4-2 Milestone 3

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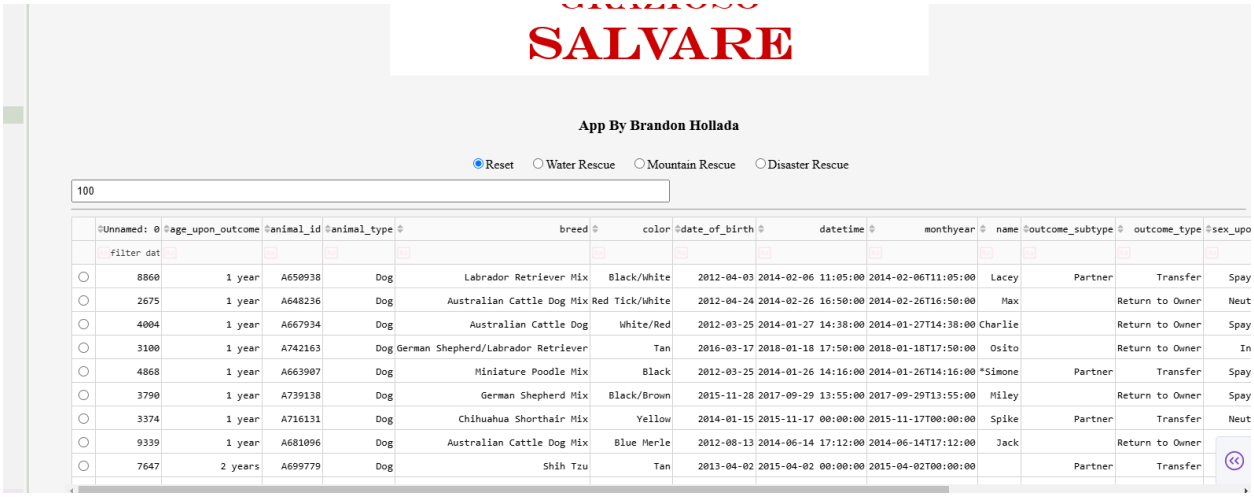
Submitted to Neil Kalinowski

For artifact two I chose to use the final from CS340. The goal of the original project was to have a program that would authenticate the user and interact with a MongoDB. The program would read in information from a database that stored animal shelter animals with their associated details. The information would be displayed in an application that could be used to filter results, see where the animal was found, and find potential rescue animals. The reason that I found this to be an ideal choice for showing my improvements in algorithms and data structures is because of the design revolving around sorting. While practicing for interviews, I found that within algorithms and data structures, bigO time complexity is huge focus of this area. So, with the main function of the program to be able to sort and search, this seemed like a great place to show my understanding of bigO time complexities and how to apply it to real solutions. Looking at CS340, I found that the search for common rescue animals could be optimized. It is one that is called on for a constant set of parameters. Because of this consistent set of parameters, the results could be precomputed and recalled for future searches. This means that instead of every search having a complexity of O(n), which means it has to search through every row each search, the complexity could be reduced. The first search through the database would require O(n) but repeat searches would only require O(1) as they are only pulling up the already known list of search results. I think this shows I have an understanding and ability to apply one of the most important

concepts of algorithms and data structures. So, this made it an easy decision to include this artifact.

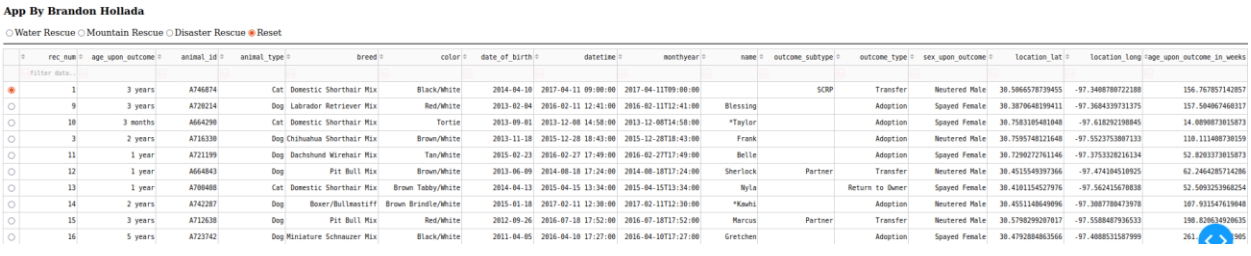
Outside of that main enhancement, I made some visual improvements to the program by formatting it in an easier to read manner. I also added the ability to search for an age range or name that would return close results. The results were based on a formula that would determine if a match was close to the user's input. Other improvements I added were to clean up some areas of the code by removing unused code, removing potential errors with incorrect search fields, and adding descriptive comments to the new code. One of the areas I fell short in was being able to store search results to be able to go back to previous searches. While working on this, I felt it was an addition that did not add much into showing my abilities for this section. Some other modification that I made was to make the program run standalone instead of through Jupyter notebook. I did this by making it run through standard dash instead. This was one of the biggest challenges that I had, trying to get the program to run outside of the school virtual machines that were setup for this program. I tried to get it to work through the web version of Jupyter but decided it would be better if the user could run it without relying on a web version of a program. The other area that I modified was having the program directly access the .csv file instead of going through mongoDB. The reason for this is that the future modifications that I want to make to this is to have it run through an SQL database. So, it seemed like it would have been unproductive to get it to work with MongoDB and have to change it in the future. While I think that I have some areas I can still improve in this artifact, I think that this does a good job of showing my abilities in the area.

Below shows the program running off dash with direct access to the csv file. This shows a similar layout with so visual improvement and a search result for 100 week old giving both 1 year and 2 year old animals. This range is determined by the algorithm provided in the code.



	Unnamed: 0	age_upon_outcome	animal_id	animal_type	breed	color	date_of_birth	datetime	monthyear	name	outcome_subtype	outcome_type	sex_upo
	filter dat												
○	8860	1 year	A650938	Dog	Labrador Retriever Mix	Black/White	2012-04-03	2014-02-06 11:05:00	2014-02-06T11:05:00	Lacey	Partner	Transfer	Spay
○	2675	1 year	A648236	Dog	Australian Cattle Dog Mix	Red Tick/White	2012-04-24	2014-02-26 16:50:00	2014-02-26T16:50:00	Max		Return to Owner	Neut
○	4004	1 year	A667934	Dog	Australian Cattle Dog	White/Red	2012-03-25	2014-01-27 14:38:00	2014-01-27T14:38:00	Charlie		Return to Owner	Spay
○	3100	1 year	A742163	Dog	German Shepherd/Labrador Retriever	Tan	2016-03-17	2018-01-18 17:50:00	2018-01-18T17:50:00	Osito		Return to Owner	In
○	4868	1 year	A663907	Dog	Miniature Poodle Mix	Black	2012-03-25	2014-01-26 14:16:00	2014-01-26T14:16:00	*Simone	Partner	Transfer	Spay
○	3790	1 year	A739138	Dog	German Shepherd Mix	Black/Brown	2015-11-28	2017-09-29 13:55:00	2017-09-29T13:55:00	Miley		Return to Owner	Spay
○	3374	1 year	A716131	Dog	Chihuahua Shorthair Mix	Yellow	2014-01-15	2015-11-17 00:00:00	2015-11-17T00:00:00	Spike	Partner	Transfer	Neut
○	9339	1 year	A681096	Dog	Australian Cattle Dog Mix	Blue Merle	2012-08-13	2014-06-14 17:12:00	2014-06-14T17:12:00	Jack		Return to Owner	
○	7647	2 years	A699779	Dog	Shih Tzu	Tan	2013-04-02	2015-04-02 00:00:00	2015-04-02T00:00:00		Partner	Transfer	

Below is the original, similar in design but functioning differently in the background.



	rec_num	age_upon_outcome	animal_id	animal_type	breed	color	date_of_birth	datetime	monthyear	name	outcome_subtype	outcome_type	sex_upon_outcome	location_lat	location_long	age_upon_outcome_in_weeks
	filter data...															
◉	1	3 years	A746874	Cat	Domestic Shorthair Mix	Black/White	2014-04-10	2017-04-11 09:00:00	2017-04-11T09:00:00		SCRP	Transfer	Neutered Male	30.5866578739455	-97.3408780722188	156.76785714285
○	9	3 years	A720214	Dog	Labrador Retriever Mix	Red/White	2013-02-04	2016-02-11 12:41:00	2016-02-11T12:41:00	Blessing		Adoption	Spayed Female	30.3870648199411	-97.3684339731375	157.504067468317
○	10	3 months	A664290	Cat	Domestic Shorthair Mix	Tortie	2013-09-01	2013-12-08 14:58:00	2013-12-08T14:58:00	*Taylor		Adoption	Spayed Female	30.7583105481048	-97.618292198845	14.0890873015873
○	3	2 years	A716330	Dog	Chihuahua Shorthair Mix	Brown/White	2013-11-18	2015-12-28 18:43:00	2015-12-28T18:43:00	Frank		Adoption	Neutered Male	30.7595748121648	-97.5523753807133	110.111408730159
○	11	1 year	A721199	Dog	Dachshund Wirehair Mix	Tan/White	2015-02-23	2016-02-27 17:49:00	2016-02-27T17:49:00	Belle		Adoption	Spayed Female	30.7290272761146	-97.3753328216134	52.8203373015873
○	12	1 year	A664843	Dog	Pit Bull Mix	Brown/White	2013-06-09	2014-08-18 17:24:00	2014-08-18T17:24:00	Sherlock	Partner	Transfer	Neutered Male	30.4515549397366	-97.474184510925	62.2464285714286
○	13	1 year	A700488	Cat	Domestic Shorthair Mix	Brown Tabby/White	2014-04-13	2015-04-15 13:34:00	2015-04-15T13:34:00	Nyla		Return to Owner	Spayed Female	30.4101154527976	-97.562415670838	52.5093253968254
○	14	2 years	A742287	Dog	Boxer/Bullmastiff	Brown Brindle/White	2015-01-18	2017-02-11 12:30:00	2017-02-11T12:30:00	*Kawhi		Adoption	Neutered Male	30.4551148649096	-97.3087780473978	107.931547619048
○	15	3 years	A712638	Dog	Pit Bull Mix	Red/White	2012-09-26	2016-07-18 17:52:00	2016-07-18T17:52:00	Marcus	Partner	Transfer	Neutered Male	30.5798299287017	-97.5588487936533	198.820634920635
○	16	5 years	A723742	Dog	Miniature Schnauzer Mix	Black/White	2011-04-05	2016-04-10 17:27:00	2016-04-10T17:27:00	Gretchen		Adoption	Spayed Female	30.4792884863566	-97.4088531587999	261.[illegible]905