COMP3322 Modern Technologies on World Wide Web

Assignment Two

Total 20 points

Deadline: 23:59 October 29, 2024

Overview

You will design and develop a Web app that retrieves and displays 'real-time' passenger flight information from Hong Kong Airport Open Data. This REST web service provided by HK Airport returns historical data (including current calendar day) in JSON format. For this assignment, we only display current calendar date departure and arrival passenger flight information. The Web app should be nicely rendered on any desktop computer and smartphone.

Objectives

1. A learning activity to support ILO 1 and ILO 2.
2. To learn how to make use of Open Data.
3. To practice using JavaScript to (1) create dynamic content, (2) carry out AJAX communication for retrieving Open Data, and (3) selectively display flight information.
4. To practice using CSS styling to design a flexible and responsive layout.

Hong Kong Airport Open Data

We are using the data provided by the REST API of the Hong Kong Airport Authority for building our Web App.

Website: https://data.gov.hk/en-data/dataset/aahk-team1-flight-info

You can download the data dictionary about the request parameters and the response data set from here. https://www.hongkongairport.com/iwov-resources/misc/opendata/Flight_Information_DataSpec_en.pdf

To get the **departure** data for calendar date **2024-09-26**, use this URL
https://www.hongkongairport.com/flightinfo-rest/rest/flights/past?date=2024-09-26&lang=en&cargo=false&arrival=false

To get the **arrival** data for calendar date **2024-09-26**, use this URL
https://www.hongkongairport.com/flightinfo-rest/rest/flights/past?date=2024-09-26&lang=en&cargo=false&arrival=true

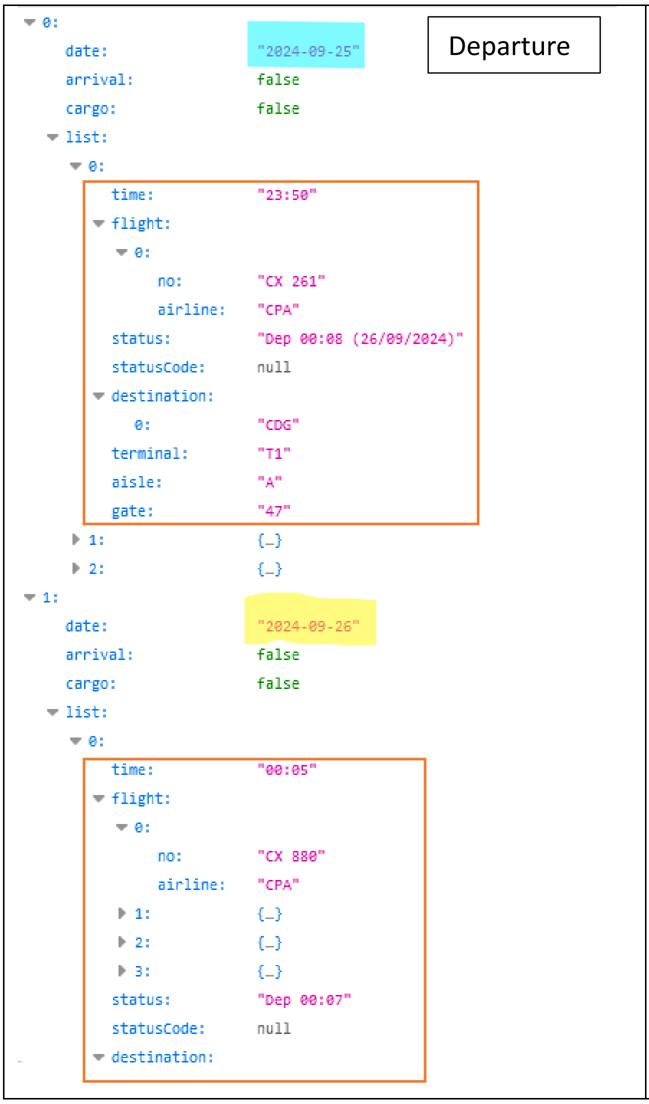
Please note that the date string must be in the format YYYY-MM-DD.

The datasets for departure and arrival flights have common fields and a few unique fields. Here is the example JSON data returned by the system on **2024-09-26**.

Each flight schedule consists of a time field, a list of flight no. and airline, and the flight status. For the departure flight, it has the destination list, terminal, aisle, and gate no. for the passengers to board the plane. **Please note that each departure flight may have more than one flight no. and airline and may go to more than one destination.** For the arrival flight, it has the origin list, baggage belt no., arrival hall, and parking stand. **It is also possible that an arrival flight may have more than one origin airport.** For the departure and arrival schedules, it may contain one or more flights which was/were scheduled on a date before the current calendar date but being departed at / arrived on a time in the current calendar date.

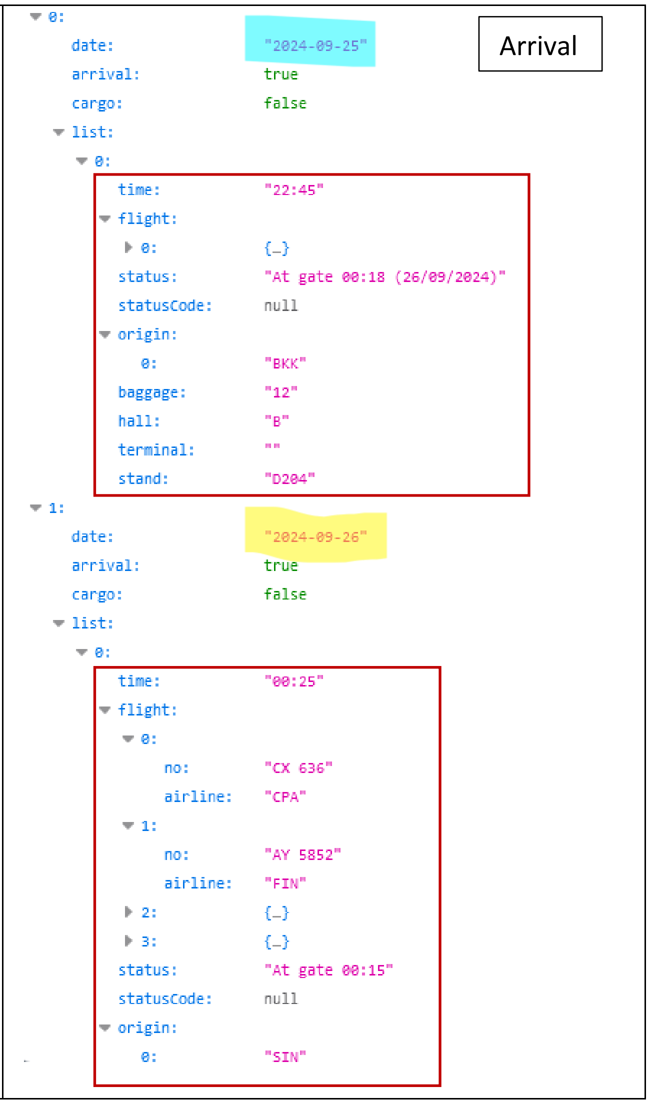
Please read the data dictionary file to learn the meaning of individual fields and perform a few GET requests **using Firefox** to examine the returned JSON datasets.

These are the datasets retrieved from the server for the date 2024-09-26.



Departure

```
▼ 0:
    date:               "2024-09-25"
    arrival:            false
    cargo:              false
  ▼ list:
    ▼ 0:
        time:           "23:50"
      ▼ flight:
        ▼ 0:
            no:         "CX 261"
            airline:    "CPA"
        status:         "Dep 00:08 (26/09/2024)"
        statusCode:     null
      ▼ destination:
          0:            "CDG"
        terminal:       "T1"
        aisle:          "A"
        gate:           "47"
    ▶ 1:                {…}
    ▶ 2:                {…}
▼ 1:
    date:               "2024-09-26"
    arrival:            false
    cargo:              false
  ▼ list:
    ▼ 0:
        time:           "00:05"
      ▼ flight:
        ▼ 0:
            no:         "CX 880"
            airline:    "CPA"
        ▶ 1:            {…}
        ▶ 2:            {…}
        ▶ 3:            {…}
        status:         "Dep 00:07"
        statusCode:     null
      ▼ destination:
```



Arrival

```
▼ 0:
    date:               "2024-09-25"
    arrival:            true
    cargo:              false
  ▼ list:
    ▼ 0:
        time:           "22:45"
      ▼ flight:
        ▶ 0:            {…}
        status:         "At gate 00:18 (26/09/2024)"
        statusCode:     null
      ▼ origin:
          0:            "BKK"
        baggage:        "12"
        hall:           "B"
        terminal:       ""
        stand:          "D204"
▼ 1:
    date:               "2024-09-26"
    arrival:            true
    cargo:              false
  ▼ list:
    ▼ 0:
        time:           "00:25"
      ▼ flight:
        ▼ 0:
            no:         "CX 636"
            airline:    "CPA"
        ▼ 1:
            no:         "AY 5852"
            airline:    "FIN"
        ▶ 2:            {…}
        ▶ 3:            {…}
        status:         "At gate 00:15"
        statusCode:     null
      ▼ origin:
          0:            "SIN"
```

The destination and the origin airports are encoded by the standard IATA code. To provide useful information to the users, we have prepared another JSON file – **iata.json**, which contains more descriptive information about an airport. For examples,

IATA code: HKG
{
"iata_code": "HKG",
"name": "Hong Kong International Airport",
"continent": "AS",
"iso_country": "HK",
"iso_region": "HK-U-A",
"municipality": "Hong Kong"
}
	IATA code: MEL
	{
	"iata_code": "MEL",
	"name": "Melbourne International Airport",
	"continent": "OC",
	"iso_country": "AU",
	"iso_region": "AU-VIC",
	"municipality": "Melbourne"
	}

IATA code: KIX
{
"iata_code": "KIX",
"name": "Kansai International Airport",
"continent": "AS",
"iso_country": "JP",
"iso_region": "JP-27",
"municipality": "Osaka"
}
	IATA code: WUH
	{
	"iata_code": "WUH",
	"name": "Wuhan Tianhe International Airport",
	"continent": "AS",
	"iso_country": "CN",
	"iso_region": "CN-42",
	"municipality": "Wuhan"
	}

Unfortunately, we **cannot directly fetch** HK Airport flight data through our web app using JavaScript. It is because the hongkongairport.com server does not set up the CORS setting. Cross-origin resource sharing (CORS) is a mechanism that allows restricted resources on a web page to be requested from another domain outside the domain from which the first resource was served. To overcome this limitation, we have prepared a **flight.php** program, which allows our web server to act as a client to request flight data from Hong Kong Airport and relay the data to our web app. The flight.php program accepts the same set of query strings as the Hong Kong airport server.

flight.php?date=2024-09-27&lang=en&cargo=false&arrival=true

Please place the flight.php program and the iata.json file under the public_html folder of your docker web server container.

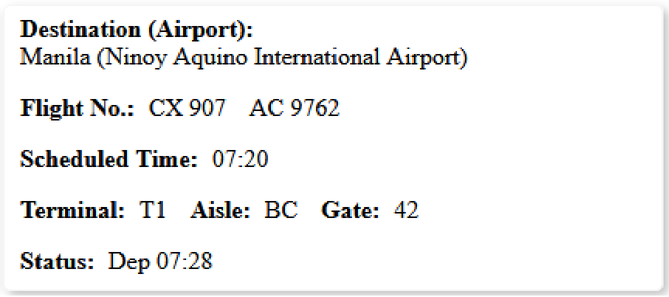
```
public_html
|
├── flight.php
├── iata.json
├── main.js
├── styles.css
└── index.html
```

For this assignment, you are going to develop the index.html, main.js and styles.css files.

Requirements

- You must implement the program using **vanilla JavaScript**. No other JS libraries and CSS libraries are allowed. Place all JavaScript code in the main.js file and all styling rules in the styles.css file.
- You should develop the application using the course's LAMP docker containers. If you experienced technical problems using docker, use the department's i7.cs.hku.hk server for development and testing. (To connect to i7.cs.hku.hk, you have to set up and connect to HKUVPN first.)
- Retrieve HKA Open Data and iata.json **using AJAX XHR object or fetch API.**
- Extract data for each flight in the departure and arrival datasets.

  For a departure flight, list **all flight no.**, the scheduled time, destination location and airport, terminal, aisle, gate no., and the status of the flight. Here is an example departure flight on September 28, 2024, and the corresponding JSON data.



Destination (Airport):
Manila (Ninoy Aquino International Airport)

Flight No.: CX 907 AC 9762

Scheduled Time: 07:20

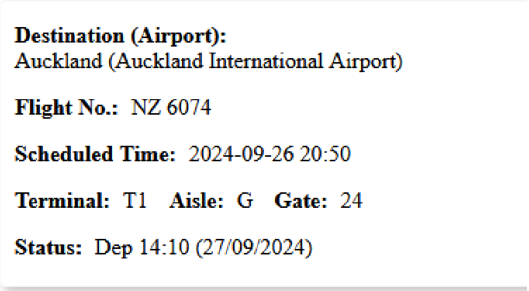
Terminal: T1 **Aisle:** BC **Gate:** 42

Status: Dep 07:28

```
{
  "time": "07:20",
  "flight": [
    {
      "no": "CX 907",
      "airline": "CPA"
    },
    {
      "no": "AC 9762",
      "airline": "ACA"
    }
  ],
  "status": "Dep 07:28",
  "statusCode": null,
  "destination": [
    "MNL"
  ],
  "terminal": "T1",
  "aisle": "BC",
  "gate": "42"
}
```

You obtain the location and airport information from the **municipality and name fields** of the iata.json dataset.

Here is another example departure flight departed on September 27, 2024, but was scheduled on September 26, 2024, and the corresponding JSON data.



Destination (Airport):
Auckland (Auckland International Airport)

Flight No.: NZ 6074

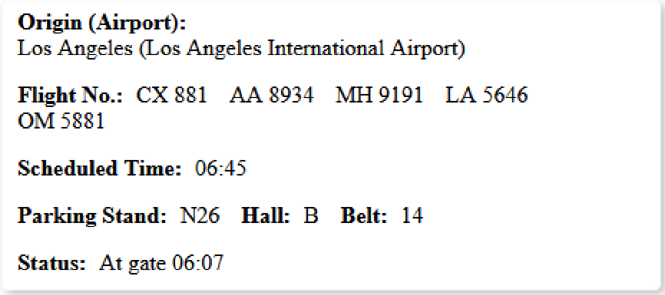
Scheduled Time: 2024-09-26 20:50

Terminal: T1 **Aisle:** G **Gate:** 24

Status: Dep 14:10 (27/09/2024)

```
[
  {
    "date": "2024-09-26",
    "arrival": false,
    "cargo": false,
    "list": [
      {
        "time": "20:50",
        "flight": [
          {
            "no": "NZ 6074",
            "airline": "ANZ"
          }
        ],
        "status": "Dep 14:10 (27/09/2024)",
        "statusCode": null,
        "destination": [
          "AKL"
        ],
        "terminal": "T1",
        "aisle": "G",
        "gate": "24"
      },
```

For an arrival flight, list **all flight no.**, the scheduled time, origin location and airport, parking stand, hall, belt no., and the status of the flight. Here is an example arrival flight on September 28, 2024, and the corresponding JSON data.



Origin (Airport):
Los Angeles (Los Angeles International Airport)

Flight No.: CX 881 AA 8934 MH 9191 LA 5646 OM 5881

Scheduled Time: 06:45

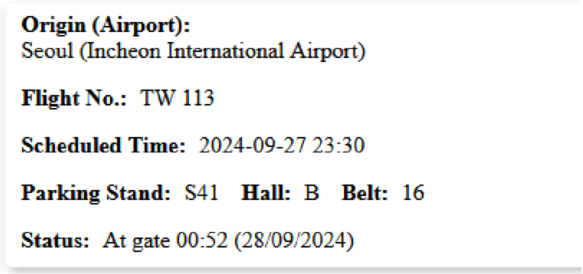
Parking Stand: N26 **Hall:** B **Belt:** 14

Status: At gate 06:07

```
{
  "time": "06:45",
  "flight": [
    {
      "no": "CX 881",
      "airline": "CPA"
    },
    {
      "no": "AA 8934",
      "airline": "AAL"
    },
    {
      "no": "MH 9191",
      "airline": "MAS"
    },
    {
      "no": "LA 5646",
      "airline": "LAN"
    },
    {
      "no": "OM 5881",
      "airline": "MGL"
    }
  ],
  "status": "At gate 06:07",
  "statusCode": null,
  "origin": [
    "LAX"
  ],
  "baggage": "14",
```

	"hall": "B", "terminal": "", "stand": "N26" }

Here is another example arrival flight arrived on September 28, 2024, but was expected to arrive on September 27 at 23:30 and the corresponding JSON data.



Origin (Airport):
Seoul (Incheon International Airport)

Flight No.: TW 113

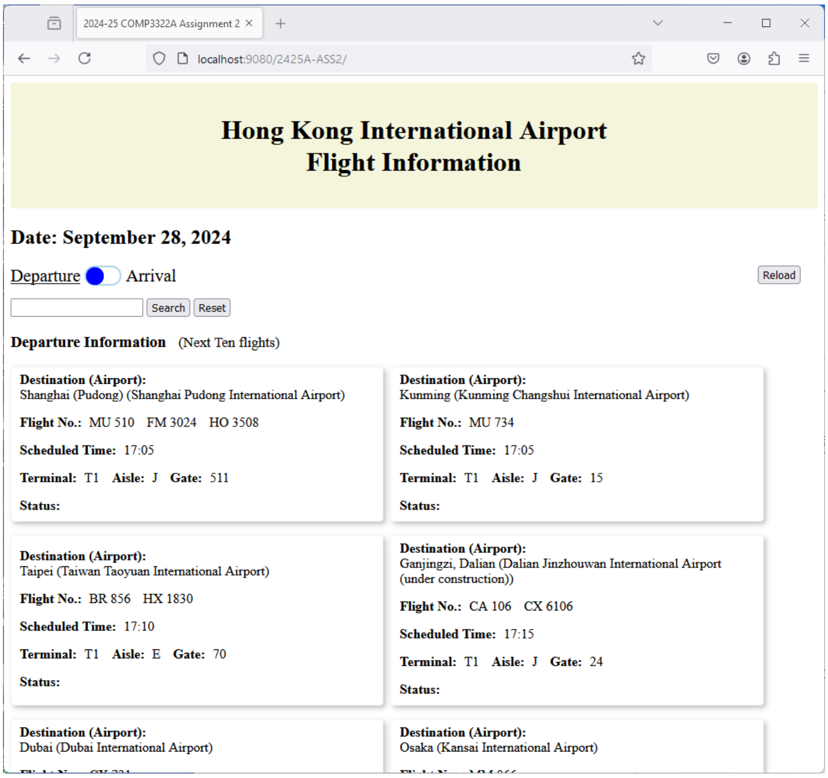
Scheduled Time: 2024-09-27 23:30

Parking Stand: S41 **Hall:** B **Belt:** 16

Status: At gate 00:52 (28/09/2024)

```
{
  "time": "23:30",
  "flight": [
    {
      "no": "TW 113",
      "airline": "TWB"
    }
  ],
  "status": "At gate 00:52 (28/09/2024)",
  "statusCode": null,
  "origin": [
    "ICN"
  ],
  "baggage": "16",
  "hall": "B",
  "terminal": "",
  "stand": "S41"
}
```

- Our Web App consists of a title, the current date, a mechanism to switch between displaying the departure flights or arrival flights, a searching field for searching flights to/from a specific location, and some buttons. Here is the screenshot of a **sample** implementation.



Hong Kong International Airport
Flight Information

Date: September 28, 2024

Departure Information (Next Ten flights)

Destination (Airport):
Shanghai (Pudong) (Shanghai Pudong International Airport)

Flight No.: MU 510 FM 3024 HO 3508

Scheduled Time: 17:05

Terminal: T1 **Aisle:** J **Gate:** 511

Status:

Destination (Airport):
Kunming (Kunming Changshui International Airport)

Flight No.: MU 734

Scheduled Time: 17:05

Terminal: T1 **Aisle:** J **Gate:** 15

Status:

Destination (Airport):
Taipei (Taiwan Taoyuan International Airport)

Flight No.: BR 856 HX 1830

Scheduled Time: 17:10

Terminal: T1 **Aisle:** E **Gate:** 70

Status:

Destination (Airport):
Ganjingzi, Dalian (Dalian Jinzhouwan International Airport (under construction))

Flight No.: CA 106 CX 6106

Scheduled Time: 17:15

Terminal: T1 **Aisle:** J **Gate:** 24

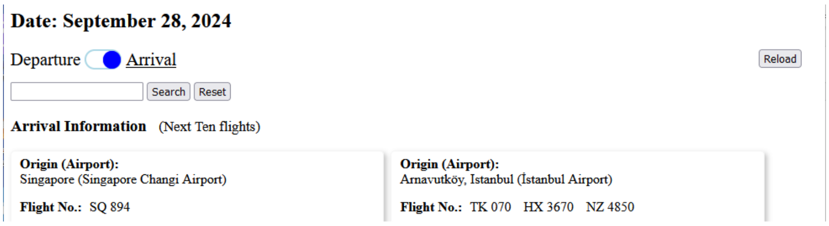
Status:

Destination (Airport):
Dubai (Dubai International Airport)

Destination (Airport):
Osaka (Kansai International Airport)

- On loading, the page **displays the departure flights by default**. Based on the **current time**, only displays information on the **next ten** (departure) flights (or less depends on the current time).

- Implement a mechanism that allows users to select which set of flight information to display. There is a **toggle switch** for the user to switch between displaying departure flights and arrival flights. Implement an animation to slowly flip the switch from left to right and from right to left. Also, adjust the headings and the flight information accordingly.



Date: September 28, 2024

Departure ● Arrival

Arrival Information (Next Ten flights)

Origin (Airport):
Singapore (Singapore Changi Airport)

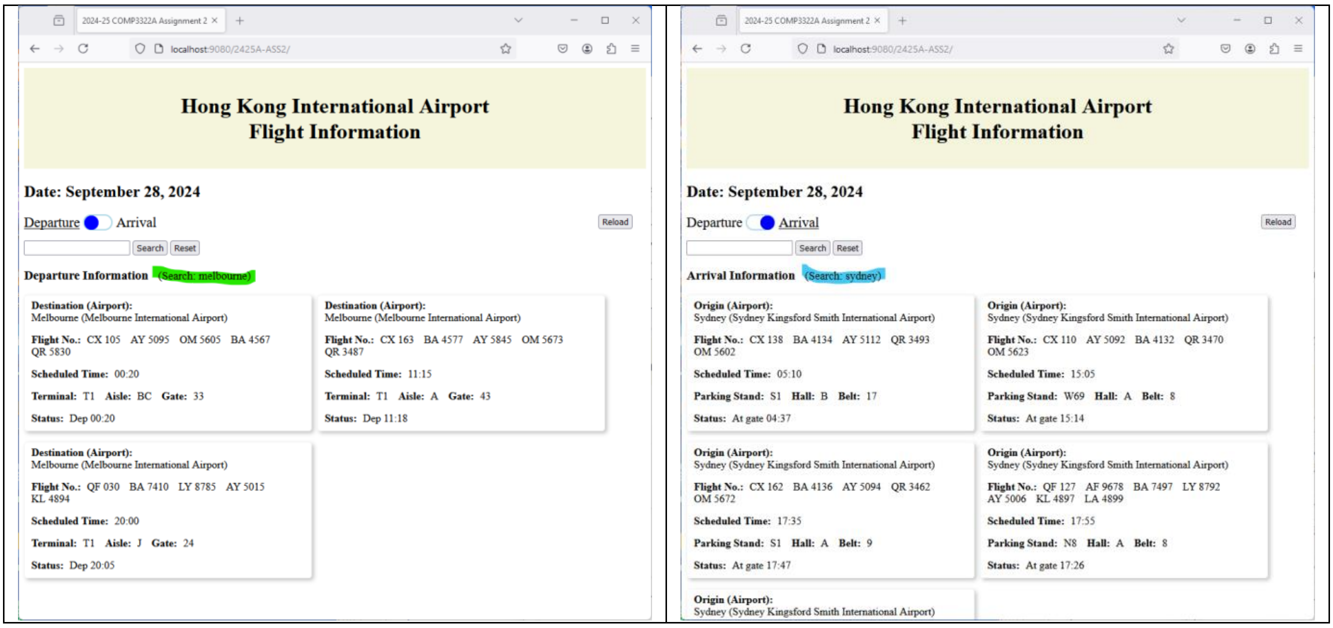
Flight No.: SQ 894

Origin (Airport):
Arnavutköy, Istanbul (Istanbul Airport)

Flight No.: TK 070 HX 3670 NZ 4850

Similarly, when switching to the arrival view, only displays information on the next ten (arrival) flights.

- There is a search input field for the user to enter a name (location/airport) for searching, a search button to trigger the search, and a reset button to return the page to normal view. When the user clicks on the Search button with a value in the input field, the system will search **all** flight data under **current context** – departure or arrival, for records with the matched value in the Destination or Origin field. The search is case-insensitive.



Hong Kong International Airport
Flight Information

Date: September 28, 2024

Departure ● Arrival

Departure Information (Search: melbourne)

Destination (Airport):
Melbourne (Melbourne International Airport)

Flight No.: CX 105 AY 5095 OM 5605 BA 4567 QR 5830

Scheduled Time: 00:20

Terminal: T1 **Aisle:** BC **Gate:** 33

Status: Dep 00:20

Destination (Airport):
Melbourne (Melbourne International Airport)

Flight No.: CX 163 BA 4577 AY 5845 OM 5673 QR 3487

Scheduled Time: 11:15

Terminal: T1 **Aisle:** A **Gate:** 43

Status: Dep 11:18

Destination (Airport):
Melbourne (Melbourne International Airport)

Flight No.: QF 030 BA 7410 LY 8785 AY 5015 KL 4894

Scheduled Time: 20:00

Terminal: T1 **Aisle:** J **Gate:** 24

Status: Dep 20:05

Hong Kong International Airport
Flight Information

Date: September 28, 2024

Departure ● Arrival

Arrival Information (Search: sydney)

Origin (Airport):
Sydney (Sydney Kingsford Smith International Airport)

Flight No.: CX 138 BA 4134 AY 5112 QR 3493 OM 5602

Scheduled Time: 05:10

Parking Stand: S1 **Hall:** B **Belt:** 17

Status: At gate 04:37

Origin (Airport):
Sydney (Sydney Kingsford Smith International Airport)

Flight No.: CX 110 AY 5092 BA 4132 QR 3470 OM 5623

Scheduled Time: 15:05

Parking Stand: W69 **Hall:** A **Belt:** 8

Status: At gate 15:14

Origin (Airport):
Sydney (Sydney Kingsford Smith International Airport)

Flight No.: CX 162 BA 4136 AY 5094 QR 3462 OM 5672

Scheduled Time: 17:35

Parking Stand: S1 **Hall:** A **Belt:** 9

Status: At gate 17:47

Origin (Airport):
Sydney (Sydney Kingsford Smith International Airport)

Flight No.: QF 127 AF 9678 BA 7497 LY 8792 AY 5006 KL 4897 LA 4899

Scheduled Time: 17:55

Parking Stand: N8 **Hall:** A **Belt:** 8

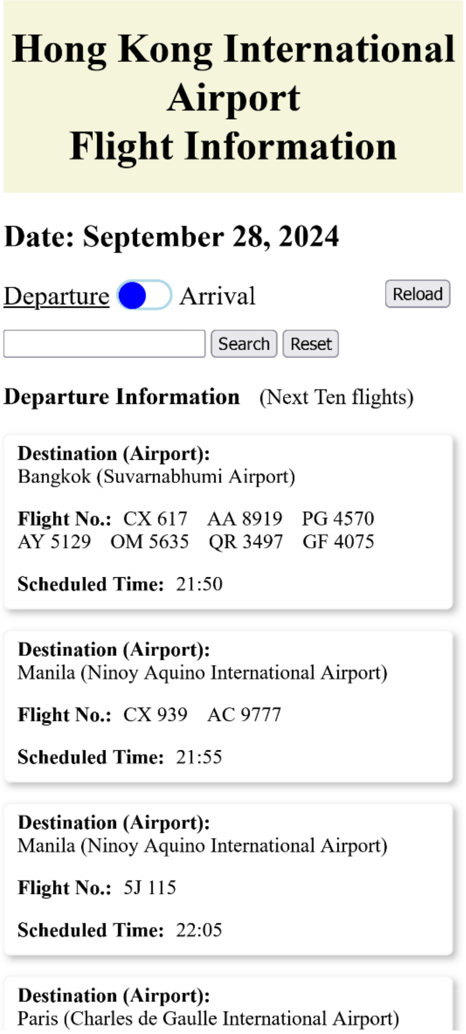
Status: At gate 17:26

Origin (Airport):
Sydney (Sydney Kingsford Smith International Airport)

In addition to showing all matched flights, the system shows the information with (Search: xxxxxxxxx) to indicate that these are the results of the search.
Users can return to the normal view by either clicking on the reset button or switching to another context.

- There is a reload button on the right for forcing the page to reload. By reloading the page, the system gets the updated departure and arrival datasets and displays the departure view by default. This allows the system to show the latest changes on the flight information.
- The base document of our Web app is the **index.html** file. You can add any HTML tags to the <body> part of the file. To display the flight information, you use JavaScript to dynamically create all HTML elements and their contents during runtime and use CSS and JavaScript to set the styling and layout. You are required to place all JavaScript code in an external JS file named **main.js** and all CSS style rules in an external file named **styles.css**.

- You **should implement** appropriate CSS settings for rendering the Web app on a desktop browser (with at least 1000px screen width) and a smartphone (with a screen width between 350px – 500px). There is one additional requirement for the mobile view. To reduce space occupied by a block of flight information, the system hides the last two rows of content in each block. Add an on-click event to the blocks for toggling between showing all content or hide the last two rows.



Hong Kong International Airport Flight Information

Date: September 28, 2024

Departure ● Arrival

Departure Information (Next Ten flights)

Destination (Airport):
Bangkok (Suvarnabhumi Airport)

Flight No.: CX 617 AA 8919 PG 4570 AY 5129 OM 5635 QR 3497 GF 4075

Scheduled Time: 21:50

Destination (Airport):
Manila (Ninoy Aquino International Airport)

Flight No.: CX 939 AC 9777

Scheduled Time: 21:55

Destination (Airport):
Manila (Ninoy Aquino International Airport)

Flight No.: 5J 115

Scheduled Time: 22:05

Destination (Airport):
Paris (Charles de Gaulle International Airport)

Resources

Here are the required resources for building the Web app. You can download a copy via the course's Moodle page.

- iata.json – this JSON file contains more descriptive information about the airports.
- flight.php – the PHP file that acts as a client to request flight data from HKAA API server.

Testing platform

We shall place all your submitted files in the LAMP container set and use Chrome and/or Firefox to test the programs.

Submission

Please finish this assignment before Tuesday, October 29 23:59. Submit the following files:

1. index.html
2. main.js
3. styles.css

Grading Policy

Points	Criteria
3.0	Download and extract data from the departure and arrival dataset • Using fetch API or XHR objects to download all required .json files • Correctly extract all data and required fields from the datasets
0.5	Display the header and current date
5.0	Display the flight data • Correctly display flight blocks on desktop view and mobile view • Only show the next Ten flights based on the current time • Allow showing and hiding content on mobile view
4.0	Implement a mechanism (with animation) to switch between displaying the departure flights and arrival flights. • After switching, returns to display the next ten flight information according to the current time.
4.0	Implement the search feature • Allow searching a location or airport for current display context

	• Implement the reset button to resume the normal view
1.0	Implement the reload button for fetching updated datasets and loading the default view
2.5	Styling and layout ▪ Support both desktop and mobile settings ▪ Basic styling
-1.0	Not using index.html as the Web app main page
-8.0	Use external JavaScript/CSS libraries

Plagiarism

Plagiarism is a very serious academic offence. Students should understand what constitutes plagiarism, the consequences of committing an offence of plagiarism, and how to avoid it. ***Please note that we may request you to explain to us how your program is functioning as well as we may also make use of software tools to detect software plagiarism.***