



# ASSIGNMENT ASSIGNMENT 2

CSCI 571 – Spring 2025

[Abstract](#)

Server-side Scripting using Python, Flask, JSON, AJAX, and Artsy API

This content is protected and may not be shared, uploaded, or distributed.

Marco Papa  
papa@usc.edu

# Assignment 2: Server-side Scripting using Python, Flask, JSON, AJAX, and Artsy API

## 1 Objectives

1. Get experience with Python programming language and Flask framework.
2. Get experience creating web pages using HTML, CSS and JavaScript. Understand DOM, use JSON format. Use fetch API or XMLHttpRequest for AJAX.
3. Get experience with Artsy API.
4. Get experience with Google Cloud Platform (GCP).

## 2 Assignment Description Resources

1. Assignment Description Document (This document)
2. Grading Guidelines
3. Reference Video
4. Piazza

## 3 General Directions

1. The backend of this assignment must be implemented in Python using Flask. For Python and Flask kick-start, please refer to the i) lecture slides on D2L Brightspace and ii) [Flask Quickstart documentation](#).
2. The backend of this assignment must be deployed to GCP. See D2L Brightspace for deployment of your project on the Google Cloud platform.
3. You must refer to the assignment description document (this document), rubric, the reference video and instructions in Piazza while developing this assignment. All discussions and explanations in Piazza related to this assignment are part of the assignment description and rubric. Therefore, please review all Piazza threads before submitting the assignment. If there is a conflict between Piazza and this description and/or the rubric, answers in Piazza supersede the others.
4. The assignment will be graded using the latest version of the Google Chrome browser. Developing assignments using the latest version of Google Chrome is advised.

## 4 Description

In this assignment, you are going to create a web page that allows its users to search for artists using the [Artsy API](#). The results of the search will be listed as a list of artist cards. When a user clicks on an artist card, details about the chosen artist will be shown.

### 4-1 Artsy Developer Registration

To use Artsy API, you need to create a developer account in Artsy, create an app and get a client ID and a client Secret.

Download the PDF file named **Artsy REST API Setup** from D2L Brightspace to create an account, obtain the credentials to use the Artsy APIs, and test the APIs using Postman.

## 4-2 Artsy API Endpoints

The full list and documentation of the Artsy API endpoints are given in <https://developers.artsy.net/v2/>. In this assignment, you will use 3 Artsy API endpoints: [Authentication](#), [Search](#), and [Artists](#).

Search and Artists endpoints require the **X-XAPP-Token** header, which you will get through the Authentication endpoint.

### 4-2-1 Authentication Endpoint

The Authentication endpoint has the base URL [https://api.artsy.net/api/tokens/xapp\\_token](https://api.artsy.net/api/tokens/xapp_token). You must send your request using the HTTP POST method. It requires two parameters: **client\_id** and **client\_secret**. Set **client\_id** to the **Client Id** that was assigned to your app, and **client\_secret** to the **Client Secret** that was assigned to your app. The Authentication endpoint returns a JSON response in the following form:

```
{
  "type" : "xapp_token",
  "token" : "...",
  "expires_at" : "2025-01-05T23:46:35+00:00"
}
```

The **token** field of the response will be used while accessing the Search and Artists endpoints. Notice that the token returned from the Authentication API will expire 1 week after being requested. You can either implement a logic that refreshes the token when it expires (elegant solution) or get a new token before each request (not elegant solution). For the purposes of this assignment, we will not grade how you implement this logic. You are free to do it either way.

### 4-2-2 Search Endpoint

Search endpoint allows you to search for anything in the Artsy database. It has the base URL <https://api.artsy.net/api/search>. You send your request using the HTTP GET method. It accepts a query parameter **q**. You send your search query through this parameter. The maximum number of results can be set by the **size** parameter, which has the maximum value of 10. In this assignment, you will always set it to 10. You can filter results to show only artists by setting **type** parameter to "artist". In addition to the query parameter, you should set X-XAPP-Token header in your request to the token returned from Authentication endpoint.

Example request: <https://api.artsy.net/api/search?q=picasso&size=10&type=artist>

The server returns a JSON result, excerpt from which is given below.

```

total_count:      7483
offset:           0
q:                "picasso"
▼ _links:
  ▼ self:
    href:          "https://api.artsy.net/api/search?offset=0&q=picasso&size=10"
  ▼ next:
    href:          "https://api.artsy.net/api/search?offset=10&q=picasso&size=10"
▼ _embedded:
  ▼ results:
    ▼ 0:
      type:         "artist"
      title:        "Pablo Picasso"
      description:   null
      og_type:      "artist"
      ▼ _links:
        ▼ self:
          href:      "https://api.artsy.net/api/artists/4d8b928b4eb68a1b2c0001f2"
        ▼ permalink:
          href:      "https://www.artsy.net/artist/pablo-picasso"
        ▼ thumbnail:
          href:      "https://d32dm0rphc51dk.cloudfront.net/i3rCA3IaKE-cLBnc-USswQ/square.jpg"
    ▼ 1:
      type:         "artist"
      title:        "Paloma Picasso"
      description:   null
      og_type:      "artist"
      ▼ _links:
        ▼ self:
          href:      "https://api.artsy.net/api/artists/52b32400275b24533a00019c"
        ▼ permalink:
          href:      "https://www.artsy.net/artist/paloma-picasso"
        ▼ thumbnail:
          href:      "https://d32dm0rphc51dk.cloudfront.net/88_9TcM9tcyhE0TPmKOHEA/square.png"

```

The search results are listed in ["\_embedded"]["results"] field. Search endpoint returns search results across 5 types: artist, artwork, profile, gene and show. In this assignment, we are only interested in artist results. **The {id} of artist** can be extracted from the ["\_links"]["self"]["href"] field of each result. The part after the last slash symbol is the {id} of the artist. (e.g. if the artist link is <https://api.artsy.net/api/artists/4d8b928b4eb68a1b2c0001f2>, artist {id} is 4d8b928b4eb68a1b2c0001f2)

Artsy search results are paginated, meaning that it returns a specific number of results after each request (set by the size parameter) and if the remaining results are wanted, another request can be made to the link in the ["\_links"]["next"]["href"] field of the response. In this assignment, you will only use results from the first page and will not make additional requests.

We are interested in ["title"] (name of the artist) and ["\_links"]["thumbnail"]["href"] (image for the artist) fields as well as the {id}s of artists in this assignment. When an artist does not have an image, ["\_links"]["thumbnail"]["href"] field contains "/assets/shared/missing\_image.png".

### 4-2-3 Artists Endpoint

The Artists endpoint is used to get details about an artist. It has the base URL <https://api.artsy.net/api/artists>. You send your request using the HTTP GET method. It accepts a parameter **{id}**, denoting the ID of an artist. Differently from the Search API, you append the **id**

parameter to the link without specifying the name of the parameter, in compliance with REST recommendations (i.e., you send request to <https://api.artsy.net/api/artists/{id}>). Like the search endpoint, you should set X-XAPP-Token header in your request to the token returned from the Authentication endpoint.

Example request: <https://api.artsy.net/api/artists/4d8b928b4eb68a1b2c0001f2>

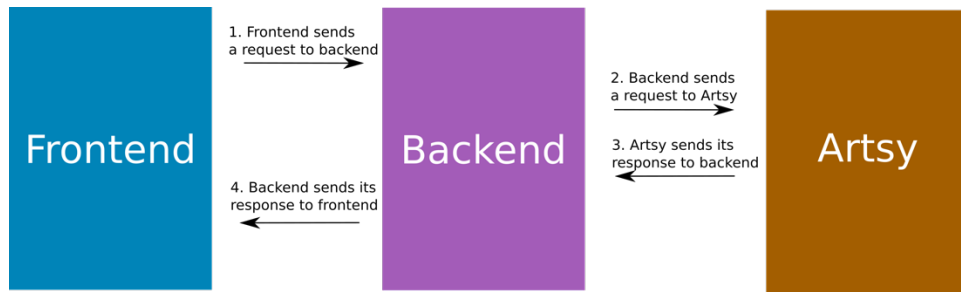
The server returns a JSON result as given below.

| JSON   | Raw Data | Headers                              |
|--|----------|--------------------------------------|
| Save   | Copy     | Collapse All Expand All Filter: JSON |
| id: "4d8b928b4eb68a1b2c0001f2"   |          |                                      |
| slug: "pablo-picasso"  |          |                                      |
| created_at: "2010-08-03T16:09:33+00:00"  |          |                                      |
| updated_at: "2022-05-21T08:11:51+00:00"  |          |                                      |
| name: "Pablo Picasso"  |          |                                      |
| sortable_name: "Picasso Pablo"   |          |                                      |
| gender: "male"   |          |                                      |
| biography: "Born in Málaga, Spain, in 1881, Pablo Picasso showed an early passion for drawing. His father, an art teacher, began giving him lessons in figure drawing and oil painting at the age of seven. Picasso enrolled in the School of Fine Arts in Barcelona and then at Madrid, but withdrew from formal training in 1899 to return to Barcelona, where he worked as a graphic artist. In 1900, Picasso made his first visit to Paris, and until 1904, he split his time between Paris and Barcelona. After meeting Georges Braque in 1907, Picasso and Braque worked closely together to develop Cubism. By 1910, they had developed a distinctive Cubist idiom, fracturing their subjects into small, faceted forms and working with a muted palette. Rejecting the traditional depiction of three-dimensional objects from one viewpoint, they instead represented the subject from a multitude of perspectives. In 1912, Picasso and Braque began experimenting with collage and papier collé, introducing real elements, such as newspaper, artificial wood, and wallpaper, into their paintings to achieve trompe-l'œil effects. By 1913-12, Cubism had become popular as the latest avant-garde movement and progressive painters across Europe began painting in Cubist styles. After the upheaval of World War One, Picasso - together with other European artists including André Derain, Giorgio de Chirico, and Fernand Léger - returned to a more traditional artistic exploration of Cubism, often painting works in remarkably different styles in a period of only a few hours. By 1927, Picasso began experimenting with Surrealist imagery, incorporating morphed and distorted figures in his paintings. When the Spanish Civil War broke out in 1936, Picasso reacted with explicit, emotional works, painting the masterpiece Guernica in response to the bombing of the town by the fascist Generalissimo Francisco Franco in 1937. From the late 1940s through the 1960s, Picasso worked primarily in the south of France, where he painted, made ceramics, and experimented with printmaking. In the 1950s, Picasso began reinterpreting the work of the great masters, making paintings based on Velázquez, Goya, Manet, Courbet, and Delacroix. During the 1950s, Picasso's international fame increased greatly with large exhibitions and retrospectives across the world. He continued to work prolifically through his eighties and nineties. He died in 1973, leaving behind an unparalleled legacy that has shaped the development of modern and contemporary art." |          |                                      |
| birthday: "1881"   |          |                                      |
| deathday: "1973"   |          |                                      |
| hometown: "Málaga, Spain"  |          |                                      |
| location: "Paris and Mougins, France"  |          |                                      |
| nationality: "Spanish"   |          |                                      |
| target_supply: true  |          |                                      |
| image_versions: { 0: "four_thirds", 1: "large", 2: "square", 3: "tall" }   |          |                                      |
| links: { thumbnail: { href: "https://d32m0rphc5ldk.cloudfront.net/l3rCA31aKE-clBnc-USwQ/four_thirds.jpg" }, image: { href: "https://d32m0rphc5ldk.cloudfront.net/l3rCA31aKE-clBnc-USwQ/image_version.jpg" }, templated: true, self: { href: "https://api.artsy.net/api/artists/4d8b928b4eb68a1b2c0001f2" }, permalink: { href: "https://www.artsy.net/artist/pablo-picasso" }, artworks: { href: "https://api.artsy.net/api/artworks?artist_id=4d8b928b4eb68a1b2c0001f2" }, published_artworks: { href: "https://api.artsy.net/api/artworks?artist_id=4d8b928b4eb68a1b2c0001f2&published=true" }, similar_artists: { href: "https://api.artsy.net/api/artists?similar_to_artist_id=4d8b928b4eb68a1b2c0001f2" }, similar_contemporary_artists: { href: "https://api.artsy.net/api/artists?similar_to_artist_id=4d8b928b4eb68a1b2c0001f2&similarity_type=contemporary" }, genes: { href: "https://api.artsy.net/api/genes?artist_id=4d8b928b4eb68a1b2c0001f2" }  |          |                                      |

In this assignment, we are interested in ["name"], ["birthday"], ["deathday"], ["nationality"] and ["biography"] fields of this response.

### 4.3 System Overview

The system contains three components: 1) browser (frontend), 2) Flask application (backend) and 3) Artsy servers. You will implement the frontend and the backend. Your backend will have two functionalities: serving the frontend static files to the browser and responding to the frontend's AJAX requests by fetching data from Artsy servers. You will not directly call the Artsy APIs from the frontend, as it requires disclosing Client Id, Client Secret and XAPP\_TOKEN to the public. The data flow diagram after an AJAX call is shown below.



**Sending a request to anywhere except your backend from the frontend will result in a 4-point penalty. Please do not directly call Artsy API endpoints from your frontend JavaScript.**

All requests from frontend to backend must be implemented using HTTP GET method, as you will not be able to send us sample backend endpoint links as a part of your submission if you use HTTP POST.


#### 4-4 Page Layout

The page contains a header section, a content section and a footer section arranged vertically.

The header section is a static bar containing the site title “Artist Search” on its left. The footer section is another static bar containing Artsy attribution “Powered by Artsy.”, in which the Artsy logo is placed before the word “Artsy”. When Artsy text on the footer is clicked, the page is redirected to [Artsy homepage](#).

Artist Search

Page Header

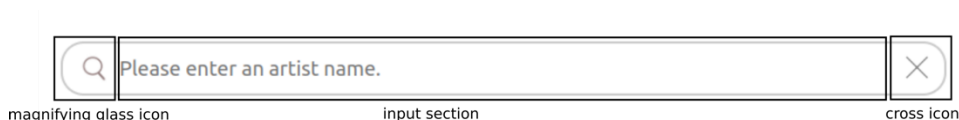
Powered by  Artsy.

Page Footer

The content section contains the contents of the page, in which the following features will be shown.

#### 4-5 Search Bar

When a user opens the page for the first time, there is only a search bar in the content section. Search bar contains three items: a magnifying glass icon on the left, an input section in the middle and a cross icon on the right, shown below.



Search Bar

When the cross icon is clicked, the contents of the input section are cleared.

The magnifying glass icon and cross icon are partially transparent (Hint: Check **opacity** CSS property), and are made opaque when hovered as shown below.



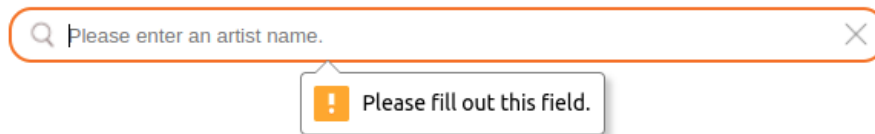
### Magnifying Glass Icon is Made Opaque when Hovered

Artist names can be entered into the input section of the search bar. The input section has the placeholder value "Please enter an artist name.", which is shown when the input field is empty (Hint: Check **placeholder** attribute of input tag). When the input section is focused (i.e., input section is clicked and the cursor is blinking within the field), the search bar's border color should be made orange as shown below (Hint: Check CSS **focus-within** pseudo-class).



### Search Bar when Input Section is Focused

Users can initiate a search by either **1) clicking the magnifying glass icon** or **2) by hitting the enter key**. If the user initiates the search when the input text is empty, an alert should pop up showing the text "Please fill out this field." in Google Chrome browser shown below (Hint: Check **required** attribute of input tag).



### Search Bar when Search is Initiated without Input

When the search is initiated, your frontend will do an AJAX call to the backend, sending the input text. Upon receiving the request, your backend will make a request to [Artsy Search API](#), forwarding the input text to Artsy Search API via parameter **q** as described in the Search Endpoint section above. Until a response is received from the backend, loading gif is shown below the search bar as shown below.

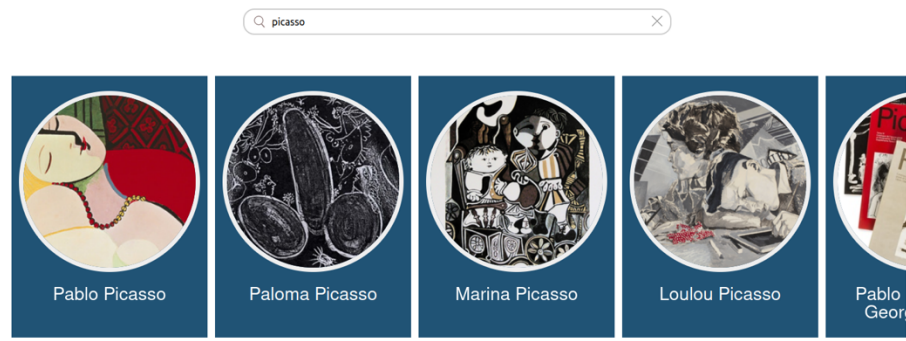


### Loading GIF is Shown Until a Response Arrives

When the response arrives, loading gif is hidden and the results are shown in the result list.

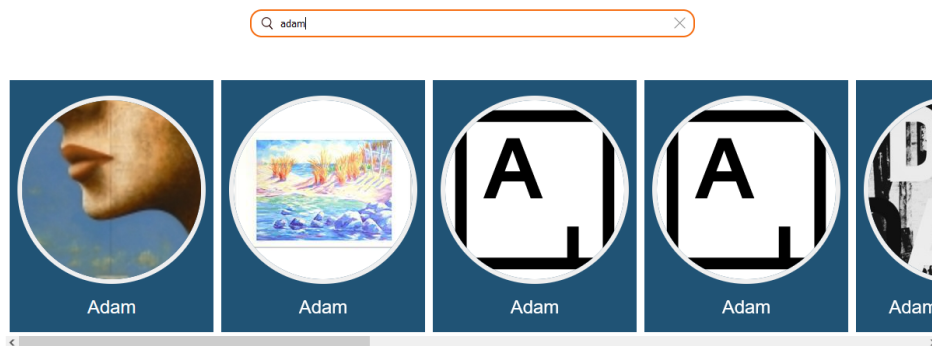
## 4-6 Result List

The results of the search are shown as a list of cards. Each card contains the artist image with link retrieved from ["\_links"]["thumbnail"]["href"] field of an artist in the result of the response of search endpoint. Image is contained in a circular frame (Hint: Check **border-radius** CSS property) with white border. Below the image, the artist's name is listed corresponding to the ["title"] field of the artist result. The list of result cards is scrollable. The cards have a blue background color (HTML Color Code: #205375).



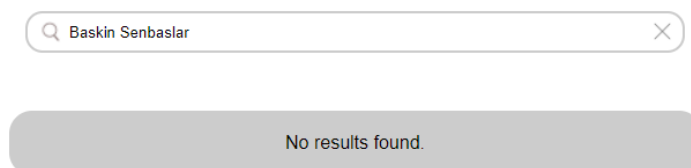
Result List

If a particular artist does not have an image, Artsy returns “/assets/shared/missing\_image.png” in the ["\_links"]["thumbnail"]["href"] field as mentioned in Section 4-2-2. In this case, you will place the Artsy logo as the artist image as shown below.



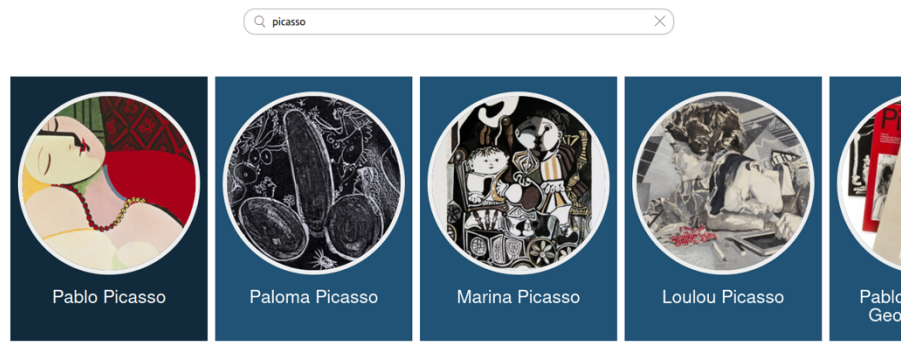
Artsy Logo is Shown if an Artist Does Not Have an Image

If the search results are empty, i.e. no artists match the given query, an error message containing text “No results found.” will be shown as below.



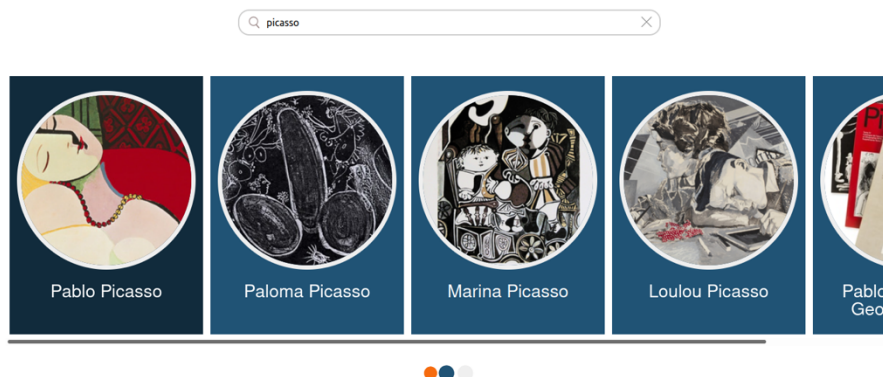


When a card is hovered, its background color changes to darker blue (HTML Color Code: #112B3C) as shown below.



#### The Background Color Change of a Hovered Card

When an artist card is clicked, your frontend will do an AJAX call to your backend to get artist details. To get artist details, you must send artist ID to the backend. For that, you must associate artist IDs with cards, which you can do during initial search by sending artist IDs from your backend to the frontend as a part of the response. Until a response is received from the backend, loading gif is shown below the result list as shown below.



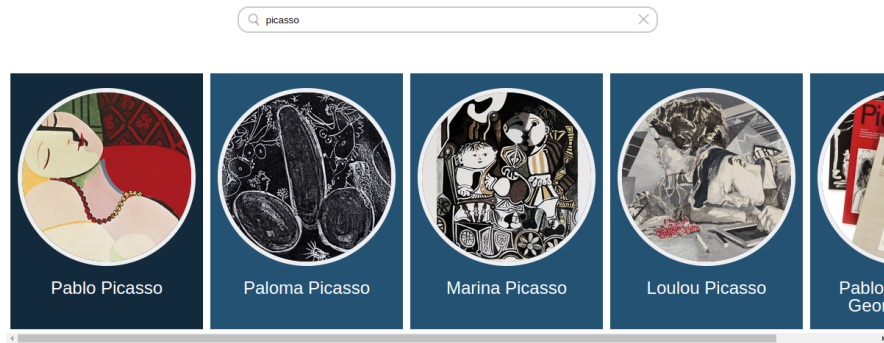
#### Loading Gif is Shown Until a Response Arrives

The selected card's background color is permanently set to darker blue after the click, which denotes the active card for which details are being shown. It will remain darker blue until another card is selected, at which point the background color of the newly selected card will be set to darker blue and the original card's background will be set to original blue. (See Section 4-8 for different use cases)

When the response arrives for artist details, you will hide the loading gif and show the artist details.

#### 4-7 Artist Details

Details will include artist name, artist birth year, artist death year, artist nationality and artist biography. The details are presented as follows.



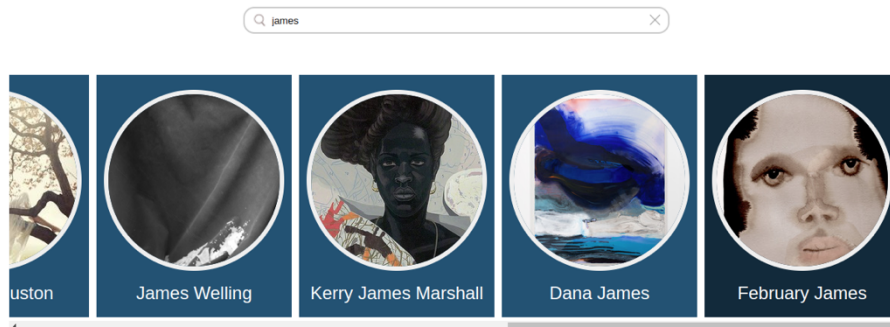
#### Pablo Picasso (1881 - 1973)

Spanish

Born in Málaga, Spain, in 1881, Pablo Picasso showed an early passion for drawing. His father, an art teacher, began giving him lessons in figure drawing and oil painting at the age of seven. Picasso enrolled in the School of Fine Arts in Barcelona and then at Madrid, but withdrew from formal training in 1899 to return to Barcelona, where he worked as a graphic artist. In 1900, Picasso made his first visit to Paris, and until 1904, he split his time between Paris and Barcelona. Late in 1901, Picasso began making paintings on themes of desolation and despair, depicting solitary and melancholy figures in paintings flooded with blue. In 1904, Picasso began his Rose Period, lightening his palette from the dark, moody blues of the previous years in favor of beige, red, and rose tones. Casting aside the melancholy subjects of the Blue Period, Picasso painted circus performers, harlequins, and clowns. After meeting Georges Braque in 1907, Picasso and Braque worked closely together to develop Cubism. By 1910, they had developed a distinctive Cubist idiom, fracturing their subjects into small, faceted forms and working with a muted palette. Rejecting the traditional depiction of three-dimensional objects from one viewpoint, they instead represented the subject from a multitude of perspectives. In 1912, Picasso and Braque began experimenting with collage and papier collé, introducing real elements, such as newsprint, artificial wood, and wallpaper, into their paintings to achieve trompe-l'oeil effects. By 1911–12, Cubism had become popular as the latest avant-garde movement and progressive painters across Europe began painting in Cubist styles. After the upheaval of World War One, Picasso - together with other European artists including André Derain, Giorgio de Chirico, and Fernand Léger - returned to a more traditional artistic exploration of Cubism, often painting works in remarkably different styles in a period of only a few hours. By 1927, Picasso began experimenting with Surrealist imagery, incorporating morphed and distorted figures in his paintings. When the Spanish Civil War broke out in 1936, Picasso reacted with explicit, emotional works, painting the masterpiece *Guernica* in response to the bombing of the town by the fascist Generalissimo Francisco Franco in 1937. From the late 1940s through the 1960s, Picasso worked primarily in the south of France, where he painted, made ceramics, and experimented with printmaking. In the 1950s, Picasso began reinterpreting the work of the great masters, making paintings based on Velázquez, Goya, Manet, Courbet, and Delacroix. During the 1950s, Picasso's international fame increased greatly with large exhibitions and retrospectives across the world. He continued to work prolifically through his eighties and nineties. He died in 1973, leaving behind an unparalleled legacy that has shaped the development of modern and contemporary art.

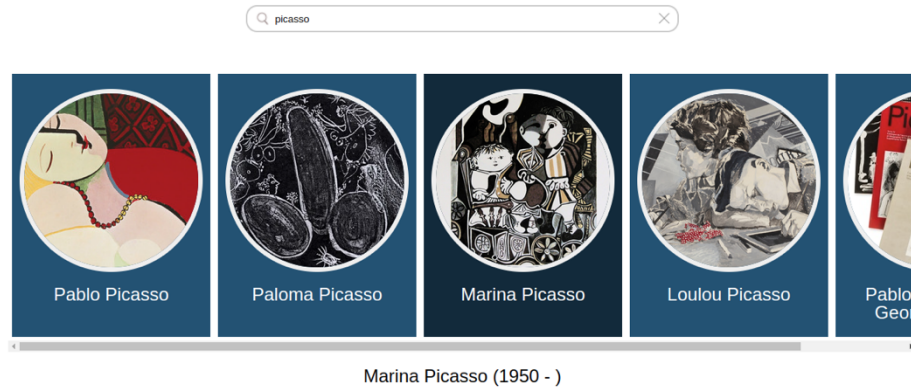
#### Artist Details

First line contains the name of the artist followed by birth and death days. Next line contains the nationality of the artist. Next, the biography is shown. This information corresponds to ["name"], ["birthday"], ["deathday"], ["nationality"] and ["biography"] fields of the artists endpoint response. If any of the fields are empty, you should simply leave them blank. Examples are given below

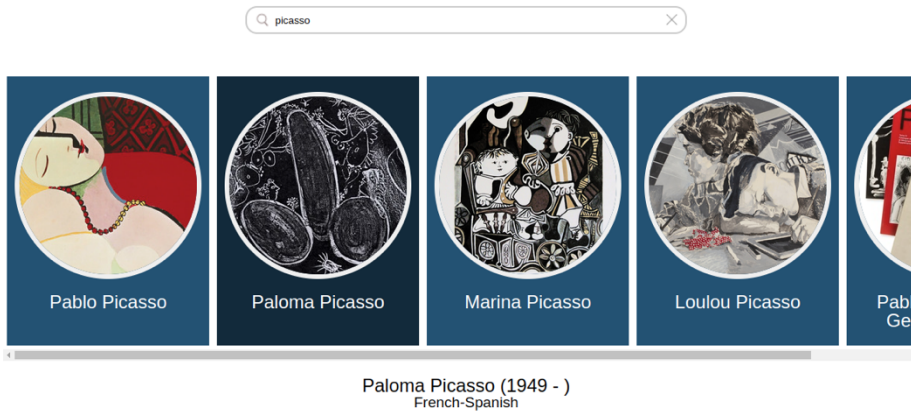


February James ( - )  
American

No Biography, No Birth Year, No Death Year



No Nationality, No Death Year, No Biography



No Death Year, No Biography

#### 4-8 Different Use Cases

When a user clicks on another search result while the details of an artist are being shown, the website will hide the artist details and show the loading gif below the result list until a response arrives. The background color of the newly selected card will be set to darker blue, and the background color of the previously selected card will be set to original blue. When the response arrives, the details of the newly selected artist will be shown, and the loading gif will be hidden.

When a user searches a new artist using the search bar while the details of an artist are shown, the details will be hidden, background color of the selected card will **not** be changed, and the loading gif will be shown under the list of results until a response arrives. In this case, search results will not be hidden, but they will be replaced whenever results arrive. When the response arrives, the loading gif will be hidden and all background colors will be set to original blue.

When a user searches a new artist using the search bar while search results are being shown without any details, only the loading gif will be made visible until a response arrives. Search results will not be hidden, but they will be replaced whenever results arrive. When the response arrives, loading gif will be hidden. (Similar behavior as the paragraph above)

## 5 Assignment Submission

In your course assignment page, update the Assignment 2 link to refer to your deployed website. Also, provide an additional link to one of your cloud query entry points. Your project must be hosted on Google Cloud. Graders will verify that these links are indeed pointing to Google Cloud.

Also, submit your source code file to DEN D2L as a **ZIP archive**. Put your frontend and backend codes, plus any additional files needed to build your app (e.g., yaml file). The timestamp of your last submission will be used to verify if you used any grace days.

## 6 Notes

- You **cannot** use frontend JS frameworks or libraries (React, Angular, Vue, Svelte, Alpine, etc.).
- You can use jQuery in Assignment 2, but it is not needed.
- You **cannot** use Bootstrap or any other CSS libraries for Assignment 2. **If Bootstrap (or any other CSS library) is used, a 4-point reduction will be applied.**
- You can use CSS **reset styles** (that serves the purpose of unifying default browser element look and behavior) in your CSS file. You **may** take it from existing CSS libraries and design systems. Make sure to **specify the origin of such code** to avoid an academic violation.
- You **cannot** use bundlers (Vite, Webpack, Rollup, etc.) as well as code processors/transformers (Sass, Babel, etc.).
- The appearance of the webpage should be like the reference video as much as possible.
- Artsy lacks information for a lot of artists. Most do not have biographies; some do not have nationalities. Here are some examples for testing:
  - Pablo Picasso: Has every detail.
  - Vincent van Gogh: Has everything except biography.
  - Yayoi Kusama: Has everything except death date (Since she is not dead)
  - Claude Monet: Has every detail.
  - Andy Warhol: Has every detail.

## 7 Static Resources

Loading GIF, Artsy logo, magnifying glass icon and cross icon can be found in D2L Brightspace.