

**Tugas 6**  
**METODE PENGUMPULAN DATA DIGITAL - API**



**Disusun oleh Kelompok 11:**

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**Mata Kuliah Metode Pengumpulan Data Digital**

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## Website 1 : OLX

Website OLX adalah platform online yang memungkinkan pengguna untuk membeli, menjual, dan berinteraksi dengan barang-barang bekas atau baru secara lokal.

Tujuan :

1. Analisis Pasar : Dengan mengumpulkan data tentang handphone yang dijual di daerah Depok pada website OLX, pengguna dapat melakukan analisis pasar untuk memahami tren harga, permintaan, dan penawaran. Hal ini dapat membantu pengguna dalam mengambil keputusan sebelum membeli handphone.
2. Pemantauan Persaingan : Dengan menggunakan data yang sudah dikumpulkan, pengguna dapat memantau aktivitas pesaing dan strategi harga mereka.

Akan dilakukan web scraping menggunakan API pada website [www.olx.com](https://www.olx.com) untuk mengambil informasi mengenai handphone yang dijual di daerah Depok.

Berikut adalah tahapannya :

- Inspect elemen, dan mencari URL API

```
https://www.olx.co.id/api/relevance/v4/search?category=208&facet\_limit=100&location=4000024&location\_facet\_limit=20&platform=web-desktop&query=handphone&relaxedFilters=true&spellcheck=true&user=18e980c4fd9x6843dcdd
```

- Menampilkan data di python

```
url =
"https://www.olx.co.id/api/relevance/v4/search?category=208&facet_limit=100&location=4000024&location_facet_limit=20&platform=web-desktop&query=handphone&relaxedFilters=true&spellcheck=true&user=18e980c4fd9x6843dcdd"
payload = {}
headers = {"User-Agent" : "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/123.0.0.0 Safari/537.36"}

response = requests.request("GET", url, headers=headers,
data=payload)
print(response.text)
```

- Ganti Tipe data ke JSON

```
# GANTI TIPE KE JSON
import json
```

```
json_data = json.loads(response.text) ['data']
```

## - Tabulasi Data

```
#Tabulasi
import pandas as pd
df = pd.json_normalize(json_data)
df
```

result :

| id        | score    | category_id | ad_id     | has_phone_param | description   | created_at                | inspection_info | title  | multi_location | locations_resolved | COUNTRY_name | locations_resolved.ADMIN_LEVEL_1_id | locations_resolved.ADMIN_LEVEL_2_id |
|-----------|----------|-------------|-----------|-----------------|---|---------------------------|-----------------|--|----------------|--------------------|--------------|-------------------------------------|-------------------------------------|
| 918643890 | 1.000000 | 208         | 918643890 | False           | Samsung a54 5g in Baru in Elm<br>buka dus... in Ram 8/128gb | 2024-03-30T12:58:09+07:00 | None            | Samsung a54 5g ram 8/128gb                       | None           | ...                | Indonesia    | 2000009                             |                                     |
| 915428172 | 0.998221 | 208         | 915428172 | False           | Galaxy Gadget kini tersedia<br>dengan in-RAM 8/256gb        | 2024-03-28T13:30:01+07:00 | None            | Samsung Galaxy S24 Ultra                         | None           | ...                | Indonesia    | 2000009                             |                                     |
| 918592543 | 0.990441 | 208         | 918592543 | False           | for sale in iPhone 14 pro max<br>256gb i box full set...    | 2024-03-30T13:59:10+07:00 | None            | iPhone 14 Pro Max 256GB i box                    | None           | ...                | Indonesia    | 2000009                             |                                     |
| 917931714 | 0.994862 | 208         | 917931714 | False           | Cukup dengan E KTP saja<br>bisa bawa pulang handph...       | 2024-03-15T14:03:15+07:00 | None            | Ciolan bunga Ringan iPhone 15 Series bunga mu... | None           | ...                | Indonesia    | 2000009                             |                                     |
| 917001158 | 0.992863 | 208         | 917001158 | False           | 90Hz punch hold screen with<br>magic ring in 18 watt...     | 2024-04-01T14:05:07+07:00 | None            | INFINIX HOT 40i NFC 8+8/256GB                    | None           | ...                | Indonesia    | 2000009                             |                                     |
| 918759707 | 0.991103 | 208         | 918759707 | False           | No minus in Ram 3/32GB . Hp<br>dan charger                  | 2024-04-01T14:02:24+07:00 | None            | Vivo Y12 3/32Gb                                  | None           | ...                | Indonesia    | 2000009                             |                                     |
| 903314125 | 0.989324 | 208         | 903314125 | False           | Jual Hp Oppo F15 Gold Ram<br>3/16 lcd baru & bat...         | 2024-04-01T13:48:29+07:00 | None            | Oppo F15 Gold Ram 3/16                           | None           | ...                | Indonesia    | 2000009                             |                                     |
| 918758245 | 0.987544 | 208         | 918758245 | False           | Batangan dan dus<br>only in Minus patah di tombol<br>v...   | 2024-04-01T13:32:15+07:00 | None            | Poco X3 GT 8/256                                 | None           | ...                | Indonesia    | 2000009                             |                                     |
| 918758003 | 0.985765 | 208         | 918758003 | False           | JUAL AJA VIVO Y21 in RAM<br>4/84 in KELENGKAPAN FILLS...    | 2024-04-01T13:27:05+07:00 | None            | VIVO Y21 RAM 4/65                                | None           | ...                | Indonesia    | 2000009                             |                                     |
| 918757990 | 0.983988 | 208         | 918757990 | False           | Vivo y12 ram 3/32 nominus<br>in dan pas ala makar...        | 2024-04-01T13:26:56+07:00 | None            | Vivo y12 ram 3/32 nominus                        | None           | ...                | Indonesia    | 2000009                             |                                     |

## - Melihat semua isi kolom

```
df.columns
```

result :

```
Index(['id', 'score', 'category_id', 'ad_id', 'has_phone_param', 'description',
      'created_at', 'inspection_info', 'title', 'multi_location',
      'partner_id', 'user_type', 'partner_code', 'monetizationInfo', 'images',
      'certified_car', 'is_kyc_verified_user', 'deal_price',
      'business_platform', 'main_info', 'artificial_boost', 'display_date',
      'isSpinViewAvailable', 'user_id', 'installment', 'created_at_first',
      'locations', 'parameters', 'spell.id', 'spell.key', 'spell.version',
      'spell.main', 'spell.facet_disabled', 'spell.default_sorting',
      'status.status', 'status.allow_edit', 'status.ban_reason_id',
      'status.display', 'status.translated_display', 'status.link',
      'status.flags.new', 'status.flags.hot', 'status.message',
      'status.allow_deactivate', 'favorites.count',
      'favorites.count_label_next', 'price.value.raw',
      'price.value.currency.iso_4217', 'price.value.currency.pre',
      'price.value.display', 'price.key_name', 'price.key', 'package.id',
```

```
'locations_resolved.COUNTRY_id', 'locations_resolved.COUNTRY_name',  
'locations_resolved.ADMIN_LEVEL_1_id',  
'locations_resolved.ADMIN_LEVEL_1_name',  
'locations_resolved.ADMIN_LEVEL_3_id',  
'locations_resolved.ADMIN_LEVEL_3_name',  
'locations_resolved.SUBLOCALITY_LEVEL_1_id',  
'locations_resolved.SUBLOCALITY_LEVEL_1_name', 'favorites.count_label',  
'package_id', 'favorites.count_label_prev'],  
dtype='object')
```

- Melihat Keseluruhan data pada baris pertama

```
print(df.iloc[0].to_string())
```

result :

```
id                                     918643890  
score                                1.0  
category_id                           208  
ad_id                                 918643890  
has_phone_param                       False  
description                           Samsung a54 5g\nBaru\nBlm buka dus.. \nRam 8/1...  
created_at                           2024-03-30T12:58:09+07:00  
inspection_info                       None  
title                                Samsung a54 5g ram 8/128gb  
multi_location                       None  
partner_id                           None  
user_type                             Regular  
partner_code                         None  
monetizationInfo                     None  
images                               [{'id': '2411503583', 'external_id': '6606b6c7...  
certified_car                         False  
is_kyc_verified_user                  False  
deal_price                           None  
business_platform                     None  
main_info                            None  
artificial_boost                      False  
display_date                         2024-03-29T12:40:49+0000  
isSpinViewAvailable                  False  
user_id                              7039993  
installment                          None  
created_at_first                     2024-03-29T19:40:49+07:00  
locations                            [{'lat': -6.375, 'lon': 106.823, 'region_id': ...  
parameters                            [{'type': 'single', 'key': 'make', 'value': 'e...  
spell.id                             112  
spell.key                            DISCERN_LOCATION_ES  
spell.version                        1  
spell.main                           False  
spell.facet_disabled                 False  
spell.default_sorting                DEFAULT  
status.status                        active  
status.allow_edit                    True  
status.ban_reason_id                 None  
status.display                       active  
status.translated_display            Aktif  
status.link                          None  
status.flags.new                     False  
status.flags.hot                     False  
status.message                       None  
status.allow_deactivate              True  
favorites.count                      0  
favorites.count_label_next           1  
price.value.raw                      4800000.0  
price.value.currency.iso_4217        IDR  
price.value.currency.pre              Rp
```

|   |              |
|---|--------------|
| price.value.display                         | Rp 4.800.000 |
| price.key_name                              | Harga        |
| price.key                                   | price        |
| package.id                                  | 2000057      |
| locations_resolved.COUNTRY_id               | 1000001      |
| locations_resolved.COUNTRY_name             | Indonesia    |
| locations_resolved.ADMIN_LEVEL_1_id         | 2000009      |
| locations_resolved.ADMIN_LEVEL_1_name       | Jawa Barat   |
| locations_resolved.ADMIN_LEVEL_3_id         | 4000024      |
| locations_resolved.ADMIN_LEVEL_3_name       | Depok Kota   |
| locations_resolved.SUBLOCALITY_LEVEL_1_id   | 5001321      |
| locations_resolved.SUBLOCALITY_LEVEL_1_name | Beji         |
| favorites.count_label                       | NaN          |
| package_id                                  | NaN          |
| favorites.count_label_prev                  | NaN          |

- Setelah itu, akan dipilih kolom-kolom yang dibutuhkan

```
df2 =
df[['id', 'title', 'description', 'price.value.display', 'locations_
resolved.SUBLOCALITY_LEVEL_1_name', 'locations_resolved.ADMIN_LEV
EL_3_name']]
df2
```

result

|    | id        | title   | description   | price.value.display | locations_resolved.SUBLOCALITY_LEVEL_1_name | locations_resolved.ADMIN_LEVEL_3_name |
|----|-----------|---|---|---------------------|---|---------------------------------------|
| 0  | 918843890 | Samsung a54 5g ram 8/128gb                        | Samsung a54 5g/nBaru/nBim buka dus. \nRam 8/1...    | Rp 4.800.000        | Beji  | Depok Kota                            |
| 1  | 915426172 | Samsung Galaxy S24 Ultra                          | Galaxy Gadget kini tersedia dengan \n- RAM 8/2...   | Rp 21.999.000       | Beji  | Depok Kota                            |
| 2  | 918592543 | iPhone 14 Pro Max 256GB Ibox                      | forsale/niphone 14 pro max 256gb ibox fullsetl...   | Rp 17.000.000       | Cipayung                                    | Depok Kota                            |
| 3  | 917931714 | Cicilan bunga Ringan Iphone 15 Series bunga mu... | Cukup dengan EKTP saja bisa bawa pulang handph...   | Rp 13.999.000       | Beji  | Depok Kota                            |
| 4  | 917001156 | INFINIX HOT 40i NFC 8+8/256GB                     | 90Hz punch hold screen with magic ring\n18watt...   | Rp 1.699.000        | Sawangan                                    | Depok Kota                            |
| 5  | 918759707 | Vivo Y12 3/32Gb                                   | No minus\nRam 3/32GB . Hp dan charger               | Rp 850.000          | Sawangan                                    | Depok Kota                            |
| 6  | 903314125 | Oppo F15 Gold Ram 3 /16                           | Jual Hp Oppo F15 Gold Ram 3/16 Iod baru & bat...    | Rp 650.000          | Pancoran Mas                                | Depok Kota                            |
| 7  | 918758245 | Poco X3 GT 8/256                                  | Batangan dan dus only\nMinus patah di tombol v...   | Rp 2.700.000        | Beji  | Depok Kota                            |
| 8  | 918758003 | VIVO Y21 RAM 4/65                                 | JUAL AJA VIVO Y21\nRAM 4/64\nKELENGKAPAN FILLS...   | Rp 1.200.000        | Cipayung                                    | Depok Kota                            |
| 9  | 918757990 | Vivo y12 ram 3/32 nominus hp dan cas aja          | Vivo y12 ram 3/32 nominus hp dan cas aja mahar...   | Rp 750.000          | Pancoran Mas                                | Depok Kota                            |
| 10 | 918758886 | Iphone 11 - 64Gb                                  | Iphone 11\n64 GB\npurple warna jarang\nfisik m...   | Rp 4.200.000        | Limo  | Depok Kota                            |
| 11 | 918758318 | Samsung galaxy z fold 5 12 256gb                  | Samsung galaxy z fold 5 12 256gb Second ex Res...   | Rp 16.900.000       | Beji  | Depok Kota                            |
| 12 | 918755947 | Samsung a23 6/128 like new fulset                 | Kelengkapan : \n* fulset\n\nKondisi : \n* no m...   | Rp 1.750.000        | Beji  | Depok Kota                            |
| 13 | 918755910 | Samsung a23 6/128 lengkap like new tanpa minus    | Kelengkapan : \n* fulset\n\nKondisi : \n* no m...   | Rp 1.750.000        | Pancoran Mas                                | Depok Kota                            |
| 14 | 918755851 | Samsung a23 6/128 lengkap like new                | Kelengkapan : \n* fulset\n\nKondisi : \n* no m...   | Rp 1.750.000        | Cilodong                                    | Depok Kota                            |
| 15 | 918755204 | Samsung Z Flip6 Bunga 0%                          | Promo Ramadhan HOME CREDIT\n\n(Samsung Bunga 0%...  | Rp 14.999.000       | Sawangan                                    | Depok Kota                            |
| 16 | 918749358 | Realme C31 second                                 | Realme C31 \nRam 3/32                               | Rp 1.000.000        | Cilodong                                    | Depok Kota                            |
| 17 | 918733680 | Samsung A54 256Gb                                 | LIKE NEW KAK PEMBELIAN BULAN FEB AKHIR MULUS B...   | Rp 4.000.000        | Sukmajaya                                   | Depok Kota                            |
| 18 | 918031941 | Iphone 13 bisa cicilan proses 3 menit             | Cicilan mudah tanpa kartu kredit\nCUKUP KTP DA...   | Rp 9.999.000        | Beji  | Depok Kota                            |
| 19 | 918153743 | Zenfone 9 8/256 hitam fullset                     | Flash sale edisi gajian\ninasus zenfone 9 8/256 ... | Rp 8.800.000        | Pancoran Mas                                | Depok Kota                            |

- Rename Kolom

```
df2.rename(columns={
    'title': 'Judul',
    'description': 'Deskripsi',
    'price.value.display': 'Harga',
    'locations_resolved.SUBLOCALITY_LEVEL_1_name': 'Kecamatan',
    'locations_resolved.ADMIN_LEVEL_3_name': 'Kota'
}, inplace=True)
```

```
df2.head(16)
```

result

|    | id        | Judul   | Deskripsi  | Harga         | Kecamatan    | Kota       |
|----|-----------|---|--|---------------|--------------|------------|
| 0  | 918643890 | Samsung a54 5g ram 8/128gb                        | Samsung a54 5g\nBaru\nBlm buka dus... \nRam 8/1... | Rp 4.800.000  | Beji         | Depok Kota |
| 1  | 915426172 | Samsung Galaxy S24 Ultra                          | Galaxy Gadget kini tersedia dengan \n- RAM 8/2...  | Rp 21.999.000 | Beji         | Depok Kota |
| 2  | 918592543 | iPhone 14 Pro Max 256GB Ibox                      | forsale\niphone 14 pro max 256gb ibox fullset\...  | Rp 17.000.000 | Cipayung     | Depok Kota |
| 3  | 917931714 | Cicilan bunga Ringan Iphone 15 Series bunga mu... | Cukup dengan EKTP saja bisa bawa pulang handph...  | Rp 13.999.000 | Beji         | Depok Kota |
| 4  | 917001156 | INFINIX HOT 40i NFC 8+8/256GB                     | 90Hz punch hold screen with magic ring\n18watt...  | Rp 1.699.000  | Sawangan     | Depok Kota |
| 5  | 918759707 | Vivo Y12 3/32Gb                                   | No minus\nRam 3/32GB . Hp dan charger              | Rp 850.000    | Sawangan     | Depok Kota |
| 6  | 903314125 | Oppo F1S Gold Ram 3 /16                           | Jual Hp Oppo F1S Gold Ram 3/16 lcd baru & bat...   | Rp 550.000    | Pancoran Mas | Depok Kota |
| 7  | 918758245 | Poco X3 GT 8/256                                  | Batangan dan dus only\nMinus patah di tombol v...  | Rp 2.700.000  | Beji         | Depok Kota |
| 8  | 918758003 | VIVO Y21 RAM 4/65                                 | JUAL AJA VIVO Y21\nRAM 4/64\nKELENGKAPAN FILLS...  | Rp 1.200.000  | Cipayung     | Depok Kota |
| 9  | 918757990 | Vivo y12 ram 3/32 nominus hp dan cas aja          | Vivo y12 ram 3/32 nominus hp dan cas aja mahar...  | Rp 750.000    | Pancoran Mas | Depok Kota |
| 10 | 918756686 | Iphone 11 - 64Gb                                  | Iphone 11\n64 GB\npurple warna jarang\nfisik m...  | Rp 4.200.000  | Limo         | Depok Kota |
| 11 | 918756318 | Samsung galaxy z fold 5 12 256gb                  | Samsung galaxy z fold 5 12 256gb Second ex Res...  | Rp 16.900.000 | Beji         | Depok Kota |
| 12 | 918755947 | Samsung a23 6/128 like new fulset                 | Kelengkapan : \n* fulset\n\nKondisi : \n* no m...  | Rp 1.750.000  | Beji         | Depok Kota |
| 13 | 918755910 | Samsung a23 6/128 lengkap like new tanpa minus    | Kelengkapan : \n* fulset\n\nKondisi : \n* no m...  | Rp 1.750.000  | Pancoran Mas | Depok Kota |
| 14 | 918755851 | Samsung a23 6/128 lengkap like new                | Kelengkapan : \n* fulset\n\nKondisi : \n* no m...  | Rp 1.750.000  | Cilodong     | Depok Kota |
| 15 | 918755204 | Samsung Z Flip5 Bunga 0%                          | Promo Ramadhan HOME CREDIT\n\nSamsung Bunga 0%...  | Rp 14.999.000 | Sawangan     | Depok Kota |

## Website 2 : IndoGold

Akan dilakukan web scraping menggunakan API pada website [www.indogold.id](http://www.indogold.id) untuk mengambil informasi mengenai harga beli dan jual emas 7 tahun terakhir dan harga beli dan jual perak 7 tahun terakhir

Tujuannya adalah untuk mendapatkan harga dan jual beli emas serta harga jual dan beli perak untuk memperoleh akses terkini mengenai harga pasar dari logam mulia tersebut. Informasi tersebut sangat penting untuk para investor, pedagang, individu yang tertarik dalam investasi atau perdagangan logam mulia

Berikut tahapannya :

### 1. Harga Beli Emas

- Insepct elemen dan cari URL API nya

```
https://www.indogold.id/ajax/chart_range/GOLD/2017-03-30/2024-03-30
```

- Menampilkan data di Python

```
url =  
"https://www.indogold.id/ajax/chart_range/GOLD/2017-03-30/"
```

```

2024-03-30"
payload={}
headers = {}

response = requests.request("GET", url, headers=headers,
data=payload)

print(response.text)

```

- Ganti tipe data ke JSON

```

import json
json_data = json.loads(response.text)
json_data

```

- Tabulasi data

```

data = json_data[0]['data']
df = pd.DataFrame(data, columns=['timestamp', 'open',
'high', 'low', 'close'])
# Menampilkan DataFrame
print(df)

```

Output :

|      | timestamp     | open    | high    | low     | close   |
|------|---------------|---------|---------|---------|---------|
| 0    | 1490832000000 | 542500  | 544500  | 541000  | 544000  |
| 1    | 1490918400000 | 545000  | 545000  | 539000  | 542500  |
| 2    | 1491004800000 | 545500  | 546000  | 545000  | 546000  |
| 3    | 1491091200000 | 546000  | 546000  | 545500  | 545500  |
| 4    | 1491177600000 | 547000  | 547000  | 543500  | 546000  |
| ...  | ...           | ...     | ...     | ...     | ...     |
| 2553 | 1711411200000 | 1122723 | 1130675 | 1115765 | 1120735 |
| 2554 | 1711497600000 | 1132166 | 1134154 | 1120735 | 1122723 |
| 2555 | 1711584000000 | 1144591 | 1147076 | 1129184 | 1132166 |
| 2556 | 1711670400000 | 1151549 | 1154531 | 1142106 | 1144094 |
| 2557 | 1711756800000 | 1152046 | 1153537 | 1151549 | 1151549 |

[2558 rows x 5 columns]

- tambahkan kolom “tanggal” ke dalam data diatas, untuk memudahkan kita melihat daftar harga belinya. Harga beli ada di kolom “open”

|      | timestamp     | open    | high    | low     | close   | tanggal    |
|------|---------------|---------|---------|---------|---------|------------|
| 0    | 1490832000000 | 542500  | 544500  | 541000  | 544000  | 2017-03-30 |
| 1    | 1490918400000 | 545000  | 545000  | 539000  | 542500  | 2017-03-31 |
| 2    | 1491004800000 | 545500  | 546000  | 545000  | 546000  | 2017-04-01 |
| 3    | 1491091200000 | 546000  | 546000  | 545500  | 545500  | 2017-04-02 |
| 4    | 1491177600000 | 547000  | 547000  | 543500  | 546000  | 2017-04-03 |
| ...  | ...           | ...     | ...     | ...     | ...     | ...        |
| 2553 | 1711411200000 | 1122723 | 1130675 | 1115765 | 1120735 | 2024-03-26 |
| 2554 | 1711497600000 | 1132166 | 1134154 | 1120735 | 1122723 | 2024-03-27 |
| 2555 | 1711584000000 | 1144591 | 1147076 | 1129184 | 1132166 | 2024-03-28 |
| 2556 | 1711670400000 | 1151549 | 1154531 | 1142106 | 1144094 | 2024-03-29 |
| 2557 | 1711756800000 | 1152046 | 1153537 | 1151549 | 1151549 | 2024-03-30 |

## 2. Harga Jual Emas

API :

```
https://www.indogold.id/ajax/chart_range_jual/GOLD/2017-03-30/2024-03-30
```

Harga Jual :

```
data = json_data[0]['data']

# Mengubah data menjadi DataFrame
df = pd.DataFrame(data, columns=['timestamp', 'open', 'high', 'low', 'close'])

# Menampilkan DataFrame
print(df)

tanggal_range = pd.date_range(start='2017-03-30', end='2024-03-30')

# Konversi rentang tanggal menjadi format yang diinginkan
tanggal_formatted = tanggal_range.strftime('%Y-%m-%d')

# Menambahkan kolom "tanggal" ke DataFrame
df['tanggal'] = tanggal_formatted

# Menampilkan DataFrame
print(df)
```

Output :



|      | timestamp     | open    | high    | low     | close   | tanggal    |
|------|---------------|---------|---------|---------|---------|------------|
| 0    | 1490832000000 | 531500  | 533000  | 533500  | 530000  | 2017-03-30 |
| 1    | 1490918400000 | 534000  | 531000  | 534000  | 528000  | 2017-03-31 |
| 2    | 1491004800000 | 534500  | 534500  | 535000  | 533500  | 2017-04-01 |
| 3    | 1491091200000 | 534500  | 534500  | 535000  | 534500  | 2017-04-02 |
| 4    | 1491177600000 | 535500  | 534500  | 536000  | 532500  | 2017-04-03 |
| ...  | ...           | ...     | ...     | ...     | ...     | ...        |
| 2553 | 1711411200000 | 1095000 | 1093000 | 1102500 | 1088000 | 2024-03-26 |
| 2554 | 1711497600000 | 1104000 | 1094500 | 1106000 | 1093000 | 2024-03-27 |
| 2555 | 1711584000000 | 1116000 | 1104000 | 1118500 | 1101000 | 2024-03-28 |
| 2556 | 1711670400000 | 1123000 | 1115500 | 1125500 | 1113500 | 2024-03-29 |
| 2557 | 1711756800000 | 1123500 | 1123000 | 1124500 | 1123000 | 2024-03-30 |

### 3. Harga Beli Perak

API :

```
https://www.indogold.id/ajax/chart_range/PERAK/2017-03-30/2024-03-30
```

Harga Beli :

```
data = json_data[0]['data']
df = pd.DataFrame(data, columns=['timestamp', 'open',
'high', 'low', 'close'])
# Menampilkan DataFrame
print(df)

tanggal_range = pd.date_range(start='2017-03-30',
end='2024-03-30')

# Konversi rentang tanggal menjadi format yang diinginkan
tanggal_formatted = tanggal_range.strftime('%Y-%m-%d')

# Menambahkan kolom "tanggal" ke DataFrame
df['tanggal'] = tanggal_formatted

# Menampilkan DataFrame
print(df)
```

Output :

|      | timestamp     | open  | high  | low   | close | tanggal    |
|------|---------------|-------|-------|-------|-------|------------|
| 0    | 1490832000000 | 11050 | 11100 | 11000 | 11050 | 2017-03-30 |
| 1    | 1490918400000 | 11050 | 11050 | 10950 | 11050 | 2017-03-31 |
| 2    | 1491004800000 | 11100 | 11100 | 11050 | 11100 | 2017-04-01 |
| 3    | 1491091200000 | 11100 | 11100 | 11100 | 11100 | 2017-04-02 |
| 4    | 1491177600000 | 11100 | 11100 | 11000 | 11100 | 2017-04-03 |
| ...  | ...           | ...   | ...   | ...   | ...   | ...        |
| 2553 | 1711411200000 | 18315 | 18535 | 18205 | 18425 | 2024-03-26 |
| 2554 | 1711497600000 | 18425 | 18480 | 18205 | 18315 | 2024-03-27 |
| 2555 | 1711584000000 | 18645 | 18645 | 18260 | 18425 | 2024-03-28 |
| 2556 | 1711670400000 | 18700 | 18755 | 18590 | 18645 | 2024-03-29 |
| 2557 | 1711756800000 | 18700 | 18755 | 18700 | 18700 | 2024-03-30 |

#### 4. Harga Jual Perak

##### API

```
https://www.indogold.id/ajax/chart_range_jual/PERAK/2017-03-30/2024-03-30
```

##### Harga Jual

```
data = json_data[0]['data']
df = pd.DataFrame(data, columns=['timestamp', 'open',
'high', 'low', 'close'])

# Menampilkan DataFrame
print(df)

tanggal_range = pd.date_range(start='2017-03-30',
end='2024-03-30')

# Konversi rentang tanggal menjadi format yang diinginkan
tanggal_formatted = tanggal_range.strftime('%Y-%m-%d')

# Menambahkan kolom "tanggal" ke DataFrame
df['tanggal'] = tanggal_formatted

# Menampilkan DataFrame
print(df)
```

Output :

|      | timestamp     | open  | high  | low   | close | tanggal    |
|------|---------------|-------|-------|-------|-------|------------|
| 0    | 1490832000000 | 8950  | 8950  | 9000  | 8900  | 2017-03-30 |
| 1    | 1490918400000 | 9000  | 8950  | 9000  | 8900  | 2017-03-31 |
| 2    | 1491004800000 | 9000  | 9000  | 9000  | 9000  | 2017-04-01 |
| 3    | 1491091200000 | 9000  | 9000  | 9000  | 9000  | 2017-04-02 |
| 4    | 1491177600000 | 9000  | 9000  | 9000  | 8950  | 2017-04-03 |
| ...  | ...           | ...   | ...   | ...   | ...   | ...        |
| 2553 | 1711411200000 | 13350 | 13400 | 13500 | 13300 | 2024-03-26 |
| 2554 | 1711497600000 | 13450 | 13350 | 13500 | 13250 | 2024-03-27 |
| 2555 | 1711584000000 | 13600 | 13450 | 13600 | 13300 | 2024-03-28 |
| 2556 | 1711670400000 | 13650 | 13600 | 13650 | 13550 | 2024-03-29 |
| 2557 | 1711756800000 | 13650 | 13650 | 13650 | 13650 | 2024-03-30 |

### Website 3: Agoda

Agoda adalah sebuah platform pemesanan perjalanan online yang memungkinkan penggunanya untuk mencari dan memesan hotel dan akomodasi di berbagai destinasi. Akan dilakukan web scrapping menggunakan API pada website [www.agoda.com](https://www.agoda.com) untuk mengambil beberapa informasi mengenai hotel di Yogyakarta.

Berikut adalah tahapan nya :

1. Inspect elemen, dan mencari URL API

```
https://www.agoda.com/api/personalization/PersonalizeRecommendedProperties/v1?recommendationType=2&hotelId=0&finalPriceView=1&hasSearchCriteria=true&cityId=14018&lengthOfStay=1&checkIn=2024-04-10T00%3A00%3A00&adults=1&children=0&rooms=1&_ts=1711957536477
```

2. Menampilkan data pada python

```
agoda="https://www.agoda.com/api/personalization/PersonalizeRecommendedProperties/v1?recommendationType=2&hotelId=0&finalPriceView=1&hasSearchCriteria=true&cityId=14018&lengthOfStay=1&checkIn=2024-04-10T00%3A00%3A00&adults=1&children=0&rooms=1&_ts=1711957536477"

payload={}
headers = {}

responsel = requests.request("GET", agoda, headers=headers, data=payload)
```

```
responsel.text
```

```
'{"PersonalizedRecommendedProperties":[],"PersonalizedRecommendationTitle":"Based on properties you\\u0027ve viewed, you might like:","PersonalizedRecommendationPriceText":"Prices from","RecommendationType":2}'
```

```
agodayogyakarta = !gdown 1Ku2nPDkkNHN0g5O3kXGRccSRAagcjPXn
```

### 3. Mengganti tipe data menjadi JSON

```
agodayogyakarta_file=open('agoda_yogyakarta.json')
yogyakarta=json.load(agodayogyakarta_file)
```

### 4. Tabulasi data

```
yogyakarta1 = yogyakarta['PersonalizedRecommendedProperties']

property_list = []

for property_data in yogyakarta1:
    property_dict = {
        'PropertyId': property_data['PropertyId'],
        'HotelName': property_data['HotelName'],
        'HotelUrl': property_data['HotelUrl'],
        'StarRating': property_data['StarRating'],
        'ReviewCount': property_data['ReviewCount'],
        'ReviewScoreText': property_data['ReviewScoreText'],
        'ReviewScore': property_data['ReviewScore'],
        'Price': property_data['Price'],
        'DiscountMessage': property_data['DiscountMessage']
    }
    property_list.append(property_dict)

df = pd.DataFrame(property_list)

df
```

|   | PropertyId | HotelName                             | HotelUrl  | StarRating | ReviewCount | ReviewScoreText | ReviewScore | Price  | DiscountMessage |
|---|------------|---------------------------------------|---|------------|-------------|-----------------|-------------|--------|-----------------|
| 0 | 409746     | Hotel Tentrem Yogyakarta              | /hotel-tentrem-yogyakarta/hotel/yogyakarta-id...  | star-5     | 4587        | Exceptional     | 9.2         | 151.37 | 25% DISCOUNT    |
| 1 | 746720     | Greenhost Boutique Hotel Prawirotaman | /greenhost-boutique-hotel-prawirotaman/hotel/y... | star-4     | 4653        | Excellent       | 8.9         | 49.49  | 41% DISCOUNT    |
| 2 | 772296     | Adhithana Hotel Yogyakarta            | /adhithana-hotel-yogyakarta/hotel/yogyakarta-...  | star-3     | 2715        | Excellent       | 8.8         | 53.37  | 35% DISCOUNT    |
| 3 | 1199795    | Lafayette Boutique Hotel              | /lafayette-boutique-hotel/hotel/yogyakarta-id...  | star-5     | 2776        | Exceptional     | 9.1         | 104.43 | 28% DISCOUNT    |
| 4 | 2989957    | Yogyakarta Marriott Hotel             | /yogyakarta-marriott-hotel_2/hotel/yogyakarta-... | star-5     | 2328        | Exceptional     | 9.2         | 134.34 | 30% DISCOUNT    |

#### Website 4: tiket.com

tiket.com adalah sebuah platform yang menyediakan jasa pemesanan tiket perjalanan secara online. Akan dilakukan web scrapping menggunakan API pada website [www.tiket.com](http://www.tiket.com) untuk mengambil beberapa informasi mengenai jadwal keberangkatan dan kedatangan kereta dari Bandung (BD) ke Gambir (GMR).

Berikut adalah tahapan nya :

1. Inspect elemen, dan mencari URL API

```
https://www.tiket.com/ms-gateway/tix-train-search-v2/journeys?orig=BD&otype=STATION&dest=GMR&dtype=STATION&ttype=ONE\_WAY&ddate=20240401&rdate=&account=1&icount=0
```

2. Menampilkan data pada python

```
tiket=
"https://www.tiket.com/ms-gateway/tix-train-search-v2/journeys?
orig=BD&otype=STATION&dest=GMR&dtype=STATION&ttype=ONE_WAY&ddate=20240401&rdate=&account=1&icount=0"

payload={}
headers = {}

response3 = requests.request("GET", tiket, headers=headers,
data=payload)

response3.text
```

```
'<!DOCTYPE html><html lang="en-US"><head><title>Just a moment...</title><meta http-equiv="Content-Type" content="text/html; charset=UTF-8"><meta http-equiv="X-UA-Compatible" content="IE=edge"><meta name="robots" content="noindex,nofollow"><meta name="viewport" content="width=device-width,initial-scale=1"><style>{box-sizing:border-box;margin:0;padding:0}html{line-height:1.15;-webkit-text-size-adjust:100%;color:#313131}button,html{font-family:system-ui,-apple-system,BlinkMacSystemFont,Segoe UI,Roboto,Helvetica Neue,Arial,Noto Sans,sans-serif,Apple Color Emoji,Segoe UI Emoji,Segoe UI Symbol,Noto Color Emoji}@media (prefers-color-scheme:dark){body{background-color:#222;color:#d9d9d9}body a{color:#fff}body a:hover{color:#ee730a;text-decoration:underline}body .lds-ring div{border-color:#999 transparent transparent}body .font-red{color:#b20f03}body .big-button,body .pow-button{background-color:#4693ff;color:#1d1d1d}body #challenge-success-text{background-image:url(...
```

```
tiketfile = !gdown 1D217EKq83Ko3QcxXsG1z31T6SOfMAJm0
```

3. Mengganti tipe data menjadi JSON

```

bdgjkt_file=open('bdg_jkt.json')
bdgjkt=json.load(bdgjkt_file)

bdgjkt_code = bdgjkt['code']
bdgjkt_message = bdgjkt['message']
bdgjkt_errors = bdgjkt['errors']
bdgjkt_data = bdgjkt['data']

bdgjkt_departjourneys = bdgjkt_data['departJourneys']

bdgjkt_journeys = bdgjkt_departjourneys['journeys']
bdgjkt_journeys

```

#### 4. Tabulasi data

```

data_bdgjkt = pd.json_normalize(bdgjkt_journeys)
data_bdgjkt.info()

```

| #  | Column                     | Non-Null Count | Dtype  |
|----|----------------------------|----------------|--------|
| 0  | id                         | 10 non-null    | object |
| 1  | segmentSchedules           | 10 non-null    | object |
| 2  | labelType                  | 5 non-null     | object |
| 3  | nudges                     | 10 non-null    | object |
| 4  | segmentCount               | 10 non-null    | int64  |
| 5  | departDate                 | 10 non-null    | object |
| 6  | departTime                 | 10 non-null    | object |
| 7  | arriveDate                 | 10 non-null    | object |
| 8  | arriveTime                 | 10 non-null    | object |
| 9  | totalDuration              | 10 non-null    | int64  |
| 10 | transitTimings             | 10 non-null    | object |
| 11 | nextDays                   | 10 non-null    | int64  |
| 12 | originStation.id           | 10 non-null    | int64  |
| 13 | originStation.code         | 10 non-null    | object |
| 14 | originStation.name         | 10 non-null    | object |
| 15 | originStation.locator      | 0 non-null     | object |
| 16 | originStation.city         | 0 non-null     | object |
| 17 | destinationStation.id      | 10 non-null    | int64  |
| 18 | destinationStation.code    | 10 non-null    | object |
| 19 | destinationStation.name    | 10 non-null    | object |
| 20 | destinationStation.locator | 0 non-null     | object |
| 21 | destinationStation.city    | 0 non-null     | object |

```

dropkolom = ['segmentSchedules', 'labelType', 'nudges',
'transitTimings',
'destinationStation.locator','destinationStation.city',

```

```

tabel_bdgjkt = data_bdgjkt.drop(columns=dropkolom)
tabel_bdgjkt

```

|   | id                                       | segmentCount | departDate | departTime | arriveDate | arriveTime | totalDuration | originStation.code | originStation.name | destinationStation.id | destinationStation.code | destinationStation.name |
|---|--|--------------|------------|------------|------------|------------|---------------|--------------------|--------------------|-----------------------|-------------------------|-------------------------|
| 0 | BD-GMR-2024-04-01-7047-EKO-Q-910125968   | 1            | 2024-04-01 | 15:00:00   | 2024-04-01 | 17:45:00   | 9900          | BD                 | Bandung            | 11                    | GMR                     | Gambir                  |
| 1 | BD-GMR-2024-04-01-7047-EKO-S-910126023   | 1            | 2024-04-01 | 15:00:00   | 2024-04-01 | 17:45:00   | 9900          | BD                 | Bandung            | 11                    | GMR                     | Gambir                  |
| 2 | BD-GMR-2024-04-01-7047-EKS-J-910125532   | 1            | 2024-04-01 | 15:00:00   | 2024-04-01 | 17:45:00   | 9900          | BD                 | Bandung            | 11                    | GMR                     | Gambir                  |
| 3 | BD-GMR-2024-04-01-7047-EKS-I-910125473   | 1            | 2024-04-01 | 15:00:00   | 2024-04-01 | 17:45:00   | 9900          | BD                 | Bandung            | 11                    | GMR                     | Gambir                  |
| 4 | BD-GMR-2024-04-01-7047PC-EKS-A-939990631 | 1            | 2024-04-01 | 15:00:00   | 2024-04-01 | 17:45:00   | 9900          | BD                 | Bandung            | 9                     | GMR                     | Gambir                  |
| 5 | BD-GMR-2024-04-01-7027A-EKO-S-910553898  | 1            | 2024-04-01 | 22:00:00   | 2024-04-02 | 00:49:00   | 10140         | BD                 | Bandung            | 15                    | GMR                     | Gambir                  |
| 6 | BD-GMR-2024-04-01-7027A-EKO-Q-910553793  | 1            | 2024-04-01 | 22:00:00   | 2024-04-02 | 00:49:00   | 10140         | BD                 | Bandung            | 15                    | GMR                     | Gambir                  |
| 7 | BD-GMR-2024-04-01-7027A-EKS-I-910553258  | 1            | 2024-04-01 | 22:00:00   | 2024-04-02 | 00:49:00   | 10140         | BD                 | Bandung            | 15                    | GMR                     | Gambir                  |
| 8 | BD-GMR-2024-04-01-7027A-EKS-J-910553363  | 1            | 2024-04-01 | 22:00:00   | 2024-04-02 | 00:49:00   | 10140         | BD                 | Bandung            | 15                    | GMR                     | Gambir                  |
| 9 | BD-GMR-2024-04-01-7027PC-EKS-A-939994985 | 1            | 2024-04-01 | 22:00:00   | 2024-04-02 | 00:49:00   | 10140         | BD                 | Bandung            | 12                    | GMR                     | Gambir                  |

## Website 5: FlightStats

FlightStats adalah sebuah platform online yang menyediakan informasi penerbangan. Akan dilakukan webscraping dengan API pada website flightstats.com untuk memperoleh informasi kedatangan pesawat di bandara Soekarno-Hatta (CGK) pada tanggal 30 Maret 2023.

- URL API

```
"https://www.flightstats.com/v2/api-next/flight-tracker/arr/CGK/2024/3/30/6?carrierCode=&numHours=6&rqid=y3kzflvjw9"
```

- Menampilkan data pada python

```
url_fs =
"https://www.flightstats.com/v2/api-next/flight-tracker/arr/CGK/2024/3/30/6?carrierCode=&numHours=6&rqid=y3kzflvjw9"

payload_fs = {}
headers_fs = {}

response_fs = requests.request("GET", url_fs, headers=headers_fs,
data=payload_fs)
print(response_fs.text)
```

- Mengganti tipe data menjadi JSON

```
jdata_fs = json.loads(response_fs.text)
jdata_fs1 = jdata_fs['data']
jdata_fs2 = jdata_fs1['flights']
```

- Tabulasi Data

```
df_fs = pd.json_normalize(jdata_fs2)
df_fs
```

|     | sortTime                 | operatedBy          | url  | departureTime.time@PM | departureTime.time@A | arrivalTime.time@PM | arrivalTime.time@A | carrier.fs | carrier.name     | carrier.flightNumber | airport.fs | airport.city   | isCodeshare |
|-----|--------------------------|---------------------|--|-----------------------|----------------------|---------------------|--------------------|------------|------------------|----------------------|------------|----------------|-------------|
| 0   | 2024-03-29T13:55:00.000Z | None                | /flight-tracker/CTV/491?year=2024&month=3&date=... | 8:20PM                | 20:20                | 6:55PM              | 20:55              | CTV        | Citilink         | 491                  | BDJ        | Banjarnasin    | NaN         |
| 1   | 2024-03-29T14:55:00.000Z | None                | /flight-tracker/CTV/725?year=2024&month=3&date=... | 8:30PM                | 20:30                | 9:55PM              | 21:55              | CTV        | Citilink         | 725                  | SUB        | Surabaya       | NaN         |
| 2   | 2024-03-29T23:00:00.000Z | None                | /flight-tracker/NH/671?year=2024&month=3&date=...  | 12:05AM               | 00:05                | 6:00AM              | 06:00              | NH         | ANA              | 871                  | HND        | Tokyo          | NaN         |
| 3   | 2024-03-29T23:00:00.000Z | Operated by ANA 871 | /flight-tracker/GA/9351?year=2024&month=3&date=... | 12:05AM               | 00:05                | 6:00AM              | 06:00              | GA         | Garuda Indonesia | 9351                 | HND        | Tokyo          | True        |
| 4   | 2024-03-29T23:00:00.000Z | Operated by ANA 871 | /flight-tracker/UA/7902?year=2024&month=3&date=... | 12:05AM               | 00:05                | 6:00AM              | 06:00              | UA         | United Airlines  | 7902                 | HND        | Tokyo          | True        |
| ... | ...                      | ...                 | ...  | ...                   | ...                  | ...                 | ...                | ...        | ...              | ...                  | ...        | ...            | ...         |
| 227 | 2024-03-30T05:00:00.000Z | None                | /flight-tracker/JT/713?year=2024&month=3&date=...  | 10:35AM               | 10:35                | 12:00PM             | 12:00              | JT*        | Lion Air         | 713                  | PNK        | Pontianak      | NaN         |
| 228 | 2024-03-30T05:00:00.000Z | None                | /flight-tracker/JT/1171?year=2024&month=3&date=... | 11:10AM               | 11:10                | 12:00PM             | 12:00              | JT*        | Lion Air         | 171                  | TKG        | Bandar Lampung | NaN         |
| 229 | 2024-03-30T05:05:00.000Z | None                | /flight-tracker/CTV/715?year=2024&month=3&date=... | 10:40AM               | 10:40                | 12:05PM             | 12:05              | CTV        | Citilink         | 715                  | SUB        | Surabaya       | NaN         |
| 230 | 2024-03-30T05:15:00.000Z | None                | /flight-tracker/CTV/333?year=2024&month=3&date=... | 10:50AM               | 10:50                | 12:15PM             | 12:15              | CTV        | Citilink         | 333                  | UPG        | Ujung Pandang  | NaN         |
| 231 | 2024-03-30T05:20:00.000Z | None                | /flight-tracker/ID/7154?year=2024&month=3&date=... | 11:25AM               | 11:25                | 12:20PM             | 12:20              | ID*        | Batik Air        | 7154                 | SIN        | Singapore      | NaN         |

232 rows x 13 columns

## Website 6: FlightRadar24

FlightRadar24 merupakan sebuah platform yang dapat melacak penerbangan dan mengetahui detailnya. Akan dilakukan webscraping untuk mengetahui detail penerbangan kedatangan pada bandara Soekarno-Hatta (CGK).

### - URL API

```
"https://api.flightradar24.com/common/v1/airport.json?code=cgk&plugin[]=&plugin-setting[schedule][mode]=arrivals&plugin-setting[schedule][timestamp]=1711965142&page=1&limit=100&fleet=&token="
```

### - Menampilkan data pada python

```
flightradar =
"https://api.flightradar24.com/common/v1/airport.json?code=cgk&plugin[]=&plugin-setting[schedule][mode]=arrivals&plugin-setting[schedule][timestamp]=1711965142&page=1&limit=100&fleet=&token="

pl={}
hd = {}

response = requests.request("GET", flightradar, headers=hd,
data=pl)
!gdown 1oK80AWVl1f9kiN7osF6JalzOSYhvJvLu
```

### - Mengganti tipe data menjadi JSON

```
df_fr24 = open('jsonformatter_flightradar24_cgkArrivals.txt')
data_fr24 = json.load(df_fr24)
data_fr24
jsonfr = data_fr24['result']
jsonfr2 = jsonfr['response']
jsonfr3 = jsonfr2['airport']
jsonfr4 = jsonfr3['pluginData']
jsonfr5 = jsonfr4['schedule']
jsonfr6 = jsonfr5['arrivals']
flightradar_data = jsonfr6['data']
flightradar_data
```



- Tabulasi data dan kolom pada tabel

```
df_radar = pd.json_normalize(flightradarfinal)
df_radar
```

|     | flight.identification.id | flight.identification.row | flight.identification.number.default | flight.identification.number.alternative | flight.identification.callsign | flight.identification.codeshare                  | flight.status.live | flight.status.text | flight.status.icon | flight.status.estimated | ... | flight.time.scheduled.dep |
|-----|--------------------------|---------------------------|--------------------------------------|--|--------------------------------|--|--------------------|--------------------|--------------------|-------------------------|-----|---------------------------|
| 0   | 3490803                  | 540331886                 | QG967                                | None                                     | CTV967                         | None   | False              | Landed 16:51       | green              | None                    | ... | 17:15                     |
| 1   | 3497018                  | 5403304507                | GA113                                | None                                     | GA113                          | [MH5785, NH5500]                                 | False              | Landed 16:50       | green              | None                    | ... | 17:15                     |
| 2   | 3496400a                 | 5403304854                | GA411                                | QG411                                    | GA411                          | [WVS411, TK9371, KL4055, EV7114, VQ3339, SV9347] | False              | Landed 16:30       | green              | None                    | ... | 17:15                     |
| 3   | 349640c3                 | 5403324953                | ID6523                               | None                                     | BTX6523                        | None   | False              | Landed 16:45       | green              | None                    | ... | 17:15                     |
| 4   | None                     | 5403333425                | J7795                                | None                                     | None                           | None   | False              | Scheduled*         | None               | None                    | ... | 17:15                     |
| ... | ...                      | ...                       | ...                                  | ...                                      | ...                            | ...  | ...                | ...                | ...                | ...                     | ... | ...                       |
| 95  | None                     | 540331737                 | QG425                                | None                                     | None                           | None   | False              | Scheduled          | None               | None                    | ... | 17:15                     |
| 96  | None                     | 5403311093                | QG969                                | None                                     | None                           | None   | False              | Scheduled          | None               | None                    | ... | 17:15                     |
| 97  | None                     | 5403401600                | TR278                                | None                                     | None                           | [SO8592]   | False              | Scheduled          | None               | None                    | ... | 17:15                     |
| 98  | None                     | 5403450140                | 885109                               | None                                     | None                           | [J15109]   | False              | Scheduled          | None               | None                    | ... | 17:15                     |
| 99  | None                     | 5403027679                | 885537                               | None                                     | None                           | [J15120]   | False              | Scheduled          | None               | None                    | ... | 17:15                     |

```
df_radar.columns
```

```
Index(['flight.identification.id', 'flight.identification.row',
      'flight.identification.number.default',
      'flight.identification.number.alternative',
      'flight.identification.callsign', 'flight.identification.codeshare',
      'flight.status.live', 'flight.status.text', 'flight.status.icon',
      'flight.status.estimated', 'flight.status.ambiguous',
      'flight.status.generic.status.text',
      'flight.status.generic.status.type',
      'flight.status.generic.status.color',
      'flight.status.generic.status.diverted',
      'flight.status.generic.eventTime.utc',
      'flight.status.generic.eventTime.local', 'flight.aircraft.model.code',
      'flight.aircraft.model.text', 'flight.aircraft.registration',
      'flight.aircraft.country.id', 'flight.aircraft.country.name',
      'flight.aircraft.country.alpha2', 'flight.aircraft.country.alpha3',
      'flight.aircraft.hex', 'flight.aircraft.restricted',
      'flight.aircraft.serialNo', 'flight.aircraft.age.availability',
      'flight.aircraft.availability.serialNo',
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