Algorithms and programming
Requirements analysis and specification

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Problem identification and requirements analysis

Case Study: Application for COP16 activities

Customer	Cali mayor's office
User	People who want to attend this event voluntarily (Collaborators) and people who want to know the program that is going to be carried out (Users).
Functional requirements	RF1: Volunteer registration in the system. RF2: Record walk (tour) to a biodiverse site. RF3 - Storage and registration of places with biological diversity. RF4 – Sort and display places from largest to smallest area in km 2. RF5 - Consultation of the Department with More Diverse Places Registered RF6 - Register community that takes care of the biodiverse place RF7 - Species registration in a biodiverse place RF8 - Species consultation in a biodiverse place

	RF9 - Consult communities with specific problems *RF10 - Modify the data of a species in a biodiverse place*
Context of the problem	*The aim is to develop an application to support COP16 in Cali, focused on biodiversity management. The first phase will focus on the registration of ecological events, including details such as routes, participants and weather conditions. The second phase will be dedicated to creating an inventory of biodiverse places in the region, allowing information such as name, location and area to be recorded. Both phases seek to provide a useful tool for COP16 organizers and volunteers, facilitating the management of activities and promoting awareness about the importance of biodiversity in the region.*
Non-functional requirements	*Answer: The system must respond to user requests within a maximum of 5 seconds.* *Scalability: Must be able to handle an increase in the number of users and data without significantly impacting performance.* *Ability to perform calculations: For example, mathematical calculations to organize all the people on buses and make sure that no person is left out.* *Platform: The system must be compatible with different operating systems (Windows, Linux, macOS) and modern web browsers but in certain cases recommending the most optimal browsers for the user.*

	Integration: The system must be able to integrate with other information systems, such as mapping systems or government databases. Readability: The code must be readable and easy to understand for any developer. Extensibility: The system should be easy to extend to include new functionality in the future.
Process requirements	The most critical process requirements for this project focus on ensuring quality, collaboration, and flexibility. A development process that includes constant testing to ensure that the system works correctly and rigorous change management is essential. Effective communication between all involved and the adoption of agile methodologies are key to ensuring that the system adapts to the changing needs of the project and meets the highest quality standards.

Identifier and name	**RF1: Registration of the volunteer in the system.**		
Summary	*The program must allow the organizer to register, requesting information such as the organizer's full name, ID number, and finally providing a greeting to the user.*		
input	**Name** **input**	**Data type**	**Condition** **valid values**

	name of the user	*string*	*the name must count on the following form: First name, Middle name (optional), First surname and Second surname (optional)* *They can't enter numbers in this field.*
	ID card	*string*	*Must contain only numbers.* *The minimum of numbers are 5 and the maximum 15.* *Can't contain points*
Result or Postcondition	*successfully registers in the database with all your information (name and ID), and a welcome message is displayed. If any data is invalid (for example, example, the format of the ID card), the request is rejected registration and correction is requested.*		
outputs	**Name of output**	**Data type**	**Format**
	user registered	*string*	*"Perfect! You are registered in*

			our platform"
	greeting	*string*	*"Welcome, [Name of user]"*
	message from mistake	*String*	*"There is a mistake in the process by Please make sure the values do not allowed "*

Identifier and name	RF2- *Record walk (tour) to a biodiverse site.*		
Summary	*The system will allow volunteers to register a walk to a biodiversity site. To do this, they will have to choose between three scheduled routes, enter the number of participants and guides who will take part, and finally, the current temperature of the city and the relative humidity percentage. After registration, the meeting point, start and end time of the activity will be displayed, according to the chosen route; also, whether or not it is a good day to walk through the city; and, in addition, the number of buses that will be necessary to make the trip.*		
input	**Name input**	**Data type**	**Condition valid values**

	Route	*Boolean*	*Only the options that are currently available will be allowed to be chosen. available*
	Time and date of exit	*DataTime*	*Only the specific format of (dd/mm/yyyy) and time in 24h format.*
	number of participant is	*int*	*It must be an integer, that is, it cannot contain periods, commas or letters. the number of participants will be analyzed, -* *It must be an integer value positive greater than 0.* *- Must not exceed the total available capacity.*
	number of guides	*int*	*It must be an integer, that is, it cannot contain periods, commas or letters.*
	temperature to	*double*	*The temperature must be between 20°C and 25°C*
	humidity	*double*	*Relative humidity should be between 40% and 60%*
Result or Postcondition	*The route and schedule have been successfully selected, registration and update in the database on the amount of people in the group, making a distinction between*		

	participants and guides. The following are approved or disapproved: conditions to be able to continue with the process		
outputs	**Name of output**	**data type**	**Format**
	Route to choose	Boolean	The user must choose between the options presented: "What route do you want to take? - Farallones - East - hillside
	Schedule of the route	Boolean	What schedule do you want? take? (date and time) - Route, Time in Colombian time format (DD,MM,YYYY) - Route, Time in Colombian time format (DD,MM,YYYY) - Route, Time in Colombian time format (DD,MM,YYYY)
	Message from record of the cluster	String	"The participants and guides have been registered successfully"

	message from approval	String	"It's a nice day to walk around Cali!"
	message from disapproval	String	"The weather is not good for walking in Cali"
	Calculation of the number of buses	String	The number of buses assigned to [Route] is [Number of buses]
	Message from mistake	String	"Registration was not successful Please rectify the process"

Identifier and name	RF3.*Storage and registration of places with biological diversity.*		
Summary	Information on biodiverse sites is recorded, including the name of the site, the department, its extension in square kilometers and a photo of the place.		
input	Name entrance	Data type	Condition values valid
	Name of the Place	string	- It must be a unique text string and not empty.

			- Must not contain special characters.
	Name of the Department	*string*	*- Must be a text value that matches one of the valid departments: Chocó, Valle, Cauca, Nariño.*
	Area of the Place	*float*	*- It must be a value greater positive numeric that 0.*
	Photo of the place	*String*	*It must be a valid path with a .jpg extension or .png*
	date opening	*String*	*DD/MM/YYYY*
	resources economic	*double*	*must be greater than 0*
Result or Postcondition	*The biodiversity site is correctly registered with its name, department, area, photo, opening date, responsible community, economic resources, and up to 50 species with name, type, photo, quantity (requirement #6). If there is any error or data invalid, an error message is displayed.*		

outputs	Name of output	data type	Format
	Message from the place registration	string	"The place was registered successfully"
	Error message	string	"The place could not be registered correctly, by Please check the information"

Identifier and name	RF4.*Sort and display places from largest to smallest area in km 2.*
Summary	The system allows you to consult a list of registered places, ordered from lowest to highest in terms of its area in square kilometers.
NO INPUTS	

outputs	Name of output	Data type	Format

	Order of places	list<String>	List of places Biodiverse ordered from least to greatest area in kilometers

Identifier and name	RF5.*Query of the Department with More Places Various Registered*		
Summary	The system shows which department has the most registered biodiversity sites and how many sites it has in total.		
NO INPUTS			
outputs	**Name of output**	**data type**	**Format**
	Department Consultation	string	tthe system show which department has more Biodiverse places registered and how many places has: "The department with more places Biodiverse registered is [Name of department] with a total of [Amount of places]"

Identifier and name	RF6 Community registration that cares for the place Biodiverse		
Summary	*Register a community responsible for the care of the biodiversity site and associates the data entered.*		
input	**Name entrance**	**data type**	**Condition valid values**
	name community	*String*	*can't be empty*
	guy community	*String*	*Afro-Colombian, Indigenous, Raizal*
	name representative	*String*	*can't be empty*
	cellular representative	*String*	*must have 10 digits*

	song population	int	Must be an integer value positive greater than 0.
	issues community	List<String >	It should be a list containing one or more problems that the community faces (For example: lack of hospital, lack of school, lack of drinking water, lack of access to basic food, etc.)
Result or Postcondition	The species is correctly recorded in the selected biodiversity site, as long as the limit of 50 species is not exceeded and the data is valid. If there is any error(duplicate species, limit exceeded, etc.), it is eliminated. notified and the registration is rejected.		
outputs	**Name of output**	**data type**	**Format**
	message confirmation	string	The species [Species name] was recorded in [name of place]
	error message	String	"Invalid value, please check the list and enter a valid number."

Identifier and name	RF7 Species registration in a biodiverse place

Summary	Allows you to store information about a species in a biodiverse place.		
input	**Name input**	**data type**	**Condition valid values**
	place option	int	It must be a number whole. The value must correspond to a number from the displayed list of places registered (for example, if there are 5 places, the input value must be between 1 and 5).
	name species	String	non-empty text
	type species	String	It must be flora or fauna
	photo species	String	It must be a valid path with a .jpg or .png extension
	quantity of specimens	int	It cannot be a negative number.
Result or Postcondition	The species is correctly recorded in the selected biodiversity site, provided that the limit of 50 species is not exceeded and the data is valid. If there are		

	any error (duplicate species, limit exceeded, etc.), it will notifies and the registration is rejected.		
outputs	*Name of output*	*data type*	*Format*
	message confirmation	*string*	*The species [Species name] was recorded in* *[name of place]*
	error message	*String*	*"Invalid value, please check the list and enter a* *valid number."*

Identifier and name	RF8 species consultation in a biodiverse place		
Summary	*The system must allow to consult the information of the registered communities.*		
input	**Name entrance**	*data type*	**Condition valid values**
	Species a consult	*int*	*Must be an integer value positive greater than 0.* *must be a list containing the communities registered community*

Result or Postcondition	All community information is displayed at consult.		
outputs	**Name of output**	**data type**	**Format**
	list of species	*List<String g>*	*1. [species name 1]* *2. [species name 2] (In this case, the user* *Enter the number that corresponds to the species* *consult)*
	error message	*String*	*"Invalid value, please check the list and enter a* *valid number."*
	information community	*String*	*"information of the species:* *Place to which it belongs: [place option]* *name: [species name]* *Type: [species type]* *photo of the species: [photo species]* *Number of copies: [number of copies]*

Identifier and name	RF9 Consult Communities with Problems specific		
Summary	The system allows to consult and obtain information from communities that face problems of lack of hospital or lack of school.		
input	**Name input**	**data type**	**Condition valid values**
	There are no inputs		
Result or Postcondition	All community information is displayed at consult.		
outputs	**Name of output**	**data type**	**Format**
	the Communities With Problems	*List<String g>*	*List of objects Community, each one containing:* *name: [name community]* *Type: [community type]* *Representative: [name representative]* *Contact: [cell phone representative]* *Number of inhabitants: [number of inhabitants]*

			problems of the community: [name: [community name]
			Type: [community type]
			Representative: [name representative]
			Contact: [cell phone representative]
			Number of inhabitants: [number of inhabitants]
			problems of the community: [problems community]"
			(The latter mentions whether the community faces a lack of hospital, lack of school, or both)"
	error message	*String*	*"Invalid value, please check the list and enter a valid number."*
	information community	*String*	*"information of the species:* *Place to which it belongs: [place option]* *name: [species name]*

			Type: [species type] photo of the species: [photo species] Number of specimens: [number of specimens]

Identifier and name	RF10 Modify the data of a species in a place Biodiverse		
Summary	Allows you to modify the information of a species registered in a biodiverse place, including name, type, photo and number of copies.		
input	**Name input**	data type	Condition valid values
	species name	String	Name of a species already recorded at the site, non- empty text.
	new species name	String	Flora or fauna
	new photo species	String	Valid route with extension . jpg or .png

	new quantity of specimens	int	It cannot be a negative number.
Result or Postcondition	*The data of the selected species is updated on the biodiversity site. If the species does not exist on the site or if any data is invalid (such as a negative number for quantity), an error is generated and the user is notified to change the data to correct it.*		
outputs	**Name of output**	**data type**	**Format**
	message confirmation	*String*	*"The data for the species [species name] has been successfully modified for the place [name place]."*
	error message	*String*	*"Error: Species [species name] was not found at location [location name]. Check the information "accepted"*