파이썬 웹 크롤링

강사 장철원

Section 0

목차

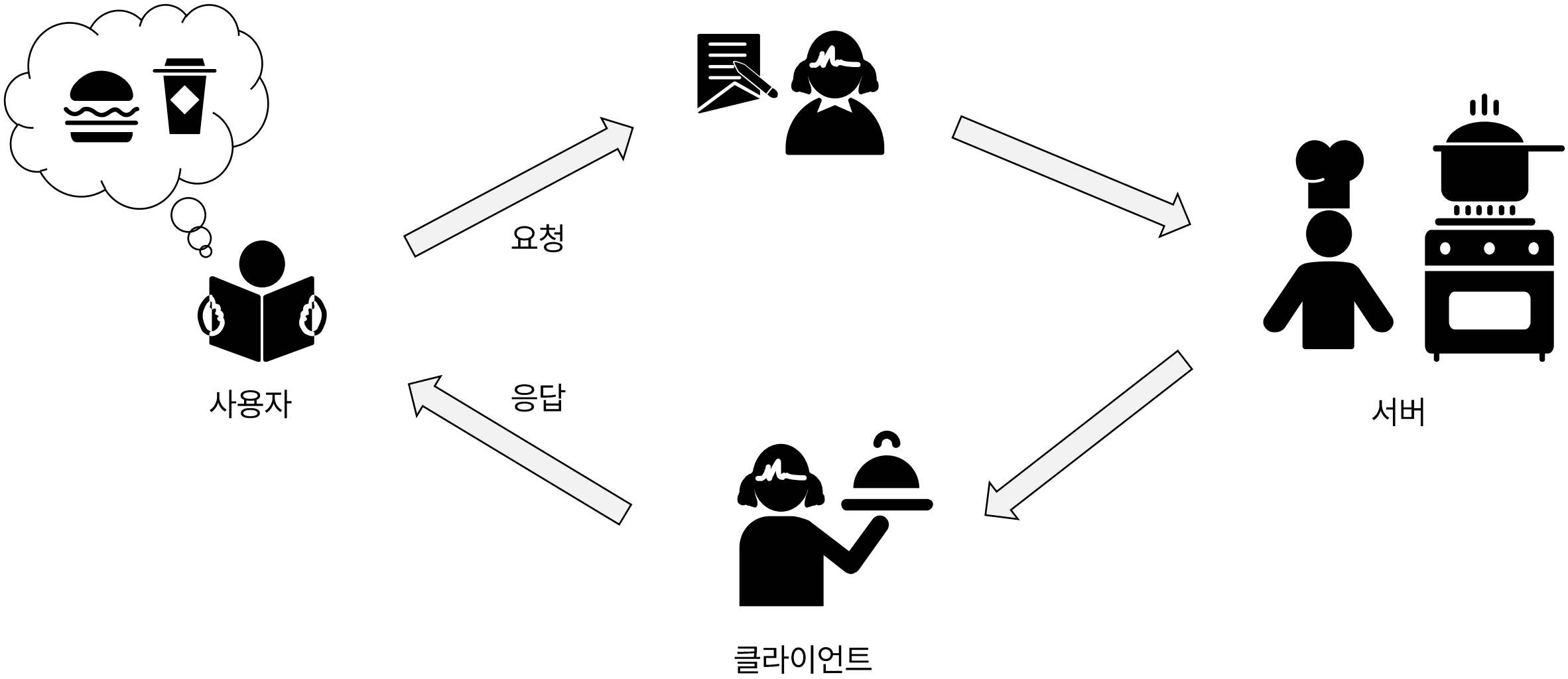
❑ API를 활용한 날씨 데이터 크롤링하기

파이썬 웹 크롤링

Section 1. 날씨 데이터 크롤링

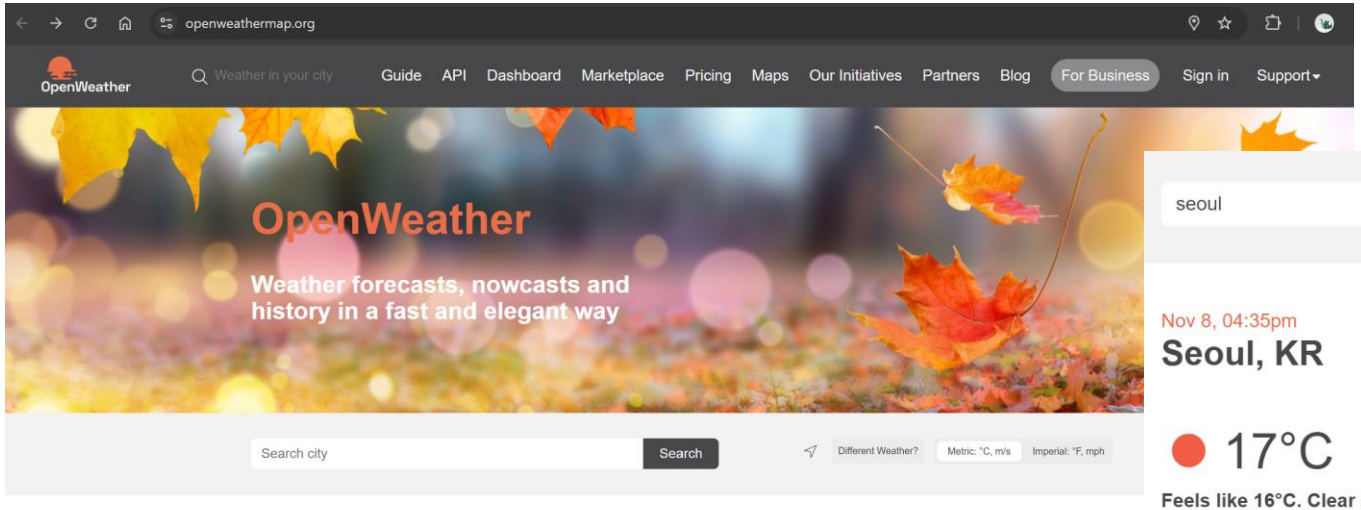
Section 1-1. 크롤링 웹 사이트 확인

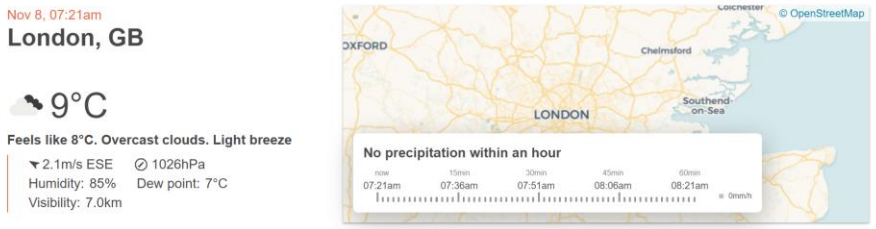
API(Application Programming Interface)

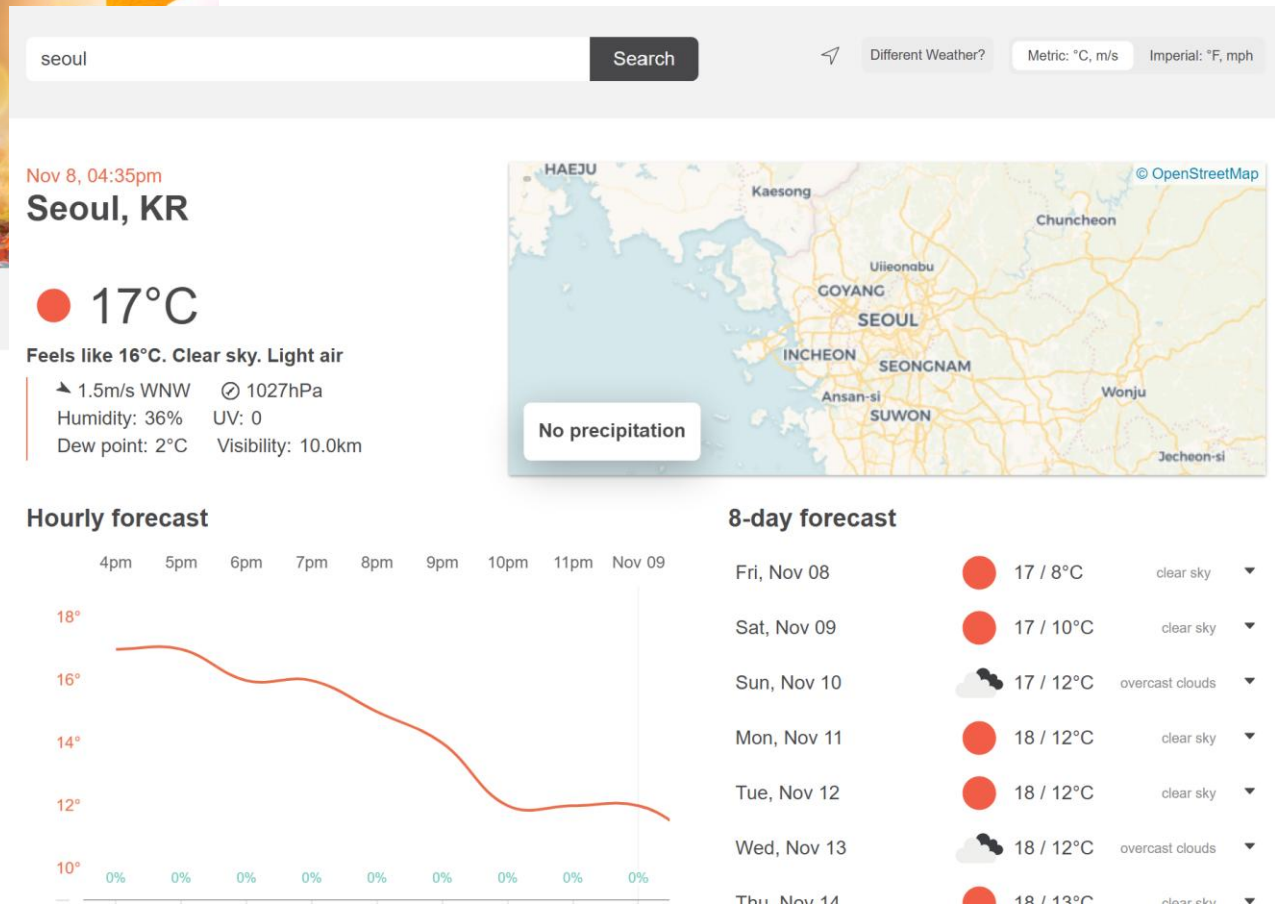


Section
크롤링웹사이트확인

크롤링 개요 https://openweathermap.org/



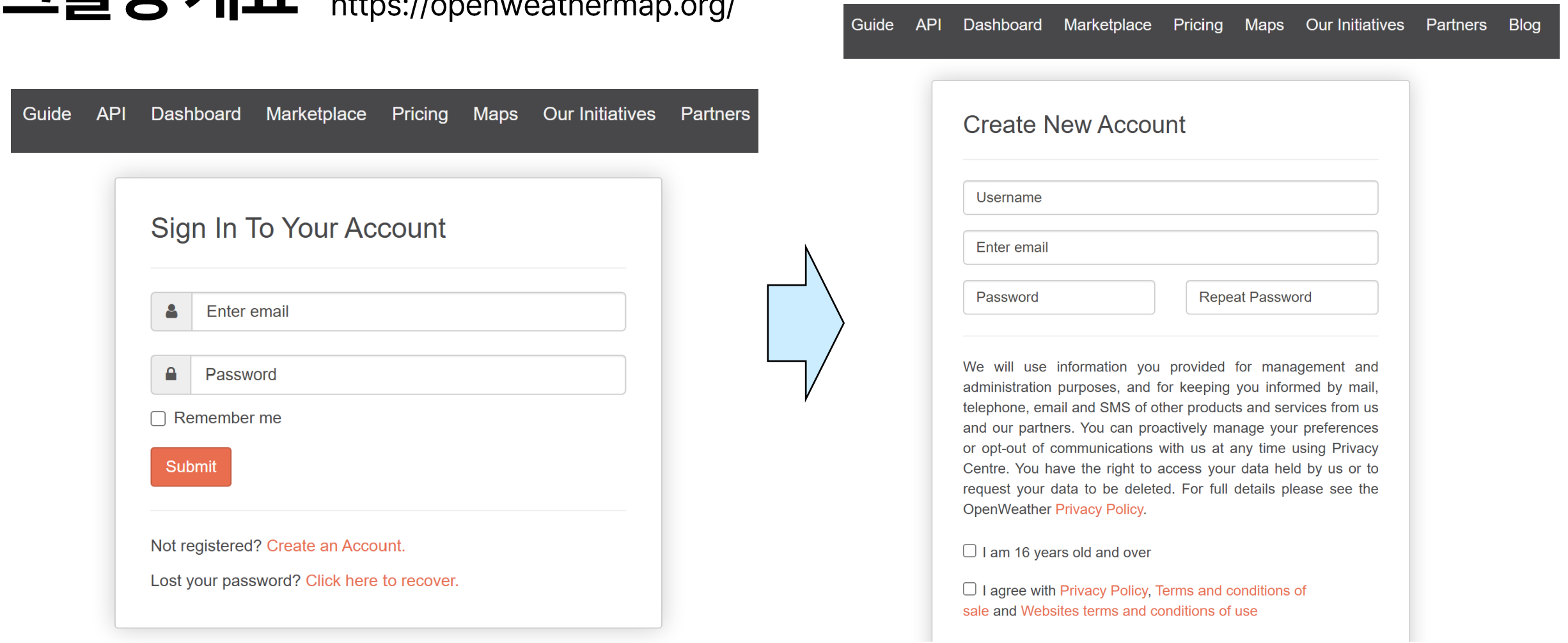




Section
크롤링웹사이트확인

크롤링 개요

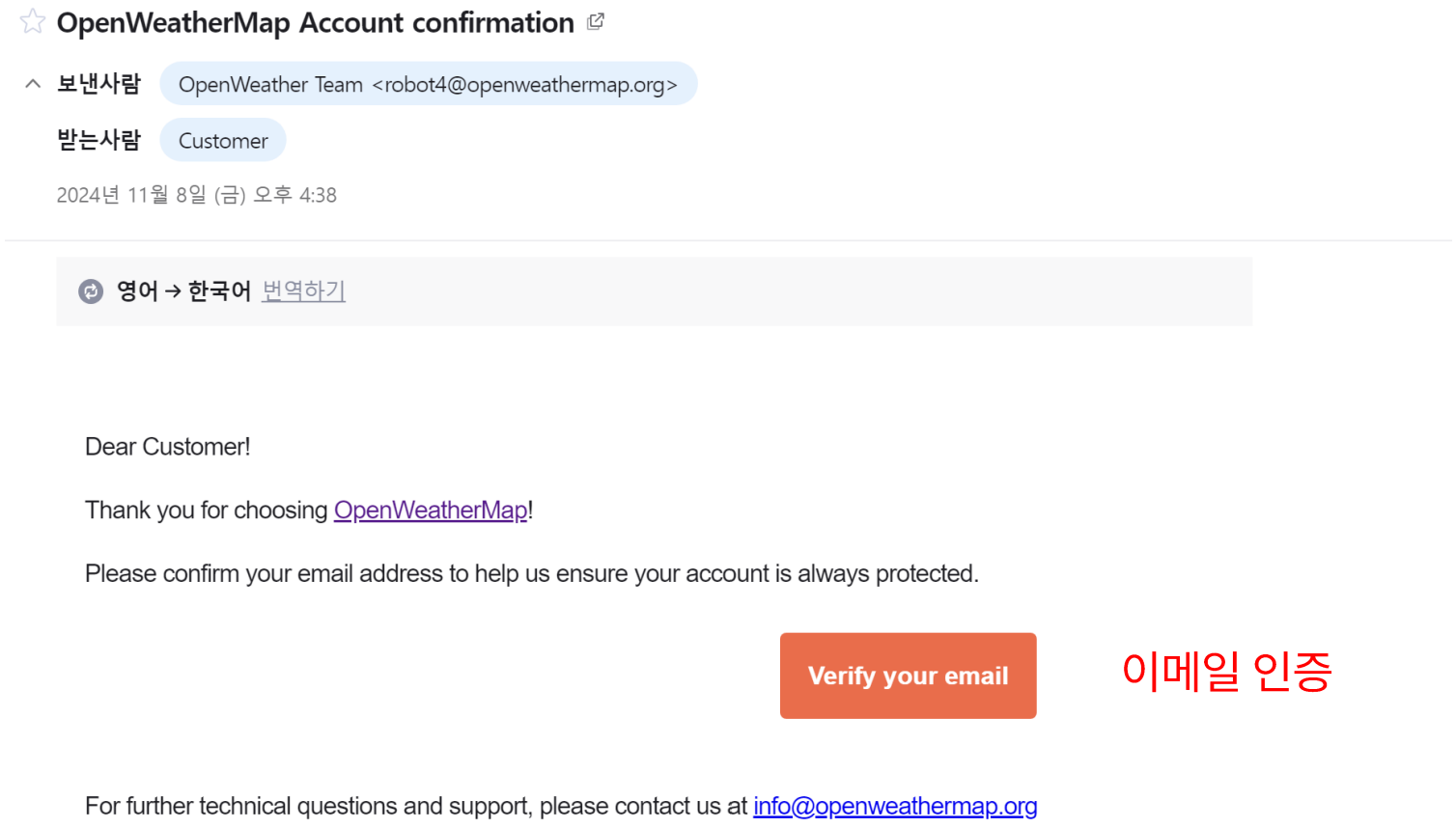
https://openweathermap.org/



Section

크롤링웹사이트확인

크롤링 개요 https://openweathermap.org/



OpenWeatherMap Account confirmation

보낸사람 OpenWeather Team <robot4@openweathermap.org>

받는사람 Customer

2024년 11월 8일 (금) 오후 4:38

영어 → 한국어 번역하기

Dear Customer!

Thank you for choosing OpenWeatherMap!

Please confirm your email address to help us ensure your account is always protected.

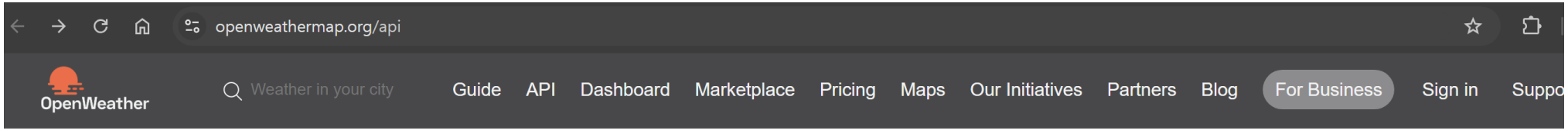
Verify your email

이메일 인증

For further technical questions and support, please contact us at info@openweathermap.org

Section
크롤링웹사이트확인

크롤링 개요 https://openweathermap.org/api



Weather API

Home / Weather API

Please, sign up to use our fast and easy-to-work weather APIs. As a start to use OpenWeather products, we recommend our One Call API 3.0. For more functionality, please consider our products, which are included in professional collections.

One Call API 3.0

API doc Subscribe

Make an API call to receive access to the various data:

- **Current weather and forecasts:**
  - minute forecast for 1 hour
  - hourly forecast for 48 hours
  - daily forecast for 8 days

  and government weather alerts
- **Weather data for any timestamp** for 45+ years historical archive and 4 days ahead forecast
- **Daily aggregation** of weather data for 45+ years archive and 1.5 years ahead forecast
- **Weather overview** with a human-readable weather summary for today and tomorrow's forecast

Read more about this API and subscription plan in the **FAQ**.

Pay as you call

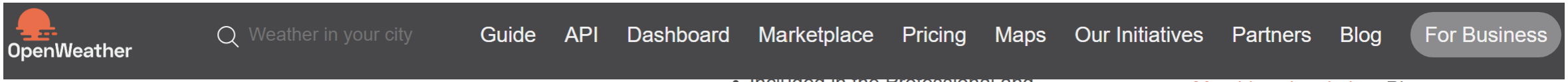
1,000 API calls per day for free
0.0012 GBP per API call over the daily limit

Subscribe

This is a separate subscription plan, which includes only One Call API.

Section
크롤링웹사이트확인

크롤링 개요 https://openweathermap.org/



- Included in the Professional and Enterprise subscription plans
- Monthly subscription. Please contact us to get access.

구독

5 Day / 3 Hour Forecast

API doc | Subscribe

- 5 day forecast for any location on the globe
- 5 day forecast with a 3-hour step
- JSON and XML formats
- Included in both free and paid subscriptions

Road Risk API

Doc | Get a quote

- Specify your route and get weather data and national alerts for the point of destination and along the route
- Current, forecast for 5 days and historical weather data for 1 year for your route
- Weather data are available for any point on the globe
- To receive information on price and get a quote, please contact us

Solar Irradiance & Energy Prediction service

Section
크롤링웹사이트확인

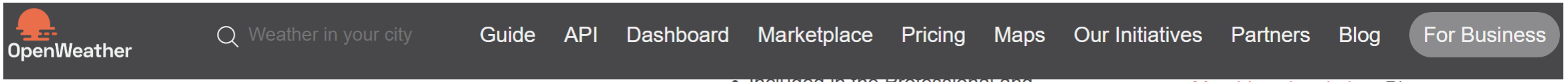
크롤링 개요 https://openweathermap.org/

Current weather and forecasts collection

Free	Startup	Developer	Professional	Enterprise
Get API key	**30 GBP**/ month Subscribe	**140 GBP**/ month Subscribe	**370 GBP**/ month Subscribe	**1500 GBP**/ month Subscribe
60 calls/minute **1,000,000 calls**/month	**600 calls**/minute **10,000,000 calls**/month	**3,000 calls**/minute **100,000,000 calls**/month	**30,000 calls**/minute **1,000,000,000 calls**/month	**200,000 calls**/minute **5,000,000,000 calls**/month
Current Weather	Current Weather	Current Weather	Current Weather	Current Weather
3-hour Forecast 5 days	3-hour Forecast 5 days	3-hour Forecast 5 days	3-hour Forecast 5 days	3-hour Forecast 5 days
Hourly Forecast 4 days	Hourly Forecast 4 days	**Hourly Forecast 4 days**	Hourly Forecast 4 days	Hourly Forecast 4 days
Daily Forecast 16 days	**Daily Forecast 16 days**	Daily Forecast 16 days	Daily Forecast 16 days	Daily Forecast 16 days
Climatic Forecast 30 days	Climatic Forecast 30 days	**Climatic Forecast 30 days**	Climatic Forecast 30 days	Climatic Forecast 30 days
Bulk Download	Bulk Download	Bulk Download	**Bulk Download (global cities)**	Bulk Download (global cities + ZIPs of US, EU, UK)

Section
크롤링웹사이트확인

크롤링 개요 https://openweathermap.org/



- Included in the Professional and Enterprise subscription plans
- Monthly subscription. Please contact us to get access.

5 Day / 3 Hour Forecast

API 문서 확인하기

API doc Subscribe

- 5 day forecast for any location on the globe
- 5 day forecast with a 3-hour step
- JSON and XML formats
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Road Risk API

Doc Get a quote

- Specify your route and get weather data and national alerts for the point of destination and along the route
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Solar Irradiance & Energy Prediction service

Section

크롤링 웹사이트 확인

크롤링 개요 https://openweathermap.org/

답장 전체답장 전달 | 삭제 스팸차단 안읽음 | 이동 더보기

받는사람 Customer

2024년 11월 8일 (금) 오후 4:41

영어 → 한국어 번역하기

Dear Customer!

Thank you for subscribing to Free OpenWeatherMap!

API 키 보관 잘하기

API key:
- Within the next couple of hours, your API key [redacted] will be activated and ready to use
- You can later create more API keys on your account page
- Please, always use your API key in each API call

Endpoint:
- Please, use the endpoint api.openweathermap.org for your API calls
- Example of API call:
api.openweathermap.org/data/2.5/weather?q=London,uk&APPID=b100918669f8c8c3a9f3f109eb9ab47a

Useful links:
- API documentation https://openweathermap.org/api
- Details of your plan https://openweathermap.org/price
- Please, note that 16-days daily forecast and History API are not available for Free subscribers

Section
크롤링웹사이트확인

크롤링 개요 https://openweathermap.org/

Coordinates by location name

How to make an API call

API call

```
http://api.openweathermap.org/geo/1.0/direct?q={city name},{state code},{country code}&limit={limit}&appid={API key}
```

Parameters

`q`	required	City name, state code (only for the US) and country code divided by comma. Please use ISO 3166 country codes.
`appid`	required	Your unique API key (you can always find it on your account page under the "API key" tab)
`limit`	optional	Number of the locations in the API response (up to 5 results can be returned in the API response)

Example of API call

```
http://api.openweathermap.org/geo/1.0/direct?q=London&limit=5&appid={API key}
```

Call 5 day / 3 hour forecast data

How to make an API call

You can search weather forecast for 5 days with data every 3 hours by geographic coordinates. All weather data can be obtained in JSON and XML formats.

API call

```
api.openweathermap.org/data/2.5/forecast?lat={lat}&lon={lon}&appid={API key}
```

Parameters

`lat`	required	Latitude. If you need the geocoder to automatic convert city names and zip-codes to geo coordinates and the other way around, please use our Geocoding API
`lon`	required	Longitude. If you need the geocoder to automatic convert city names and zip-codes to geo coordinates and the other way around, please use our Geocoding API
`appid`	required	Your unique API key (you can always find it on your account page under the "API key" tab)
`units`	optional	Units of measurement. `standard`, `metric` and `imperial` units are available. If you do not use the `units` parameter, `standard` units will be applied by default. Learn more
`mode`	optional	Response format. JSON format is used by default. To get data in

Section
크롤링 웹사이트 확인

날씨 데이터 크롤링 https://openweathermap.org/

[1]:
```
from bs4 import BeautifulSoup
from urllib.request import urlopen
```

[12]:
```
cityname = "Seoul"
limit = 3
apikey = "[redacted]"
```

[3]:
```
url_location = "http://api.openweathermap.org/geo/1.0/direct?q={}&limit={}&appid={}".format(cityname, limit, apikey)
```

[4]:
```
print(url_location)
```

```
http://api.openweathermap.org/geo/1.0/direct?q=Seoul&limit=3&appid=[redacted]
```

Section
크롤링 웹사이트확인

날씨 데이터 크롤링 https://openweathermap.org/

[5]:
```
html = urlopen(url_location)
bs_obj = BeautifulSoup(html, "html.parser")
print(bs_obj)
```


```
[{"name":"Seoul","local_names":{"ml":"സോൾ","ba":"Сеул","an":"Seúl","mk":"Сеул","my":"ဆိုးလ်မြို့","bs":"Seul","ky":"Сеул","de":"Seoul","vo":"Söul","sk":"Soul","hr":"Seul","fa":"سئول","ur":"سؤل","nl":"Seoel","kn":"ಸೌಲ್","az":"Seul","mr":"सोल","pl":"Seul","ku":"Sêûl","th":"โซล","eo":"Seulo","eu":"Seul","cv":"Сеул","uk":"Сеул","qu":"Siul","sr":"Сеул","it":"Seul","ro":"Seul","hy":"Սեուլ","os":"Сеул","el":"Σεούλ","ar":"سول","tg":"Сеул","ta":"சியோல்","bg":"Сеул","ko":"서울","ka":"სეული","tk":"Seul","kk":"Сеул","hu":"Szöul","lt":"Seulas","vi":"Seoul","ca":"Seül","be":"Сеул","uz":"Seul","bn":"সিওল","mn":"Сөул","tr":"Seul","en":"Seoul","oc":"Seol","gl":"Seúl","he":"סיאול","es":"Seúl","hi":"सियोल","fi":"Soul","is":"Seúl","lv":"Seula","km":"សេអ៊ូល","ru":"Сеул","bo":"སེའུལ་","af":"Seoel","bh":"सियोल","et":"Sõul","sl":"Seul","yi":"סעאל","ja":"ソウル","zh":"首尔市 / 首爾","fr":"Séoul","la":"Seulum","cs":"Soul","am":"ሶል","sv":"Seoul","pt":"Seul"},"lat":37.5666791,"lon":126.9782914,"country":"KR"}]
```


[44]:
```
bs_obj.text
```

[44]:

```
'[{"name":"Seoul","local_names":{"ml":"സോൾ","ba":"Сеул","an":"Seúl","mk":"Сеул","my":"ဆိုးလ်မြို့","bs":"Seul","ky":"Сеул","de":"Seoul","vo":"Söul","sk":"Soul","hr":"Seul","fa":"سئول","ur":"سؤل","nl":"Seoel","kn":"ಸೌಲ್","az":"Seul","mr":"सोल","pl":"Seul","ku":"Sêûl","th":"โซล","eo":"Seulo","eu":"Seul","cv":"Сеул","uk":"Сеул","qu":"Siul","sr":"Сеул","it":"Seul","ro":"Seul","hy":"Սեուլ","os":"Сеул","el":"Σεούλ","ar":"سول","tg":"Сеул","ta":"சியோல்","bg":"Сеул","ko":"서울","ka":"სეული","tk":"Seul","kk":"Сеул","hu":"Szöul","lt":"Seulas","vi":"Seoul","ca":"Seül","be":"Сеул","uz":"Seul","bn":"সিওল","mn":"Сөул","tr":"Seul","en":"Seoul","oc":"Seol","gl":"Seúl","he":"סיאול","es":"Seúl","hi":"सियोल","fi":"Soul","is":"Seúl","lv":"Seula","km":"សេអ៊ូល","ru":"Сеул","bo":"སེའུལ་","af":"Seoel","bh":"सियोल","et":"Sõul","sl":"Seul","yi":"סעאל","ja":"ソウル","zh":"首尔市 / 首爾","fr":"Séoul","la":"Seulum","cs":"Soul","am":"ሶል","sv":"Seoul","pt":"Seul"},"lat":37.5666791,"lon":126.9782914,"country":"KR"}]'
```


[45]:
```
len(bs_obj.text)
```

[45]:
```
988
```

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크롤링 웹사이트확인

날씨 데이터 크롤링 https://openweathermap.org/

[46]:
```
import json
```

[52]:
```
loc_list = json.loads(bs_obj.text)
```

[53]:
```
print(loc_list)
```

```
[{'name': 'Seoul', 'local_names': {'ml': 'സിയോൾ', 'ba': 'Сеул', 'an': 'Seúl', 'mk': 'Сеул', 'my': 'ဆိုးလ်မြို့', 'bs': 'Seul', 'ky': 'Сеул', 'de': 'Seoul',
'vo': 'Söul', 'sk': 'Soul', 'hr': 'Seul', 'fa': 'سئول', 'ur': 'سؤل', 'nl': 'Seoel', 'kn': 'ಸೌಲ್', 'az': 'Seul', 'mr': 'सोल', 'pl': 'Seul', 'ku': 'Sêû
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ል', 'sv': 'Seoul', 'pt': 'Seul'}, 'lat': 37.5666791, 'lon': 126.9782914, 'country': 'KR'}]
```

[54]:
```
type(loc_list)
```

[54]:
```
list
```

[55]:
```
len(loc_list)
```

[55]:
```
1
```

Section
크롤링 웹사이트확인

날씨 데이터 크롤링 https://openweathermap.org/

[57]:
```
print(loc_list[0])
```

```
{'name': 'Seoul', 'local_names': {'ml': 'സിയോൾ', 'ba': 'Сеул', 'an': 'Seúl', 'mk': 'Сеул'
'vo': 'Söul', 'sk': 'Soul', 'hr': 'Seul', 'fa': 'سئول', 'ur': 'سؤل', 'nl': 'Seoel', 'kn':
l', 'th': 'โซล', 'eo': 'Seulo', 'eu': 'Seul', 'cv': 'Сеул', 'uk': 'Сеул', 'qu': 'Siul', 's
'Сеул', 'el': 'Σεούλ', 'ar': 'سول', 'tg': 'Сеул', 'ta': 'சியோல்', 'bg': 'Сеул', 'ko': '서
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l': 'Seúl', 'he': 'סיאול', 'es': 'Seúl', 'hi': 'सियोल', 'fi': 'Soul', 'is': 'Seúl', 'lv':
l', 'bh': 'सियोल', 'et': 'Sõul', 'sl': 'Seul', 'yi': 'סעאל', 'ja': 'ソウル', 'zh': '首尔市 ,
ź', 'sv': 'Seoul', 'pt': 'Seul'}, 'lat': 37.5666791, 'lon': 126.9782914, 'country': 'KR'}
```

[58]:
```
print(loc_list[1])
```

```
---------------------------------------------------------------------------
IndexError                                Traceback (most recent call last)
Cell In[58], line 1
----> 1 print(loc_list[1])

IndexError: list index out of range
```

[59]:
```
type(loc_list[0])
```

[59]:
```
dict
```

[60]:
```
loc_list[0]['lat']
```

[60]:
```
37.5666791
```

[62]:
```
loc_list[0]['lon']
```

[62]:
```
126.9782914
```

Section
크롤링 웹사이트확인

날씨 데이터 크롤링 https://openweathermap.org/

[63]:
```
lat = loc_list[0]['lat']
lon = loc_list[0]['lon']
```

[64]:
```
url_history = "http://api.openweathermap.org/data/2.5/forecast?lat={}&lon={}&appid={}".format(lat, lon, apikey)
```

[65]:
```
html2 = urlopen(url_history)
bs_obj2 = BeautifulSoup(html2, "html.parser")
print(bs_obj2)
```


```
{"cod":"200","message":0,"cnt":40,"list":[{"dt":1731218400,"main":{"temp":292.38,"feels_like":291.66,"temp_min"
2,"sea_level":1022,"grnd_level":1015,"humidity":50,"temp_kf":1.01},"weather":[{"id":801,"main":"Clouds","descri
s":{"all":24},"wind":{"speed":1.75,"deg":307,"gust":2.18},"visibility":10000,"pop":0,"sys":{"pod":"d"},"dt_txt"
0,"main":{"temp":291.05,"feels_like":290.15,"temp_min":290.13,"temp_max":291.05,"pressure":1022,"sea_level":102
f":0.92},"weather":[{"id":800,"main":"Clear","description":"clear sky","icon":"01n"}],"clouds":{"all":2},"wind"
ibility":10000,"pop":0,"sys":{"pod":"n"},"dt_txt":"2024-11-10 09:00:00"},{"dt":1731240000,"main":{"temp":288.51
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y","icon":"01n"}],"clouds":{"all":2},"wind":{"speed":1.15,"deg":319,"gust":1.45},"visibility":10000,"pop":0,"sy
00"},{"dt":1731250800,"main":{"temp":287.44,"feels_like":286.2,"temp_min":287.44,"temp_max":287.44,"pressure":1
midity":49,"temp_kf":0},"weather":[{"id":800,"main":"Clear","description":"clear sky","icon":"01n"}],"clouds":{
ust":1.25},"visibility":10000,"pop":0,"sys":{"pod":"n"},"dt_txt":"2024-11-10 15:00:00"},{"dt":1731261600,"main"
min":286.51,"temp_max":286.51,"pressure":1022,"sea_level":1022,"grnd_level":1015,"humidity":49,"temp_kf":0},"we
```
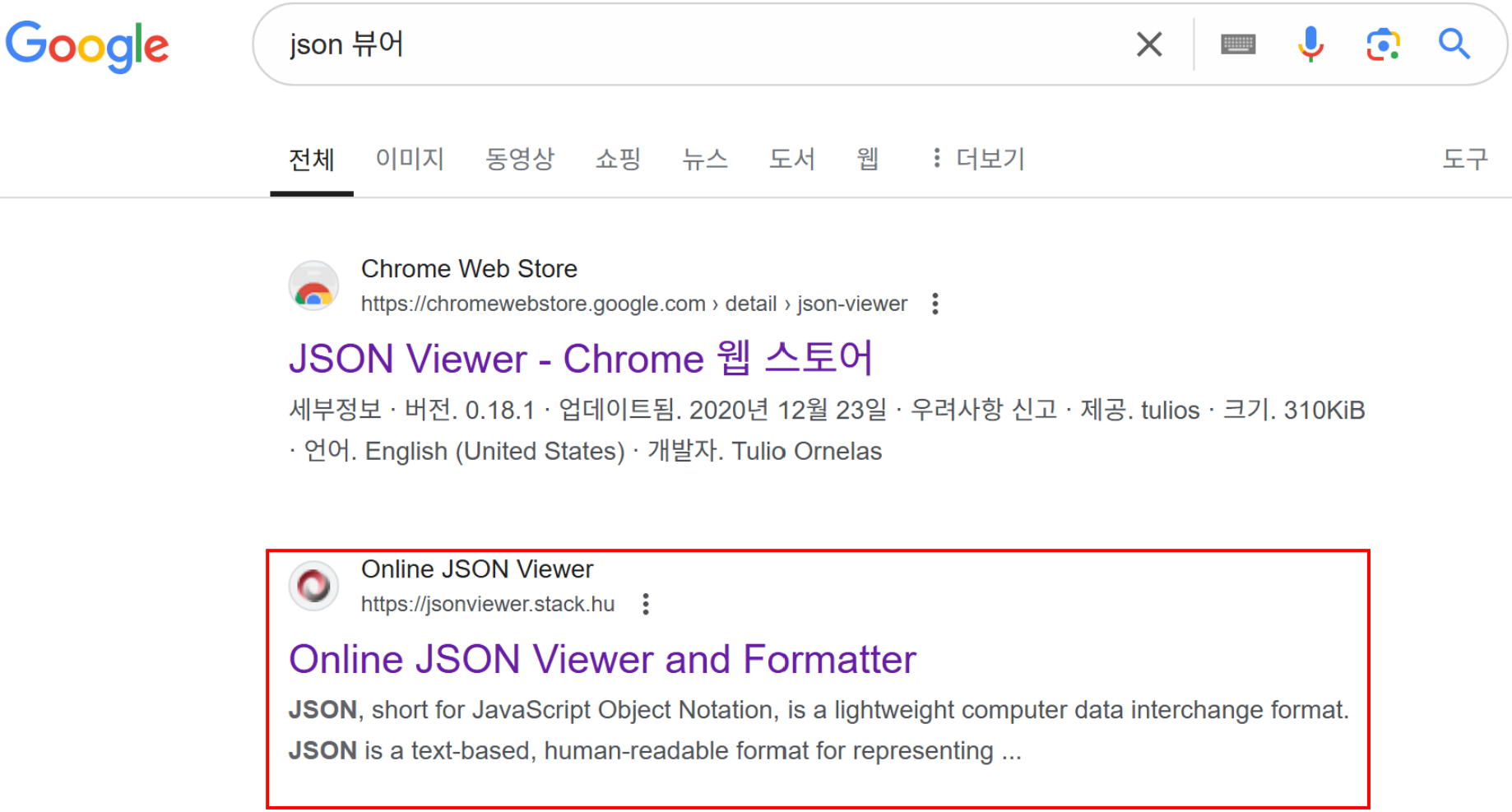

Section
크롤링 웹사이트확인

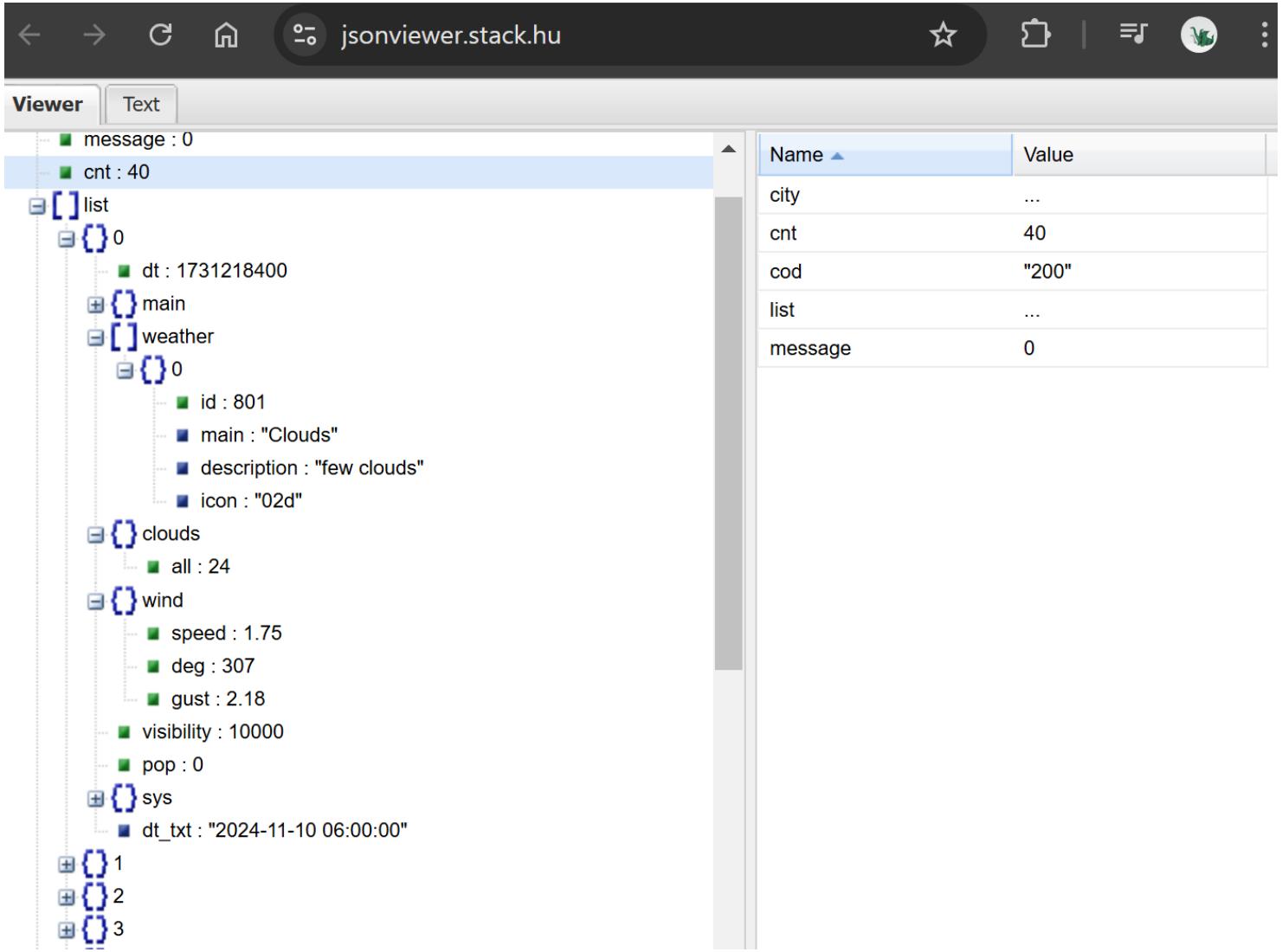
날씨 데이터 크롤링 https://openweathermap.org/



Section

크롤링 웹사이트 확인

날씨 데이터 크롤링 https://jsonviewer.stack.hu/



Section
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날씨 데이터 크롤링 https://openweathermap.org/

[66]:
```
weather = json.loads(bs_obj2.text)
```

[70]:
```
type(weather)
```

[70]:
```
dict
```

[73]:
```
weather['list'][0]
```

[73]:
```
{'dt': 1731218400,
 'main': {'temp': 292.38,
  'feels_like': 291.66,
  'temp_min': 291.37,
  'temp_max': 292.38,
  'pressure': 1022,
  'sea_level': 1022,
  'grnd_level': 1015,
  'humidity': 50,
  'temp_kf': 1.01},
 'weather': [{'id': 801,
   'main': 'Clouds',
   'description': 'few clouds',
   'icon': '02d'}],
 'clouds': {'all': 24},
 'wind': {'speed': 1.75, 'deg': 307, 'gust': 2.18},
 'visibility': 10000,
 'pop': 0,
 'sys': {'pod': 'd'},
 'dt_txt': '2024-11-10 06:00:00'}
```

[74]:
```
weather['list'][0]['main']
```

[74]:
```
{'temp': 292.38,
 'feels_like': 291.66,
 'temp_min': 291.37,
 'temp_max': 292.38,
 'pressure': 1022,
 'sea_level': 1022,
 'grnd_level': 1015,
 'humidity': 50,
 'temp_kf': 1.01}
```

[75]:
```
weather['list'][0]['main']['temp']
```

[75]:
```
292.38
```

[76]:
```
len(weather['list'])
```

[76]:
```
40
```

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크롤링 웹사이트확인

날씨 데이터 크롤링 https://openweathermap.org/

[27]:
```
temp_list = []
n = len(weather['list'])
for i in range(0, n):
    temp_value = weather['list'][i]['main']['temp']
    temp_list.append(temp_value)
```

[28]:
```
print(temp_list)
```

```
[304.32, 302.38, 299.38, 297.83, 298.13, 301.66, 304.6, 305.19, 303.07, 300.9, 299.79, 298.86, 298.54, 302.09, 306.47, 307.79, 305.98, 302.84, 301.31, 300.18, 299.33, 303.4, 308.48, 310.33, 308.42, 304.83, 303.36, 302.03, 300.87, 304.58, 309.09, 311.14, 307.5, 304.92, 303.35, 302.52, 300.82, 304.31, 309.61, 309.7]
```

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크롤링 웹사이트확인

날씨 데이터 크롤링 https://openweathermap.org/

[29]:
```
weather['list'][0]['dt_txt']
```

[29]:
```
'2025-07-21 09:00:00'
```

[30]:
```
dt_list = []
for i in range(0, n):
    dt_value = weather['list'][i]['dt_txt']
    dt_list.append(dt_value)
```

[31]:
```
print(dt_list)
```

```
['2025-07-21 09:00:00', '2025-07-21 12:00:00', '2025-07-21 15:00:00', '2025-07-21 18:00:00', '202
3:00:00', '2025-07-22 06:00:00', '2025-07-22 09:00:00', '2025-07-22 12:00:00', '2025-07-22 15:00:
-07-23 00:00:00', '2025-07-23 03:00:00', '2025-07-23 06:00:00', '2025-07-23 09:00:00', '2025-07-2
0', '2025-07-23 21:00:00', '2025-07-24 00:00:00', '2025-07-24 03:00:00', '2025-07-24 06:00:00', '
15:00:00', '2025-07-24 18:00:00', '2025-07-24 21:00:00', '2025-07-25 00:00:00', '2025-07-25 03:00
5-07-25 12:00:00', '2025-07-25 15:00:00', '2025-07-25 18:00:00', '2025-07-25 21:00:00', '2025-07-
0']
```

Section
크롤링 웹사이트확인

날씨 데이터 크롤링 https://openweathermap.org/

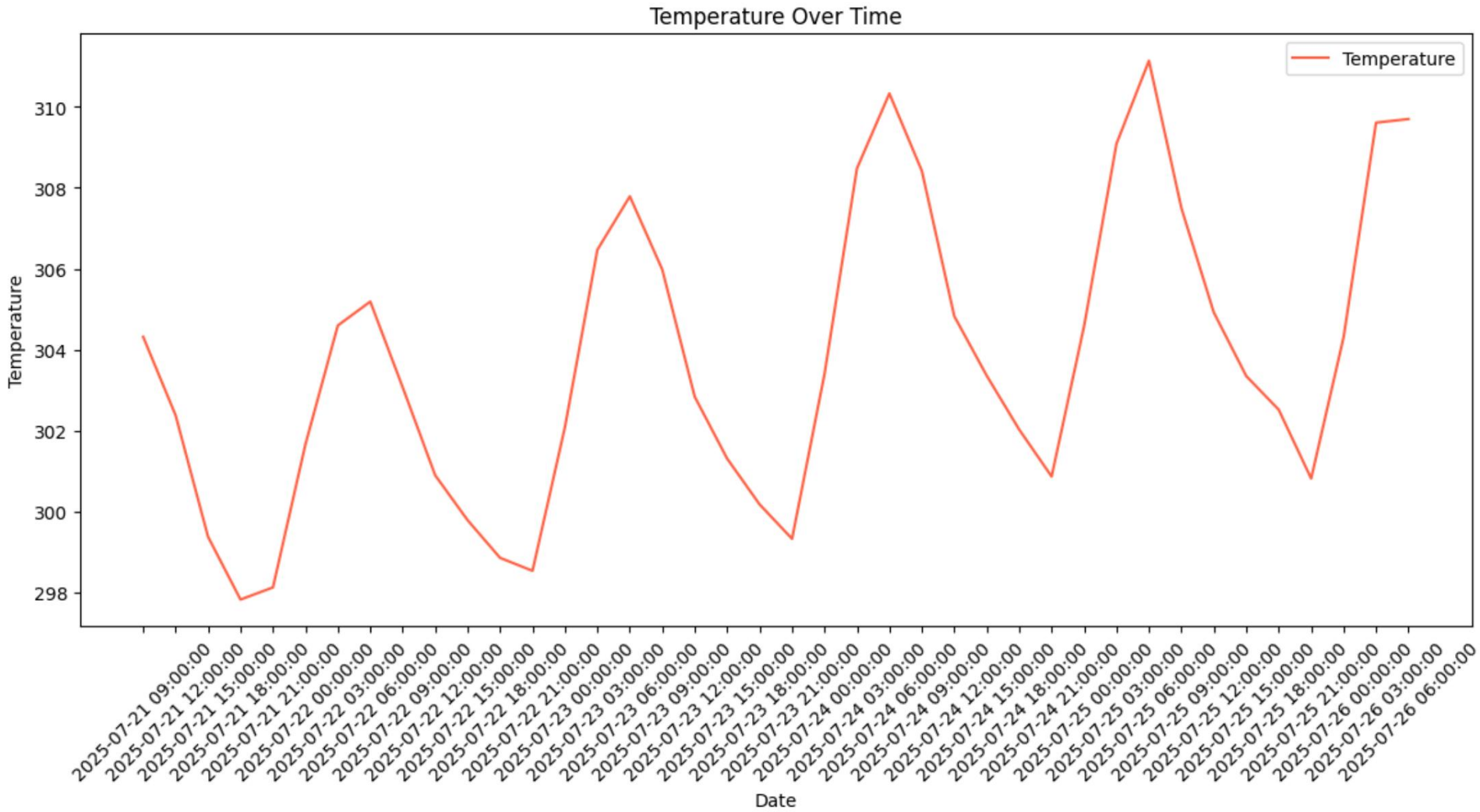
[83]:
```
import matplotlib.pyplot as plt
```

[89]:
```
plt.figure(figsize=(14, 6))
plt.plot(dt_list, temp_list, color='tomato', label='Temperature')
plt.xlabel('Date')
plt.ylabel('Temperature')
plt.title('Temperature Over Time')
plt.xticks(rotation=45)
plt.legend()
plt.show()
```

Section

크롤링 웹사이트 확인

날씨 데이터 크롤링 https://openweathermap.org/



감사합니다.

Q & A