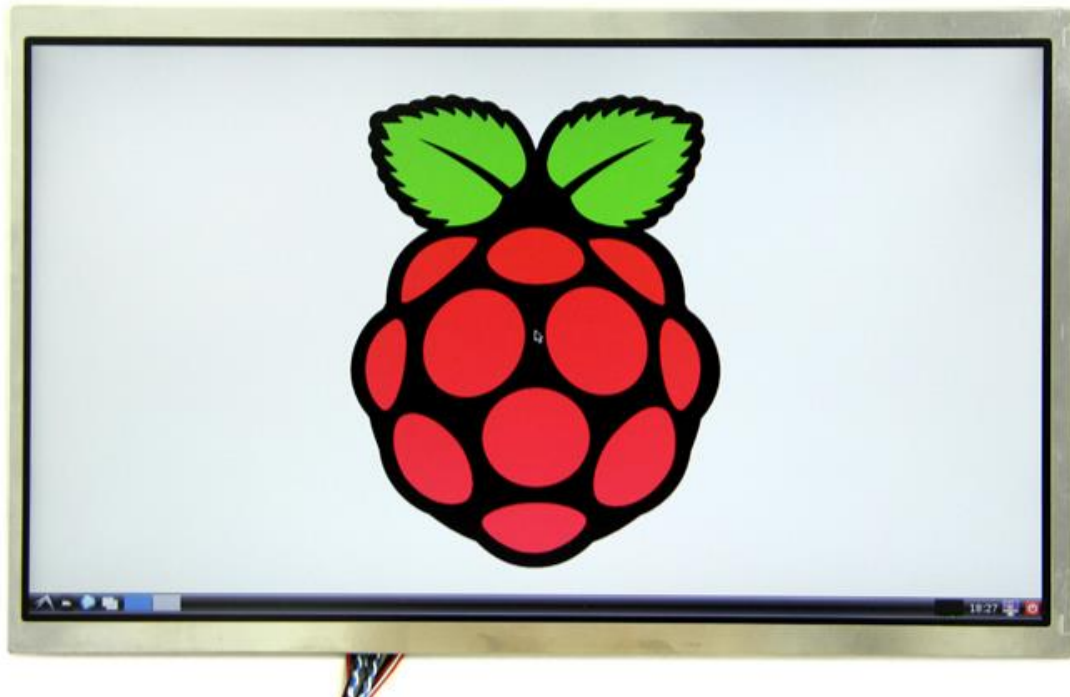
1.2   What do we need

- Raspberry Pi 3 Model B

https://www.seeedstudio.com/Raspberry-Pi-3-Model-B-p-2625.html

- 10.1 Inch LCD Display - 1366x768

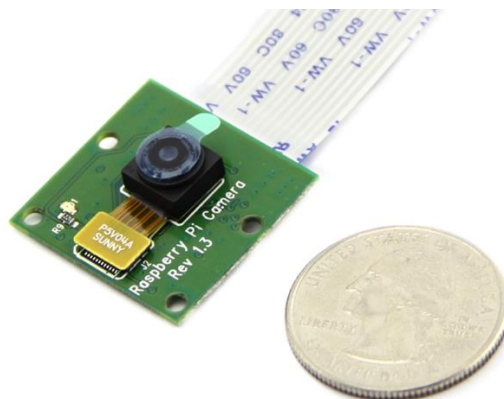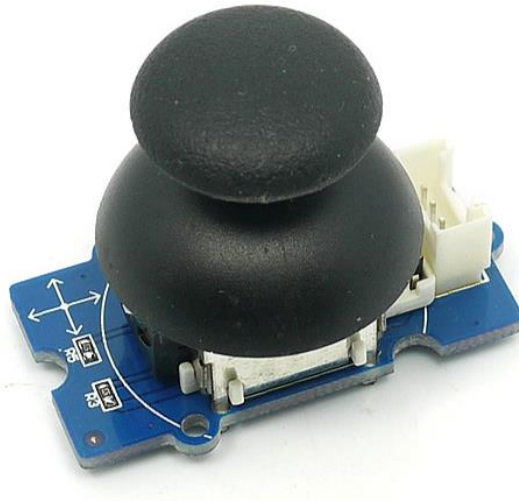https://www.seeedstudio.com/10.1-Inch-LCD-Display-1366x768-HDMI%26VGA%26NTSC%26PAL-p-1586.html

- GrovePi+

https://www.seeedstudio.com/GrovePi%2B-p-2241.html

- Raspberry Pi Camera Module

https://www.seeedstudio.com/Raspberry-Pi-Camera-Module-p-1659.html

● Grove - Thumb Joystick

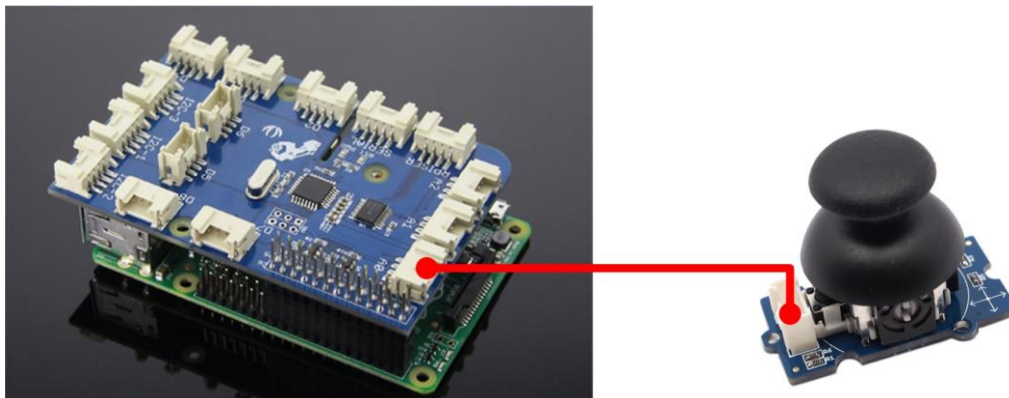https://www.seeedstudio.com/Grove-Thumb-Joystick-p-935.html
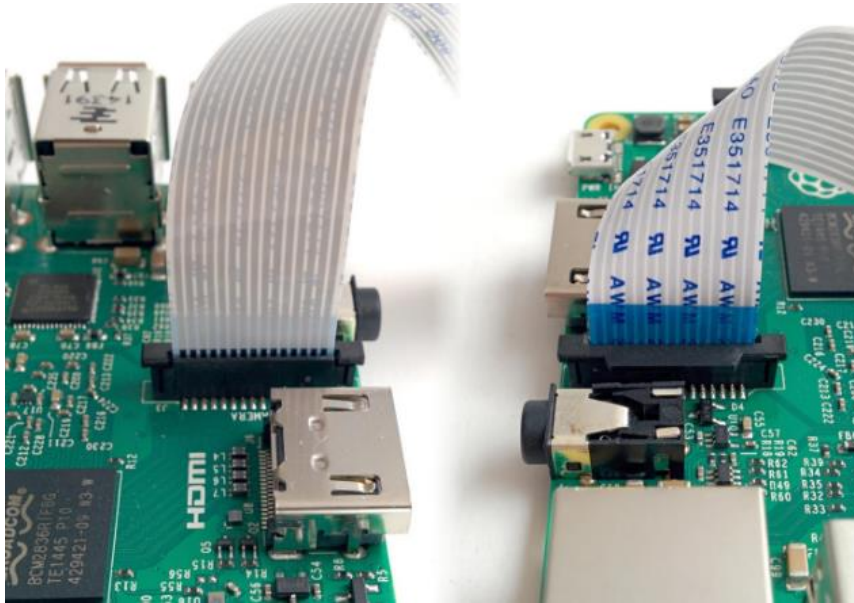

● Micro SD Card(larger than 4GB)

1.3　Wiring

The Grove – Thumb Joystick has X and Y axes, each of them are ~10K potentiometers and can control 2D movement by generating analog signals. So we connect this module to an analog port – A0.

Then connect the Pi Camera to the Raspberry Pi just as below picture shows.

1.4 Software Work

The software work of this project is a bit more. First we should build the software development environment.

1.4.1 Setup the GrovePi+

GrovePi is an open source platform for connecting Grove Sensors to the Raspberry Pi. In this project we use GrovePi+ to deal with some real time work, such as the joystick.

You can click here to learn how to get started the GrovePi+.

http://www.dexterindustries.com/GrovePi/get-started-with-the-grovepi/setting-software/

1.4.2 Setup the Pi Camera

If you are using the Raspbian distro, it is best to install picamera using the system's package manager: apt. This will ensure that picamera is easy to keep up to date, and easy to remove should you wish to do so. It will also make picamera available for all users on the system. To install picamera using apt simply:

```
$ sudo apt-get update
$ sudo apt-get install python-picamera python3-picamera
```

Make sure the camera module isn't sat on anything conductive (e.g. the Pi's USB ports or its GPIO pins). Now, apply power to your Pi. Once booted, start the Raspberry Pi Configuration utility and enable the camera module:
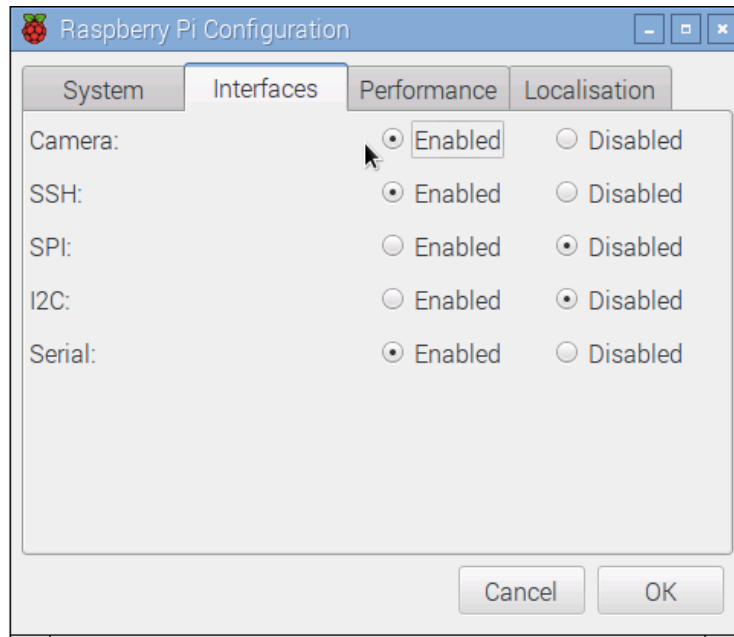
More information about Pi Camera you can click here.

http://picamera.readthedocs.io/en/release-1.12/index.html

1.4.3 Setup the Photo Printer

In this project, we select a Canon-SELPHY-CP1200-Wireless-Compact-Photo printer, this photo printer support wireless connect, in order to ensure the stability of the system we use mini USB cable to connect Photo Printer and Raspberry Pi.
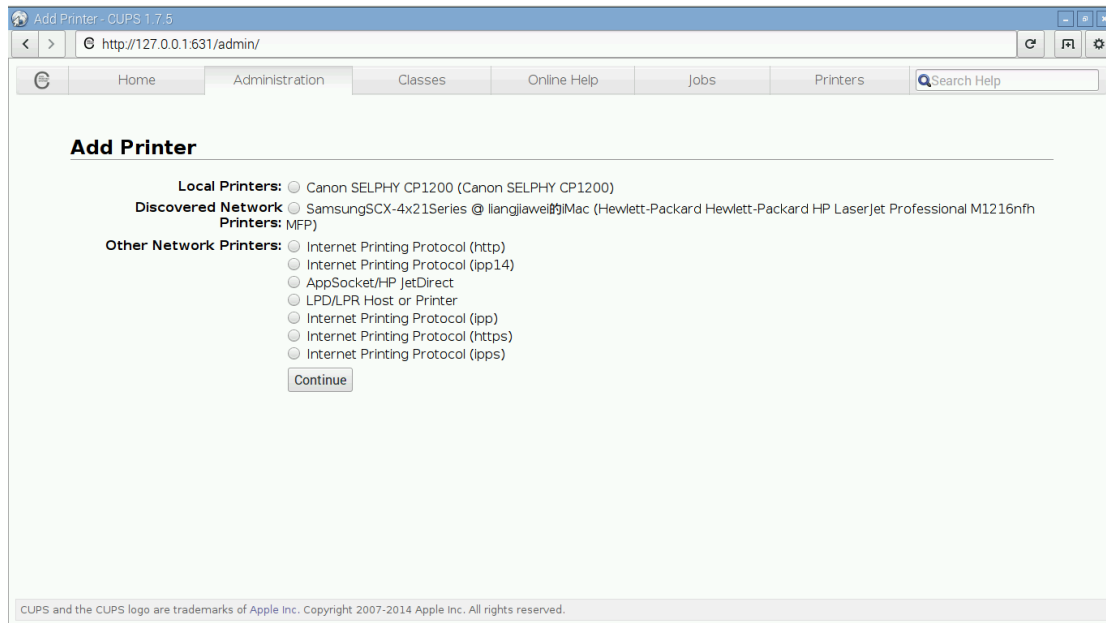
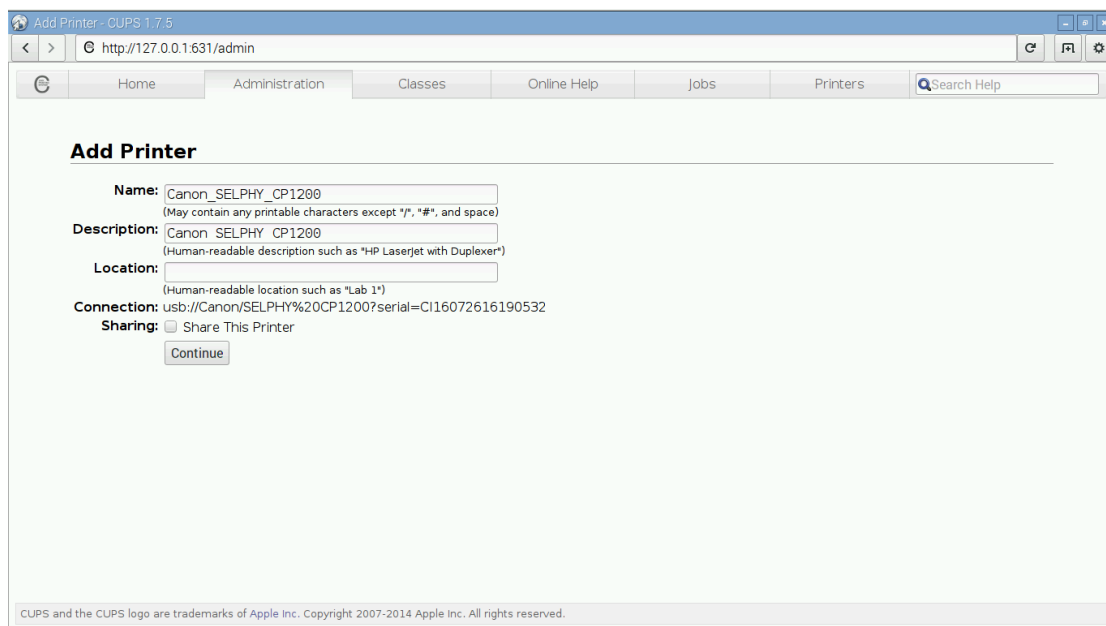Now we should install the printer driver CUPS ,

sudo apt-get install cups

http://www.penguintutor.com/linux/printing-cups

Then configure the printer as below picture shows.
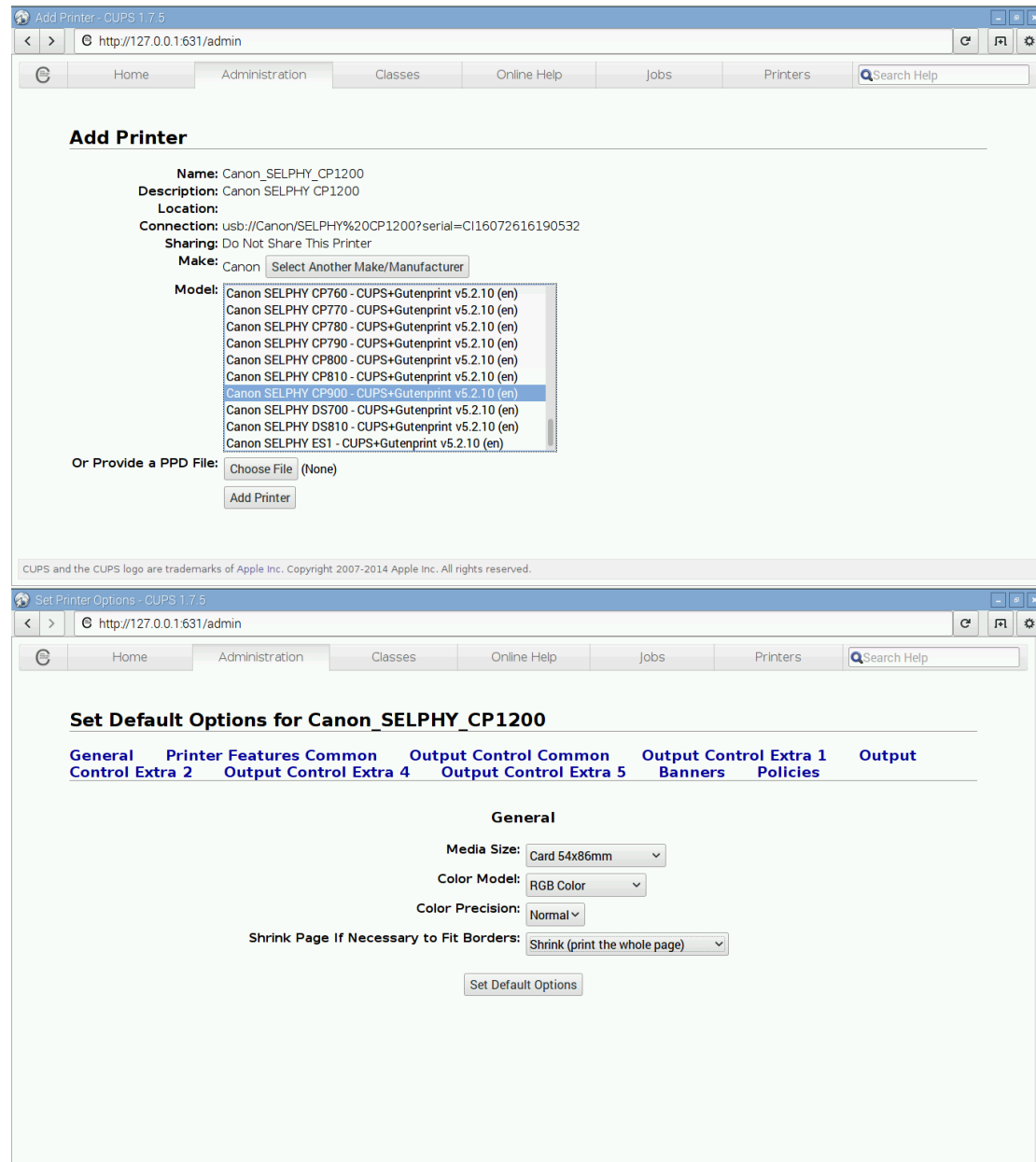
Add printer and select canon SELPHY CP1200

Click "Continue".

In this step, we should set the photo size, in this project we set the media size "Card 54×86mm".
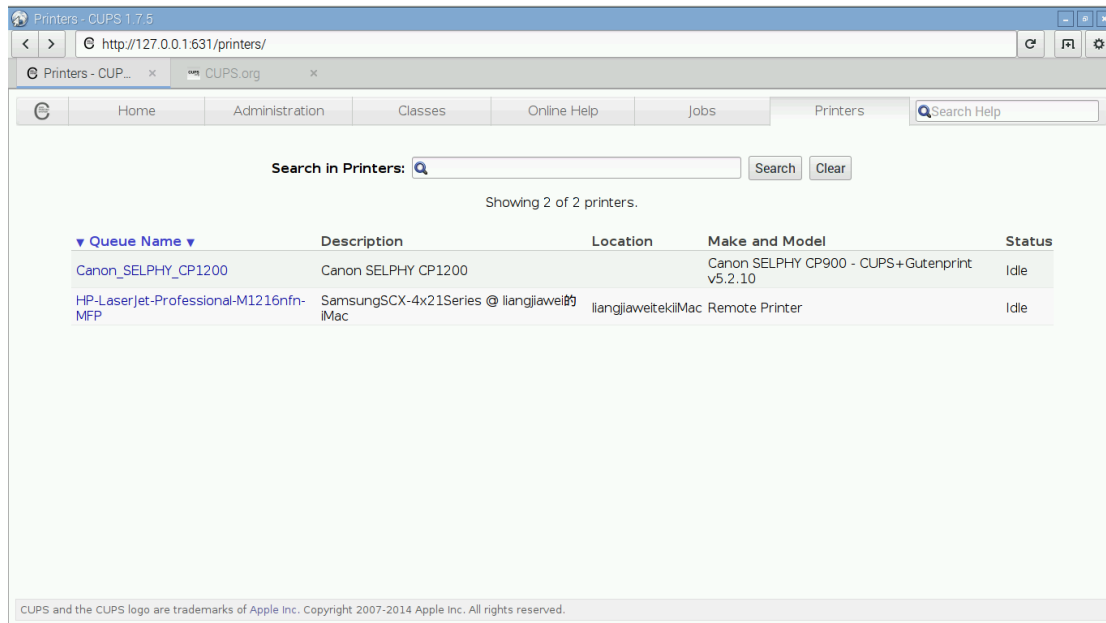
Then we should install some libraries for pycups

sudo apt-get install python-dev

sudo apt-get install libcups2-dev

Download the pycups code and install

git clone git://git.fedorahosted.org/git/pycups.git

sudo python setup.py install

Now, we can print a photo to have a test.

1.4.4 Install Pyside and Download the project code

We use pyside to develop the game UI.

sudo apt-get install python-pyside

And then download the code

cd ~

git clone https://github.com/Lee-Kevin/RPI_Photo_booth
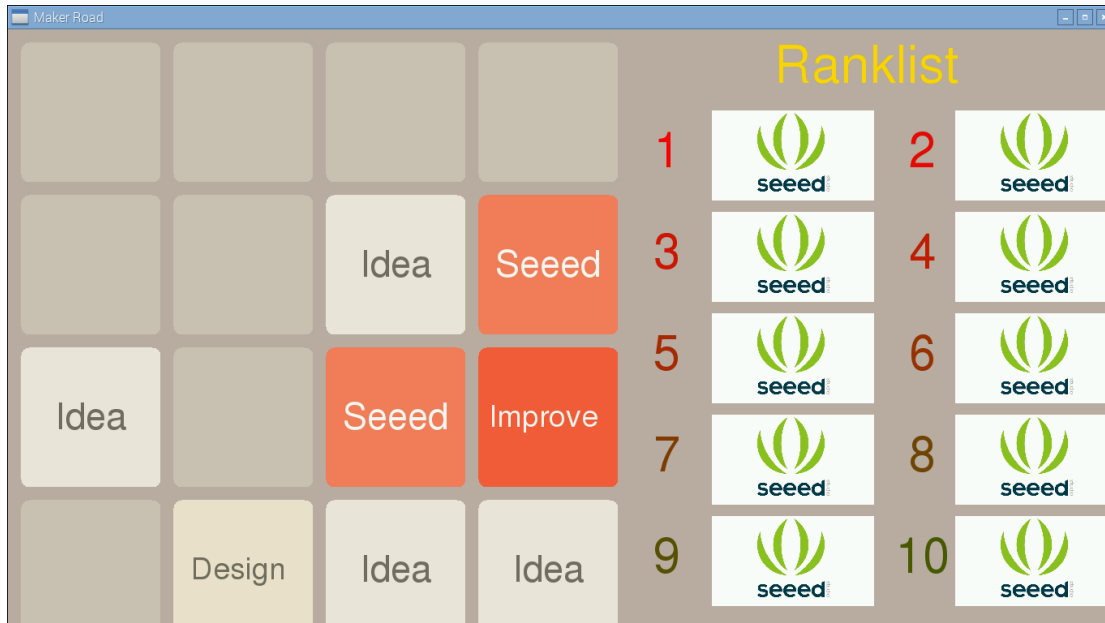
Now you can run the seeed.py to see whether the game start normally. And if you're luckily enough you can see the picture as below shows.

1.4.5 Setup the startup script

At last, maybe we all want to launch the game automatically when the raspberry pi boot.

The alternative method is to create a configuration file that is unique to the currently logged in user. First you need to edit this text file :

```
sudo nano ~/.config/lxsession/LXDE/autostart
```

This file represents a list of commands to be executed when the GUI loads. It is usually blank when you first edit it so just add the applications you need to auto-load:

For this project You can auto-launch th Python scripts by adding the line :

```
@/usr/bin/python /home/pi/RPI_Photo_booth/seeed.py
```

This works best in this example the Python script is stored in the home directory of the default Pi user. If another user is logged in they wouldn't have access to this directory so LXDE may not be able to autoload it.

To save and exit the nano editor press CTRL-X, Y and then ENTER.

1.5 The Result

Now you can use the Grove – Thumb Joystick to play this game. When you get Market(1024), the camera will start and take a photo of yours then print it out, at the same time your photo will be shown on the Ranklist. Enjoy!

1.6 Make. Invent. Do.

This project is made as an Open Source Project. It's a starting point. Let your creativity go wild with the mechanical, electrical and software design. Make the demo your own. Decorate it. Improve the work. No matter what, write a recipe about it.

To share and progress together.