2022S CSCE311 Homework 1:

Due 11:59PM, February 18, 2022 (Friday)

50 Points in total

Please work with your teammates on the following tasks and list their name here.

Aime Christian Tuyishime

1. +12 (Data Type) What data type is each of the following?

|  |  |
| --- | --- |
| 5 int |  |
| 5.0 float |  |
| 5 > 1 boolean |  |
| '5' string |  |
| 5 \* 2 int |  |
| '5' \* 2 string |  |
| '5' + '2' string |  |
| 5 / 2 float |  |
| 5 // 2 int |  |
| [5, 2, 1] list |  |
| 5 in [1, 4, 6] boolean |  |
| math.pi float |  |

2. +8 (ADT) Implement your own list class myList that behaves like class list except that:

• The addition (+) operator returns the sum of the lengths of the two lists (instead of

the concatenation).

• The multiplication (\*) operator returns the product of the lengths of the two lists.

The two operands, for both operators, are assumed to be lists.

>>> a=['h’, ‘e’, ‘l’, ‘l’, ‘o']

>>> x = myList(a)

>>> x + 'universe'

13

>>> x \* 'universe'

40

1. +10 (Data Structure) The mirror image of string vow is string wov, and the mirror image wood is string boow. The mirror image of string bed cannot be represented as a string, however, because the mirror image of e is not a valid character.

Develop function mirror() that takes a string and returns its mirror image but only if the mirror image can be represented using letters in the alphabet.

>>> mirror('vow')

'wov'

>>> mirror('wood')

'boow'

>>> mirror('bed')

'INVALID'

1. +20 (2D-array) Complete the program for playing Game of life.
2. Implement the function numLiveNeighbors() in life.py
3. Implement the function draw() in gameoflife.py
4. Run the program and copy paste the output here

[0, 0, 0, 0, 0]

[0, 1, 1, 0, 0]

[0, 0, 1, 0, 0]

[0, 0, 1, 0, 0]

[0, 0, 0, 0, 0]

[0, 0, 0, 0, 0]

[0, 1, 1, 0, 0]

[0, 0, 1, 1, 0]

[0, 0, 0, 0, 0]

[0, 0, 0, 0, 0]

[0, 0, 0, 0, 0]

[0, 1, 1, 1, 0]

[0, 1, 1, 1, 0]

[0, 0, 0, 0, 0]

[0, 0, 0, 0, 0]

[0, 0, 1, 0, 0]

[0, 1, 0, 1, 0]

[0, 1, 0, 1, 0]

[0, 0, 1, 0, 0]

[0, 0, 0, 0, 0]

[0, 0, 1, 0, 0]

[0, 1, 0, 1, 0]

[0, 1, 0, 1, 0]

[0, 0, 1, 0, 0]

[0, 0, 0, 0, 0]

[0, 0, 1, 0, 0]

[0, 1, 0, 1, 0]

[0, 1, 0, 1, 0]

[0, 0, 1, 0, 0]

[0, 0, 0, 0, 0]

[0, 0, 1, 0, 0]

[0, 1, 0, 1, 0]

[0, 1, 0, 1, 0]

[0, 0, 1, 0, 0]

[0, 0, 0, 0, 0]

[0, 0, 1, 0, 0]

[0, 1, 0, 1, 0]

[0, 1, 0, 1, 0]

[0, 0, 1, 0, 0]

[0, 0, 0, 0, 0]

[0, 0, 1, 0, 0]

[0, 1, 0, 1, 0]

[0, 1, 0, 1, 0]

[0, 0, 1, 0, 0]

[0, 0, 0, 0, 0]

1. If the grid size can be specified as n\*n, the size of INIT\_CONFIG is k, what the worst case running time of this gameoflife program O( )?

O