DAWBIO M12

PROJECTO DE FINAL DE CURSO

Submission date
World With Clear Ari
W.W.C.A

Iván de Montserrat
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RA1. Introduction and Context

1. Bioinformatics Market

Our project focuses on the pollution of planet earth, it is a current issue and related to life sciences. In this sector we find many world organizations such as Europe, the United States or the UN, which provide a lot of current data in real time and facilitate the creation of APIs aimed at controlling emissions

2. Business opportunities

We have detected that there is a lot of data on pollution but they are not clear, and they are not grouped either and make it difficult to use them. Our business opportunity is to be one of the few companies that uses this data to clearly show a trend and its consequences.

3. Project description

Introduction

This project is based on a web that will dynamically display a map with the respective pollution, we intend to clearly show the difference in pollution over time and health problems.

We also propose to create a communication area between researchers and science enthusiasts who want to contribute their knowledge.

Bibliography

Problem you want to address

Currently there is a lot of information on pollution and we intend to use official data from public organizations to visually show what they represent.

Data sources

https://aqicn.org/api/es

https://www.climatewatchdata.org/

Data structure

Columns DataSet

- **API**

status	String	status code, can be ok or error.
data	Object	Station data
idx	Number	Unique ID for the city monitoring station.
aqi	Number	Real-time air quality information.
time	Object	Measurement time information.
s	String	Local measurement time time.
z	String	Station timezone.
city	Object	Information about the monitoring station.
name	String	Name of the monitoring station.
geo	[Number]	Latitude/Longitude of the monitoring station.
url	String	Webpage associated to the the monitoring station.
attributions	[Object]	EPA Attribution for the station
iaqi	Object[]	Measurement time information.
pm25	Object	Individual AQI for the PM2.5.
v	Number	Individual AQI for the PM2.5.
forecast	Object[]	Forecast data
daily	Object[]	Daily forecast data
pm25	Object	PM2.5 forecast
pmp10	Object	PM10 forecast
o3	Object	Ozone forecast
uvi	Object	Ultra Violet Index forecast

- **CSV Agriculture**

-Area (String) - Country identifier
-Short names (String) - It is divided by areas of the country, where land is cultivated.
-Year (date) - polluting production per year.

- **CSV Fertilizers and Pesticides**

- Source (String) - From where the data has been analyzed and investigated
-Area (String) - Country identifier.
-Short names (String) - Differentiate whether the data are fertilizers or pesticides .
-1991 (date) – Number of fertilizers and pesticides used or discarded each year
-1992 (date) – Number of fertilizers and pesticides used or discarded each year
-1993 (date) – Number of fertilizers and pesticides used or discarded each year
-1994 (date) – Number of fertilizers and pesticides used or discarded each year
-1995 (date) – Number of fertilizers and pesticides used or discarded each year
-1996 (date) – Number of fertilizers and pesticides used or discarded each year

…

Actors

Users: login and logout

Admin: admin the page

Investigator: create news

Goals

Create a large community to get as many people as possible to solve pollution problems

Technologies (Java, PHP, MariaDB, Angular, Biopython, R, etc.)

- Java (spring-boot)

- Typescript (angular)

- Javascript (d3)

- Python (flask)

- Json

- JWT

- CSV

- MySQL

Mockup of the main page

| Logo | | Nav menu |

Image	Lorem ipsum dolor sit amet, consectetur adipiscing elit. Duis congue massa vel magna porttitor placerat.	Map 1
Image	Lorem ipsum dolor sit amet, consectetur adipiscing elit. Duis congue massa vel magna porttitor placerat.	
Image	Lorem ipsum dolor sit amet, consectetur adipiscing elit.	Map 2

4 Occupational Safety and Health

1. Commuting accident: Do not exceed the speed limit and try to be attentive.
2. falls: signal that a floor is slippery and not run through the corridors.
3. falling objects: do not leave heavy objects at a great height
4. electrical contacts: keep wires unpeeled and out of contact.
5. cuts and punctures: Avoid sharp areas or objects
6. Mental fatigue: rest your eyes and mind every 30 minutes it is advisable to have a window where you can see the horizon
7. Postural fatigue: avoid having a position for a long time and alternate between sitting and standing, use a chair that adapts to the contour of the back.
8. Bumps or bumps against stationary objects: Avoid objects in the corridor and if it is not possible to properly signal
9. Fire: Inform about the measures to be taken in case of fire and know the emergency exits avoiding panic.
10. Overexertion: Knowing your limits and not wanting to cover more than necessary, it is important to properly manage the work.

RA2. Use Cases, Requirements, Mockups, Resources, Cost Estimation

1. Use Cases, Functional Requirements, Non-Functional Requirements

Functional Requirement

1. The app can authenticate users.
2. The app can authorize a user.
3. The app can send messages between users, administrators and researchers.
4. The app can display content created by researchers and users can comment on it.
5. The app has a nice interface for researchers to create content.
6. The application has a section for managing users, using a graphical interface.
7. The application uses the data of the users to generate graphs that the administrators can see.
8. The application will provide different general pollution maps that can be consumed by users.
9. The application provides forums to have meeting areas.

Non-Functional Requirements
1. The app authorize and authenticate users with JWT.
2. The application saves the data in MySQL.
3. The application encrypts the password once when registering with sha256 and with AES.
4. The application uses a structure of micro services to communicate with the maps.
5. The application uses web sockets for instant communication between the client and the server.

Roger Puga Ruiz (66h)		
ID	Functional Requirements	Workload
FR1	The app can authenticate users	1
FR2	The app can authorize a user	1
FR3	The app allow users to update their profile.	0.5
FR4	The app allow users to change their password. Includes e-mail verification.	1
FR5	The app allow users to view and comment news	1
FR6	The app can send messages between users, administrators and researchers(websockets)	1.3
FR7	The app allows administrators to manage the users (CRUD)	0.2
FR8	The app allows administrators to see page statistics.	1
FR9	Researchers can write news	1
FR10	The application provides forums to have meeting areas	0.5

FR11	The application allows users to comment on images of molecules.	1
FR12	Query NCBI about molecules (call Python)	0.5
Total:		10

Albert Casany		
ID	Functional Requirements	Workload
FR13	Create map d3	2,5
FR14	Information when you hover mouse over it	1,5
FR15	Clean CSV	0,5
FR16	Flask backend	1,5
FR17	Statistics bar chart Agriculture d3	2
FR18	Interactive slider for each year	1,5
FR19	Styles page	0,5
...		
Total:		10

Iván de Monserrat Navarro (66h)		
ID	Functional Requirements	Workload
FR20	Create dataBase	0,1
FR21	Receive information from weather stations / Get API data	0,5
FR22	Validate information from API and get most relevant info	0,25
FR23	Insert data into dataBase	0,2
FR24	Create backend server + Configuration	1
FR25	Create spain Map on D3 with angular	1
FR26	Create backend functions for request data to dataBase	0,95
FR27	D3 map station points	0,5
FR28	D3 map zoom	0,5
FR29	Show ranking	1
FR30	Show info data	1
FR31	Show forecast data	1
FR32	Incorporate Login	1
FR33	Incorporate Script	1
...		
Total:		10

2. Mockups and Diagrams
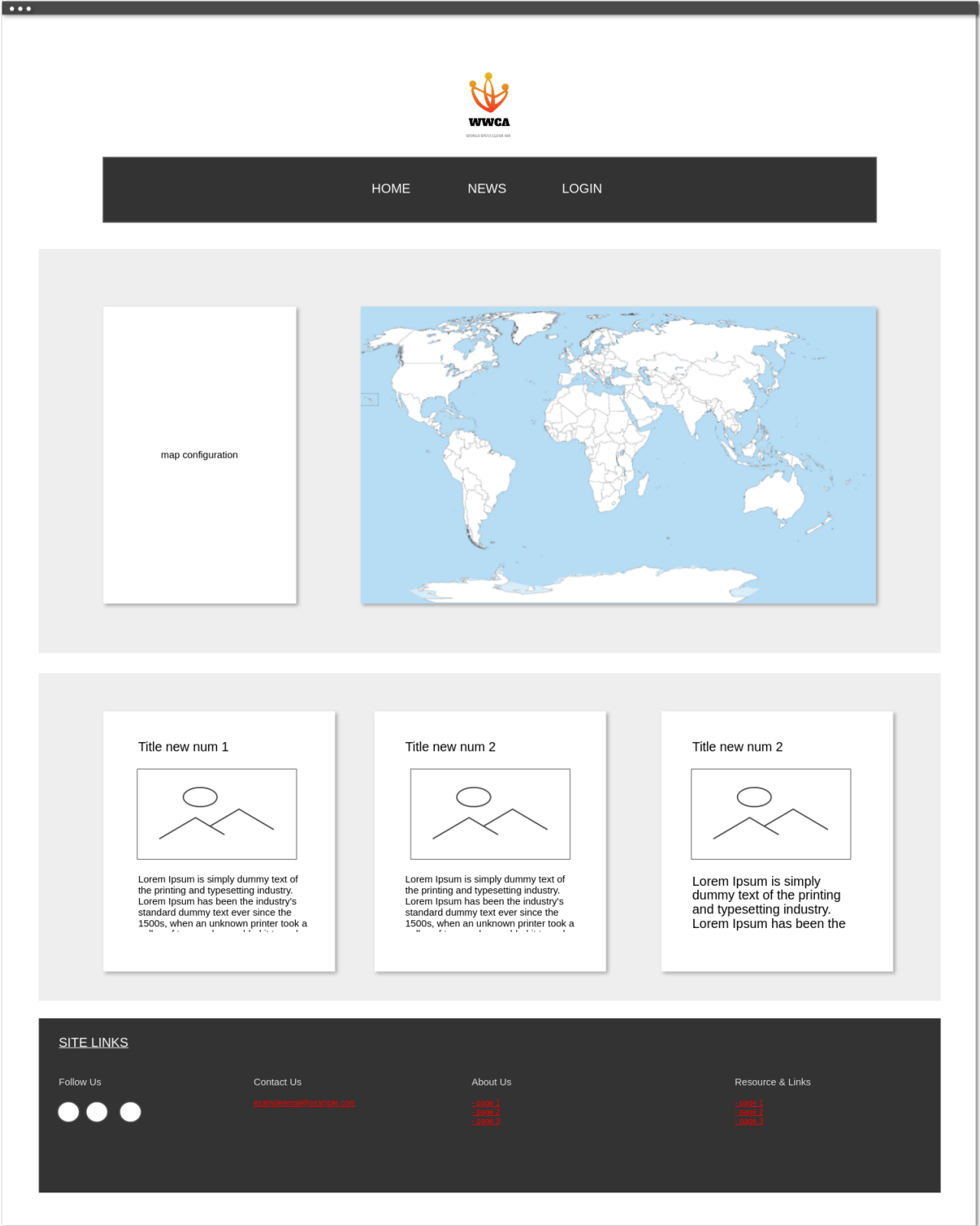
Main view or home, we can see the pollution map and some relevant news.

WWCA
WORLD WIDE CLEAN AIR

HOME   NEWS   LOGIN

Title new num 1

Lorem Ipsum is simply dummy text of
the printing and typesetting industry.
Lorem Ipsum has been the industry's
standard dummy text ever since the
1500s, when an unknown printer took a

Title new num 2

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SITE LINKS

Follow Us

Contact Us
examplemail@example.com

About Us
- page 1
- page 2
- page 3

Resource & Links
- page 1
- page 2
- page 3

News view, where we can see the list of all news
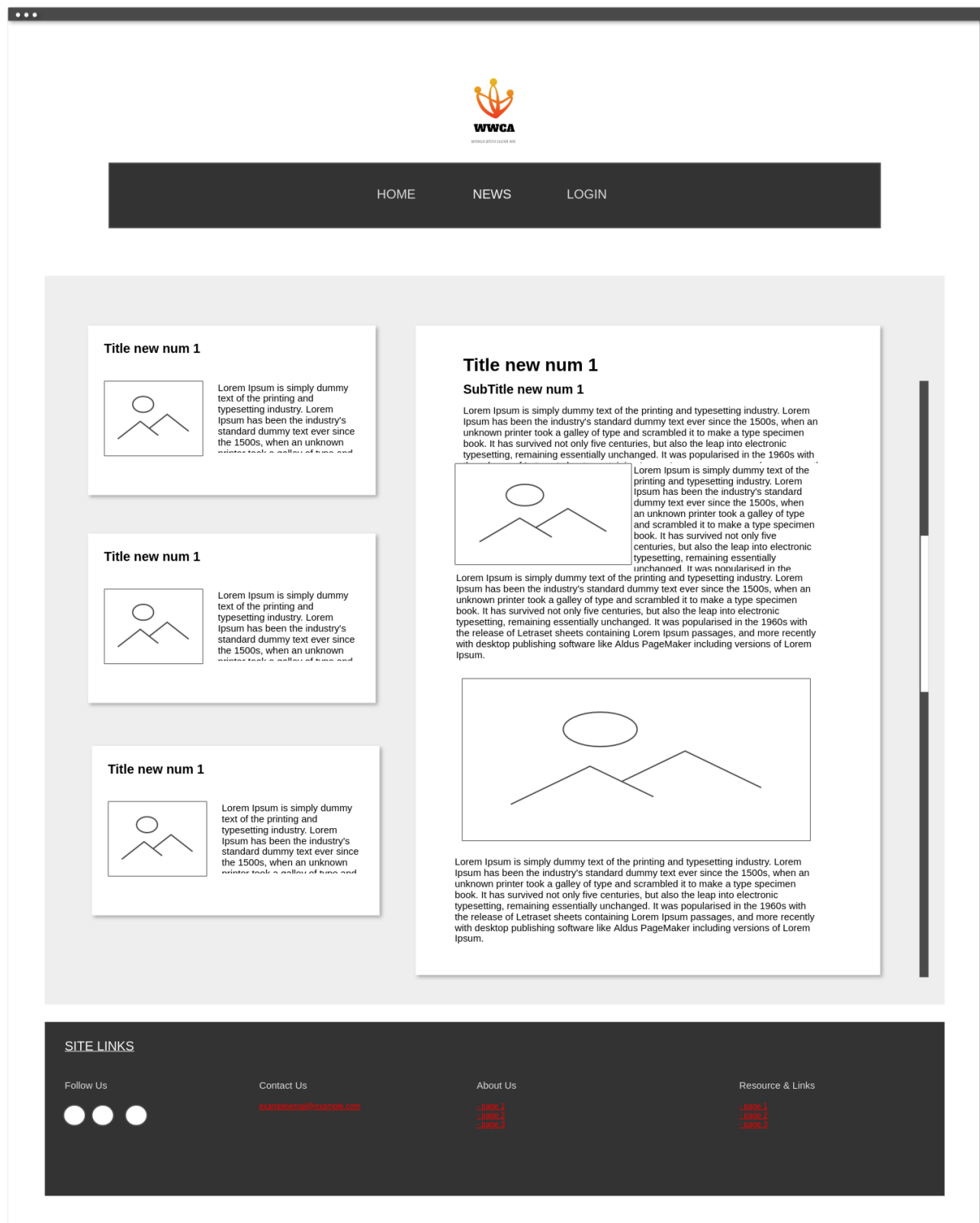
View for a selected news, where we can see the selected news and three other news.

Login view, where to log in

Entity-Relationships diagram Roger
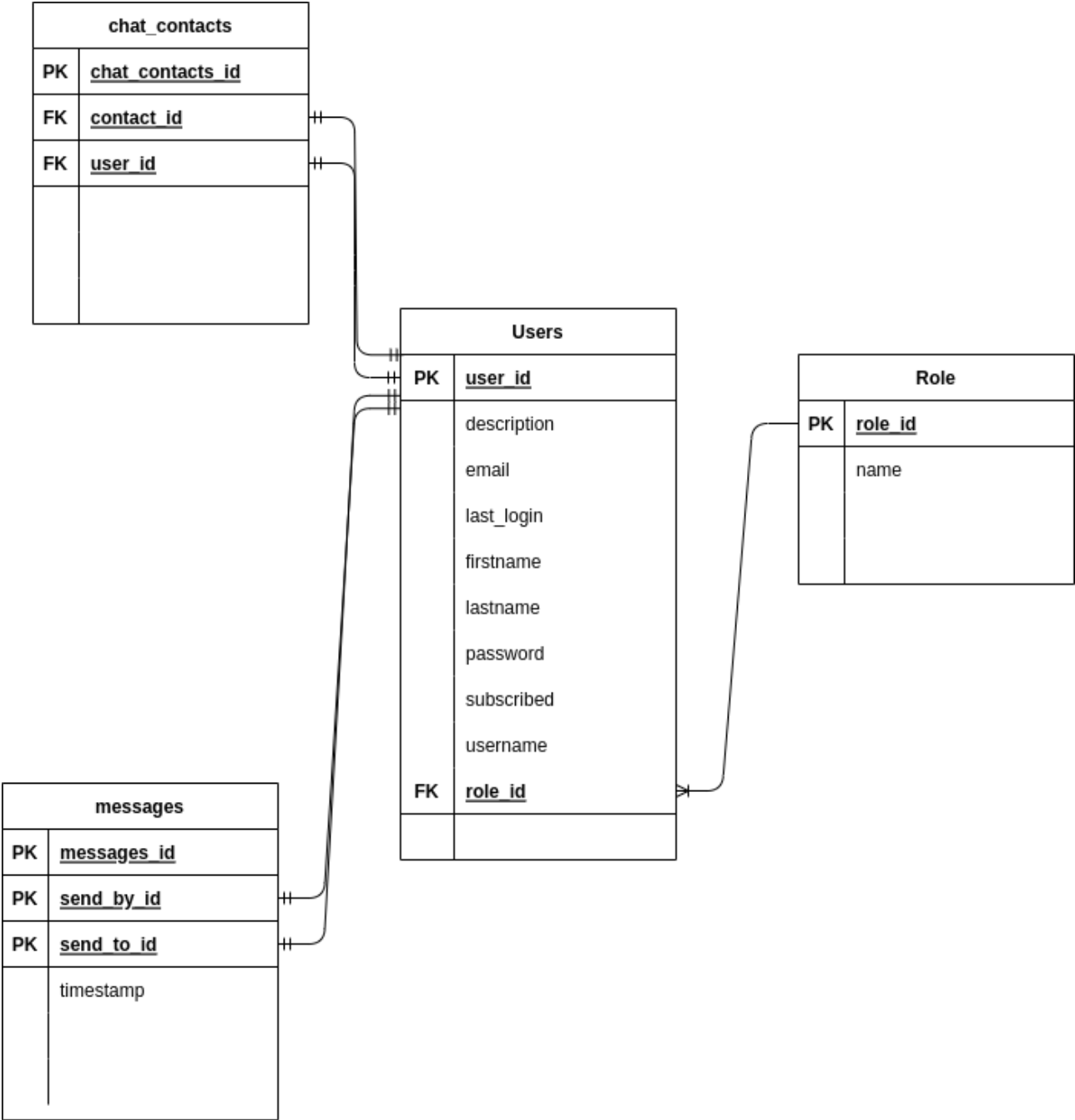
Class diagram Roger
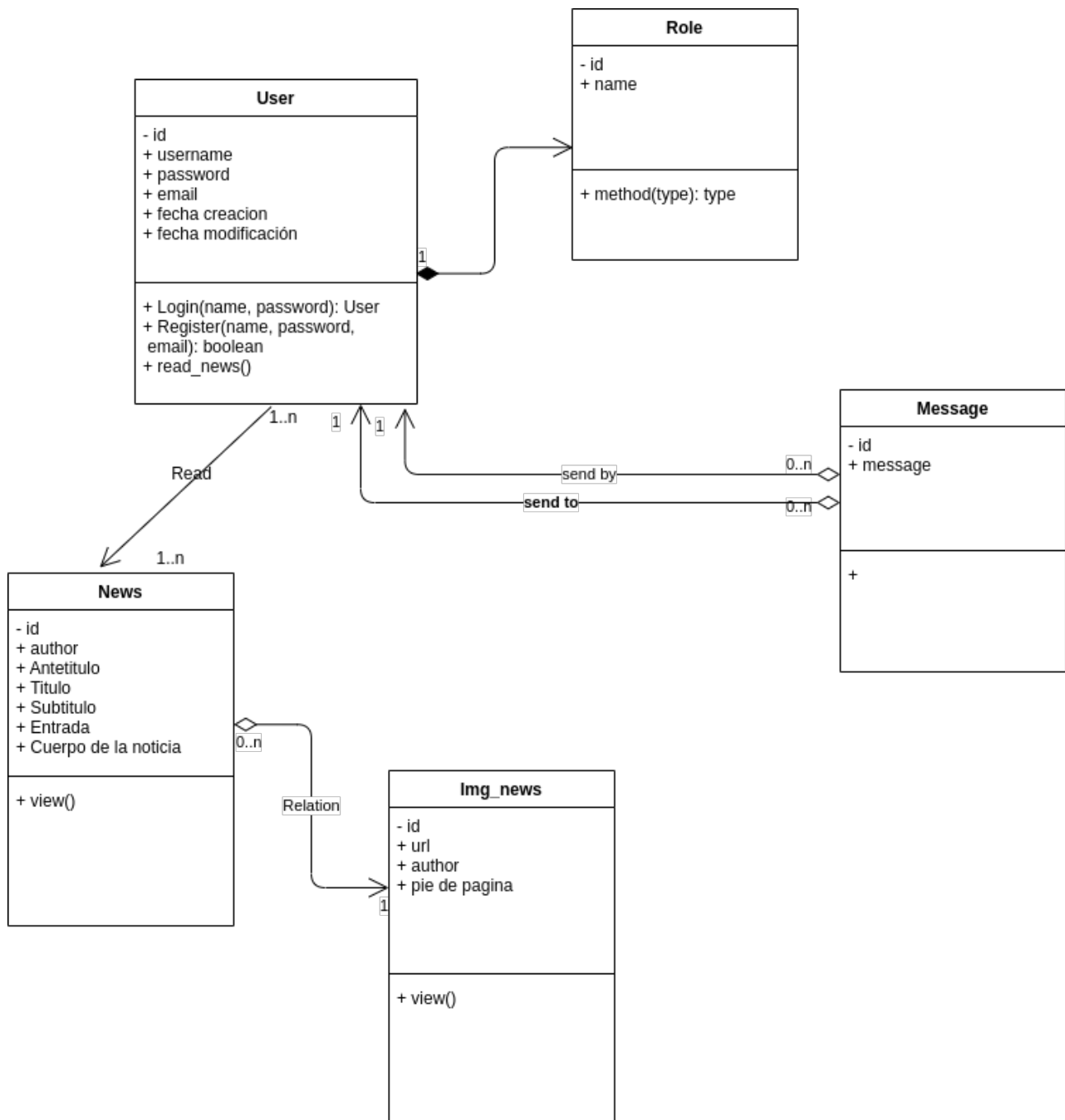
Use Case diagram Roger
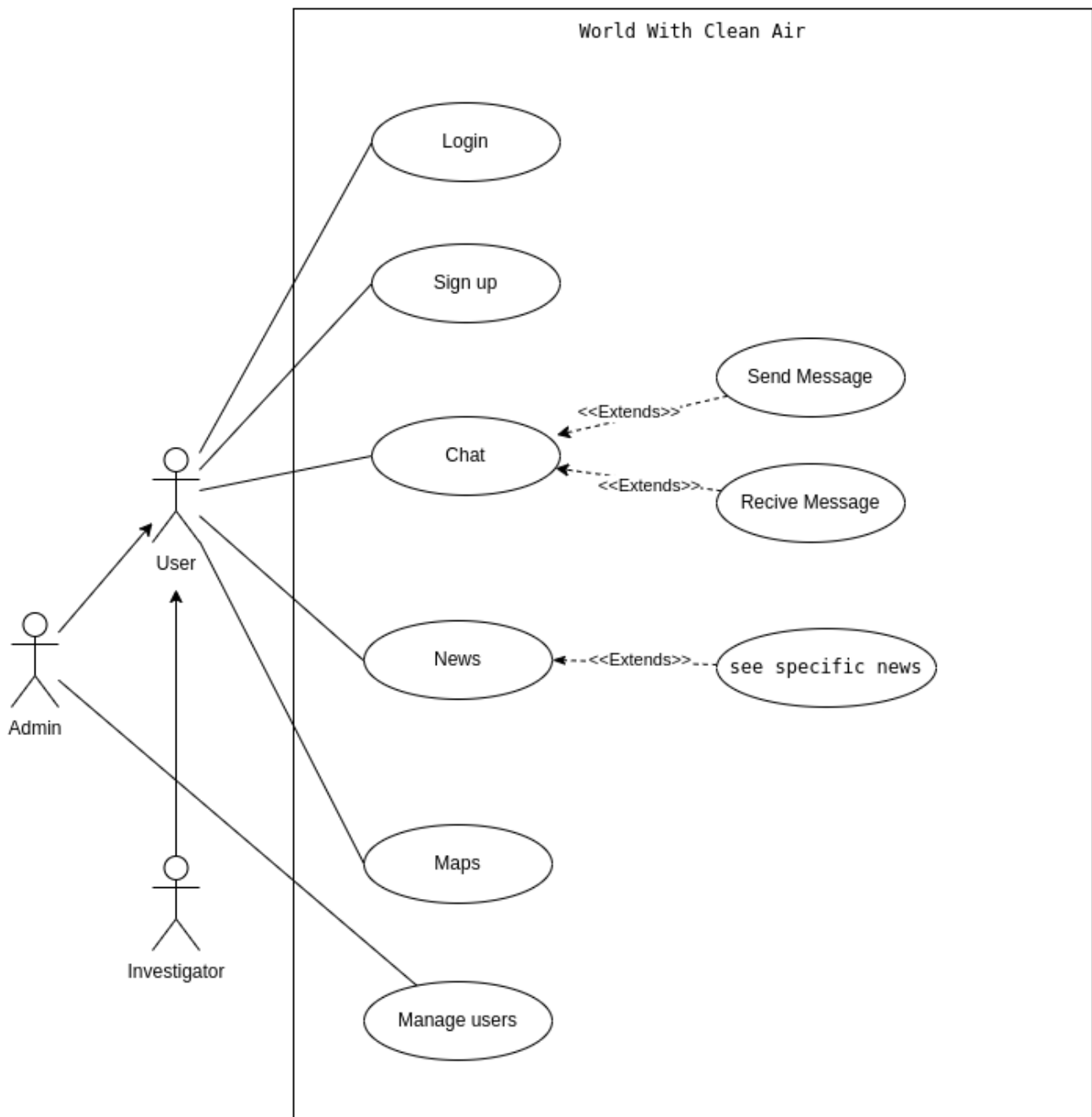
Entity-Relationships diagram Iván

spainAirPollution

info_air_pollution

PK	id int AUTOINCREMENT
	air_quality_level int(10) NOT NULL
	dominant_pollution char(20) NOT NULL
	location_name char(180) NOT NULL
	date_day_info DATE NOT NULL
	date_time_info TIME NOT NULL
	latitude DECIMAL(10) NOT NULL
	longitude DECIMAL(10) NOT NULL
	no2 DECIMAL(10) DEFAULT NULL
	pm10 DECIMAL(10) DEFAULT NULL
	pm25 DECIMAL(10) DEFAULT NULL
	co DECIMAL(10) DEFAULT NULL
	o3 DECIMAL(10) DEFAULT NULL
	so2 DECIMAL(10) DEFAULT NULL
	wg DECIMAL(10) DEFAULT NULL
	dew DECIMAL(10) DEFAULT NULL
	t DECIMAL(10) DEFAULT NULL
	w DECIMAL(10) DEFAULT NULL
	r DECIMAL(10) DEFAULT NULL
	p DECIMAL(10) DEFAULT NULL
	h DECIMAL(10) DEFAULT NULL

forecast_air_pollution

PK	id int AUTOINCREMENT
	customer_id int NOT NULL
	location_name char(180) NOT NULL
	date_day_info DATE NOT NULL
	pollutant char(40) NOT NULL
	avg int(5) DEFAULT NULL
	max int(5) DEFAULT NULL
	min int(5) DEFAULT NULL

users

PK	id int AUTOINCREMENT
	username char(80) NOT NULL
	password char(80) NOT NULL
	role char(40) DEFAULT 'user'

pidScript

PK	id int AUTOINCREMENT
	pid INTEGER NOT NULL

Class diagram Iván
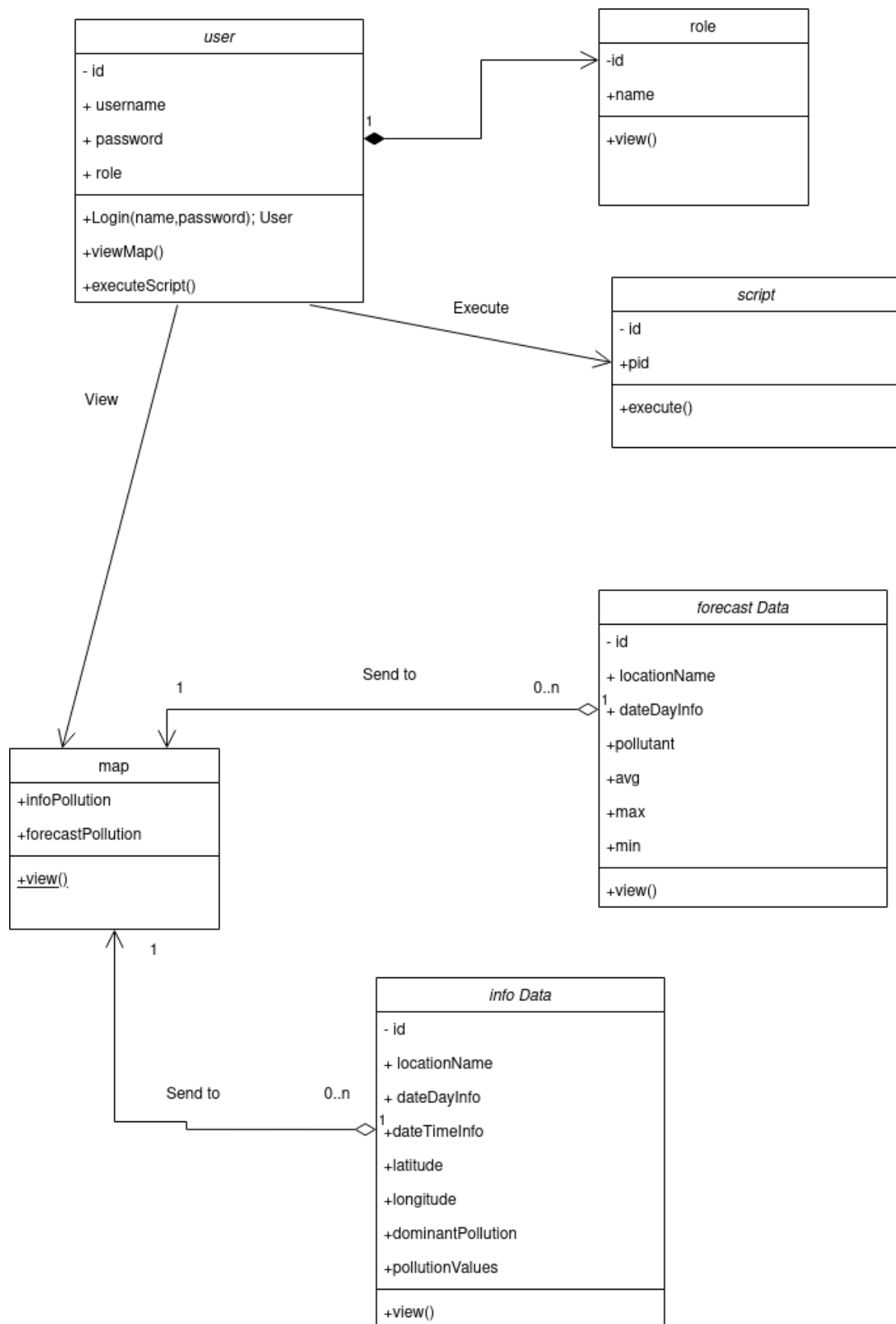
Use case diagram Iván
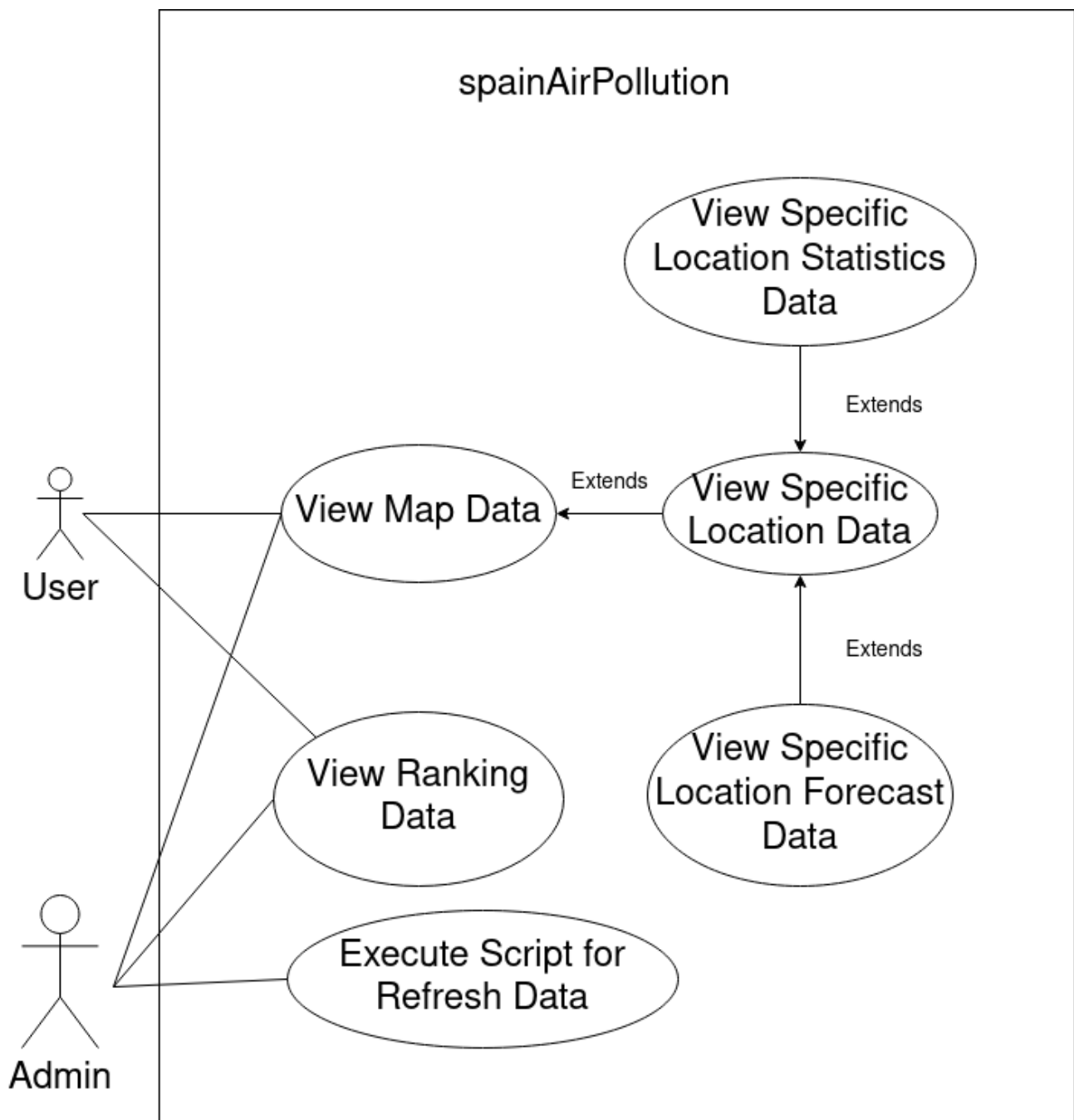
3. Resources and Cost Estimation

Technical equipment

COMPONENTS	PRICE	LINK
HP Pavilion Desktop TP01-2000ns Intel Core i5-11400/16GB/1TB SSD	749€	Computer
AOC 24B1H 23.6" LED FullHD Mate	139€	Monitor
Logitech Keyboard K120 Negro	11,48€	Keyword
Tempest X20 Vigilant Ratón Gaming	30€	Mouse
TOTAL	929€	

Human resources

STAFF	AVERAGE SALARY
FullStack Developer	2110€/month
Bioinformatic	1690€/month
TOTAL	3800/month€

Workspace

STUDY	PRICE/MONTH
Study in Barcelona 60m2	630€
Subtotal workspace costs:	300€
TOTAL	930€

TOTAL COSTS: 5059€

RA3. Planning

1. Project Planning

Albert Casany

M12 Final project				**95%**												
W.W.C.A				26/05/22												

WBS	Task Names	Resource Names	Start	Duration	Finish	% Complete	Calendar days	Days Completed	Days Remaining
			25-abr-2022	44	25-may-2022	95%	31		
		Albert Casany Vila	25-abr-2022	44	25-may-2022	99%	31	11	1
1		Create a map	25-abr-2022	10	06-may-2022	100%	12	10	0
2		Clean csv	06-may-2022	2	09-may-2022	95%	4	1	1
3		information when you hover your mouse over it	09-may-2022	2	10-may-2022	90%	2	1	1
4		Flask Backend	11-may-2022	4	16-may-2022	40%	6	1	3
5		Statistics bar chart Agriculture d3	17-may-2022	5	23-may-2022	95%	7	4	1
6		interactive slider for each year	24-may-2022	2	25-may-2022	100%	2	2	0
7		Style page	25-may-2022	2	26-may-2022	90%	2	1	1

Roger Puga Ruiz

M12 Final project				**72%**												
W.W.C.A				05/27/22												

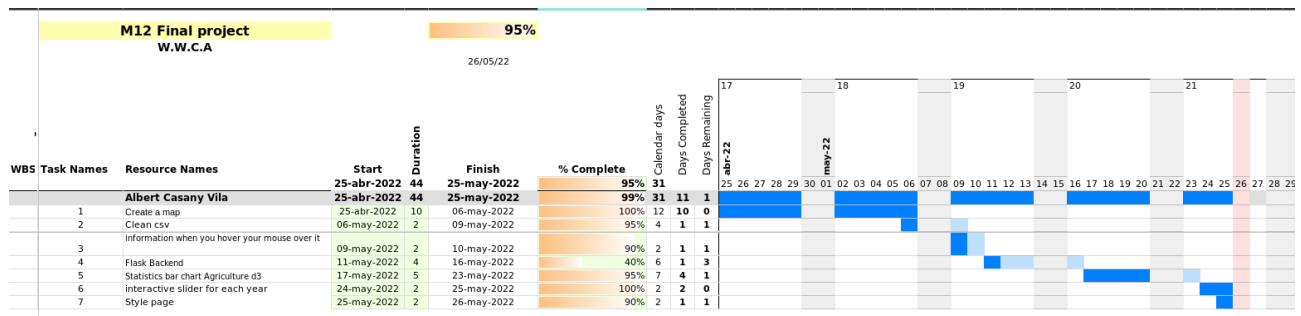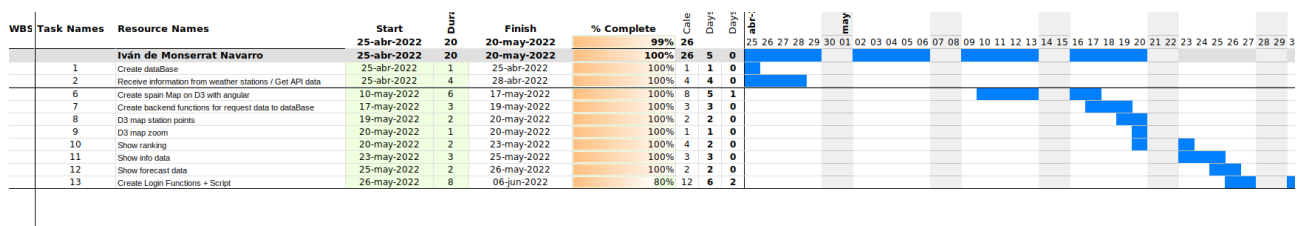| WBS	Task Names	Resource Names	Start	Duration	Finish	% Complete	Calendar days	Days Completed	Days Remaining
			19-Apr-2022	25	24-May-2022	72%	36		
		Roger Puga Ruiz	19-Apr-2022	25	24-May-2022	100%	36	9	0
1		Authenticate users	19-Apr-2022	7	27-Apr-2022	100%	9	7	0
2		Authorize users	27-Apr-2022	2	28-Apr-2022	100%	2	2	0
3		Users can update their profile.	28-Apr-2022	2	29-Apr-2022	100%	2	2	0
4		Users can message other users (websockets)	29-Apr-2022	5	05-May-2022	100%			
5		Admins can manage the users (CRUD)	05-May-2022	2	09-May-2022	100%			
6		Admins can view the page statistics	09-May-2022	6	16-May-2022	0%			
7		Researchers can write news	16-May-2022	3	18-May-2022	50%			
8		Users can interact with the forums	18-May-2022	2	19-May-2022	0%			
9		Users can view and comment news	19-May-2022	4	24-May-2022	0%			
10		Users can change their password. Includes e-mail verification.	24-May-2022	4	27-May-2022	0%			

Iván de Monserrat

WBS	Task Names	Resource Names	Start	Duration	Finish	% Complete	Cale	Days	Days
			25-abr-2022	20	20-may-2022	99%	26		
		Iván de Monserrat Navarro	25-abr-2022	20	20-may-2022	100%	26	5	0
1		Create dataBase	25-abr-2022	1	25-abr-2022	100%	1	1	0
2		Receive information from weather stations / Get API data	25-abr-2022	4	28-abr-2022	100%	4	4	0
6		Create spain Map on D3 with angular	10-may-2022	6	17-may-2022	100%	8	5	1
7		Create backend functions for request data to dataBase	17-may-2022	3	19-may-2022	100%	3	3	0
8		D3 map station points	19-may-2022	2	20-may-2022	100%	2	2	0
9		D3 map zoom	20-may-2022	1	20-may-2022	100%	1	1	0
10		Show ranking	20-may-2022	2	23-may-2022	100%	4	2	0
11		Show info data	23-may-2022	3	25-may-2022	100%	3	3	0
12		Show forecast data	25-may-2022	2	26-may-2022	100%	2	2	0
13		Create Login Functions + Script	26-may-2022	8	06-jun-2022	80%	12	6	2

2. Risk Mitigation Planning

1. risk of lack of time. If there is no time, I think I could leave the part of showing news because it would be a service that we would not maintain, it would be the research community itself.
2. risk of miscommunication between microservices. To maintain a web by microservices we have to be very clear about how the client and the server are going to communicate.
3. The biggest risk to address is the delay or non-completion of the different tasks of each member. This can appear due to multiple factors such as poor planning, poor analysis, lack of time, and even technical inability.

RA4. Tests

1. Unit/Integration testing

Roger Puga Ruiz

FR1: Add user	
1	should throw an exception if the user is empty
2	should throw an exception if the user already exists
3	should throw an exception if any of its fields is wrong
FR3: Edit profile	
1	should throw an exception if any of its fields are empty
2	should throw an exception if any of its fields is wrong
3	should throw an exception if some of your fields already exist
FR6: Users can message other users	
1	should throw exception if recipient does not exist
2	should throw an exception if the emissary does not exist
FR9: Researchers can write news	
1	should throw an exception if you don't have the necessary authorization
2	should throw an exception if some form fields are empty
FR8: Admin can manage users	
1	should throw an exception if you don't have the necessary authorization
2	should throw an exception if any field does not correspond to the expected values, for example a date

Iván de Monserrat

FR29: Show Rankings	
1	Should not display html if rankings request fails
2	Shold throw a httlClient error request if backend response fails
FR23: Insert data into database	
1	Should throw an exeption if SQLSyntax is wrong in query
2	Should stop inserting data if SQLSyntas is wrong
FR25: Create spain Map on D3 with angular	
1	Should not render map if backend response fails
2	Should throw an exception if map not render
FR21: Receive information from weather stations / Get API data	
1	should throw an exception if API block the IP
2	should throw an exception if API fails on response
FR31: Show forecast data	
1	should display NO DATA if data is null
2	Should remove html <> if object data is null

2. Usability/Accessibility testing

We take into account that the web is accessible and usable. The reasons are various from facilitating use by people with disabilities to achieving greater use and market for it.

Regarding accessibility, we will try to follow guidelines that help disabled people:

ACCESSIBILITY	
Measure	Description
Complex objects	Graphs, maps, trees, will be complemented with descriptions that help to understand them.
Semantic tags	Use of HTML5 semantic tags that facilitate screen reading.
Use of alternative text in images	Alternative descriptions that are useful.
Lightweight views	Although the views will require visualization of images, graphics, maps, canvas, we will try to make the weight of these as light as possible.
Contrast images	Contrast images Adequate contrast for easy viewing.

USABILITY	
Measure	Description
Textual emphasis	When we want to emphasize some part of the text, we should use at least: underlining, bold, italics.
Aesthetics and minimalist design	Easy and intuitive design, offering the right, necessary and useful information.
Error prevention	Prevent the user through typical error messages.
Consistency and standards	Homogeneous look and feel of the website.
Visibility of system status	The user must be informed about what is happening by means of: process bars, messages or animations.
Freedom and control for the user	Confirmation, undo and redo functions.