CS206A Data Structure

Project2

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Part Ⅰ.

```
Are you a mammal?[Y or N]
Y
Are you bigger than a cat?[Y or N]
Y
My guess is Kangaroo Am I right? [Y or N]
N
I give up. What are you?
dog
Please type yes/no question that will distinguish a dog from a Kangaroo
Your question :  is it dog?
As adog, is it dog?Please answer [Y or N]
Y
shall we play again? [Y or N]
Y
Are you a mammal?[Y or N]
Y
Are you bigger than a cat?[Y or N]
Y
is it dog?[Y or N]
Y
My guess is dog Am I right? [Y or N]
Y
The answer is correct
shall we play again? [Y or N]
```

The function order_list(file) is a function that reads the data from .txt file and change them to a list. Thus, preorder_list becomes the list that contains data in preorder traversal and postorder_list becomes the list that contains data in postorder traversal.

Variable i is index for preorder_list and variable j is index for postorder_list.

In the function AnimalGuessing(i, j, preorder_list, postorder_list), the program works interactively with the user. If the current element is a question, that the function gets an input which is "Y" or "N". And then it changes the value of i and j and redo the function AnimalGuessing.(recursion) Otherwise, if the current element is not a question, it prints the answer and gets an input(Y or N). If the input is Y, it is just correct answer. If the input is N, it gets another three inputs: new animal, new question, and new Y/N answer. According to the inputs, the function inserts the inputs in preorder_list and postorder_list and then updates the original .txt files.

Part Ⅱ.

The progress which is for reading data from the data files is in function order_list. Assume that the size of data is n. In case of preorder_list, the time complexity is O(n) because of for-loop. In case of postorder_list, the time complexity is also O(n) because of for-loop. Thus the time complexity for reading data from data files is same for both data-A and data-B.

The progress which is for storing data to the data files is in function AnimalGuessing(line34~line41/ line47~line54). Assume that the size of data is n. In case of preorder_list, the time complexity is O(n) because of for-loop. In case of postorder_list, the time complexity is also O(n) because of for-loop. Thus the time complexity for storing data to data files is same for both data-A and data-B.

Part Ⅲ.

```
"C:₩Users₩IN CHUL₩AppData₩Local₩Programs₩Python₩Python36-32₩python.exe" "C:/Users/IN CHUL/Desktop/part3/PJ2.py"
Are you a mammal?[Y or N or U]
Y
Are you bigger than a cat?[Y or N or U]
Y
My guess is Kangaroo Am I right? [Y or N or U]
U
Is the question Are you bigger than a cat? where you made a mistake? [Y or N or U]
U
Are you bigger than a cat?[Y or N or U]
Y
My guess is Kangaroo Am I right? [Y or N or U]
Y
The answer is correct
shall we play again? [Y or N]
```

```
"C:₩Users₩IN CHUL₩AppData₩Local₩Programs₩Python₩Python36-32₩python.exe" "C:/Users/IN CHUL/Desktop/part3/PJ2.py"
Are you a mammal?[Y or N or U]
Y
Are you bigger than a cat?[Y or N or U]
U
Is the question Are you a mammal? where you made a mistake? [Y or N or U]
Y
Do you live underwater?[Y or N or U]
N
My guess is Robin Am I right? [Y or N or U]
Y
The answer is correct
shall we play again? [Y or N]
```

```
"C:WUsersWIN CHULWAppDataWLocalWProgramsWPythonWPython36-32Wpython.exe" "C:/Users/IN CHUL/Desktop/part3/PJ2.py
Are you a mammal?[Y or N or U]
Y
Are you bigger than a cat?[Y or N or U]
N
My guess is Mouse Am I right? [Y or N or U]
U
Is the question Are you bigger than a cat? where you made a mistake? [Y or N or U]
N
Is the question Are you a mammal? where you made a mistake? [Y or N or U]
Y
Do you live underwater?[Y or N or U]
Y
My guess is Trout Am I right? [Y or N or U]
Y
The answer is correct
shall we play again? [Y or N]
```

The program for Part3 is updated version of the program for Part1. We added a list named treelist. The treelist is a list that stores "U", "R", or "L" according to the user's input. If the user's input chooses the left tree, "L" is appended to treelist, and if the user's input chooses the right tree, "R" is appended to treelist. If the user chooses "Undo", "U" is appended to treelist. The contents of treelist is used when the user choose to undo.

In part3, the progress for reading data from and storing data to data files is same with part1 so the time complexity is same with part2.

The progress which is for reading data from the data files is in function order_list. Assume that the size of data is n. In case of preorder_list, the time complexity is O(n) because of for-loop. In case of postorder_list, the time complexity is also O(n) because of for-loop. Thus the time complexity for reading data from data files is same for both data-A and data-B.

The progress which is for storing data to the data files is in function AnimalGuessing(line34~line41/ line47~line54). Assume that the size of data is n. In case of preorder_list, the time complexity is O(n) because of for-loop. In case of postorder_list, the time complexity is also O(n) because of for-loop. Thus the time complexity for storing data to data files is same for both data-A and data-B.

Part IV.

(1) 660 minutes

(2) 180 minutes

(3) 30 minutes

(4) 450 minutes