

Encyclopedia of Life

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Github Link: <https://github.com/dylankrieg/oop-project>

Final State of System Statement

A paragraph on the final state of your system: what features were implemented, what features were not and why, what changed from Project 5 and 6

Our web-application is a simple encyclopedia of animals where users can learn facts about a variety of species including tigers, whales, primates, and more.

We implemented a variety of features. Some of these features are user-visible and others are not. Some visible features include a home page with dynamically generated links that route to unique pages specific to each species using the *FlyWeight* pattern. The HTML for the links comes from a stateless AnimalLink Object and is based on information passed in by the HomePage object which receives it from a request to the backend database and manages it using a Database Wrapper class.

Image 1: Home page with Dynamically Generated Links from the Backend Database

The screenshot shows a web browser window with the title 'Encyclopedia of Life' at the top left. To its right is a navigation bar with a menu icon and the word 'About'. Below the title, the heading 'Species List' is displayed. A list of ten animal names follows, each preceded by a blue underlined link: Bengal Tiger, Siberian Tiger, Humpback Whale, Blue Whale, Narwhal, Panda, Red Fox, Sloth, Elephant, and Baboon.

- [Bengal Tiger](#)
- [Siberian Tiger](#)
- [Humpback Whale](#)
- [Blue Whale](#)
- [Narwhal](#)
- [Panda](#)
- [Red Fox](#)
- [Sloth](#)
- [Elephant](#)
- [Baboon](#)

Encyclopedia of Life

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Another feature is a series of content-rich pages corresponding to each species with a listing of facts about the species that come from a database which are passed into an Animal object created using the *Factory Pattern*.

Image 2: Content-Rich Pages Generated Dynamically from the Database

Encyclopedia of Life About

Bengal Tiger

Description:
The Bengal tiger is a population of the *Panthera tigris tigris* subspecies. It ranks among the biggest wild cats alive today. It is considered to belong to the world's charismatic megafauna

Predominantly Found:
Bangladesh, Bhutan, China, India, Indonesia, Malaysia, Myanmar, Nepal, Russia and Thailand

Conservation Status:
Mid endangered



Encyclopedia of Life About

Narwhal

Description:
Often dubbed the unicorns of the sea, narwhals are strange and beautiful creatures with long tusks protruding from their heads. Members of the population of more than 80,000 can weigh up to 4,200 pounds and grow as long as 17 feet in length. Read on to learn more about these fascinating animals.

Predominantly Found:
Arctic waters of Canada, Greenland, Norway and Russia

Conservation Status:
Near Threatened



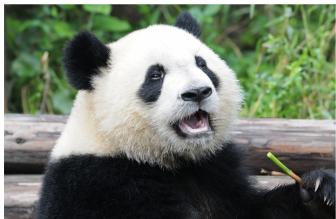
Encyclopedia of Life About

Panda

Description:
The panda, with its distinctive black and white coat, is adored by the world and considered a national treasure in China. This bear also has a special significance for WWF because it has been our logo since our founding in 1961.

Predominantly Found:
Southwest China

Conservation Status:
Vulnerable



Encyclopedia of Life

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Another feature is a backend server API which handles requests for the database of animals and parses the database into a JSON from a CSV File using the *Singleton Pattern* for the parser object.

Image 3: CSV Database for the Backend which is Parsed using a Single Instance of a Parser Object

id	name	description	location	status	image_link
1	Bengal Tiger	The Bengal tiger is a population of the <i>Panthera tigris tigris</i> subspecies. It ranks among the biggest wild cats alive today. It is considered to belong to the world's charismatic megafauna.	Bangladesh, Bhutan, China, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Russia and Thailand	Md endangered	https://ubt-lifelibrary.com/22/20322-00-C1793026/Bengal-tiger-Panthera-tigris-tigris-Maharashtra-India.jpg
2	Siberian Tiger	The Siberian tiger is a subspecies of the Amur tiger. It is found in the northern part of the Amur basin in the Russian Far East, Northeast China and possibly North Korea. It once ranged throughout the Korean Peninsula, but has been extirpated from that region.	Siberia	Critically Endangered	https://upload.wikimedia.org/wikipedia/commons/thumb/1/1e/Tigra_tigra_sibirica_Male.jpg
3	Humpback	The humpback whale is a member of the rorqual whale family. It is the second largest whale after the blue whale. It has a distinctive body shape, with long pectoral fins and a small dorsal fin.	All oceans	Not endangered	https://upload.wikimedia.org/wikipedia/commons/thumb/0/0f/Humpback_and_calf_-Permit14882-37906_%202019131422529_001700px-HHMMNR-.JPG
4	Blue Whale	This whale has a heart the size of a Volkswagen Beetle. Its stomach can hold one ton of krill and it can eat up to 4000 pounds of krill per day. Blue whales can weigh up to 200 tons (approximately 33 elephants). The blue whale has a heart the size of a Volkswagen Beetle. Its stomach can hold one ton of krill and it can eat up to 4000 pounds of krill per day. Blue whales can weigh up to 200 tons (approximately 33 elephants).	Arctic waters of Canada, Greenland, Norway and Sweden	Endangered	https://files.worldwildlife.org/www/images/blue_whale_blue_whale_smaller01.jpg_shutterstock_791699823.jpg
5	Narwhal	Often dubbed the unicorn of the sea, narwhals are strange and beautiful creatures with long tusks projecting from their heads. Males of the population of males over 80,000 can weigh up to 2,400 pounds and grow a single tusk that can be six feet long.	Southwest China	Newly Threatened	https://upload.wikimedia.org/wikipedia/commons/thumb/b/bd/Narwhal_001.jpg/1200px-Narwhal_001.jpg
6	Panda	The panda, with its distinctive black and white coat, is adored by the world and considered a national treasure of China. It is also one of the most endangered species in the world, due to habitat loss and our hunting in 1951.	North America	Vulnerable	https://i.natureworks.com/75ae7744-edc7-44fe-b7f7-d0e202742f97/giant-panda-adult_3x2.jpg
7	Red Fox	Red foxes are foxes with red fur across the face, back, sides, and tail. Their front, ears, and belly are grayish-white. Red foxes have black feet and black-tipped ears that are large and pointy. One of the most remarkable characteristics of the red fox is the fluffy, bushy tail. Red foxes are about three feet long and two feet tall.	North America	Least Concern	https://www.mnn.org/pets/article/21817/red-wolf-winter-south-china-hail-winters.jpg
8	Skunk	Skunks are small mammals that are about 15 inches long and weigh about 2.5 pounds. They have a dark brown coat with a white stripe running down the center of their back. Skunks have a strong smell that they use to defend themselves. They use their tails to pick up objects, trumpet warnings, great other elephants, or suck up water for drinking. Skunks have a very strong sense of smell and can smell up to 10 miles away. A skunk's tail can either be left or right-skewed, and the one they use more is usually smaller because of wear and tear. Skunks are omnivores and eat a variety of things, including insects, small mammals, birds, fruit, fish, and more objects. gather food, and strip bark from trees. They can also be used for defense. During the winter, skunks hibernate in burrows and do not move around much.	Amazon	Critically Endangered	https://files.worldwildlife.org/www/images/Baby_Skunk_Henning_IStock_3_12_2014control_overview4tzw0mR_ISBeak_00000148149303large_min.jpg
9	Elephant	They are some of the world's largest monkeys. There are five species of the baboon — olive, yellow, chacma, Guinean, and sacred — located across various habitats in Africa and Asia. The olive baboon is the most abundant and widely distributed. Baboons are social animals and live in groups. Baboons do not have a prehensile (grasping) tail — meaning their tails are not used as a hand — but they are still able to climb when necessary. Baboons have a very strong sense of smell and can smell up to 10 miles away. Baboons have a longer mane around the neck, called a ruff.	Africa, Asia	Endangered	https://i.natureworks.com/01c1647039-46ca-8370-aa3b01ea2f16329f1779_16v9.jpg
10	Baboon		Africa	Least Concern	https://cdn.mos.cms.futurenet.net/9PaoXyUeoUJw8FTcmC.jpg

We have also implemented the *Facade pattern* as a DatabaseWrapper class which abstracts and encapsulates interacting with the JSON-based database of species which is received from the backend API and CSV database. Specific functions include the ability to retrieve information about an animal based on the ID corresponding to it which is part of the URL shown on the home page.

Some key difference between the current site and the site from projects 5-6 is that a lot of time was invested into setting up a Postgres database using Docker which the client could interact directly with using a Postgres client wrapper for Node-JS. This wrapper came with issues and took a long time to debug and it was ultimately decided that it would be simpler to switch to storing the database in a CSV.

As we worked on using a CSV as a database, it was discovered that file read functionality which was needed for parsing a CSV couldn't be done on the front end which led to us needing to create a backend API. This API which runs on a different port from the frontend has permission to read files and parses the CSV file into a JSON structure that is sent to the React-based frontend upon request.

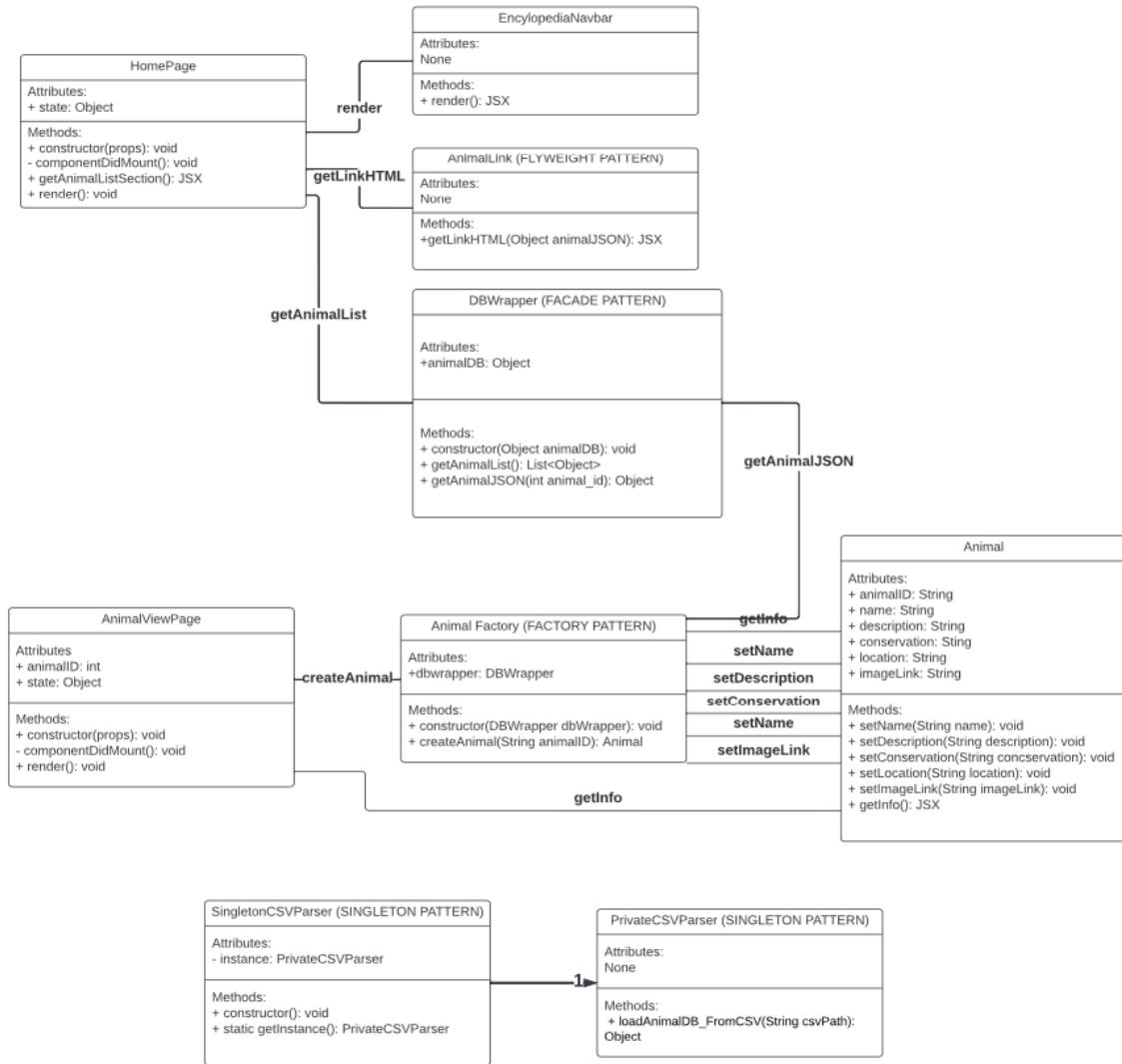
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Final Class Diagram and Comparison Statement

*A thorough UML class diagram representing your final set of classes and key relationships of the system
Highlight and document in that diagram any patterns that were included (in whole or part) in your design*

Final Class Diagram:

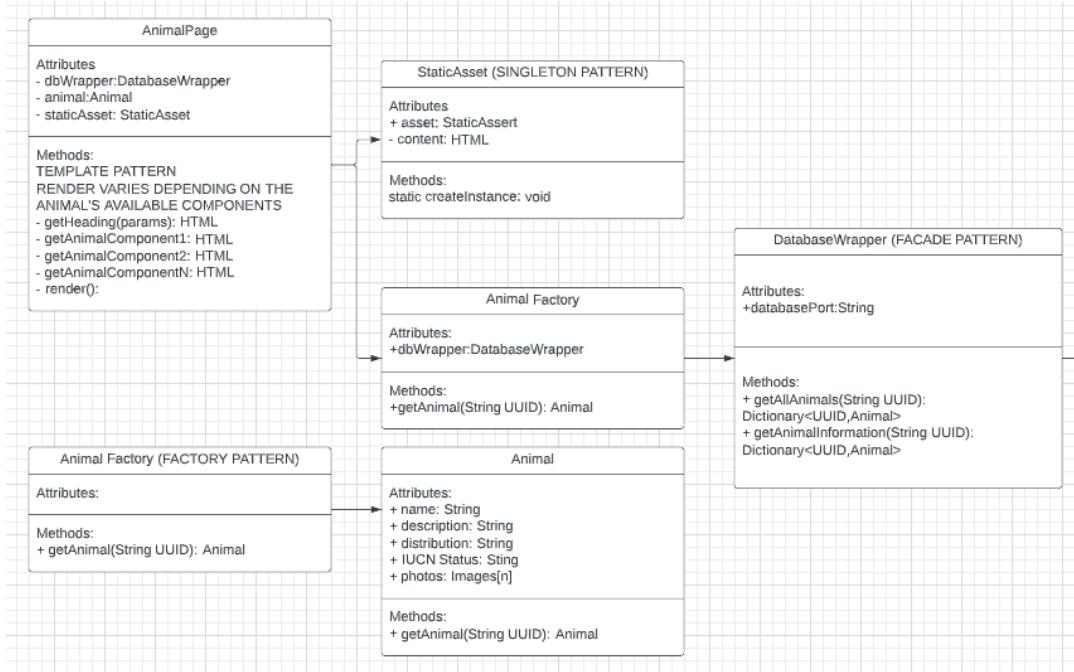


Encyclopedia of Life

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Include the class diagram submitted in Project 5, and use it to show what changed in your system from that point into the final submission

Project 5 Class Diagram:



There have been a lot of changes in the system especially when comparing the current system to that of Project 5. In terms of classes and patterns which are shown in the UML's, these include changing our use of the Singleton Pattern from being used for static assets to being used for a single instance of a backend CSV parser.

Another change is that we choose not to use the Template Pattern to selectively render portions of the page corresponding to animals. Instead as our 4th pattern, we choose to implement the FlyWeight pattern instead of the Template Pattern. The Flyweight pattern is used to display dynamically generated links that route to specific-specific pages. The HTML for the links comes from a stateless AnimalLink Object and is based on information passed in by the HomePage object which receives it from a request to the backend database and manages it using a Database Wrapper class.

Encyclopedia of Life

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Third-Party code vs. Original code Statement

The majority of the code in this project is entirely original except for a few small pieces. Some files like parts of “package.json”, “package-lock.json”, “App.css”, “index.js”, “index.css” were automatically generated by NPM and the React framework. Additionally code for libraries was not written by us. There are hundreds of such libraries and they are described in our package.json. Other pieces of code include Regex for parsing a line of a CSV file into an array of strings which was found on Stackoverflow. Links to all sources are below.

List of Libraries Link (Frontend package.json):

<https://github.com/dylankrieg/oop-project/blob/master/server/package.json>

List of Libraries Link (Backend package.json):

<https://github.com/dylankrieg/oop-project/blob/master/web-app/package.json>

React Framework Link:

<https://reactjs.org/>

NPM Link:

<https://www.npmjs.com/>

Regex Link:

<https://stackoverflow.com/questions/11456850/split-a-string-by-commas-but-ignore-commas-within-double-quotes-using-javascript>

Statement on the OOAD Process for your Overall Semester Project

List three key design process elements or issues (positive or negative) that your team experienced in your analysis and design of the OO semester project

Issue 1:

One issue encountered is that coding work was not being evenly distributed across members and some members did considerably more work than others.

Issue 2:

Work that we did didn't always pan out to be useful, for instance, a lot of time was spent implementing a Postgres database using Docker which ultimately didn't work well with our setup and ended up being disregarded. This led to us being beyond where we thought we were and having to reinvent our approach to data including creating an API.

Positive Issues:

Despite setbacks, we were able to overcome some of these challenges through crunch time which led to us creating a working dynamic website with a variety of ingrained OOP patterns and databases that make it fairly unique in its overall design.

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