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## Software Documentation Guide

Environmental Justice

### The Design:

- The application is designed in a user-friendly manner using a menu and text prompts.
- Data Structure Used and Why
  - A dynamic array is used as a skeleton for the entire application. Each column of information is inserted into a variable, and all the variables are inserted into a struct. Every struct represents an element in the array.
  - The dynamic array was chosen because of its versatility. We knew that the best way to organize the data was to insert the data into a struct. The question that we needed to answer was how do we use and manipulate the data? The dynamic array allows us to accomplish every one of our functions.

### Data Set

- Original Data Set:
  - <https://www.kaggle.com/datasets/nationalparkservice/park-biodiversity?select=species.csv>
- Revised Data Set and Code can be found here:
  - <https://github.com/DJohnson2021/CSC-228-Data-Structures-and-Algorithms>

### Performance of Algorithms

- All of the algorithms used in the applications work as intended, but a couple of them have room for improvement in time constriction and the input they use. The application displays the time duration of each algorithm in ticks for the user. We had to compromise with some algorithms because it was not possible to manipulate the data set in the way we wanted. Further testing and improvement are required.

### How to?

- After running the application, a menu, as well as a text prompt, should be displayed.

```
> make -s
> ./main
*****
|           Menu           |
|*****|
| 1. Display Animal List  |
|*****|
| 2. Delete a Random Animal |
|*****|
| 3. Sort by Occurence   |
|*****|
| 4. Search Conservation Status |
|*****|
| 5. Nativeness Check    |
|*****|
| 6. Search by Order     |
|*****|
| 7. Scientific to Common Swap |
|*****|
| 0. Exit Application     |
|*****|
Choose a task to complete, choose 0 to exit application: |
```

- The is an operation corresponding to a number from zero to seven. The program should ask you to enter a number to complete a task. If a number outside the range given is chosen, the program will ask you again to select a task until a recognizable number is entered.
- After choosing a task for the program to complete, the program will execute the task.

```

> make -s
> ./main
*****
|                                     |
|               Menu                 |
|                                     |
|-----|
| 1. Display Animal List             |
|-----|
| 2. Delete a Random Animal          |
|-----|
| 3. Sort by Occurrence              |
|-----|
| 4. Search Conservation Status      |
|-----|
| 5. Nativeness Check                |
|-----|
| 6. Search by Order                 |
|-----|
| 7. Scientific to Common Swap       |
|-----|
| 8. Exit Application                |
|-----|
*****
Choose a task to complete, choose 0 to exit application: 3

Sort took: 1114 ticks
Would you like to see the new list? (Y/N)

```

- After the task is completed, the program will display the time it took to complete the task in ticks.
- Some tasks manipulate the information within the data set. After the completion of these tasks, the program will ask you if you would like to view the new list. You as the user are required to enter either “y” or “n” in response to the prompt. The program will automatically capitalize the characters you enter for its use.

Choose a task to complete, choose 0 to exit application: 3

Sort took: 1114 ticks

Would you like to see the new list? (Y/N) y

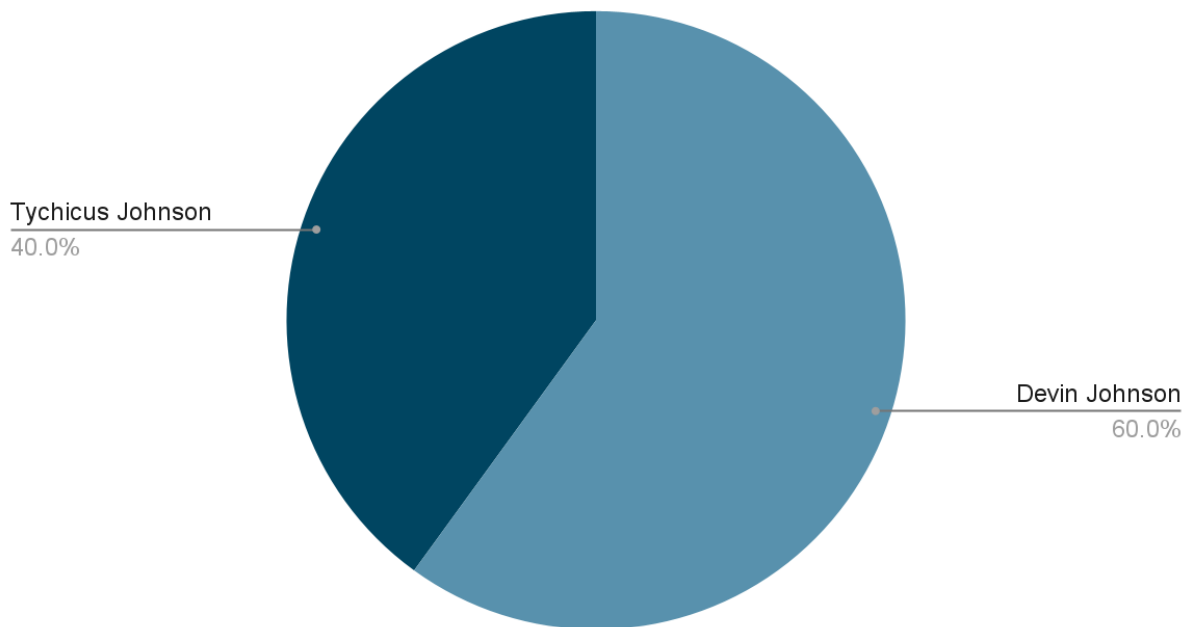
ord	Status	Species ID	Occurrence	Park Name	Nativeness	Category	Abundance	Order	Family	Scientific Name	Conservation Status	Common Name	Rec
1.	ACAD-1893	Approved	Not Confirmed	Acadia National Park	Native	Mammal	Carnivora	Canidae	Canis lupus	Eastern Timber Wolf; Gray Wolf; Timber Wolf			
2.	ACAD-1895	Native	Not Confirmed	Acadia National Park	Native	Mammal	Carnivora	Felidae	Lynx canadensis	Canada Lynx	Approved	Not Conf	
3.	ACAD-1896	Not Present (Historical Report)	Not Present (Historical Report)	Acadia National Park	Not Native	Mammal	Carnivora	Felidae	Lynx rufus	Bay Lynx; Bobcat; Red Lynx; Wild Cat	Approved	Not Conf	
4.	ACAD-1907	Approved	Not Present (Historical Report)	Acadia National Park	Native	Mammal	Carnivora	Mephitidae	Mephitis mephitis	Eastern Skunk; Polecat; Striped Skunk			
5.	ACAD-1910	Unknown	Not Present (Historical Report)	Acadia National Park	Native	Mammal	Carnivora	Mustelidae	Mustela	Weasel	In Review	Not Confirmed	
6.	ACAD-1913	Approved	Not Confirmed	Acadia National Park	Native	Mammal	Carnivora	Mustelidae	Mustela macrodon	Ancient Sea Mink; Big Sea Mink; Sea Mi			
7.	ACAD-1915	Not Native	Not Confirmed	Acadia National Park	Native	Mammal	Carnivora	Odobenidae	Odobenus rosmarus	Walrus	Approved	Not Conf	
8.	ACAD-1916	Confirmed	Not Native	Acadia National Park	Native	Mammal	Carnivora	Phocidae	Halichoerus grypus	Gray Seal	Approved	Not	
9.	ACAD-1917	Confirmed	Native	Acadia National Park	Native	Mammal	Carnivora	Phocidae	Phoca vitulina	Common Seal; Hair Seal; Harbor Seal			
10.	ACAD-1925	Approved	Not Confirmed	Acadia National Park	Native	Mammal	Chiroptera	Vespertilionidae	Myotis leibii	Eastern Small-Footed Myotis; Small-Footed			
11.	ACAD-1927	Approved	Not Present (Historical Report)	Acadia National Park	Native	Mammal	Chiroptera	Vespertilionidae	Pipistrellus subflavus	Eastern Pipistrelle; Northern Geor			
12.	ACAD-1931	Approved	Not Present (False Report)	Acadia National Park	Not Native	Mammal	Rodentia	Cricetidae	Microtus pennsylvanicus	Field Mouse; Meadow Mouse; Meadow			
13.	ACAD-1932	Approved	Not Present (Historical Report)	Acadia National Park	Native	Mammal	Rodentia	Cricetidae	Ondatra zibethicus	Common Muskrat; Muskrat; Musquash; Wat			
14.	ACAD-1939	Approved	Not Present (Historical Report)	Acadia National Park	Native	Mammal	Rodentia	Muridae	Mus musculus	House Mouse	Approved	Not Present	
15.	ACAD-1940	Not Confirmed	Not Native	Acadia National Park	Native	Mammal	Rodentia	Muridae	Rattus norvegicus	Brown Rat; Norway Rat	Approved		
16.	ACAD-1941	Not Native	Not Confirmed	Acadia National Park	Native	Mammal	Rodentia	Sciuridae	Glaucomys	Glaucomys Sp.	In Review	Not Confir	
17.	ACAD-1943	Not Native	Not Confirmed	Acadia National Park	Native	Mammal	Rodentia	Sciuridae	Glaucomys volans	Southern Flying Squirrel	Approved		
18.	ACAD-1954	Not Confirmed	Not Native	Acadia National Park	Native	Mammal	Soricomorpha	Talpidae	Parascapops breweri	Brewer's Mole; Hairy-Tailed Mole			

- After printing the new list, the program will ask you if you would like the program to execute another task. You will need to enter “y” or “n” as a response. If “n” is entered the program will end. If “y” is entered, the program will prompt you to enter a number just like in the beginning.

```
Task completed. Would you like to choose another task?(Y/N) n
Application Closed
> 
```

Division of Duties:

### Points scored



- Devin Johnson and Tychicus Johnson worked together to establish the dynamic array and its core functions
- Devin Johnson did three out of the five group functions required
- Devin Johnson helped Tychicus Johnson complete the last two group functions
- Tychicus Johnson completed his own individual functions

- Devin Johnson completed his own individual functions and included an extra function as well