**Problem identification and requirements analysis**

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## **Case study:**

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| client | Colombian District of Santiago de Cali, Capital of El Valle del Cauca |
| User | Representatives of the 190 participating Countries of COP 16, Governmental Organizations, non-governmental organizations and the common citizen. |
| Functional Requirements | FR1 Register a community.  FR2 Register a Biodiversity-rich location.  FR3 Register a Product to a Community  FR4 Delete a Product from a Community  FR5 Register a Species to a Biodiverse-rich location.  FR6 Modify the information of a Species from a Biodiverse location.  FR7 Consult information about a location.  FR8 Consult information about a Community by Department  FR9 Consult information about Communities where its major issue is the lack of Hospitals and the lack of Education.  FR10 Consult the location with more diversity of Species.  FR11 Consult the 3 largest places by Km^2. |
| Statement Context | *The organization of the COP16 biodiversity conference in Cali, Colombia, from October 21st to November 1st, 2024, is coming close and the CD of Cali is asking both universities and the tech sector to elaborate, design and develop a software application which its objective is to facilitate navigation and access to information about biodiversity-rich locations and the communities responsible for their conservation. This includes storing place, species, and community data, offering administrative functionalities and querying options, all within a user-friendly interface with multilingual support and performance optimization* |
| Non-Functional Requirements | Functional Administrative Menu, Functional Consultant Menu, Friendly User Interface, Multilingual Support, Functional Usage of its Users. |

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| Name and Identifier | *FR-1 Register a Community* | | | |
| Summary | *In this requirement, the registry of the communities will be kept with the following information: name, type, name and cell phone of the representative, number of inhabitants, major problems, product inventory. After this, a Success Message Print or error will be displayed whether or not the data is already registered* | | | |
| Inputs | **Entry name** | **Datatype** | | **Condition valid values** |
| communityName | String | | *-Special characters are not allowed.*  *-Numeric Characters are not allowed.* |
| race | String | | *-Special characters are not allowed.*  *-Numeric Characters are not allowed.*  *-Only these types of communities will be admitted (Afro-Colombian, Indigenous, Raizal)* |
| representativeName | String | | *-Special characters are not allowed.*  *-Numeric Characters are not allowed.* |
| representativePhoneNumber | Int | | *-Numeric Inputs Only.* |
| inhabitants | Int | | *-Numeric Inputs Only.* |
| majorIssues | String | | *-Special characters are not allowed.*  *-Numeric Characters are not allowed.*  *-It must be specified if they are any of these problems (lack of hospital, lack of school, lack of drinking water, lack of access to basic food)* |
| productInventory | Int | | *-No more than 20 can be entered* |
| Post-Condition or Results | Next, it will be verified if all the boxes are filled out and that they meet the conditions of valid values, if it meets that, all the data entered will be recorded, after that a Success Message Print or error will be displayed on the screen if something is missing or complies with with valid values. | | | |
| Outputs | **Output name** | | **Datatype** | **Format** |
| Success Message Print | | String |  |
| Message Print Error | | String |  |

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| Name and Identifier | *[FR2-Register to Biodiversity-rich location.]* | | | |
| Summary | *In this requirement, the record of the places will be kept, a user will be asked for some data, after that it will be verified that all the fields have been filled out and that they meet the condition of valid values, showing at the end a Success Message Print " Your data has been registered” and an Error Message Print if you have not complied.* | | | |
| Inputs | **Input Name** | **Type of Variable** | | **Valid Values ​​Condition** |
| Bio-Place Name | String | | *-Special characters are not allowed.*  *-Numeric Characters are not allowed.* |
| Department name | String | | *-Special characters are not allowed.*  *-Numeric Characters are not allowed.*  *-Only these departments will be admitted (Chocó, Valle, Cauca, Nariño)* |
| Number of square kilometers | double | | *-Only numeric characters will be accepted* |
| Area type | String | | *-Special characters are not allowed.*  *-Numeric Characters are not allowed.*  *-Only these types of areas will be admitted (protected area, national park, private area)* |
| Opening date | date | | *-Numeric Inputs Only.*  *-You must enter a date no later than the day you are registering.* |
| Photo place | String | | *-Only valid formats such as (png, jpg) will be accepted.* |
| Community that cares for her | String | | *- Special characters are not allowed.*  *-Numeric Characters are not allowed.* |
| Economic resources | double | | *-Numeric Inputs Only.* |
| Number of species that inhabit | Int | | *-Numeric Inputs Only.*  *-Value entered must not be greater than 50* |
| Post-Condition or Results | What is expected is that the data is registered correctly in the system, otherwise it will show a Message Print Error | | | |
| Outputs | **Output name** | | **Type of Variable** | **Format** |
| Success Message Print | | String | “The location data has been registered correctly” |
| Message Print Error | | String | “It happened when recording the data. Retry" |

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| Name and Identifier | *[FR3*-*Register a Product to a Community]* | | | |
| Summary | *In this requirement, the record of the products of each community will be kept, the user will be asked for the data to be recorded, at the end of the execution a Success Message Print or an Error Message Print will be displayed.* | | | |
| Inputs | **Input Name** | **Type of Variable** | | **Valid Values ​​Condition** |
| Product Name | String | | *-Special characters are not allowed.*  *-Numeric Characters are not allowed.* |
| Percentage of natural products for manufacturing | double | | *-Numeric Characters are only Allowed.* |
| Confirmation Handmade | boolean | | *-Special characters are not allowed.*  *-Numeric Characters are not allowed.*  *-True or False Inputs Only.* |
| Post-Condition or Results | What is expected is that the system correctly records the data entered by the user, then displaying a Success Message Print or Error. | | | |
| Outputs | **Output name** | | **Type of Variable** | **Format** |
| Success Message Print | | String | “The product has been registered correctly” |
| Message Print Error | | String | “An error occurred while registering the product. Retry" |

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| Name and Identifier | *[FR4 Delete a Product from a Community]* | | | |
| Summary | *In this request, a product will be deleted, the user will be asked the Product Name to be deleted, then a Success Message Print or error will be displayed.* | | | |
| Inputs | **Input Name** | **Type of Variable** | | **Valid Values ​​Condition** |
| Name of the product to delete | String | | *-Special characters are not allowed.*  *-Numeric Characters are not allowed.*  *-Inputted product name must be valid within the registered ones.* |
| Post-Condition or Results | What is expected is that the user enters the name and the system automatically deletes everything related to the product. | | | |
| Outputs | **Output name** | | **Type of Variable** | **Format** |
| Success Message Print | | String | “The product has been disposed of correctly” |
| Message Print Error | | String | “An error occurred while deleting the product. Retry" |

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| Name and Identifier | *[FR5 Register a Species to a Biodiverse-rich location.]* | | | |
| Summary | *In this requirement, the record of a species will be taken to a place, the user will be asked for the data to be recorded for the species, at the end of the execution the system will show a Success Message Print or error if any failure occurred.* | | | |
| Inputs | **Input Name** | **Type of Variable** | | **Valid Values ​​Condition** |
| Bio-Place Name to enter | String | | *-Special characters are not allowed.*  *-Numeric Characters are not allowed.*  *-The Bio-Place Name must match with one registered.* |
| Species name | String | | *-Special characters are not allowed.*  *-Numeric Characters are not allowed.* |
| Confirmation Flora or Fauna | String | | *-Special characters are not allowed.*  *-Numeric Characters are not allowed.*  *-Only these answers will be accepted (Fauna || Flora)* |
| Species photo | String | | *-The URL Adress of the Picture must be inputted.* |
| Post-Condition or Results | What is expected is for the system to correctly record the species data, then display a Success Message Print or error if any failure occurred and also display the species by location. | | | |
| Outputs | **Output name** | | **Type of Variable** | **Format** |
| Success Message Print | | String | “The species has been correctly registered” |
| Message Print Error | | String | “An error has occurred when registering the species. Try again" |
| Species by place | | String | “Species by place” |

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| Name and Identifier | *[RF6 -Modify species data in a location]* | | | |
| Summary | *In this requirement, the data of a species will be modified, the user will be asked for the name of the species to be edited, the system will verify if the species already exists, after that, it will begin to ask for the data to be modified, finally, it will be displayed a Success Message Print or error if an error has occurred,* | | | |
| Inputs | **Input Name** | **Type of Variable** | | **Valid Values ​​Condition** |
| speciesName | String | | *-Special characters are not allowed.*  *-Numeric Characters are not allowed.*  *-The name of the species must be the same as one already registered* |
| bioPlaceName | String | | *-Special characters are not allowed.*  *-Numeric Characters are not allowed.*  *-The Bio-Place Name must match with one registered.* |
| kingdomChoice | String | | *-Special characters are not allowed.*  *-Numeric Characters are not allowed.*  *-Only these answers will be accepted (Fauna || Flora)* |
| speciesPhoto | String | | *-The URL Adress of the Picture must be inputted.* |
| Post-Condition or Results | What is expected is that the system updates the species data correctly and that a Success Message Print or error is displayed if an error has occurred. | | | |
| Outputs | **Output name** | | **Type of Variable** | **Format** |
| Success Message Print | | String | “The species data has been modified correctly” |
| Message Print Error | | String | “An error occurred while modifying the species data. Try again" |

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| Name and Identifier | *[RF7-Check information about a place]* | | | |
| Summary | *In this requirement, the information of a place will be consulted, the user will be asked for the Bio-Place Name that they wish to see the information, then all the data of the previously entered place will be shown, otherwise if the place does not exists or you did not write it correctly, the program will display an Error Message Print.* | | | |
| Inputs | **Input Name** | **Type of Variable** | | **Valid Values ​​Condition** |
| bioPlaceName | String | | *-Special characters are not allowed.*  *-Numeric Characters are not allowed.*  *-The Bio-Place Name must be the same as one already registered* |
| Post-Condition or Results | After the user has entered the Bio-Place Name that they wish to see the information, the system will display all the data of the previously registered place. | | | |
| Outputs | **Output name** | | **Type of Variable** | **Format** |
| bioPlaceName | | String | “Bio-Place Name” |
| departmentName | | String | “Department name” |
| Number of square kilometers | | double | *“Number of square kilometers”* |
| Area type | | String | *“Type of area”* |
| Opening date | | date | *“Inauguration date”* |
| Photo place | | String | *“Photo place”* |
| Community that cares for her | | String | *“Community that cares”* |
| Economic resources | | double | *"Economic resources"* |
| Number of species that inhabit | | Int | *“Number of species that inhabit it”* |
| Message Print Error | | String | *“An error occurred while searching for location information. Try again"* |

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| Name and Identifier | *[RF8-Consult the information of the communities of a department]* | | | |
| Summary | *In this requirement you want to consult the community information of a department, the user must enter the name of the department that wants to see the communities and the system will show all the communities that have been registered for that department, otherwise if the name of the department does not exist or was not written correctly, the system will display an Error Message Print.* | | | |
| Inputs | **Input Name** | **Type of Variable** | | **Valid Values ​​Condition** |
| Department name | String | | *-Special characters are not allowed.*  *-Numeric Characters are not allowed.*  *-Only these departments will be admitted (Chocó, Valle, Cauca, Nariño)* |
| Post-Condition or Results | What is expected is that the system searches and displays the data of the communities of the department that the user previously entered. | | | |
| Outputs | **Output name** | | **Type of Variable** | **Format** |
| Community name | | String | “Community name” |
| Community type | | String | “Community type” |
| Community Representative Name | | String | *“Community representative name”* |
| Representative's cell phone | | Int | *“Representative's cell phone”* |
| Number of inhabitants of the community | | Int | *“Number of inhabitants of the community”* |
| Major community problems | | String | *“Major community problems”* |
| Number of products offered by the community | | Int | *“Amount of products offered by the community”* |
| Message Print Error | | String | *“An error has occurred when searching for communities for that department. Try again"* |

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| Name and Identifier | *[RF9-Consult information on communities with specific problems]* | | | |
| Summary | *In this requirement you want to consult the information of the communities with specific problems, whether it is the lack of a hospital or the lack of a school, the user must enter the problem they want to see, then the system will show the information of all the communities that have that problem, otherwise, it will show an error if the user typed a problem that does not exist or was misspelled.* | | | |
| Inputs | **Input Name** | **Type of Variable** | | **Valid Values ​​Condition** |
| Consultation of communities for major problems | String | | *-Special characters are not allowed.*  *-Numeric Characters are not allowed.*  *-If the problem must be the same as one of these problems (*they lack a hospital or they lack a school*)* |
| Post-Condition or Results | What will happen is that the system begins to search for all the communities that have that problem, then it will display all the information about each of the communities on the screen. | | | |
| Outputs | **Output name** | | **Type of Variable** | **Format** |
| Community name | | String | “Community name” |
| Community type | | String | “Community type” |
| Community Representative Name | | String | *“Community representative name”* |
| Representative's cell phone | | Int | *“Representative's cell phone”* |
| Number of inhabitants of the community | | Int | *“Number of inhabitants of the community”* |
| Major community problems | | String | *“Major community problems”* |
| Number of products offered by the community | | Int | *“Amount of products offered by the community”* |
| Message Print Error | | String | *“An error has occurred when seeking information from communities that have this problem. Try again"* |

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| Name and Identifier | *[RF10-Consult the Bio-Place Name with the greatest number of species]* | | | |
| Summary | *In this requirement, only the Bio-Place Name with the greatest number of species will be consulted, asking the user if they want to know (You must answer yes or no at the time of execution), after that the name with the most species will be displayed. and its quantity.* | | | |
| Inputs | **Input Name** | **Type of Variable** | | **Valid Values ​​Condition** |
| Consult the largest number of species | String | | *-Special characters are not allowed.*  *-Numeric Characters are not allowed.*  *-Valid answers (Yes || No)* |
| Post-Condition or Results | What is expected is that the system will begin to search for which place has the greatest number of species, finally, showing the Bio-Place Name and the number of species that inhabit it. | | | |
| Outputs | **Output name** | | **Type of Variable** | **Format** |
| Bio-Place Name | | String | “Bio-Place Name” |
| Number of species in the area | | Int | “Number of species in the place” |

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| Name and Identifier | *[RF11-See the three largest places per square kilometer]* | | | |
| Summary | *In this request, the three largest places will be consulted, the user will be asked if they want to see it (You must answer yes or no at the time of execution), after that it will show the name of the three largest places.* | | | |
| Inputs | **Input Name** | **Type of Variable** | | **Valid Values ​​Condition** |
| Check out 3 larger places | String | | *-Special characters are not allowed.*  *-Numeric Characters are not allowed.*  *-Valid answers (Yes || No)* |
| Post-Condition or Results | What is expected is that the system will begin to search for the three largest places, and then display them on the screen. | | | |
| Outputs | **Output name** | | **Type of Variable** | **Format** |
| Bio-Place Name | | String | “Bio-Place Name” |
| Bio-Place Name | | String | *“Bio-Place Name”* |
| Bio-Place Name | | String | *“Bio-Place Name”* |