CS 490DB
Assignment # 6

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I. Description

This document is a write-up for assignment 6 in CS 490DB – Applications in Natural Sciences. In this assignment, we have been asked to take raw data from the CDC's list of "parasites of public health concern" [2] and perform the following operations in a python program:

- read the raw data from a plain-text file into python
- parse out the individual parasites from this raw data using a list comprehension
- assign each parasite a number and a random "type" like a Pokemon
- write the parasites out to a CSV in the following format: *number, name, type*

While it was not required, I have decided to include exception handling on writing the CSV file because this tends to be the portion of the code that is most likely to fail given permissions issues.

II. User Interaction

This is a command-line application with minimal user interaction. To use the program, a user only needs to write invoke the python3 interpreter as shown in Fig. 1.

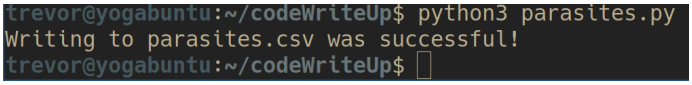

Fig. 1. Basic User Interaction

If the program has run successfully, the user will receive the message *"Writing to parasites.csv was successful!"*. However, if the program has not run successfully, the user will receive the message *"The following error occurred: "* followed by the specific exception as shown in Fig. 2.

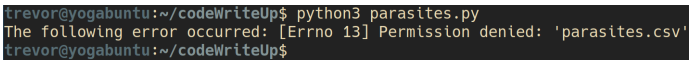

Fig. 2. Writing to CSV has failed

III. Known Issues and Limitations

For some reason the program seems to put quotation marks around some of the parasite names and not around others. There should be no quotation marks around names other than "crabs" as it is the common nick-name for a parasite. Otherwise, the program meets all of the criteria listed so long as the text file is present in the same directory as the program and is not edited from its given state.

APPENDIX A
ANSWERS TO ASSIGNMENT QUESTIONS

1) *Q: Explain how a list comprehension works.*
A: A list comprehension is analogous to a "set builder" in mathematics whereby a list of output elements is constructed from a collection of input elements (called the iterator) given some condition [4]. For example:

```
numbers = [1, 2, 3, 4, 5]
squares = [number**2 for number in numbers if number > 2]
print(squares)
```

output:

```
[9, 16, 25]
```

As illustrated above, the comprehension will take a number from the list "numbers" if that number is greater than 2 and add the square of that number to the list "squares".

2) *Q: What is the meaning of life, the universe and everything?*
A: While the generally accepted answer is "42" as per author Douglas Adams [1], Dr. Jordan Peterson argues that the meaning of life is to be found in the adoption of responsibility [3].

3) *Q: What is your favorite sorting algorithm?*
A: Merge Sort

APPENDIX B
PARASITES.PY

```
#!/usr/bin/env python

"""
This program takes a raw dump of the CDC's list of parasite names and parses
it. It then assigns a random type to each parasite (like pokemon) and
generates a pokedex style CSV file.
"""

import csv
import random

__filename__ = "parasites.py"
__author__ = "Trevor Michael Tomesh"
__copyright__ = "Copyright 2019, Trevor M. Tomesh"
__credits__ = "Trevor M. Tomesh"
__license__ = "GPL"
__version__ = "0.0.1"
__maintainer__ = "Trevor M. Tomesh"
__email__ = "tmtomesh@gmail.com"


def main():
    f = open("parasites.txt", "r")

    # The following list comprehension strips off new-lines
    # excludes category headers and 'Back To Top' string
    rawBugs = [bug.rstrip('\n') for bug in f.readlines()
               if len(bug) > 2 and "Back To Top" not in bug]
    f.close()

    writeBugs = getTypes(rawBugs)
    writeCSV(writeBugs)


def writeCSV(bugs):
    """Try to open new or existing CSV file and write bugs."""
    try:
        with open('parasites.csv', 'w') as writeFile:
            writer = csv.writer(writeFile)
            writer.writerows(bugs)
        print("Writing to " + str(writeFile.name) + " was successful!")
        writeFile.close()

    except Exception as exp:
        print("The following error occurred: " + str(exp))


def getTypes(parasites):
    """Take parasites and assign a type to them -- like in pokemon! Then
    return the list of parasites."""
    bugsOut = []
    for i in range(len(parasites)):
        bugsOut.append([i+1, parasites[i],
                        random.choice(["fire", "water", "grass"])])
    return bugsOut


main()
```

APPENDIX C
PARASITES.TXT

A
Acanthamoeba Infection

Acanthamoeba Keratitis Infection

African Sleeping Sickness (African trypanosomiasis)

Alveolar Echinococcosis (Echinococcosis, Hydatid Disease)

Amebiasis (Entamoeba histolytica Infection)

American Trypanosomiasis (Chagas Disease)

Ancylostomiasis (Hookworm)

Angiostrongyliasis (Angiostrongylus Infection)

Anisakiasis (Anisakis Infection, Pseudoterranova Infection)

Ascariasis (Ascaris Infection, Intestinal Roundworms)

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B
Babesiosis (Babesia Infection)

Balantidiasis (Balantidium Infection)

Balamuthia

Baylisascariasis (Baylisascaris Infection, Raccoon Roundworm)

Bed Bugs

Bilharzia (Schistosomiasis)

Blastocystis hominis Infection

Body Lice Infestation (Pediculosis)

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C
Capillariasis (Capillaria Infection)

Cercarial Dermatitis (Swimmer s Itch)

Chagas Disease (American Trypanosomiasis)

Chilomastix mesnili Infection (Nonpathogenic [Harmless] Intestinal Protozoa)

Clonorchiasis (Clonorchis Infection)

CLM (Cutaneous Larva Migrans, Ancylostomiasis, Hookworm)

Crabs (Pubic Lice)

Cryptosporidiosis (Cryptosporidium Infection)

Cutaneous Larva Migrans (CLM, Ancylostomiasis, Hookworm)

Cyclosporiasis (Cyclospora Infection)

Cysticercosis (Neurocysticercosis)

Cystoisospora Infection (Cystoisosporiasis) formerly Isospora Infection

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D

Dientamoeba fragilis Infection

Diphyllobothriasis (Diphyllobothrium Infection)

Dipylidium caninum Infection (dog or cat tapeworm infection)

Dirofilariasis (Dirofilaria Infection)

DPDx

Dracunculiasis (Guinea Worm Disease)

Drinking Water

Dog tapeworm (Dipylidium caninum Infection)

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E

Echinococcosis (Cystic, Alveolar Hydatid Disease)

Elephantiasis (Filariasis, Lymphatic Filariasis)

Endolimax nana Infection (Nonpathogenic [Harmless] Intestinal Protozoa)

Entamoeba coli Infection (Nonpathogenic [Harmless] Intestinal Protozoa)

Entamoeba dispar Infection (Nonpathogenic [Harmless] Intestinal Protozoa)

Entamoeba hartmanni Infection (Nonpathogenic [Harmless] Intestinal Protozoa)

Entamoeba histolytica Infection (Amebiasis)

Entamoeba polecki

Enterobiasis (Pinworm Infection)

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F

Fascioliasis (Fasciola Infection)

Fasciolopsiasis (Fasciolopsis Infection)

Filariasis (Lymphatic Filariasis, Elephantiasis)

Foodborne Diseases

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G

Giardiasis (Giardia Infection)

Gnathostomiasis (Gnathostoma Infection)

Guinea Worm Disease (Dracunculiasis)

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H

Head Lice Infestation (Pediculosis)

Heterophyiasis (Heterophyes Infection)

Hookworm Infection, Human

Hookworm Infection, Zoonotic (Ancylostomiasis, Cutaneous Larva Migrans [CLM])

Hydatid Disease (Cystic, Alveolar Echinococcosis)

Hymenolepiasis (Hymenolepis Infection)

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I

Intestinal Roundworms (Ascariasis, Ascaris Infection)

Iodamoeba buetschlii Infection (Nonpathogenic [Harmless] Intestinal Protozoa)

Isospora Infection (see Cystoisospora Infection)

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K

Kala-azar (Leishmaniasis, Leishmania Infection)

Keratitis (Acanthamoeba Infection)

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L

Leishmaniasis (Kala-azar, Leishmania Infection)

Lice Infestation (Body, Head, or Pubic Lice, Pediculosis, Pthiriasis)

Liver Flukes (Clonorchiasis, Opisthorchiasis, Fascioliasis)

Loiasis (Loa loa Infection)

Lymphatic filariasis (Filariasis, Elephantiasis)

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M

Malaria (Plasmodium Infection)

Microsporidiosis (Microsporidia Infection)

Mite Infestation (Scabies)

Myiasis

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N

Naegleria Infection

Neurocysticercosis (Cysticercosis)

Neglected Parasitic Infections in the U.S.

Neglected Tropical Diseases

Nonpathogenic (Harmless) Intestinal Protozoa

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O

Ocular Larva Migrans (Toxocariasis, Toxocara Infection, Visceral Larva Migrans)

Onchocerciasis (River Blindness)

Opisthorchiasis (Opisthorchis Infection)

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P

Paragonimiasis (Paragonimus Infection)

Pediculosis (Head or Body Lice Infestation)

Pthiriasis (Pubic Lice Infestation)

Pinworm Infection (Enterobiasis)

Plasmodium Infection (Malaria)

Pneumocystis jirovecii Pneumonia

Pseudoterranova Infection (Anisakiasis, Anisakis Infection)

Pubic Lice Infestation (Crabs , Pthiriasis)

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R

Raccoon Roundworm Infection (Baylisascariasis, Baylisascaris Infection)

Recreational Water

River Blindness (Onchocerciasis)

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S

Sappinia

Sarcocystosis (Sarcocystosis Infection)

Scabies

Schistosomiasis (Bilharzia)

Sleeping Sickness (Trypanosomiasis, African; African Sleeping Sickness)

Soil−transmitted Helminths

Strongyloidiasis (Strongyloides Infection)

Swimmer s Itch (Cercarial Dermatitis)

Swimming Pools

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T

Taeniasis (Taenia Infection, Tapeworm Infection)

Tapeworm Infection (Taeniasis, Taenia Infection)

Toxocariasis (Toxocara Infection, Ocular Larva Migrans, Visceral Larva Migrans)

Toxoplasmosis (Toxoplasma Infection)

Trichinellosis (Trichinosis)

Trichinosis (Trichinellosis)

Trichomoniasis (Trichomonas Infection)

Trichuriasis (Whipworm Infection, Trichuris Infection)

Trypanosomiasis, African (African Sleeping Sickness, Sleeping Sickness)

Trypanosomiasis, American (Chagas Disease)

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V
Visceral Larva Migrans (Toxocariasis, Toxocara Infection, Ocular Larva Migrans)

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W
Waterborne Diseases

Whipworm Infection (Trichuriasis, Trichuris Infection)

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Z
Zoonotic Diseases (Diseases spread from animals to people)

Zoonotic Hookworm Infection (Ancylostomiasis, Cutaneous Larva Migrans [CLM])

Listing 1. The raw input for the assignment

APPENDIX D

PARASITES.CSV

```
1,Acanthamoeba Infection,grass
2,Acanthamoeba Keratitis Infection,grass
3,African Sleeping Sickness (African trypanosomiasis),grass
4,"Alveolar Echinococcosis (Echinococcosis, Hydatid Disease)",fire
5,Amebiasis (Entamoeba histolytica Infection),fire
6,American Trypanosomiasis (Chagas Disease),water
7,Ancylostomiasis (Hookworm),grass
8,Angiostrongyliasis (Angiostrongylus Infection),fire
9,"Anisakiasis (Anisakis Infection, Pseudoterranova Infection)",water
10,"Ascariasis (Ascaris Infection, Intestinal Roundworms)",grass
11,Babesiosis (Babesia Infection),water
12,Balantidiasis (Balantidium Infection),water
13,Balamuthia,fire
14,"Baylisascariasis (Baylisascaris Infection, Raccoon Roundworm)",grass
15,Bed Bugs,grass
16,Bilharzia (Schistosomiasis),grass
17,Blastocystis hominis Infection,water
18,Body Lice Infestation (Pediculosis),water
19,Capillariasis (Capillaria Infection),water
20,Cercarial Dermatitis (Swimmer s Itch),water
21,Chagas Disease (American Trypanosomiasis),fire
22,Chilomastix mesnili Infection (Nonpathogenic [Harmless] Intestinal Protozoa),water
23,Clonorchiasis (Clonorchis Infection),water
24,"CLM (Cutaneous Larva Migrans, Ancylostomiasis, Hookworm)",grass
25,  C r a b s   (Pubic Lice),water
26,Cryptosporidiosis (Cryptosporidium Infection),water
27,"Cutaneous Larva Migrans (CLM, Ancylostomiasis, Hookworm)",grass
28,Cyclosporiasis (Cyclospora Infection),fire
29,Cysticercosis (Neurocysticercosis),fire
30,Cystoisospora Infection (Cystoisosporiasis) formerly Isospora Infection,fire
31,Dientamoeba fragilis Infection,water
32,Diphyllobothriasis (Diphyllobothrium Infection),grass
33,Dipylidium caninum Infection (dog or cat tapeworm infection),water
34,Dirofilariasis (Dirofilaria Infection),water
35,DPDx,water
36,Dracunculiasis (Guinea Worm Disease),water
37,Drinking Water,fire
38,Dog tapeworm (Dipylidium caninum Infection),grass
39,"Echinococcosis (Cystic, Alveolar Hydatid Disease)",water
40,"Elephantiasis (Filariasis, Lymphatic Filariasis)",fire
41,Endolimax nana Infection (Nonpathogenic [Harmless] Intestinal Protozoa),water
42,Entamoeba coli Infection (Nonpathogenic [Harmless] Intestinal Protozoa),fire
43,Entamoeba dispar Infection (Nonpathogenic [Harmless] Intestinal Protozoa),fire
44,Entamoeba hartmanni Infection (Nonpathogenic [Harmless] Intestinal Protozoa),fire
45,Entamoeba histolytica Infection (Amebiasis),water
46,Entamoeba polecki,fire
47,Enterobiasis (Pinworm Infection),water
48,Fascioliasis (Fasciola Infection),fire
49,Fasciolopsiasis (Fasciolopsis Infection),fire
50,"Filariasis (Lymphatic Filariasis, Elephantiasis)",fire
51,Foodborne Diseases,grass
52,Giardiasis (Giardia Infection),grass
53,Gnathostomiasis (Gnathostoma Infection),grass
54,Guinea Worm Disease (Dracunculiasis),fire
55,Head Lice Infestation (Pediculosis),grass
56,Heterophyiasis (Heterophyes Infection),fire
57,"Hookworm Infection, Human",fire
58,"Hookworm Infection, Zoonotic (Ancylostomiasis, Cutaneous Larva Migrans [CLM])",water
59,"Hydatid Disease (Cystic, Alveolar Echinococcosis)",grass
60,Hymenolepiasis (Hymenolepis Infection),water
61,"Intestinal Roundworms (Ascariasis, Ascaris Infection)",water
62,Iodamoeba buetschlii Infection (Nonpathogenic [Harmless] Intestinal Protozoa),grass
63,Isospora Infection (see Cystoisospora Infection ),water
64,"Kala-azar (Leishmaniasis, Leishmania Infection)",fire
65,Keratitis (Acanthamoeba Infection),water
66,"Leishmaniasis (Kala-azar, Leishmania Infection)",fire
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67,"Lice Infestation (Body, Head, or Pubic Lice, Pediculosis, Pthiriasis)",water
68,"Liver Flukes (Clonorchiasis, Opisthorchiasis, Fascioliasis)",fire
69,Loiasis (Loa loa Infection),grass
70,"Lymphatic filariasis (Filariasis, Elephantiasis)",fire
71,Malaria (Plasmodium Infection),fire
72,Microsporidiosis (Microsporidia Infection ),fire
73,Mite Infestation (Scabies),grass
74,Myiasis,fire
75,Naegleria Infection,fire
76,Neurocysticercosis (Cysticercosis),water
77,Neglected Parasitic Infections in the U.S.,grass
78,Neglected Tropical Diseases,fire
79,Nonpathogenic (Harmless) Intestinal Protozoa,grass
80,"Ocular Larva Migrans (Toxocariasis, Toxocara Infection, Visceral Larva Migrans)",fire
81,Onchocerciasis (River Blindness),fire
82,Opisthorchiasis (Opisthorchis Infection),grass
83,Paragonimiasis (Paragonimus Infection),grass
84,Pediculosis (Head or Body Lice Infestation),water
85,Pthiriasis (Pubic Lice Infestation),water
86,Pinworm Infection (Enterobiasis),grass
87,Plasmodium Infection (Malaria),water
88,Pneumocystis jirovecii Pneumonia,water
89,"Pseudoterranova Infection (Anisakiasis, Anisakis Infection)",water
90,"Pubic Lice Infestation ( C r a b s ,    Pthiriasis)",fire
91,"Raccoon Roundworm Infection (Baylisascariasis, Baylisascaris Infection)",grass
92,Recreational Water,grass
93,River Blindness (Onchocerciasis),water
94,Sappinia,fire
95,Sarcocystosis (Sarcocystosis Infection),grass
96,Scabies,grass
97,Schistosomiasis (Bilharzia),grass
98,"Sleeping Sickness (Trypanosomiasis, African; African Sleeping Sickness)",fire
99,Soil-transmitted Helminths,fire
100,Strongyloidiasis (Strongyloides Infection),fire
101,S w i m m e r s  Itch (Cercarial Dermatitis),fire
102,Swimming Pools,water
103,"Taeniasis (Taenia Infection, Tapeworm Infection)",water
104,"Tapeworm Infection (Taeniasis, Taenia Infection)",grass
105,"Toxocariasis (Toxocara Infection, Ocular Larva Migrans, Visceral Larva Migrans)",grass
106,Toxoplasmosis (Toxoplasma Infection),water
107,Trichinellosis (Trichinosis),water
108,Trichinosis (Trichinellosis),water
109,Trichomoniasis (Trichomonas Infection),grass
110,"Trichuriasis (Whipworm Infection, Trichuris Infection)",fire
111,"Trypanosomiasis, African (African Sleeping Sickness, Sleeping Sickness)",fire
112,"Trypanosomiasis, American (Chagas Disease)",grass
113,"Visceral Larva Migrans (Toxocariasis, Toxocara Infection, Ocular Larva Migrans)",water
114,Waterborne Diseases,grass
115,"Whipworm Infection (Trichuriasis, Trichuris Infection)",water
116,Zoonotic Diseases (Diseases spread from animals to people),fire
117,"Zoonotic Hookworm Infection (Ancylostomiasis, Cutaneous Larva Migrans [CLM])",fire
```

Listing 2. The output for this assignment

REFERENCES

[1] Adams, Douglas, 1952-2001. (1980). *The hitchhiker's guide to the galaxy.* New York :Harmony Books

[2] CDC - DPDx - *Parasites A-Z Index.* (2019). Retrieved 20 October 2019, from https://www.cdc.gov/dpdx/az.html

[3] Lott, T. (2019). Jordan Peterson: The pursuit of happiness is a pointless goal. Retrieved 20 October 2019, from https://www.theguardian.com/global/2018/jan/21/jordan-peterson-self-help-author-12-steps-interview

[4] Yordanov, V. (2019). *Python Basics: List Comprehensions.* Retrieved 20 October 2019, from https://towardsdatascience.com/python-basics-list-comprehensions-631278f22c40