Assignment 1: Interactive Loyalty Card

In this assignment you will write a Processing sketch to implement a QR code based loyalty card system. The system would replace card based systems such as the one shown below.

Workflow of the Virtual Loyalty Card

To use the virtual loyalty card a customer

- **Signs up** for a virtual loyalty card and receives a QR code image that they can store on their mobile phone (or print out) – this step is **not** part of the assignment (these QR code images have been generated)

- **Uses** the virtual loyalty card by presenting the QR code image to a camera at the till
  - The system checks the number of times the loyalty card has been presented by accessing a database on a server
  - If the user has sufficient virtual stamps on their card, their item is free and the virtual loyalty card is reset to empty
  - If not then their the number of virtual stamps is increased by one

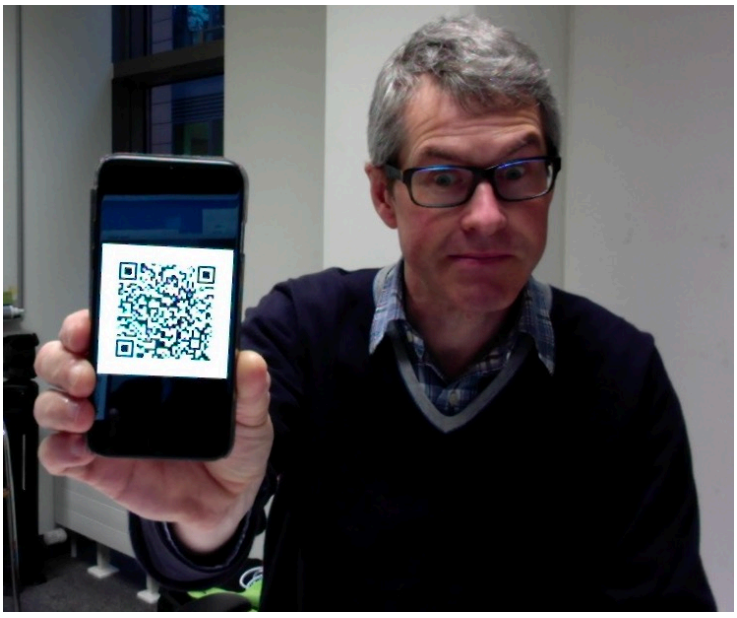
- **Sees either**
  - A screen showing that their item is free and sees their card reset to empty (to start all over again)
  - Their card incremented by another stamp

You are not required to implement all aspects of the workflow in this assignment.

This assignment concentrates on the interaction between the user and the system and does not require you to implement the server-based services. These server-based services are available to you via a RESTful interface described below, which your sketch must use in the assignment.

Example

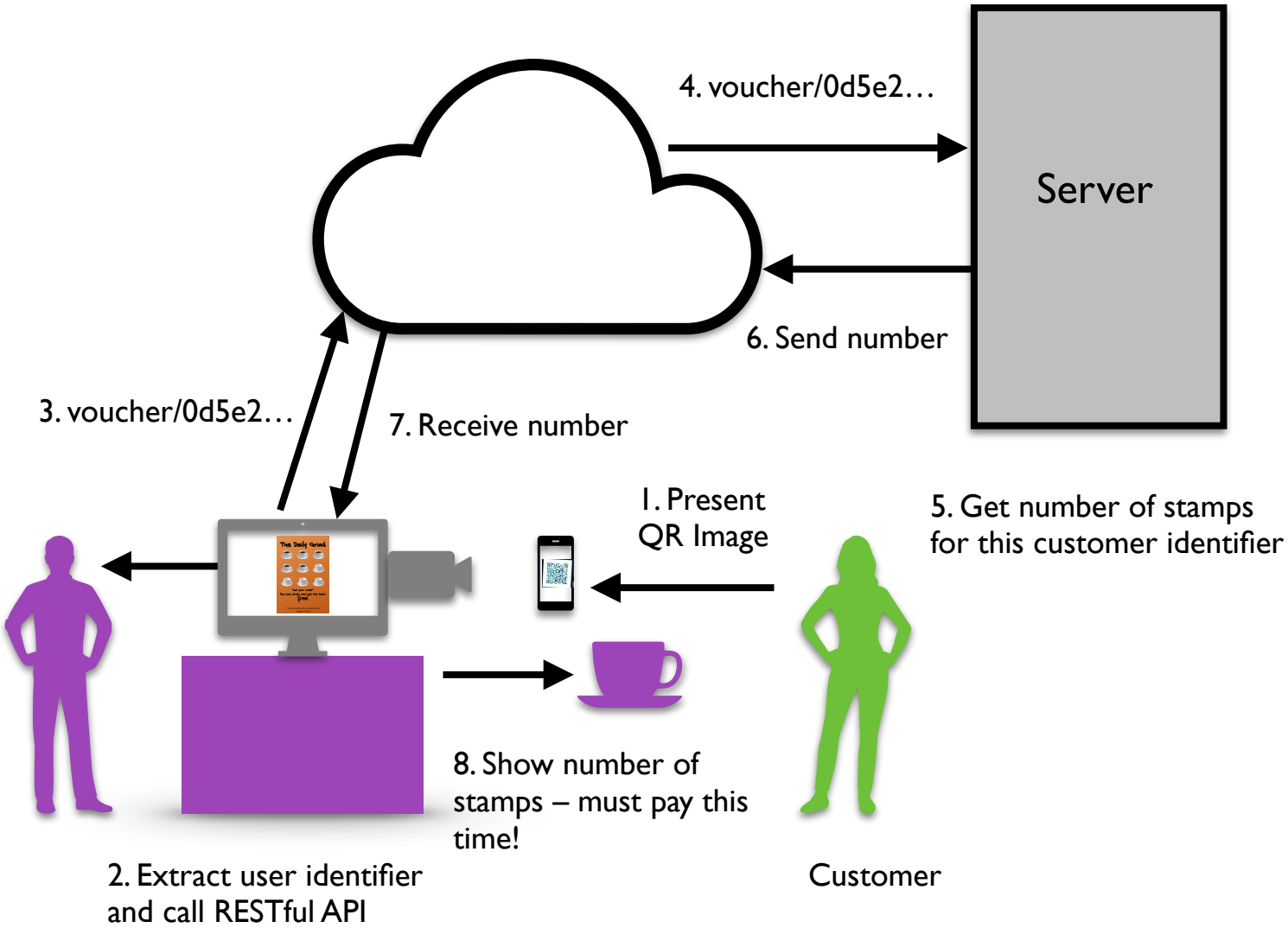
One Stamp on the Virtual Loyalty Card



A Customer Presents a Virtual Loyalty Card

Five down, four to go...

Architecture of the Virtual Loyalty Card System



Requirements for the Processing Sketch

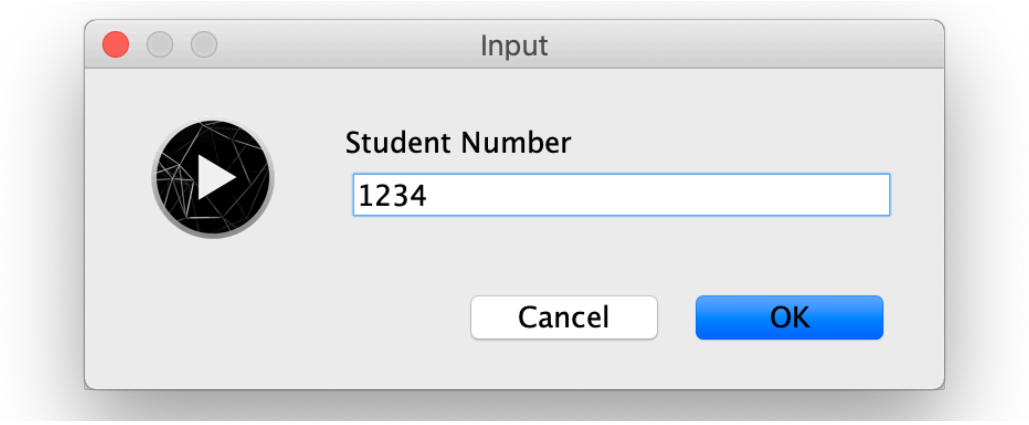
Write a Processing sketch to

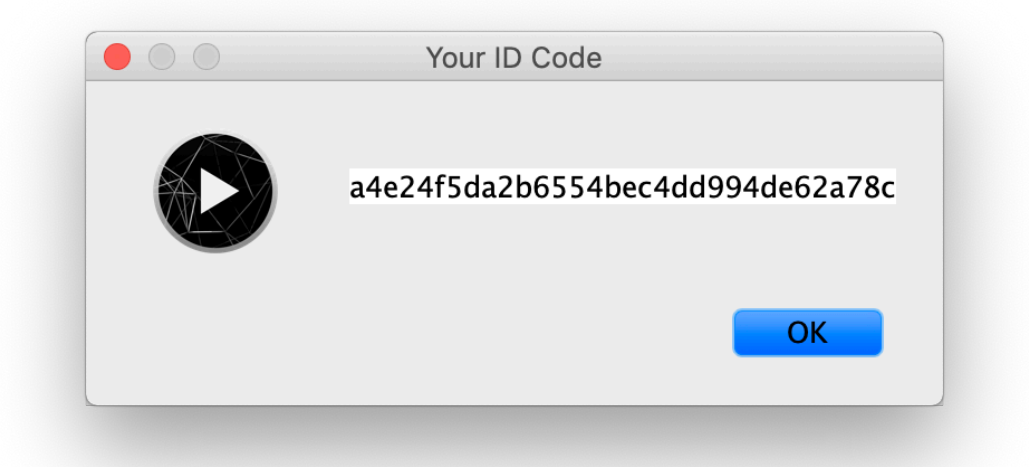
- Capture a QR code from a web camera
- Decode the customer identification information, which is formatted as a JSON object
- Query the server using the RESTful API for the number of stamps for the customer
- Present the virtual loyalty card onscreen in a form suitable when the user receives a free item or when the card is partly filled
- When the card is filled and the user receives a free item the virtual loyalty card should be reset to blank

Resources

On the Authoring MOODLE site you will find

- A Processing sketch GetMyID that generates the identifier used to identify your loyalty card. The sketch workflow is shown below





You must use your student number to generate your code and you must copy the ID code and use this in your Processing sketch.

On the Authoring MOODEL site you will also find

- A `BarCodeReader` class and an associated example of its use. You may use this class to process an image containing a QR code
- An example of working with the web camera
- An example loyalty card background image
- An example loyalty card blank token (empty coffee cup)
- An example loyalty card used token (full coffee cup)

To retrieve the QR code image you should visit the following URL

```
https://cs1.ucc.ie/~iw2/qrcode/<Your ID Code>
```

Where you must replace the text <Your ID Code> with the code retrieved using the GetMyID sketch. For example

```
https://cs1.ucc.ie/~iw2/qrcode/a4e24f5da2b6554bec4dd994de62a78c
```

The QR code contains an encoding of a JSON object with the following structure

```
{
created: String – date/time in the format yyyy-mm-dd h:mm:ss
name: String – customer's first name
ID: String – a hexadecimal MD5 hash code
}
```

For example,

```
{
"created": "2018-10-22 12:34:12",
"name":    "John",
"ID":      "a4e24f5da2b6554bec4dd994de62a78c"
}
```

Your sketch must extract the ID field and use this to retrieve and update the number of stamps using the RESTful API as follows

```
https://cs1.ucc.ie/~iw2/voucher/<Your ID Code>
```

For example

```
https://cs1.ucc.ie/~iw2/voucher/a4e24f5da2b6554bec4dd994de62a78c
```

A loyalty card can be reset to blank (i.e. number of stamps set to zero) using

```
https://cs1.ucc.ie/~iw2/reset/<Your ID Code>
```

Notes

- You may design your own loyalty card, you do not have to use the example resources
- You may make use of other information encoded in the QR code, such as the customer's name to personalise the dispaly
- Your sketch may perform some action to note the achievement of filling the virtual loyalty card
- Your application must respond sensibly when it can not find a barcode in the captured image or if the decoded contents of the barcode do not match the expected format

Deliverables

- A Processing sketch for the virtual loyalty card customer interface (this must contain all the resources needed to create and run your application; such as sketches and images)
- A short report (approximately one page) describing your solution

You may submit your assignment any time from **now to Thursday 15th November 2018 at 23:00** via the Authoring MOODLE site.

To submit, put all required assignment material in a folder, which should have your student number as its name, compress the folder and submit it using the assignment (Assignment 01) submission link on the Authoring MOODLE site.