

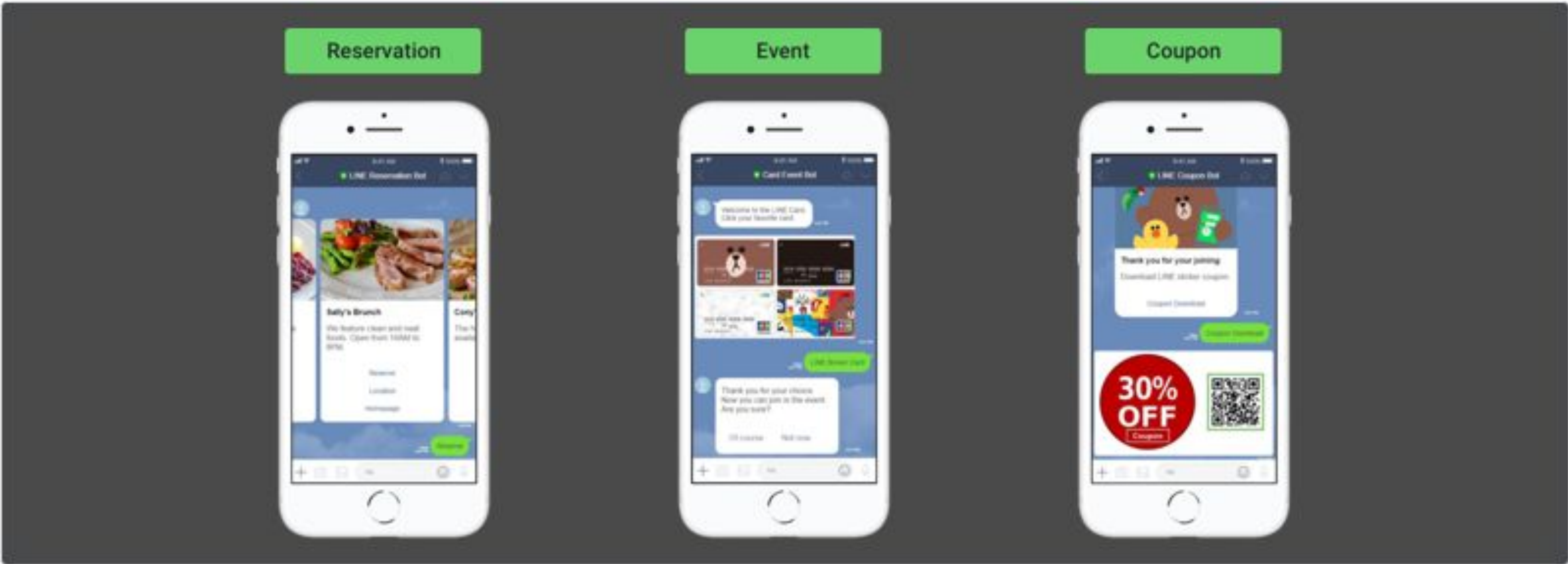
# 計算理論 111-1 期末專題

FSM Line Bot, TOC 111-1

TA: 陳紘霈、蔡易彤



## Build a Line Bot with FSM



Test your app (channel)

LINE Developers

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Bot basic ID

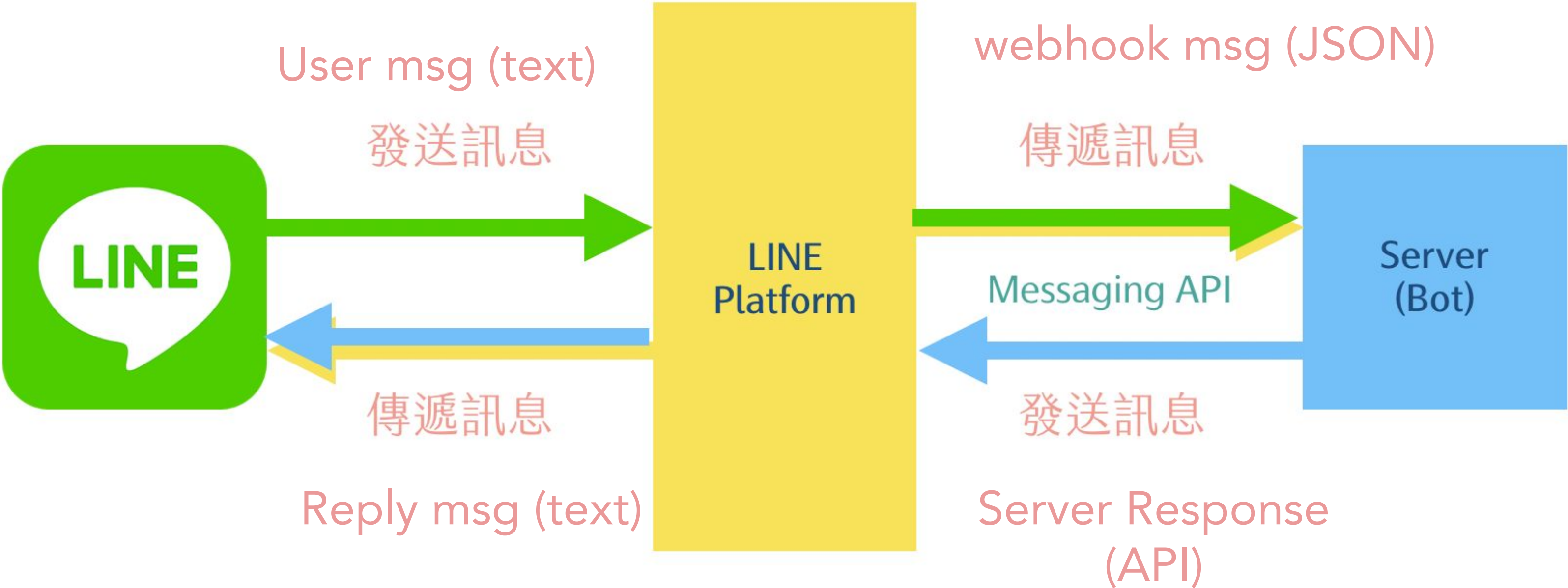
@738ulcbp

QR code



Scan this QR code with LINE to add your LINE Official Account as a friend. You can share the code with others.

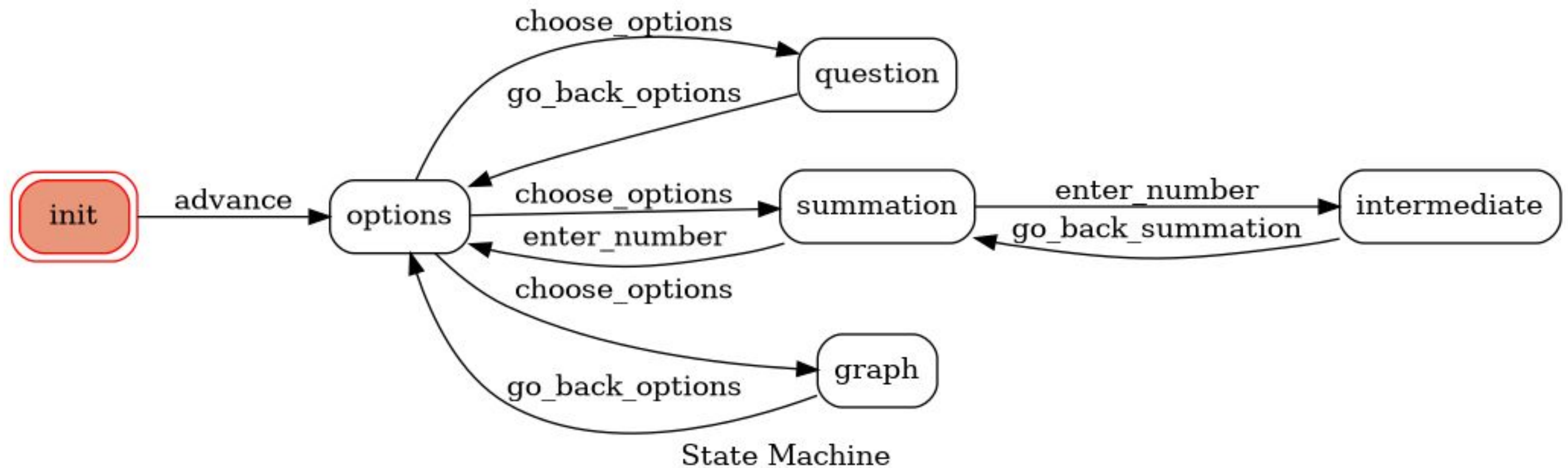
Below shows API call underneath the system. Main work of this project is to build the Server (bot).





Use finite-state-machine logics to construct the bot.

- In different state, user should receive different reply.
- Line Bot should be stateful, not stateless for this project.



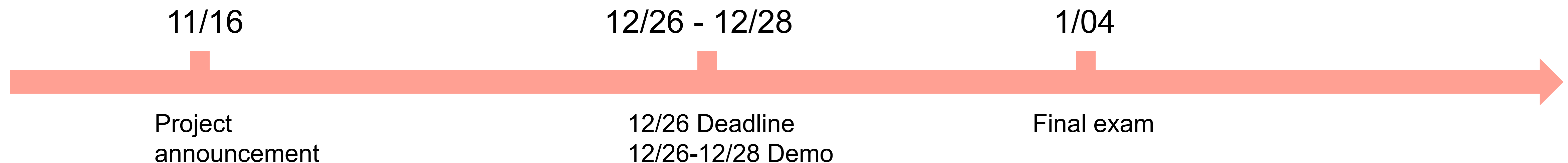
## Previous Works

- [Line Fitness](#) - 黃政瑋
- [Daily-NBA](#) - 周鼎軒
- [Currency Related](#) - 葉家彥

# Project Outline

- Project timeline
- Project roadmap
- Sample code
- Grading
- Documentation and Tutorial
- Reference
- Precautions

1. Project announcement (2022-11-16)
2. Fill in **Github repo** for grading (Google Forms)  
**Deadline (2022-12-26)**
  - Grading is based on the latest commit before deadline
4. Demo reservation (Google Forms)
5. On site demo





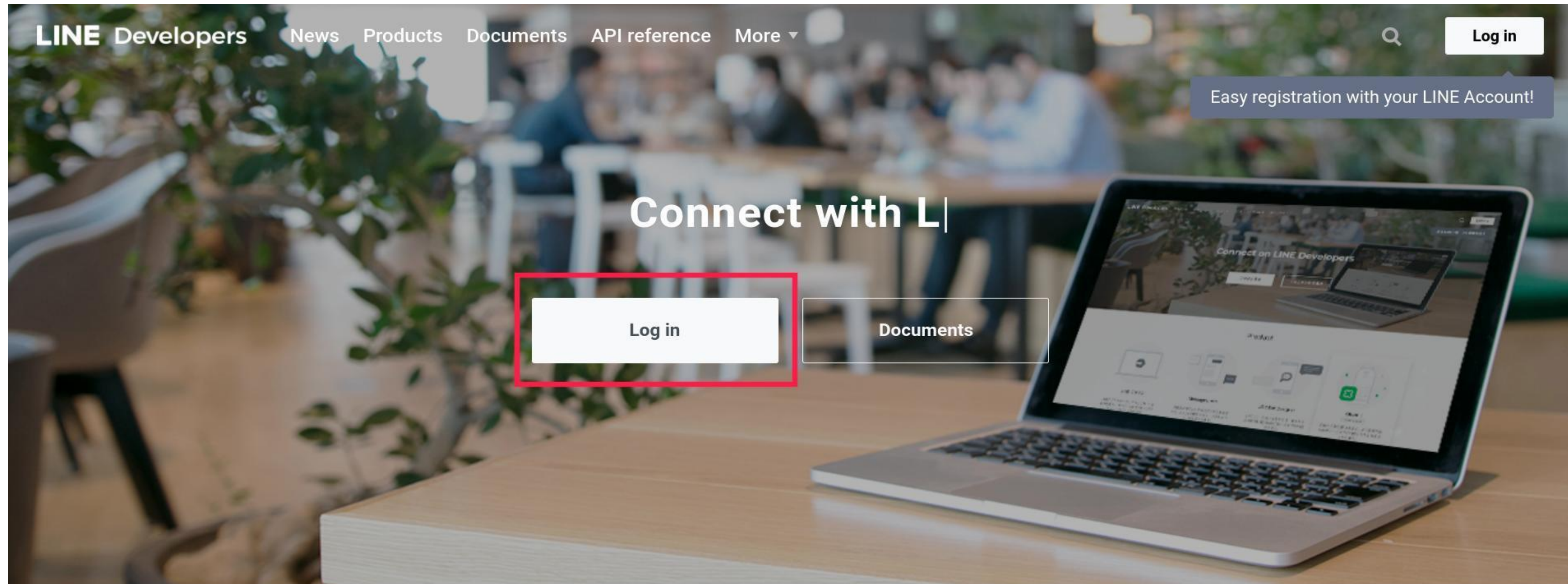
1. Have Python installed
2. Become a LINE developer
  - Create LINE Bot channel
  - Obtain access token and key
3. Build a simple server (Bot server)
4. Binding LINE bot
5. Test and develop
  - Read read read the docs!
6. Deploy
7. Show your work

## [Python installation guide](#)

Suggestion:

- Use pipenv or virtualenv to create your python environment

[Register and Login!](#)



**Products**



LINE account

## LINE Business ID

使用LINE帳號登入

或

使用商用帳號登入

建立帳號

使用LINE商用ID須遵從服務條款等規定，登入後即視為您同意相關條款內容。

[? 關於LINE商用ID](#)

繁體中文 ▾

[Help](#) [服務條款](#) © LINE Corporation

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Providers (2)

Create

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Provider	Role
Notifier	Admin
TOC-TA	Admin

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English



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Providers (2) Create

Create a new provider

Your desired name

Provider name ⓘ計理助教

✓ Don't leave this empty

✓ Don't use special characters (4-byte Unicode)

✓ Enter no more than 100 characters

Create

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This provider doesn't have any channels yet

To create one, choose a channel type below

Create a LINE Login channel

Create a Messaging API channel

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Create a channel

Fill in the blank

Channel type

Messaging API

Don't leave this empty

Provider

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Don't leave this empty

Channel icon

optional

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After channel creation, on Basic Setting, issue channel secret

The screenshot shows the LINE Developers console interface. The top navigation bar includes links for Products, Documents, API reference, News, FAQ, Community, and Blog. The left sidebar contains a 'Console home' section with a 'Providers' link, a search bar, and a list of providers including Admin, Notifier, TOC-TA, and 計理助教. Below this is a 'Tools' section with a 'Support' link. The main content area displays the 'Channel secret' section, which includes a table with columns for 'App types' (Bot) and 'Permissions' (PROFILE). The 'Channel secret' row shows a masked secret value and an 'Issue' button, which is highlighted with a red box. Below this, the 'Assertion Signing Key' section also features an 'Issue' button. The footer contains copyright information for LINE Corporation, links to terms and policies, and a language selector set to English.

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TOP > 計理助教 > Testing

optional Edit

App types Bot

Permissions ? PROFILE

Channel secret ? [masked] Issue

Assertion Signing Key ? Issue

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On messaging API settings, at the button, gather channel access token

The screenshot shows the LINE Developers console interface. The top navigation bar includes links for Products, Documents, API reference, News, FAQ, Community, and Blog. The left sidebar contains links for Console home, Providers (highlighted in green), Admin, Notifier, TOC-TA, 計理助教, Tools, and Support. The main content area displays the Messaging API settings for the 計理助教 channel. It includes sections for Auto-reply messages (Enabled) and Greeting messages (Enabled), each with an Edit button. The 'Channel access token' section is highlighted with a red box and contains the text 'Channel access token (long-lived)' and an 'Issue' button. The footer includes copyright information for LINE Corporation and links to Terms and policies, About trademarks, and an inquiry form. There are also dropdown menus for Family sites and English.

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TOP > 計理助教 > Testing > Messaging API

**Auto-reply messages** Enabled [Edit](#)

**Greeting messages** Enabled [Edit](#)

**Channel access token**

Channel access token (long-lived)

[Issue](#)

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Building a HTTP Server

- GET
- POST
- PUT
- DELETE

Choose a framework (Python)

- Flask
- Django
- Fastapi

Use FSM tools (pip install transitions) to build response logic

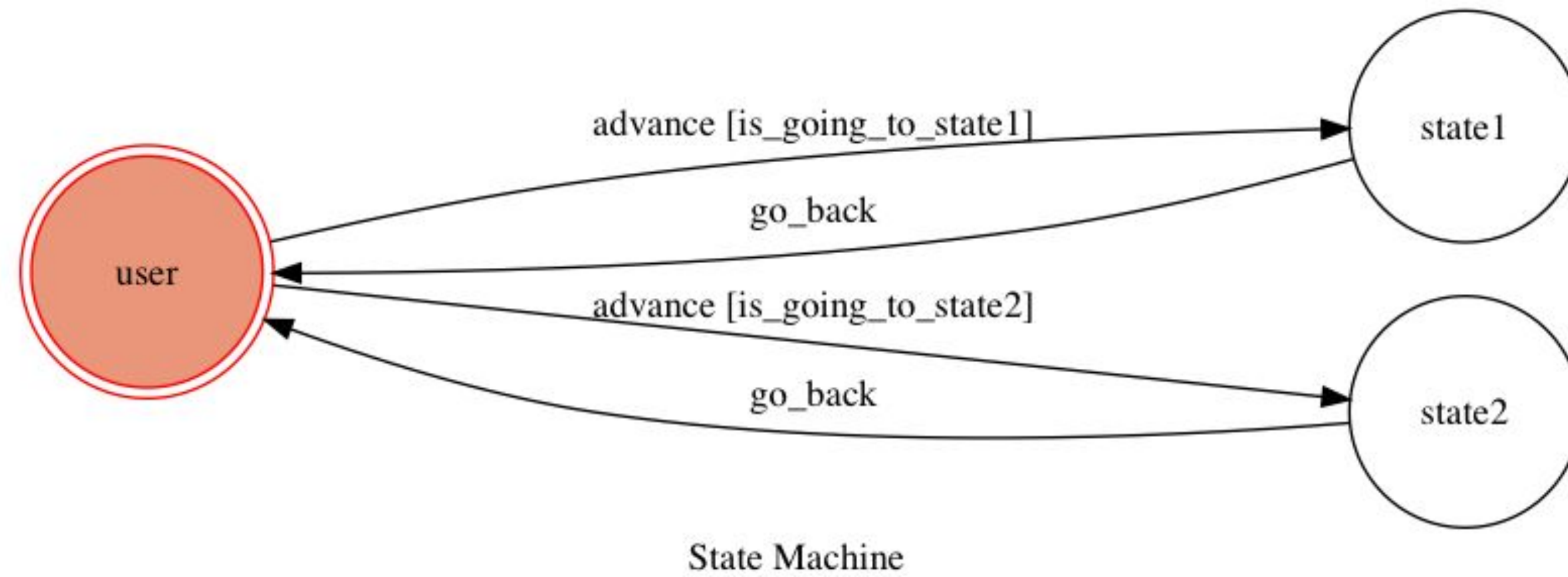
Sample Code



<https://github.com/NCKU-CCS/TOC-Project-2020>

# Building the Bot Server - FSM Graph

FSM graph for sample code.



# Writing a HTTP server - Overview

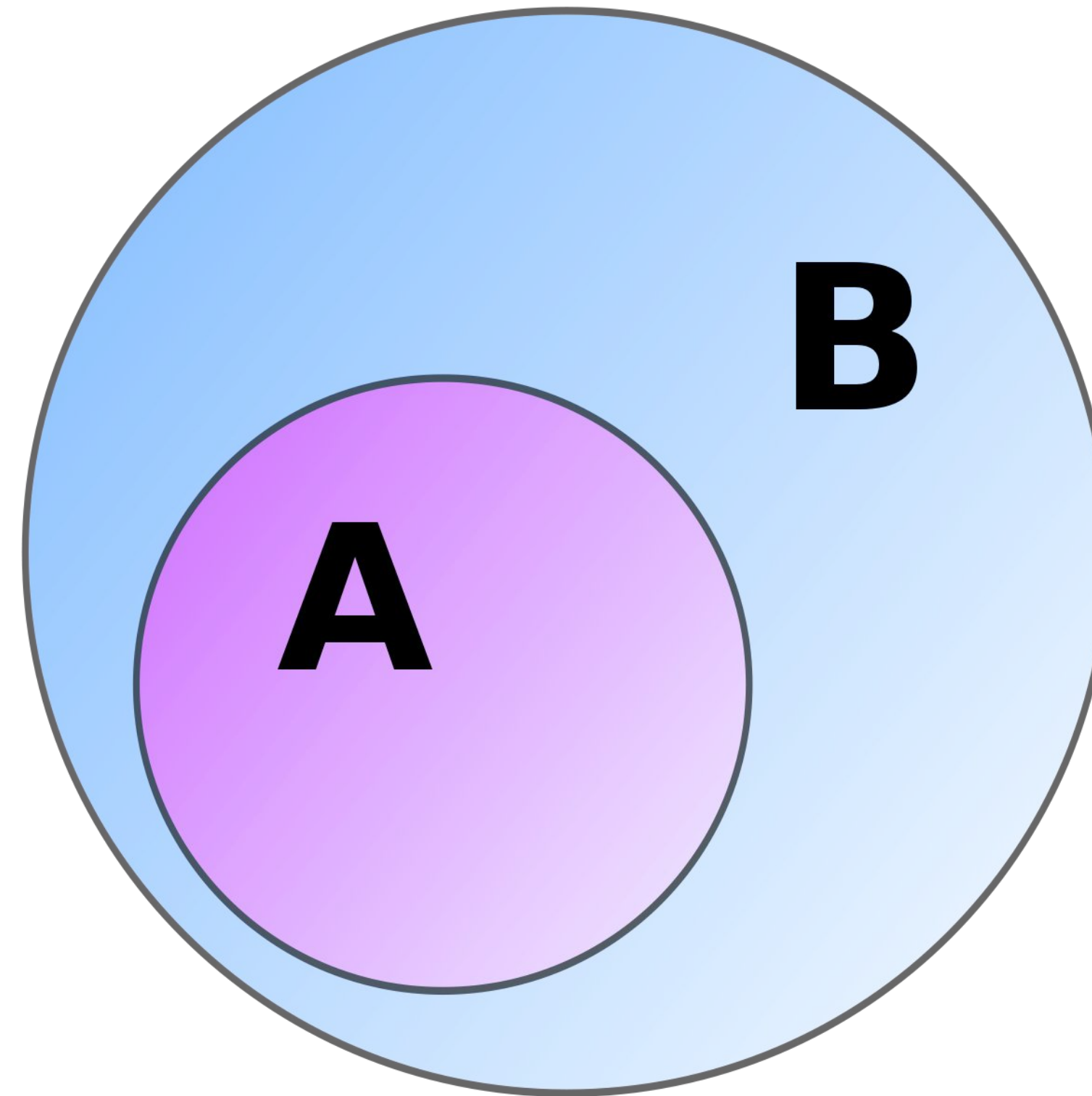
img
.env.sample
.gitignore
Aptfile
Pipfile
Pipfile.lock
Procfile
README.md
app.py
fsm.png
fsm.py
requirements.txt
utils.py

## Flask server overview

- app.py - main file
- fsm.py - file handles fsm logic
- .env - file stores environment variable
- utils.py - helper function

Best practice for writing python project is to develop your code under an enclosed environment.

- virtualenv
- poetry
- pipenv - [tutorial](#)



B - denoted as system python environment

A - denoted as project-level python environment



## Writing a HTTP server - LINE Token

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To make Bot Server able to communicate with your channel, you need to set `LINE_CHANNEL_SECRET` and `LINE_CHANNEL_ACCESS_TOKEN` to your server environment, so the app have right permission to interact with your channel.

`LINE_CHANNEL_SECRET`, `LINE_CHANNEL_ACCESS_TOKEN` are obtained from previous steps (LINE channel creation)

master

TOC-Project-2020 / .env.sample

Go to file

...

ttw225 feat(.env.sample): add sample environment settings

Latest commit 1bceb1e on Oct 30, 2019

History

1 contributor

3 lines (3 sloc) | 261 Bytes

Edit on HackMD

Raw

Blame


```
1 LINE_CHANNEL_SECRET=e5x5p5npkqjf9328if4y0v83v9hntxz6
2 LINE_CHANNEL_ACCESS_TOKEN=Eox935kn7K0GcGf49MkjXYgXlpVBcnKmt1tCy4XpQ8vjcriETIcRsD6sSRYicG9Yw2t5CPXoriBFahXT65T7ZzXAH4iVPbQYQ9GD4Kw50HPK0JKW2FVQjxBEunGMmND/bfDiSkI
3 PORT=8000
```

# Writing a HTTP server - Utils

25

utils.py - SDK for line message API

master [TOC-Project-2020 / utils.py](#) / <> Jump to ▾

 **ttw225** feat(TOC-Demo): well done

🔍 1 contributor

23 lines (14 sloc) | 488 Bytes

```
1  import os
2
3  from linebot import LineBotApi, WebhookParser
4  from linebot.models import MessageEvent, TextMessage, TextSendMessage
5
6
7  channel_access_token = os.getenv("LINE_CHANNEL_ACCESS_TOKEN", None)
8
9
10 def send_text_message(reply_token, text):
11     line_bot_api = LineBotApi(channel_access_token)
12     line_bot_api.reply_message(reply_token, TextSendMessage(text=text))
13
14     return "OK"
15
16
17 """
18 def send_image_url(id, img_url):
19     pass
20
21 def send_button_message(id, text, buttons):
22     pass
23 """
```

# Writing a HTTP server - FSM

26

fsm.py - building the fsm for LINE text message

master TOC-Project-2020 / fsm.py / <> Jump to

ttw225 feat(TOC-Demo): well done

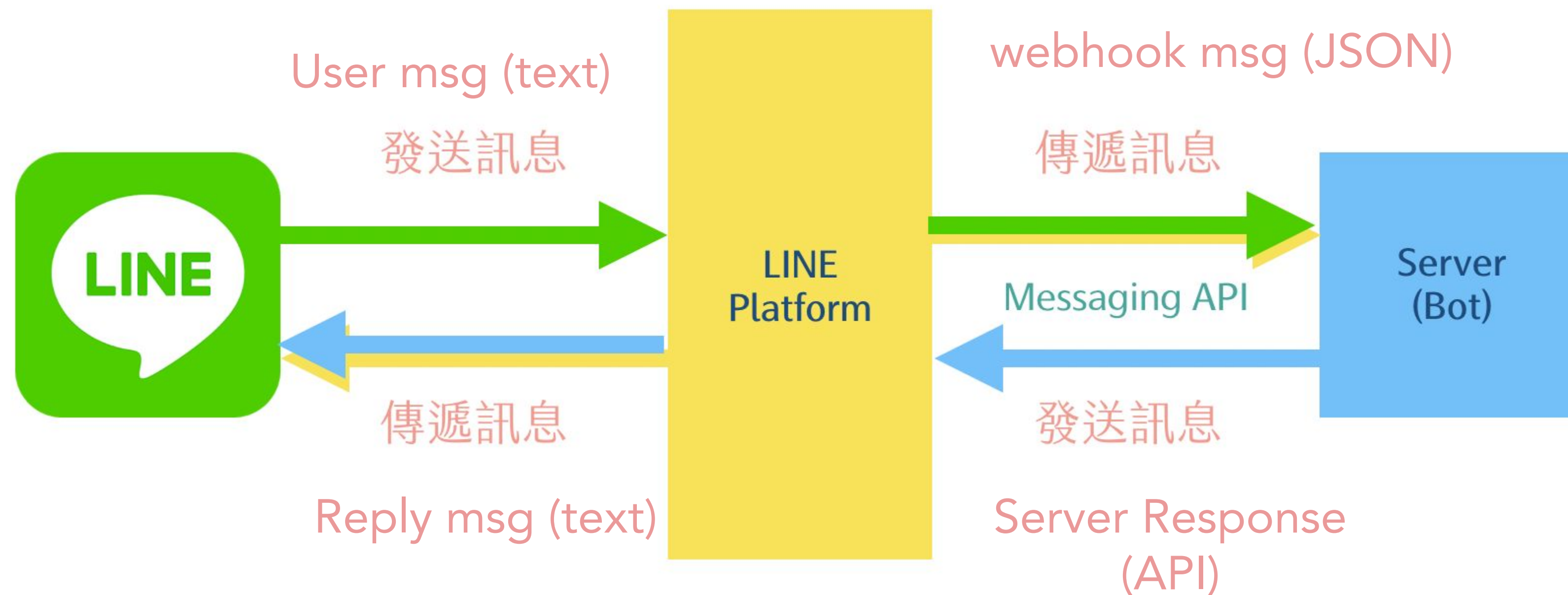
1 contributor

36 lines (25 sloc) 993 Bytes

```
1 from transitions.extensions import GraphMachine
2
3 from utils import send_text_message
4
5
6 class TocMachine(GraphMachine):
7     def __init__(self, **machine_configs):
8         self.machine = GraphMachine(model=self, **machine_configs)
9
10    def is_going_to_state1(self, event):
11        text = event.message.text
12        return text.lower() == "go to state1"
13
14    def is_going_to_state2(self, event):
15        text = event.message.text
16        return text.lower() == "go to state2"
17
18    def on_enter_state1(self, event):
19        print("I'm entering state1")
20
21        reply_token = event.reply_token
22        send_text_message(reply_token, "Trigger state1")
23        self.go_back()
```



Below shows API call underneath the system. Main work of this project is to build the Server (bot).



## ▶ Writing a HTTP server - Clone & Trace

28

1. Clone the project
2. Build environment
3. Trace the code
4. [Refer the official documentation](#)
5. Extend your bot



## ▶ Test server locally

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[ngrok](#) - secure introspectable tunnels to localhost

- Map your `localhost:8000` to `https domain`

Extra reference:

[ngrok reference](#)

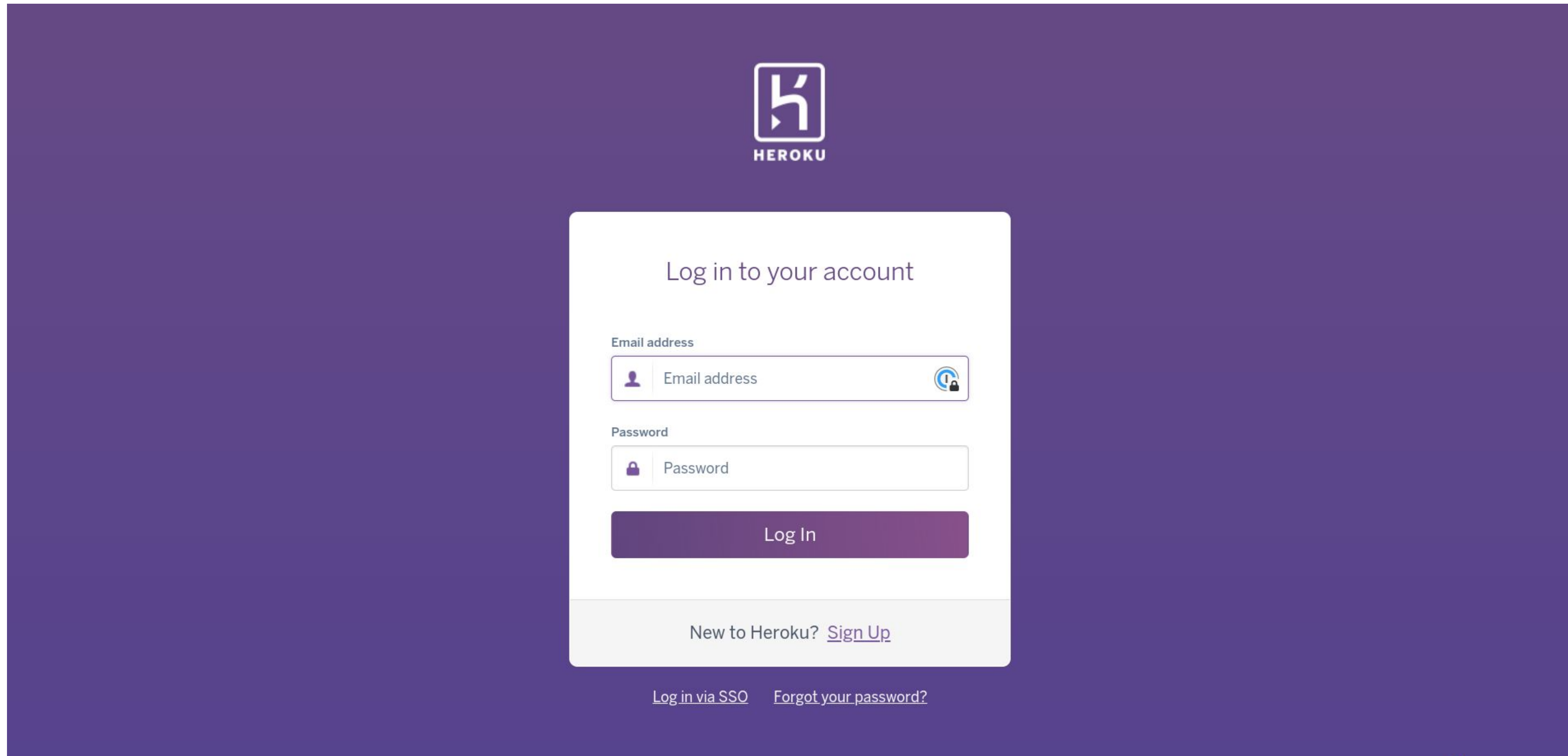
Web deployment is the process of deploying the code (html, css, javascript and server code) from source control or source artifacts to a hosting platform. This is usually in the cloud or on a local server.

## Method and Choice

- A local machine with public static IP
- Ngrok (Basic)

# Deploy with Heroku

Register Heroku and create an app



The image shows the Heroku login page. At the top center is the Heroku logo, which consists of a stylized 'h' inside a square, with the word 'HEROKU' underneath. Below the logo is a white rectangular box with rounded corners. Inside this box, the text 'Log in to your account' is centered. Below this text are two input fields. The first field is labeled 'Email address' and contains a placeholder 'Email address'. The second field is labeled 'Password' and contains a placeholder 'Password'. Below these fields is a purple button with the text 'Log In'. At the bottom of the white box, there is a link that says 'New to Heroku? Sign Up'. Below the white box, there are two links: 'Log in via SSO' and 'Forgot your password?'.

HEROKU

Log in to your account

Email address

Email address

Password

Password

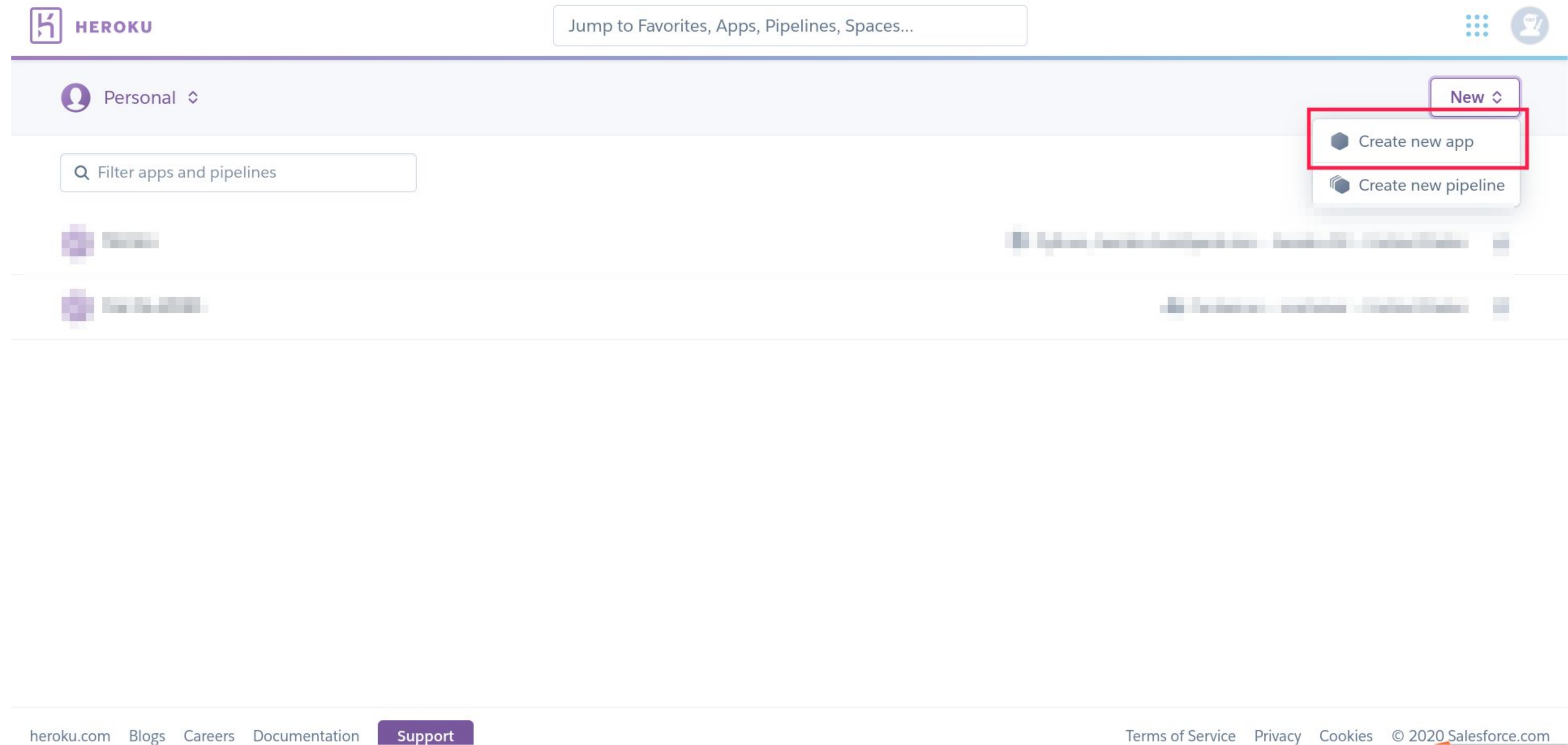
Log In

New to Heroku? [Sign Up](#)


[Log in via SSO](#) [Forgot your password?](#)

# Deploy with Heroku



Register Heroku and create an app



Fill in app name



Jump to Favorites, Apps, Pipelines, Spaces...





Create New App

App name

app-name

Choose a region

 United States

 Add to pipeline...

Create app

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## [Install Heroku-Cli](#)

### macOS

```
$ brew tap heroku/brew && brew install heroku
```

### Windows

Download the appropriate installer for your Windows installation:

64-bit installer

32-bit installer

### Ubuntu 16+

Run the following from your terminal:

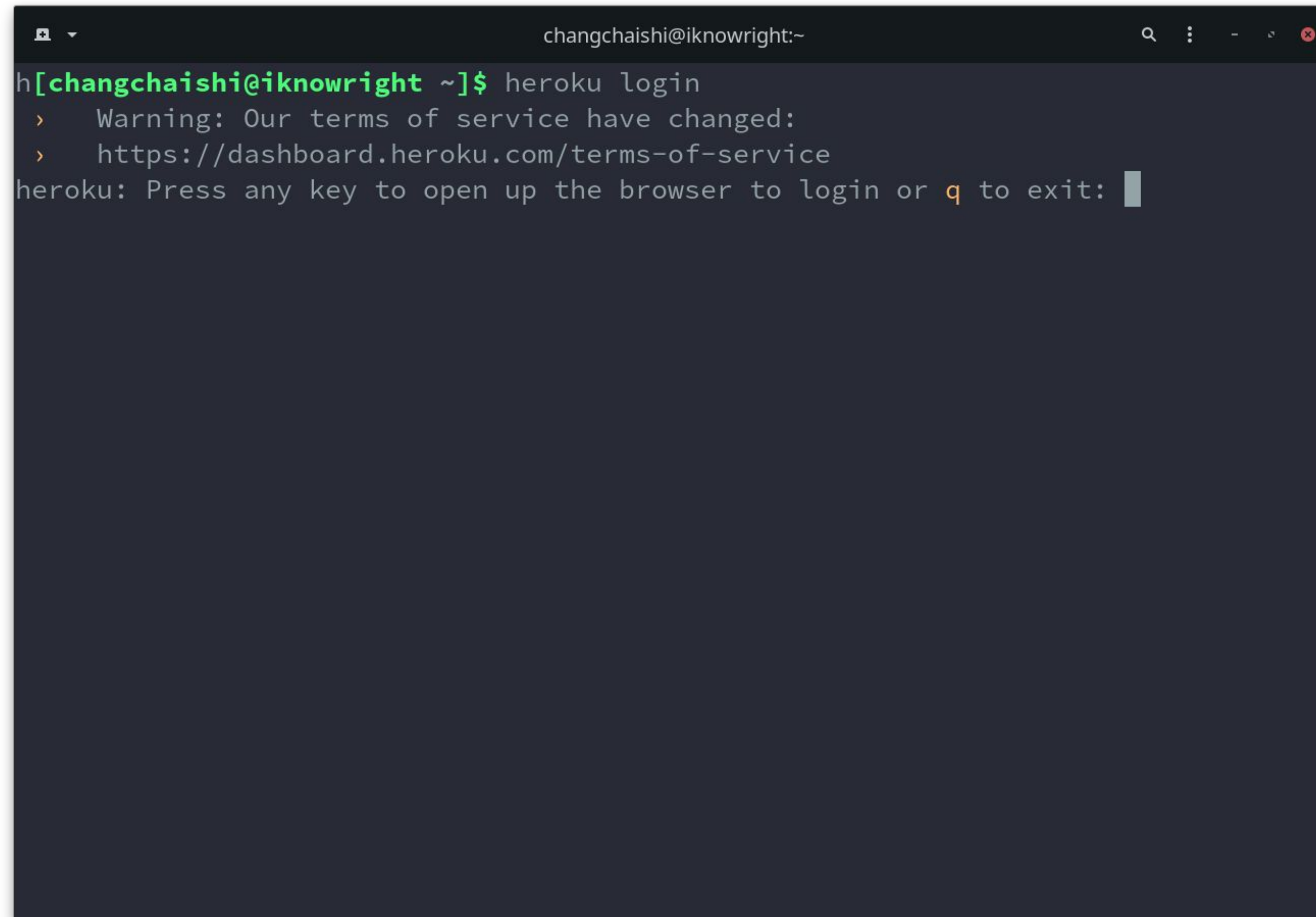
```
$ sudo snap install --classic heroku
```

[Snap is available on other Linux OS's as well.](#)

## Deploy with Heroku

Login Heroku-Cli (Terminal depends on your OS)

- Terminal will redirect you to browser-login

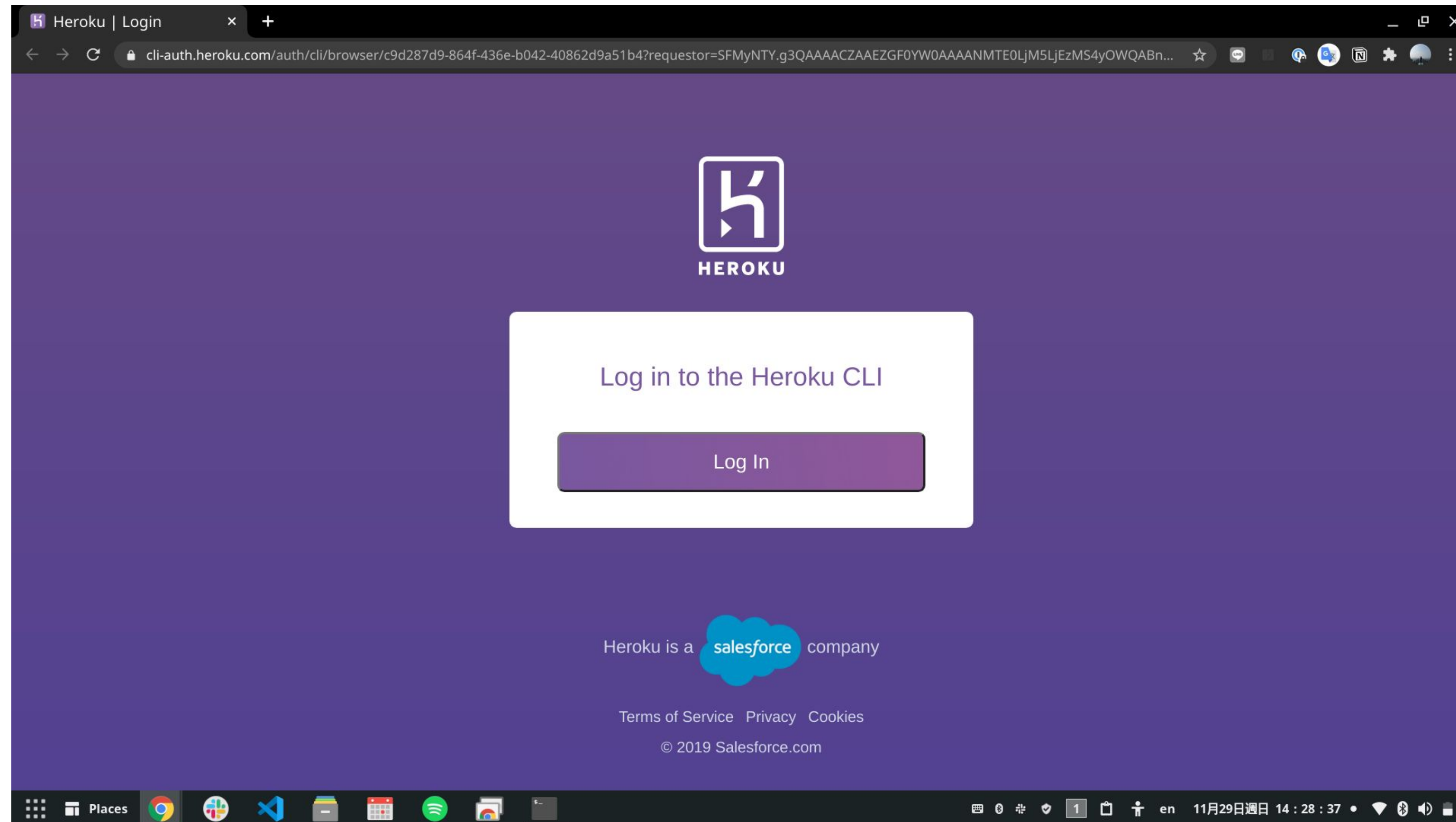
A terminal window with a dark background and light green text. The window title bar shows 'changchaishi@iknowright:~'. The prompt is 'h[changchaishi@iknowright ~]\$'. The user has entered 'heroku login'. The output shows a warning about updated terms of service with a link to 'https://dashboard.heroku.com/terms-of-service'. It then prompts the user to 'Press any key to open up the browser to login or q to exit:'.

```
changchaishi@iknowright:~  
h[changchaishi@iknowright ~]$ heroku login  
> Warning: Our terms of service have changed:  
> https://dashboard.heroku.com/terms-of-service  
heroku: Press any key to open up the browser to login or q to exit:
```

# Deploy with Heroku

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- Login Heroku-Cli (Terminal depends on your OS)
- Terminal will redirect you to browser-login



## Deploy with Heroku

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- Back to the CLI, you can see the logged in info.

```
changchaishi@iknowright:~  
h[changchaishi@iknowright ~]$ heroku login  
  > Warning: Our terms of service have changed:  
  > https://dashboard.heroku.com/terms-of-service  
heroku: Press any key to open up the browser to login or q to exit:  
Opening browser to https://cli-auth.heroku.com/auth/cli/browser/c9d287d9-864f-43  
6e-b042-40862d9a51b4?requestor=SFMyNTY.g3QAAACZAAEZGF0YW0AAAANMTE0LjM5LjEzMS4yO  
WQABnNpZ25lZG4GAB4hsBJ2AQ.BV7qi4DAoiBUxYLY8sJXB1xn0sZko1cnHBTNfuDP70Y  
Logging in... done  
Logged in as changchaishi@gmail.com  
[changchaishi@iknowright ~]$
```

## Using Git:

- What is git? Version control system
- Difference between git and github
- Local vs Remote
- Github vs Gitlab vs Heroku

## Heroku: you can choose between

- Github
- Heroku
- Docker registry



Heroku Git  
Use Heroku CLI



GitHub  
Connected



Container Registry  
Use Heroku CLI



```
[/your_project_dir] $ heroku git:remote -a {HEROKU_APP_NAME}
```

```
[/your_project_dir] $ git add .
```

```
[/your_project_dir] $ git commit -m "commit msg"
```

```
[/your_project_dir] $ git push -f heroku master
```

```
[/your_project_dir] $ Heroku logs --tail -a {HEROKU_APP_NAME}
```

After pushing your code to heroku, heroku will automatically build your app, use heroku cli to check build logs

# Binding Deployed APP to Line Console

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Tell Line which webhook url to POST. (Your server url).

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Webhook settings

Webhook URL ?https://toc-ta-2021.herokuapp.com/

VerifyEdit

Use webhook ?☒

LINE Official Account features

Edit the message text and other settings for these features in the LINE Official Account Manager

- Basic (60%)
- Present (10%)
- Functionality (10%)
- Creativity (10%)
- Bonus (5~10%)

- Able to show or generate FSM Diagram
- Bot running properly
- At least 4 states for FSM
- More than 3 transactions departing from initial state

- Demo Smoothness
- Documentation (README and etc.)
- Illustration



- State complexity (Not amount of states)
  - Transition continuity
  - Transition correctness
  - Notice that the design of state structure not to be redundant
- CRUD (create read update delete)

LineBot genre, theme :

- Sports
- Game
- Service
- News
- Techs
- Tools

- Deploy
  - AWS - Amazon Web Service
  - Heroku - PaaS (Platform as a service)
  - Microsoft Azure
  - GCP - Google cloud platform
- Extra functionality or technics
  - Line API
  - image/sound/video
  - Web crawling
  - Machine learning
  - Blockchain
  - Others

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[Line Developer 註冊](#)

[LINE 開發環境](#)

[Heroku](#)

[LineBot + python + Heroku](#)

[ngrok](#)



Bot Platform: Line (exclusively)

Programming Language / Framework: Unrestricted

- Python
- node.js
- golang
- anything else that supports FSM graph

## LINE

- Line Reply Token - can only reply once
- Line Bot (Free ver.) - friend limit: 50 people

## Heroku

- Heroku - dyno will be in sleep mode when no activities found in the server

主旨:[Final Project] 簡述遇到的問題

內文:

- 姓名學號:
- 系統環境:
- 系統版本:
- 套件版本:
- 在哪一個步驟遇到的問題:
- 詳述問題:
- 完整的錯誤訊息:
- 已經試過的解決方法:
- 在這個問題上已經花費的時間:

[2018 FAQ](#)

Thanks