DATA STRUCTURES AND DATA STORE DESCRIPTION

FIELD NAME	KEY	DATA TYPE	DATA SIZE/LENGTH	DESCRIPTION
STRUCTURE-1 RAW SIGHTINGS				
Sighting ID	Primary Key	Integer	2 bytes	Stores the ID for the sighting
Count	not null	Integer	2 bytes	Number of birds spotted
Common Name		Text		Contains the common name of the bird
Species ID	Foreign Key	Integer	2 bytes	Stores the ID of the species sighted
New Species		Text		Contains the common name if species does not exist in database
Date Time	not null	Date-Time		Time at which sighting is recorded
Location Longitude	not null	Float	4 bytes	Longitude of sighting location
Location Latitude	not null	Float	4 bytes	Latitude of sighting location
User ID	Foreign Key	Integer	2 bytes	ID of the user who entered the sighting
Image		JPEG File		Image of the bird sighted
Upvotes		Integer	2 bytes	Contains the number of upvotes to the sighting
Downvotes		Integer	2 bytes	Contains the number of downvotes to the sighting
Credible		Boolean	1 byte	Indicates if the sighting is credible or not
DESCRIPTION: This structure stores the data about the raw sightings that are inputted by the user				
FROM PROCESS: 3.3.2-Sighting Retrieval, 2.3-User Ratification, 2.2-System Ratification				
TO PROCESS: 3.3.2-Sighting Retrieval, 2.3-User Ratification, 2.2-System Ratification, 2.4-Expert Ratification				
STRUCTURE-2 REFINED SIGHTINGS				
Sighting Id	Primary Key	Integer	2 bytes	ID for the cumulative information of species sightings which happened at a place and time
Species ID	Foreign Key	Integer	2 bytes	ID of the species sighted
Location	Foreign Key	Integer	2 bytes	ID of location
Count	not null	Integer	2 bytes	Number of specimens seen
Number of Sightings	not null	Integer	2 bytes	Number of sightings of the specimen
Month	not null	Text	50 Characters	Stores the month of sighting
Image		JPEG File		Image of particular sighting
DESCRIPTION: This stores the sightings which have been ratified by users and can provide digestible information about sightings				
FROM PROCESS: 2.3-User Ratification, 2.2-System Ratification, 3-Sighting Retrieval				
TO PROCESS: 3-Sighting Retrieval, 2.3-User Ratification, 2.2-System Ratification				
STRUCTURE-3 SPECIES				
Species ID	Primary Key	Integer	2 bytes	ID of the species
Common Name	not null	Text	50 Characters	Common name of the species
Scientific Name	not null	Text	50 Characters	Scientific Name of the species
Image		JPEG File		
DESCRIPTION: Stores information about species				
FROM PROCESS: 2.5-Add Species, 2.4-Expert Ratification, 3.1.1-Species Retrieval				
TO PROCESS: 2.5-Add Species, 3.1.1-Species Retrieval				
STRUCTURE-4 LOCATIONS				
Location ID	Primary Key	Integer	2 bytes	ID of the location grid
Longitude Start	not null	Float	4 bytes	Begining longitude of the grid
Longitude End	not null	Float	4 bytes	Ending longitude of the grid
Latitude Start	not null	Float	4 bytes	Begining latitude of the grid
Latitude End	not null	Float	4 bytes	Ending latitude of the grid
DESCRIPTION: Stores the list of location grids in which sightings have been submitted				
FROM PROCESS: 3.3.2-Location Retrieval				
TO PROCESS: 3.3.2-Location Retrieval				
STRUCTURE-5 USER INFORMATION				
User ID	Primary Key	Integer	2 bytes	ID for a particular user
Username	not null	Text	50 Characters	Name of the user
E-mail	not null	Text	50 Characters	Email
Password	not null	Text	50 Characters	Password
DESCRIPTION: Stores the personal details of the user and user ID				
FROM PROCESS: 1.2-User Information Handler, 1.1- User Authentication				
TO PROCESS: 1.2-User Information Handler, 1.1- User Authentication				
STRUCTURE-6 USER LOGIN DETAILS				
Username	not null	Text	50 Characters	Name of the user
E-mail	not null	Text	50 Characters	Email
Password	not null	Text	50 Characters	Password
DESCRIPTION: Stores the login details of the user				
FROM PROCESS: 1.2-User Information Handler				
TO PROCESS: 1.2-User Information Handler, 1.1- User Authentication				
STRUCTURE-7 USER AUTHENTICATION DETAILS				
User ID	Primary Key	Integer	2 bytes	ID for a particular user
Username	not null	Text	50 Characters	Name of the user
Token	not null	Text	40 Characters	Token for user validation
DESCRIPTION: Stores user info related for login session maintainance				
FROM PROCESS: 1.2-User Information Handler, 1.1- User Authentication, 2.1 User Authentication, 3.3.1 User Authentication, 3.3.2 Sighting Retrieval				
TO PROCESS: 1.2-User Information Handler, 1.1- User Authentication, 2.1 User Authentication, 3.3.1 User Authentication, 3.3.2 Sighting Retrieval				

DATA FLOW DESCRIPTION

DATA FLOW NAME	DESCRIPTION	FROM	TO	DATA STRUCTURE
USER INFORMATION				
Login/Registration Details	Contains user's personal details	User Entity	1.2 User Info Handler	USER LOGIN DETAILS
		1 User Info process	User Info Table	
User Information	Contains user's information stored in the database	User Info Table	1.2 User Info Handler	USER INFORMATION
		1.2 User Info Handler	1.1- User Authentication	
Login Error	Contains an error message in case of non-existent user	1.2 User Info Handler	User Entity	Message String
User Auth Details	Contains authentication token of the user. May be generated by the process	1.1 User Authentication	User Auth Details table	USER AUTHENTICATION DETAILS
Verified Auth Details	Contains the verified token. Empty if token doesn't exist	User Auth Details table	1.1 User Authentication	USER AUTHENTICATION DETAILS
User Info + Auth	Contains information about the user and authentication token	1.1 User Authentication	User Entity	USER INFORMATION + USER AUTHENTICATION DETAILS
Request User Info + Auth	A request for user information along with authentication token	User Entity	1.1 User Authentication	USER AUTHENTICATION DETAILS.Token
Request User Information	A request for user info	1.1 User Authentication	1.2 User Info Handler	USER AUTHENTICATION DETAILS.User_Id
		1.2 User Info Handler	User Info Table	USER AUTHENTICATION DETAILS.User_Id
Updated User Info + Auth	Contains updated user details and auth token	User Entity	1.1 User Authentication	USER INFORMATION + USER AUTHENTICATION DETAILS
Updated User Info	Contains the user information to be updated	1.1 User Authentication	1.2 User Info Handler	USER INFORMATION
SIGHTING INPUT				
Sighting Input + Auth	Contains the sighting information along with user and auth details	User Entity A	2.1 User Authentication	RAW SIGHTINGS + USER AUTHENTICATION DETAILS
User Auth Details	Contains authentication token of the user.	2.1 User Authentication	User Auth Details table	USER AUTHENTICATION DETAILS.Token
Verified Auth Details	Contains the verified authentication details. Empty if token doesn't exist	User Auth Details table	2.1 User Authentication	USER AUTHENTICATION DETAILS
Sighting Input	Contains the sighting information	2.1 User Authentication	2.2 System Ratification	RAW SIGHTINGS
		2.2 System Ratification	Raw Sighting Table	
		2.2 System Ratification	2.3 User Ratification	
		2.3 User Ratification	User Entity B	
		2.3 User Ratification	2.4 Expert Ratification	
		2.4 Expert Ratification	Expert	
Species Info Request	Request for details of species based on common name	2.2 System Ratification	Species Table	RAW SIGHTINGS.common_name
Species Info	Details about the species. Empty if the species doesn't exist in table	Species Table	2.2 System Ratification	SPECIES
Refined Sighting Request	Request for refined sightings similar to raw sighting	2.2 System Ratification	Refined Sighting Table	RAW SIGHTINGS
Refined Sighting Info	Refined sighting details	Refined Sighting Table	2.2 System Ratification	REFINED SIGHTINGS
Updated Info	Updated raw sighting details	2.2 System Ratification	Refined Sighting Table	REFINED SIGHTINGS
Upvote/Downvote	Information about how the user voted	User Entity B	2.3 User Ratification	Boolean
Confirm/Deny + New Species	Expert approval information. If approved, contains new species info	Expert	2.4 Expert Ratification	SPECIES
New Species	Contains information about species to be added	2.4 Expert Ratification	Admin	SPECIES
		Admin	2.5 Add Species	
		2.5 Add Species	Species Table	
Confirmation	A confirmation message to the user	2.5 Add Species	User Entity	String
SIGHTING RETRIEVAL				
PROCESS 3.1				
Request Species List	Request for a list of species based on common name input	User Entity	3.1.1 Species Retrieval	String
		3.1.1 Species Retrieval	Species Table	
Species List Response	Contains a list of species	Species Table	3.1.1 Species Retrieval	SPECIES
		3.1.1 Species Retrieval	User Entity	
Species ID Sighting Request	Request for sightings of a scpecies based on ID	User Entity	3.1.1Species Retrieval	SPECIES.Species_ID
		3.1.1 Species Retrieval	3.1.2 Sighting Retrieval	
		3.1.2 Sighting Retrieval	Refined Sighting Table	
Species sighting Response	List of refined sightings for the species	Refined Sighting Table	3.1.2 Sighting Retrieval	REFINED SIGHTINGS
		3.1.2 Sighting Retrieval	3.1.1 Species Retrieval	
		3.1.1 Species Retrieval	User Entity	
PROCESS 3.2				
Request Location List	Request for a list of location grids based on a condition	User Entity	3.2.1 Locations Retrieval	Latitude, Longitude (Float)
		3.2.1 Locations Retrieval	Locations Table	
Locaitons Info Response	Contains the grid in which the input location lies	Locations Table	3.2.1 Locations Retrieval	LOCATIONS
		3.2.1 Locations Retrieval	User Entity	
Locaiton ID Sighting Request	Request for sightings at a location based on ID	User Entity	3.2.1 Locations Retrieval	LOCATIONS.Location_ID
		3.2.1 Locations Retrieval	3.2.2 Sighting Retrieval	
		3.2.2 Sighting Retrieval	Refined Sighting Table	
Location sighting Response	List of refined sightings for the location	Refined Sighting Table	3.2.2 Sighting Retrieval	REFINED SIGHTINGS
		3.2.2 Sighting Retrieval	3.2.1 Locations Retrieval	
		3.2.1 Locations Retrieval	User Entity	
PROCESS 3.3				
Request User Sighting + Auth	A request containing user login and authentication token	User Entity	3.3.1 User Authentication	USER AUTHENTICATION DETAILS.Token
Auth	Authentication Details of user	3.3.1 User Authentication	User Auth Details table	USER AUTHENTICATION DETAILS.Token
Verification	Contains complete authentication info of the user	User Auth Details table	User Auth Details table	USER AUTHENTICATION DETAILS
User ID	A request for user's sightings	3.3.1 User Authentication	3.3.2 Sighting Retrieval	USER AUTHENTICATION DETAILS.User_Id
		3.3.2 Sighting Retrieval	Raw Sighting Table	
User Sightings	Contains User's Sightings	Raw Sighting Table	3.3.2 Sighting Retrieval	REFINED SIGHTINGS
		3.3.2 Sighting Retrieval	3.3.1 User Authentication	
		3.3.1 User Authentication	User Entity	

LEVEL-1 PROCESS DESCRIPTION

S No.	Process Name	Description	Inbound Data Flows	Outbound Data Flows
1	**User Information Process**	Handles any operation related to user information, which includes registration, login, logout and retrieving user information or update user information. The process also creates and handles authentication tokens for verification tasks.	Login/Registration Information, Request for user Information and Authentication, Updated user information and Authentication, User Information	Request for user information, Login/Registration info, Updated Information
2	**Sighting Input Process**	Handles operations related to taking new sighting input from the user and sending it for ratification to other users, and in extreme scenarios to experts and then adding the ratified sighting to database. The process also ratifies sightings automatically.	New Sighting Input and authentication details, Upvote/Downvote from user, Confirmation/Denial from expert	Confirmation/Denial response to sighting owner, User Ratification request, Expert Ratification request, Sighting Info
3	**Sighting Retrieval Process**	This process handles operations which are required for retrieving data related to sightings. The data may be retrieved on the basis of location, species, time or the sightings that the user has submitted.	Location Sighting Request, Species Sighting Request, User Sighting Request, User's Sightings, Refined Sightings	Sighting Requests, Sighting Responses